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REVISED REGULATIONS OF ONTARIO, 1980

VOLUME I

ENACTED BY THE LEGISLATURE OF ONTARIO



Ontario

REVISED REGULATIONS

OF

ONTARIO, 1980

A REVISION AND CONSOLIDATION OF REGULATIONS
PUBLISHED UNDER THE AUTHORITY OF
THE REGULATIONS REVISION ACT, 1979

VOLUME I

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REVISED REGULATIONS

OF

ONTARIO, 1980

THESE REGULATIONS WERE MADE BY THE
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REGULATIONS ACT, 1969

ANNEX I

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REGULATION 1

under the Abandoned Orchards Act

GENERAL

1.—(1) A certificate designating an orchard as a neglected orchard shall be in Form 1.

(2) A revocation of a certificate in Form 1 shall be in Form 2. R.R.O. 1970, Reg. 1, s. 1.

2. The trees, shrubs or vines set out in Schedule 1 are designated for the purposes of clause 8 (b) of the Act. R.R.O. 1970, Reg. 1, s. 3.

Schedule 1

- 1. Hawthorn.
- 2. Wild plum.

R.R.O. 1970, Reg. 1, Sched. 1.

Form 1

Abandoned Orchards Act

CERTIFICATE

No.
To:
(owner as shown on last revised assessment roll)
.....
(address)

Take notice that I have designated the orchard

located on
(lot or part of lot)
....., in the
(concession or plan)
of , in the
(county or district)
of as a neglected orchard
under subsection 4 (1) of the *Abandoned Orchards Act*.

.....
(Provincial Entomologist)

Dated at , this day of ,
19.....

R.R.O. 1970, Reg. 1, Form 1.

Form 2

Abandoned Orchards Act

CERTIFICATE NO. is hereby revoked.

.....
(Provincial Entomologist)

Dated at , this day of ,
19.....

R.R.O. 1970, Reg. 1, Form 2.

REGULATION 2

under the Administration of Justice Act

FEES AND EXPENSES—COURT REPORTERS

1. Court reporters who are not salaried employees of the Ministry of the Attorney General shall be paid the following fees:

1. Court Reporters—Shorthand

—per hour, \$9

—minimum, 36

2. Electronic Recording Equipment Operator and Dicta-typist

—per hour, \$7

—minimum, 28. O. Reg. 240/80, s. 1.

2.—(1) Where a court reporter who is not a salaried employee of the Ministry of the Attorney General is required in the performance of his duties to attend at a location that is not in the community in which he ordinarily resides, he shall be paid a kilometre allowance for each kilometre actually travelled one way from his residence,

(a) in northern Ontario, of 31 cents; and

(b) in southern Ontario, of 30 cents,

and he shall receive reimbursement of meal and accommodation expenses in conformity with the provisions of the Ministry of the Attorney General Manual of Administration.

(2) For the purpose of this section, the dividing line between northern Ontario and southern Ontario is as follows:

Healy Lake (Municipal) Road from Healy Lake easterly to its junction with Highway 612; Highway 612 to Highway 103; Highway 103 easterly to its junction with Highway 69; Highway 69 easterly to its junction with Highway 118; Highway 118 through Bracebridge to its junction with Highway 11; Highway 11 northerly to its junction with Highway 60 at Huntsville; Highway 60 easterly to its junction with Highway 62 at Killaloe Station; Highway 62 to Pembroke; the above-named highways to be included in southern Ontario. O. Reg. 240/80, s. 2.

3. A court reporter is entitled to the following fees for a transcript of evidence:

1. For a single copy of the evidence in an appeal for the purpose of mechanical reproduction, \$2.75 per page.

2. For copies other than a copy referred to in paragraph 1, including charges to the jury and oral judgments, other than for use in appeal books, \$2.25 per page for the first copy and 25 cents a page for each additional copy. O. Reg. 999/76, s. 10.

4. Copies of evidence ordered by a judge for his own use shall be paid for by the Province of Ontario upon the certificate of the judge. O. Reg. 999/76, s. 13.

REGULATION 3

under the Administration of Justice Act

FEES AND EXPENSES—GENERAL

1. Persons who perform the following services in connection with the administration of justice, including those categories of public servants performing such services during off-duty periods upon the approval of the respective deputy minister or his designee shall be paid the following fees:

1. Sheriff's officers and process servers—

The serving of any writ, *subpoena*, notice, pleading or other paper, for each party served, \$5.

2. Escorts—

Conveying prisoners to a penitentiary for medical examination or to another jurisdiction, or a juvenile to a training school or for medical examination,

(a) where the distance of escorting is less than eighty kilometres, one way,

per hour, \$ 6,

minimum, 20;

(b) where the distance of escorting is eighty kilometres or more, and less than two hundred kilometres one way, per escort, \$45;

(c) where the distance is more than two hundred kilometres, per escort, \$60;

(d) where the escorting occupies more than one twenty-four hour period *per diem*, \$45.

3. Municipal Police Forces—

For executing a warrant of committal for non-payment of a fine payable under section 4 of the Act to the Treasurer of Ontario or serving personally a notice of suspension of driver's licence for non-payment of a fine, for each execution or service, \$1.50. O. Reg. 239/80, s. 1.

2.—(1) Kilometre allowance for executing a warrant or serving a writ, *subpoena*, notice, pleading or other paper, where such allowance is not otherwise payable under a regulation made under the Act, for each kilometre actually travelled one way shall be,

(a) in northern Ontario, 31 cents; and

(b) in southern Ontario, 30 cents.

(2) Persons conveying prisoners to a penitentiary or another jurisdiction or escorting a juvenile to a training school shall receive reimbursement of meal and accommodation expenses in conformity with the provisions of the Ministry of the Attorney General Manual of Administration, and,

(a) where public conveyance is used, the actual travelling expenses; or

(b) where a private conveyance is used, a kilometre allowance for each kilometre actually travelled one way,

(i) in northern Ontario, of 31 cents, and

(ii) in southern Ontario, of 30 cents.

(3) For the purpose of this section, the dividing line between northern Ontario and southern Ontario is as follows:

Healy Lake (Municipal Road from Healy Lake easterly to its junction with Highway 612; Highway 612 to Highway 103; Highway 103 easterly to its junction with Highway 69; Highway 69 easterly to its junction with Highway 118; Highway 118 through Bracebridge to its junction with Highway 11; Highway 11 northerly to its junction with Highway 60 at Huntsville; Highway 60 easterly to its junction with Highway 62 at Killaloe Station; Highway 62 to Pembroke; the above-named highways to be included in southern Ontario. O. Reg. 239/80, s. 2.

REGULATION 4

under the Administration of Justice Act

FEES AND EXPENSES OF JURORS AND CROWN WITNESSES

1. A juror attending a sitting of the Supreme Court or of the court of general sessions of the peace or of the county court shall be paid a fee of \$10 for each day of service up to and including ten days and a fee of \$40 for each day of service thereafter. O. Reg. 238/80, s. 1.

2.—(1) A witness attending a trial shall be paid for each day a fee of \$6.

(2) Barristers, solicitors and legally qualified medical practitioners when called upon to give evidence in consequence of any professional service rendered by them or to give professional opinions, shall be paid for each day a fee of \$15.

(3) Engineers, accountants, surveyors, architects and other expert witnesses when called upon to give evidence in consequence of any professional service rendered by them or to give evidence depending upon their skill or judgment shall be paid for each day a fee of \$15. O. Reg. 238/80, s. 2.

3.—(1) Jurors and Crown witnesses shall be paid the following travelling and living expenses or allowances:

1. Where travelling by private automobile, 22 cents a kilometre in northern Ontario and 21 cents a kilometre in southern Ontario one way for each kilometre necessarily travelled between his place of residence and the place of trial, or, where the trial is held in the city or town in which he resides, \$1.50.

2. Where travelling by a means other than private automobile, a sum equal to the amount of the fare actually paid for the transportation from his place of residence to the place where the trial is held, and return.

3. Where required to attend the trial on more than one day and return to his place of residence at night, the travelling allowance mentioned in paragraph 1 or 2, as the case may be, is payable in respect of each day's attendance.

4. Where required to remain overnight at the place at which the trial is held, a sum equal to the amount reasonably and actually paid by him for living expenses.

(2) For the purpose of this section, the dividing line between northern and southern Ontario is as follows:

Healy Lake (Municipal) Road from Healy Lake easterly to its junction with Highway 612; Highway 612 to Highway 103; Highway 103 easterly to its junction with Highway 69; Highway 69 easterly to its junction with Highway 118; Highway 118 through Bracebridge to its junction with Highway 11; Highway 11 northerly to its junction with Highway 60 at Huntsville; Highway 60 easterly to its junction with Highway 62 at Killaloe Station; Highway 62 to Pembroke; the above-named highways to be included in southern Ontario. O. Reg. 238/80, s. 3.

REGULATION 5

under the Administration of Justice Act

FEEES AND EXPENSES—JUSTICES
OF THE PEACE

1. A justice of the peace who is not in receipt of a salary for employment in the service of the Crown in right of Ontario shall be paid the following fees:

- 1. Receiving and swearing an information:
 - i. Information portion of a summary conviction ticket or an information charging a parking by-law violation\$.50
 - ii. All other informations other than an information to obtain a search warrant 1
- 2. Swearing an affidavit including an affidavit of service50
- 3. Considering the issue of process and, where appropriate, issuing process in matters other than where the information charges a parking by-law violation:
 - i. Considering the issue of process where no process issued 1
 - ii. Considering the issue and issuing the summons and a copy 1
 - iii. Considering the issue of a warrant and issuing the warrant . 1
- 4. Considering the issue of process and, where appropriate, issuing process on an information charging a parking by-law violation including a summons and the copy thereof:
 - i. Considering the issue of process where no process issued50
 - ii. Considering the issue of process and issuing process including a summons and copy thereof50
- 5. Considering the issue and, where appropriate, issuing a warrant where a summons has been issued in the first instance:
 - i. Considering the issue of a warrant where no warrant issued 1

- ii. Considering the issue where a warrant is issued \$ 1
- 6. Considering and, where appropriate, confirming the issue of an appearance notice, promise to appear or recognizance entered into before an officer-in-charge or a summons served under section 23 of the *Provincial Offences Act*,
 - i. Considering the confirmation where the documents are not confirmed 1
 - ii. Considering the confirmation where the documents have been confirmed 1
- 7. Issuing *subpoena* (one per case) to witnesses, unless the justice of the peace or the court considers it necessary or desirable to issue more than one50
- 8. Copy of *subpoena* for a witness30
- 9.—(1) Receiving and swearing an information for a search warrant or receiving a report in writing under section 181 of the *Criminal Code* (Canada) 1
- (2) Considering the issue of a search warrant where no search warrant issued 2
- (3) Considering the issue of a search warrant and if appropriate issuing a search warrant 2
- 10. Attending to remand prisoners, adjourn show cause hearings prior to their commencement or to take undertakings without conditions or undertakings with conditions or recognizances of bail where the judicial interim release orders have already been made including the preparation and completion of all documents,
 - i. per attendance between the hours of 8.01 a.m. and 12 mid-night 10
 - ii. per attendance between the hours of 12.01 a.m. and 8.00 a.m. 20

11. Conducting one or more judicial interim release hearings including preparation of all necessary documents such as judicial interim release orders, warrants of remand, undertakings or recognizances where the accused is released immediately following the hearing and the completion of warrants of committal where the accused are not released,
 - i. for the first hour or part thereof \$30
 - ii. for each additional hour or part thereof 12
 12. Adjourning cases and setting dates for trial as assigned by a provincial judge,
 - i. for the first hour or part thereof 30
 - ii. for each additional hour or part thereof 12
 13. Carrying-out the duties of a justice of the peace under the *Provincial Offences Act*, the *Summary Convictions Act*, being chapter 450 of the Revised Statutes of Ontario, 1970 and the *Highway Traffic Act*, as assigned by a provincial judge, other than hearing and determining prosecutions, but including pleas of guilty with an explanation for each hour or part thereof 12
 14. Carrying-out the duties of a justice of the peace as assigned by a provincial judge, to hear and determine prosecutions in a provincial offences court or a summary conviction court, including pleas of guilty with an explanation, where these sittings precede the sittings designated for not guilty pleas or where the justice of the peace is assigned by the Provincial Judge to attend at a location solely for receiving pleas of guilty with an explanation,
 - i. for the first hour or part thereof 30
 - ii. for each additional hour or part thereof 12
 15. Presiding as a justice of the peace at night court sittings in the Municipality of Metropolitan Toronto in addition to regular daily duties,
 - i. for the first hour or part thereof 45
 - ii. for each additional half hour or part thereof 10
 16. Presiding as a justice of the peace as assigned by a provincial judge in the provincial offences court or as a summary conviction court at night in the Municipality of Metropolitan Toronto for the purpose of receiving pleas of guilty with an explanation and carrying out such other duties as may from time to time be assigned by a provincial judge in addition to regular daily duties, between 4 p.m. and 9 p.m.,
 - i. for the first hour or part thereof \$45
 - ii. for each additional half hour or part thereof 10
 17. Preparing a copy of a writing or certificate, or both a writing and a certificate including a conviction or order upon the request of any person, per page . 1.50
 18. Attendance to take any recognizance other than a recognizance of bail (including preparation and completion of recognizance and copies) 2
 19. Preparing a bill of costs, when made out in detail upon the request of a party to the proceedings50
 20. Receiving moneys and issuing an official receipt therefor in respect of a fine or costs, or both, on behalf of a provincial court50
 21. Attending at the direction of the sheriff for the drafting of a panel of jurors under sections 17 and 19 of the *Juries Act*, per hour 10
 22. Solemnizing a marriage 6
 23. To receiving an information and swearing the same under section 10 of the *Mental Health Act* and conducting a hearing in respect of a request for an order for examination in the prescribed form,
 - i. for the first hour or part thereof 30
 - ii. for each additional hour or part thereof 10
- O. Reg. 237/80, s. 1; O. Reg. 305/80, s. 1.
- 2.—(1) A justice of the peace who is in receipt of a salary for employment in the service of the Crown in right of Ontario, shall be paid fees as set out in section 1 and a kilometre allowance as set out in subsection 3 (1) upon a certificate of a provincial judge for services performed as a justice of the peace outside of his normal working hours.
- (2) A justice of the peace to whom subsection (1) applies shall pay to the Treasurer of Ontario all fees collected by him as a justice of the peace during normal working hours.

(3) For the purposes of this section, normal working hours shall be 7¼ hours per day, from Monday through Friday, excepting annual vacations and statutory holidays. O. Reg. 237/80, s. 2.

3.—(1) Where a justice of the peace is required in the performance of his duties, at a location that is not in the community in which he ordinarily resides, he shall be paid a travelling allowance for each kilometre actually travelled one way from his residence,

(a) in northern Ontario, of 31 cents; and

(b) in southern Ontario, of 30 cents.

(2) For the purposes of this section the dividing line between northern Ontario and southern Ontario is as follows:

Healy Lake (Municipal) Road from Healy Lake easterly to its junction with Highway 612; Highway 612 to Highway 103; Highway 103 easterly to its junction with Highway 69; Highway 69 easterly to its junction with Highway 118; Highway 118 through Bracebridge to its junction with Highway 11; Highway 11 northerly to its junction with Highway 60 at Huntsville; Highway 60 easterly to its junction with Highway 62 at Killaloe Station; Highway 62 to Pembroke; the above-named highways to be included in southern Ontario. O. Reg. 237/80, s. 3.

REGULATION 6

under the Administration of Justice Act

FEES—SHERIFFS

1. The fees set out in the Schedule are payable to sheriffs. O. Reg. 418/80, s. 1.

Schedule

FEES PAYABLE TO SHERIFFS

1. On receipt by a sheriff of any document for service on any one person, exclusive of travelling allowance \$ 8

NOTE: The above fee may be levied at the time a return is made after service or attempted service. Where more than one document in the same proceeding is served at the same time on the same person, it shall be considered as one service.

2. On the filing of any court document (or renewal thereof) under the terms of which a sheriff is liable or required to make execution 10

3. For each attempt to levy on or to execute any such document, exclusive of travelling allowance and reasonable and necessary actual disbursements:—

i. Where no sale is held by the sheriff, an additional 20

ii. Where a sale is held by the sheriff, an additional 30

iii. Executing a writ of delivery or order of replevin, an additional 50

- 4.—(1) Kilometres necessarily travelled in the county in which the service of a paper is effected, writ executed or other service performed (one way except in the case of an arrest, when mileage is both ways), per kilometre payable in advance (see the *Sheriffs Act*):

i. in northern Ontario \$.31

ii. in southern Ontario30

- (2) The dividing line between southern Ontario and northern Ontario, for the purposes hereof, is as follows:

Healy Lake (Municipal) Road from Healy Lake easterly to its junction with Highway 612; Highway 612 to Highway 103; Highway 103 easterly to its junction with Highway 69; Highway 69 easterly to its junction with Highway 118; Highway 118 through Bracebridge to its junction with Highway 11; Highway 11 northerly to its junction with Highway 60 at Huntsville; Highway 60 easterly to its junction with Highway 62 at Killaloe Station; Highway 62 to Pembroke; the above-named highways to be included in southern Ontario.

5. On a search for writs when no certificate of such is requested, per name searched 2

6. On a search for writs when a certificate of such is supplied, per name searched 2

7. On a search for writs when an abstract of such is supplied, per writ listed on same . 2

8. For the preparation by a sheriff of a schedule of distribution under the *Creditors Relief Act*, or a calculation for satisfaction of writs, per writ 4

9. Where a sheriff is directed by the court to perform any service or do any act for which no fee is provided, he may be allowed such fee as the court thinks fit, and it shall be payable as the court directs. O. Reg. 418/80, Sched.

NOTE: See section 11 of the Sheriffs Act re certificate of search for writs.

REGULATION 7

under the Administration of Justice Act

FEES—SUPREME COURT AND COUNTY COURTS

1. The fees set out in the Schedule are payable in the Supreme Court and in the County Courts. O. Reg. 417/80, s. 1.

Schedule

FEES

PAYABLE IN THE SUPREME COURT AND THE COUNTY COURTS

1. On the issue of,
 - i. a notice of petition in a matrimonial cause\$ 30
 - ii. a duplicate writ of summons 10
 - iii. a duplicate notice of petition in a matrimonial cause 10
 - iv. any other writ of summons 30
 - v. a notice to third or subsequent parties 15
 - vi. a summons to a defendant added by counterclaim 15
 - vii. notice of counter-petition to a respondent added by counter-petition in a matrimonial cause 15
 - viii. a *subpoena* 5
 - ix. a certificate or exemplification of a judgment or order 5
 - x. a certificate certifying to court documents attached thereto 5
 - and where the documents attached consist of more than three pages, for each additional page50
 - xi. a certificate of *lis pendens* 5
 - xii. a commission to take evidence 10
 - xiii. an order for taxation of a solicitor and client bill 15
2. On the entry of an appearance 15
3. On the filing of an answer to a petition in a matrimonial cause 15

4. On the filing of a notice desiring an opportunity to redeem, or a notice requesting a sale instead of foreclosure\$ 5
5. On the setting down of,
 - i. an action or an issue for trial or for an assessment of damages, for the first time only 40
 - ii. an originating notice of motion or an application other than in an action .. 15
 - iii. a motion for leave to appeal to an appellate court 10
 - iv. a notice of appeal to an appellate court on an appeal from,
 - A. any interlocutory order 15
 - B. any final order or judgment from,
 1. a small claims court 15
 2. a county court 30
 3. the Supreme Court 30
 4. any other tribunal 30
6. On any order or judgment directing a reference (with the exception of a *praecipe* order for taxation of a solicitor and client bill) 25
7. On the filing of an application for a decree absolute in a matrimonial cause, including the making up and forwarding of the papers to and from the Registrar, S.C.O. 25
8. For making up and forwarding papers, documents and exhibits (postage or carriage charges to be paid extra on the excess over five pounds) 5
9. For making copies of documents not requiring certification, per page50
10. On the filing of a petition to quiet a title . 40
11. To inspect the books of the Supreme Court and of the county courts, containing records or entries of the writs issued, judgments entered, and bills of sale registered,
 - i. for a general search 2

- | | |
|---|--|
| <p>ii. for inspection of a writ of summons, judgment roll, or bill of sale, each . . . \$.30</p> <p>12. When a court reporter is employed upon a reference, the fees payable shall be as follows:</p> <p>i. For services at the hearing, \$50 for a full day and \$30 for a half-day or less.</p> <p>ii. For the copy of evidence to be filed on an appeal, for the purpose of mechanical reproduction, \$2.75 per page.</p> <p>iii. For the copy of evidence for use other than provided for in subitem ii, \$2.25 per page for the first copy and 25 cents per page for each additional copy.</p> <p>iv. For reading evidence to the Master from notes when no copies are ordered at the rate of \$9 per hour, payable by the party having the conduct of the reference.</p> <p>v. Subitems i and iv are not allowed where the reporter is a salaried employee of the Ministry of the Attorney General.</p> <p>13. To a special examiner for each person examined:</p> <p>i. appointment 1.50</p> <p>ii. oath, return and certificate 2.25</p> <p>iii. conducting examination, per hour or part thereof 7.50</p> <p>iv. reporter's attendance, per hour or part thereof 6.50</p> | <p>v. attendance out of office, per kilometre one way \$.25</p> <p>vi. for a copy of transcript, per page,</p> <p>A. first party ordering 2.25</p> <p>B. any additional copies, regardless of party ordering25</p> <p>NOTES:</p> <p>1. Solicitors charged at rates in excess of the above or receiving a transcript that does not substantially conform with Rule 190 of Regulation 540 of Revised Regulations of Ontario, 1980 are required to notify the Inspector of Legal Offices in writing.</p> <p>2. Subitem i of item 13 plus the per hour charge for each hour or part thereof reserved for the appointment under subitems iii and iv shall be charged on a cancelled appointment unless 48 hours notice of cancellation has been given to the examiner.</p> <p>3. No charge for a reporter's attendance shall be allowed where the reporter is a salaried employee of the Ministry of the Attorney General.</p> <p>4. No additional charge shall be made for the transcript on filing.</p> <p>5. A party requiring transcript delivery within five working days of receipt of the order shall be charged an expedite surcharge of 50 cents per page. Should delivery of the transcript be required within two working days of receipt of order, the expedite surcharge shall be \$1 per page. Such surcharges shall only be charged to the first party ordering. O. Reg. 417/80, Sched.</p> |
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REGULATION 8

under the Administration of Justice Act

FEES—UNIFIED FAMILY COURT

1. The fees set out in the Schedule are payable in the Unified Family Court. O. Reg. 1000/80, s. 1.

Schedule

FEES

PAYABLE IN THE UNIFIED FAMILY COURT

1. Filing of an application	\$30
2. Filing of a petition for divorce	30
3. Filing of an answer or answer and petition other than one containing a claim against an added party	15
4. Filing of an answer or answer and petition containing a claim against an added party	30
5. Issue of summons to a witness	5
6. Issue of certificate, including up to three pages of copies of Court documents . . .	5
For each additional page . . . . .	.50
7. Issue of final order or order directing a reference	40
8. Filing of motion for decree absolute of divorce, including transmission of papers	25
9. Copies of documents, per page . . . . .	.50
10. Transmission of papers (postage or carriage for not more than two kilograms included)	5

11. Where a court reporter is employed on a reference, the fees payable shall be,

(a) for services at the hearing,

(i) for a full day \$50

(ii) for a half day or less 30

(b) for a copy of evidence to be filed, for the purpose of mechanical reproduction, per page 2.75

(c) for the copy of evidence for use other than as provided in clause (b),

(i) per page of the first copy 2.25

(ii) per page of each additional copy25

(d) for reading evidence from notes when no copies are ordered, payable by the party having conduct of the reference, per hour 9

NOTES:

1. The fees set out in items 1, 3, 4 and 7 are not payable where the only claims made in the proceeding are under the *Child Welfare Act*, or for financial support, custody of or access to a child and costs.
2. The fees set out in clauses (a) and (d) of item 11 are not payable where the reporter is a salaried employee of the Ministry of the Attorney General.

O. Reg. 1000/80, Sched.

REGULATION 9

under the Administration of Justice Act

INVESTIGATION FEE—OFFICIAL GUARDIAN

- 1. The fee for an investigation in respect of,
 - (a) a petition for divorce or an action for annulment under the provisions of subsection 1 (6) of the *Matrimonial Causes Act*; or
 - (b) the custody, maintenance and education of a child pursuant to subsection 1 (4) of the *Minors Act*,

is\$50

O. Reg. 288/72, s. 1.

REGULATION 10

under the Agricultural Associations Act

DESIGNATION OF ASSOCIATIONS

1. Each of the associations, societies, institutes or organizations named in the Schedule is designated an association, society, institute or organization under section 2 of the Act. R.R.O. 1970, Reg. 5, s. 1.

Schedule

1. The Canadian Commercial Rabbit Growers' Association.
2. The Eastern Ontario Stocker and Feeder Sales Association.
3. The Farm Safety Council of Ontario.
4. The Federated Women's Institutes of Ontario.
5. The Ontario Association of Agrology Technologists.
6. The Ontario Association of Community Sale Operators.
7. The Ontario Beef Producers' Association.
8. The Ontario Cattle Breeders' Association.
9. The Ontario Cattlemen's Association.
10. The Ontario Hatcheries Association.
11. The Ontario Maple Syrup Producers' Association.
12. The Ontario Live Stock Protective Association.
13. The Ontario Live Stock Shippers' Association.
14. The Ontario Poultry Breeders' Association.
15. The Ontario Sheep Association.
16. The Ontario Soil and Crop Improvement Association.
17. The Ontario Swine Improvement Council.
18. The Ontario Turkey Association.
19. The South-western Ontario Live Stock Producers Association.
20. The Stoney Creek Charter Women's Institute.
21. The Strawberry Council of Ontario.
22. The Red Cherry Institute.
23. The Western Ontario Steam Threshers Association. R.R.O. 1970, Reg. 5, Sched.; O. Reg. 215/71; O. Reg. 396/71; O. Reg. 10/72, s. 1; O. Reg. 130/73, s. 1; O. Reg. 508/74, s. 1; O. Reg. 622/76, s. 1; O. Reg. 902/76, s. 1; O. Reg. 352/78, s. 1; O. Reg. 893/78, s. 1.

REGULATION 11

under the Agricultural Development Finance Act

INTEREST RATE

1. Subject to section 2, the annual rate of interest from time to time payable on deposits received through any Province of Ontario Savings Office shall be determined and paid in accordance with the following conditions:

1. Such annual rate of interest shall not exceed by more than $\frac{1}{2}$ of 1 per cent *per annum* the annual rate of interest from time to time being paid by chartered banks and trust companies carrying on business in Ontario on deposits received by them on terms similar to those on which deposits are received from the public through Province of Ontario Savings Offices.
2. In determining the annual rate of interest to be paid on deposits received through any Province of Ontario Savings Office, regard shall be had to maintaining such offices' competitive position with other financial institutions.
3. The annual rate of interest from time to time payable on deposits received through the Province of Ontario Savings Offices shall be calculated on the minimum monthly balance on deposit, and shall be paid on the last days of March and September in each year.
4. Whenever any change occurs in the annual rate of interest generally paid by chartered banks and trust companies carrying on business in Ontario on deposits received by them on terms similar to those on which deposits are

received from the public through Province of Ontario Savings Offices, the Minister of Revenue shall cause such change to be examined and shall determine whether a change is required to be made pursuant to paragraphs 1 and 2 in the annual rate of interest payable on deposits received through the Province of Ontario Savings Offices. O. Reg. 207/80, s. 1.

2. In special cases where the nature or amount of a deposit makes it expedient and advisable, the Minister of Revenue may authorize interest to be paid and computed on deposits otherwise than semi-annually or on the minimum monthly balance of an account, but the rate of interest so authorized shall not exceed the annual rate of interest from time to time applicable in accordance with paragraph 1 of section 1. O. Reg. 207/80, s. 2.

3. Where the Minister has changed the annual rate of interest, he shall forthwith cause to be prominently posted in each Province of Ontario Savings Office a notice setting forth the new rate of interest resulting from such change and the day as of which such change is effective. O. Reg. 207/80, s. 3.

4. Repayment on deposits shall be made from the office known as "The Province of Ontario Savings Office",

(a) to the depositor in person on demand; or

(b) to the order of the depositor. O. Reg. 207/80, s. 4.

REGULATION 12

under the Agricultural Societies Act

GENERAL

INTERPRETATION

1. In this Regulation,

(a) "major undertaking" means the construction of a building or structure on the premises of a society, costing in the case of a society of,

(i) Class A, more than \$6,000,

(ii) Class B, more than \$3,600, and

(iii) Class C, more than \$2,400;

(b) "specified exhibits" means exhibits shown by exhibitors for cash prizes at an exhibition or fair of horses other than horses in races or special events, cattle, sheep, swine, poultry, seeds, fruit, flowers, potatoes, vegetables, grain, honey, dairy products, clothing, home-processed foods, arts, crafts, photography and handicrafts and work performed by school pupils and members of Junior Farmer associations and 4-H clubs. R.R.O. 1970, Reg. 8, s. 1.

CLASSIFICATION OF SOCIETIES

2. Societies are classified as follows:

1. Class A, consisting of societies that in each of the three years immediately preceding the date of classification paid to exhibitors on specified exhibits at least \$6,000.

2. Class B, consisting of societies that are not Class A societies and that in each of the three years immediately preceding the date of classification paid to exhibitors on specified exhibits at least \$3,000.

3. Class C, consisting of societies that are not Class A or Class B societies. R.R.O. 1970, Reg. 8, s. 2.

DESIGNATION OF SOCIETIES

3.—(1) The following societies are designated as Class A societies:

1. Ancaster Agricultural Society, Ancaster.
2. Barrie Agricultural Society, Barrie.
3. Belleville Agricultural Society, Belleville.

4. Caledonia Agricultural Society, Caledonia.

5. Canadian National Exhibition Association, Toronto.

6. Central Canada Exhibition Association, Ottawa.

7. Halton County Agricultural Society, Milton.

8. Leamington District Agricultural Society, Leamington.

9. Lincoln Agricultural Society, Beamsville.

10. Lindsay Agricultural Society, Lindsay.

11. Markham and East York Agricultural Society, Markham.

12. Moore Agricultural Society, Brigiden.

13. Niagara Regional Agricultural Society, Welland.

14. Norfolk County Agricultural Society, Simcoe.

15. Paris Agricultural Society, Paris.

16. Region of Peel Agricultural Society, Brampton.

17. Peterborough Agricultural Society, Peterborough.

18. Rockton Agricultural Society, Rockton.

19. South Waterloo Agricultural Society, Cambridge.

20. Teeswater Agricultural Society, Teeswater.

21. Western Fair Association, London.

22. Woodstock Agricultural Society, Woodstock.

(2) The following societies are designated as Class B societies:

1. Arnprior Agricultural Society, Arnprior.

2. Aylmer and East Elgin Agricultural Society, Aylmer.

3. Beeton Agricultural Society, Beeton.

4. Campbellford-Seymour Agricultural Society, Campbellford.
5. Canadian Lakehead Exhibition Agricultural Society, Thunder Bay.
6. Carp Agricultural Society, Carp.
7. Chesterville and District Agricultural Society, Chesterville.
8. Collingwood Agricultural Society, Collingwood.
9. Cumberland Township Agricultural Society, Navan.
10. Dresden Agricultural Society, Dresden.
11. Durham Central Agricultural Society, Orono.
12. Erin Agricultural Society, Erin.
13. Glencoe Agricultural Society, Glencoe.
14. Hanover, Bentinck and Brant Agricultural Society, Hanover.
15. Huron Central Agricultural Society, Clinton.
16. Ilderton Agricultural Society, Ilderton.
17. Kenyon Agricultural Society, Maxville.
18. Kingston and District Agricultural Society, Kingston.
19. Kitchener-Waterloo Agricultural and Industrial Association, Kitchener.
20. Lansdowne Agricultural Society, Lansdowne.
21. Lennox Agricultural Society, Napanee.
22. Madoc Agricultural Society, Madoc.
23. Metcalfe Agricultural Society, Metcalfe.
24. Mitchell Agricultural Society, Mitchell.
25. New Liskeard Agricultural Society, New Liskeard.
26. North Lanark Agricultural Society, Almonte.
27. Norwood Agricultural Society, Norwood.
28. Orangeville Agricultural Society, Orangeville.
29. Orillia and District Agricultural Society, Orillia.
30. Owen Sound Agricultural Society, Owen Sound.
31. Perth and District Agricultural Society, Perth.
32. Petrolia and Enniskillen Agricultural Society, Petrolia.
33. Prince Edward County Agricultural Society, Picton.
34. Richmond Agricultural Society, Richmond.
35. Ridgetown District Agricultural Society, Ridgetown.
36. Renfrew Agricultural Society, Renfrew.
37. Roseneath Agricultural Society, Roseneath.
38. Russell Agricultural Society, Russell.
39. St. Lawrence Valley Agricultural Society, Williamstown.
40. Seaforth Agricultural Society, Seaforth.
41. South Ontario Agricultural Society, Oshawa.
42. Spencerville Agricultural Society, Spencerville.
43. Stormont Agricultural Society, Newington.
44. Stratford Agricultural Society, Stratford.
45. Strathroy Agricultural Society, Strathroy.
46. Sutton Agricultural Society, Sutton.
47. Thorndale Agricultural Society, Thorndale.
48. Tillsonburg Tri-County Agricultural Society, Tillsonburg.
49. Vankleek Hill Agricultural Society, Vankleek Hill.
50. Walkerton Agricultural Society, Walkerton.
51. Wallacetown Agricultural Society, Wallacetown.
52. Woodbridge Agricultural Society, Woodbridge.
53. Woolwich Agricultural Society, Elmira.

(3) The following societies are designated as Class C societies:

REGIONAL MUNICIPALITY OF DURHAM

1. Beaverton Agricultural Society.
2. Blackstock Agricultural Society.
3. Brooklin Spring Fair Association.
4. Port Perry Agricultural Society.
5. Sunderland Agricultural Society.
6. Uxbridge Agricultural Society.

REGIONAL MUNICIPALITY OF HALDIMAND-NORFOLK

7. Charlotteville Agricultural Society.
8. Houghton Agricultural Society.
9. North Walsingham Agricultural Society.

REGIONAL MUNICIPALITY OF HALTON

10. Acton Agricultural Society.
11. Georgetown Agricultural Society.

REGIONAL MUNICIPALITY OF
HAMILTON-WENTWORTH

12. Binbrook Agricultural Society.

REGIONAL MUNICIPALITY OF NIAGARA

13. Smithville Agricultural Society.
14. Wainfleet Agricultural Society.

REGIONAL MUNICIPALITY OF PEEL

15. Albion and Bolton Agricultural Society.
16. Caledon Agricultural Society.

REGIONAL MUNICIPALITY OF SUDBURY

17. Massey Agricultural Society.
18. St. Charles Agricultural Society.
19. Warren Agricultural Society.

REGIONAL MUNICIPALITY OF WATERLOO

20. Wellesley and North Easthope Agricultural Society.
21. Wilmot Agricultural Society.

REGIONAL MUNICIPALITY OF YORK

22. Aurora Agricultural Society.
23. Richmond Hill Agricultural Society.

24. Schomberg Agricultural Society.

DISTRICT MUNICIPALITY OF MUSKOKA

25. Bracebridge Agricultural Society.
26. Huntsville and District Agricultural Society.
27. Morrison Agricultural Society.
28. Stisted Agricultural Society.

COUNTY OF BRANT

29. Burford Agricultural Society.
30. Ohsweken Agricultural Society.

COUNTY OF BRUCE

31. Arran-Tara Agricultural Society.
32. Chesley Agricultural Society.
33. Kincardine Agricultural Society.
34. Lucknow Agricultural Society.
35. Mildmay Agricultural Society.
36. Paisley Agricultural Society.
37. Ripley Agricultural Society.
38. Tiverton Agricultural Society.
39. Wiarton and District Agricultural Society.

COUNTY OF DUFFERIN

40. Grand Valley Agricultural Society.
41. Shelburne and District Agricultural Society.

COUNTY OF ELGIN

42. Rodney Agricultural Society.
43. Shedden Agricultural Society.

COUNTY OF ESSEX

44. Colchester South and Harrow Agricultural Society.
45. Comber Agricultural Society.
46. Essex Agricultural Society.

COUNTY OF FRONTENAC

47. Parham Agricultural Society.

COUNTY OF GREY

48. Ayton Agricultural Society.
49. Beaver Valley Agricultural Society.
50. Chatsworth Agricultural Society.
51. Desboro Agricultural Society.
52. Dundalk and District Agricultural Society.
53. Durham Agricultural Society.
54. Feversham Agricultural Society.
55. Markdale Agricultural Society.
56. Meaford and St. Vincent Agricultural Society.
57. Neustadt Normanby Carrick Agricultural Society.
58. Rocklyn Agricultural Society.
59. Sydenham Agricultural Society.

PROVISIONAL COUNTY OF HALIBURTON

60. Minden Agricultural Society.

COUNTY OF HASTINGS

61. Coe Hill Agricultural Society.
62. Marmora Agricultural Society.
63. Mohawk Agricultural Society.
64. Shannonville Agricultural Society.
65. Stirling Agricultural Society.
66. Tweed Agricultural Society.

COUNTY OF HURON

67. Bayfield Agricultural Society.
68. Brussels Agricultural Society.
69. Dungannon Agricultural Society.
70. Exeter Agricultural Society.
71. Hensall South Huron Agricultural Society.
72. Howick Agricultural Society.
73. Zurich Agricultural Society.

COUNTY OF KENT

74. Highgate District Agricultural Society.
75. Merlin and District Agricultural Society.

COUNTY OF LAMBTON

76. Brooke and Alvinston Agricultural Society.
77. Florence Agricultural Society.
78. Forest Agricultural Society.
79. Plympton and Wyoming Agricultural Society.
80. Thedford Agricultural Society.

COUNTY OF LANARK

81. Maberly Agricultural Society.
82. McDonald's Corners Agricultural Society.
83. Middleville Agricultural Society.

UNITED COUNTIES OF LEEDS AND GRENVILLE

84. Delta Agricultural Society.
85. Lombardy Agricultural Society.
86. Merrickville Agricultural Society.

COUNTY OF LENNOX AND ADDINGTON

87. Centreville Agricultural Society.
88. Denbigh Agricultural Society.
89. Odessa Agricultural Society.

COUNTY OF MIDDLESEX

90. Caradoc Agricultural Society.
91. North Dorchester Agricultural Society.
92. Melbourne Agricultural Society.
93. Parkhill Agricultural Society.

COUNTY OF NORTHUMBERLAND

94. Percy Township Agricultural Society.
95. Port Hope Agricultural Society.

COUNTY OF OXFORD

- 96. Drumbo Agricultural Society.
- 97. Tavistock Agricultural Society.
- 98. West Zorra and Embro Agricultural Society.

COUNTY OF PERTH

- 99. Kirkton Agricultural Society.
- 100. Listowel Agricultural Society.
- 101. Milverton Agricultural Society.
- 102. St. Marys Agricultural Society.

COUNTY OF PETERBOROUGH

- 103. Apsley Agricultural Society.
- 104. Kinmount Agricultural Society.
- 105. Lakefield Agricultural Society.
- 106. Millbrook Agricultural Society.

UNITED COUNTIES OF PRESCOTT AND RUSSELL

- 107. Township of Clarence Agricultural Society.
- 108. Riceville Agricultural Society.

COUNTY OF RENFREW

- 109. Cobden Agricultural Society.
- 110. North Renfrew Agricultural Society.

COUNTY OF SIMCOE

- 111. Coldwater and District Agricultural Society.
- 112. Cookstown Agricultural Society.
- 113. Flos Agricultural Society.
- 114. Oro Agricultural Society.
- 115. Ramona Agricultural Society.
- 116. Tiny and Tay Agricultural Society.

UNITED COUNTIES OF STORMONT, DUNDAS
AND GLENGARRY

- 117. Mountain Township Agricultural Society.
- 118. Roxborough Agricultural Society.

COUNTY OF VICTORIA

- 119. Bobcaygeon Agricultural Society.
- 120. Fenelon Agricultural Society.
- 121. Oakwood Agricultural Society.

COUNTY OF WELLINGTON

- 122. Aberfoyle Agricultural Society.
- 123. Arthur Agricultural Society.
- 124. Drayton Agricultural Society.
- 125. Fergus Agricultural Society.
- 126. Mount Forest Agricultural Society.
- 127. Palmerston Agricultural Society.
- 128. Harriston Agricultural Society.

DISTRICT OF ALGOMA

- 129. Bruce Mines Agricultural Society.
- 130. Iron Bridge Agricultural Society.
- 131. North Shore Agricultural Society.

DISTRICT OF COCHRANE

- 132. Cochrane Agricultural Society.
- 133. Matheson Agricultural Society.
- 134. Porcupine District Agricultural Society.
- 135. Porquis Junction Agricultural Society.

DISTRICT OF KENORA

- 136. Dryden and District Agricultural Society.
- 137. Kenora Agricultural Society.

DISTRICT OF MANITOULIN

- 138. Manitowaning Agricultural Society.
- 139. Providence Bay Agricultural Society.

DISTRICT OF NIPISSING

- 140. Bonfield Agricultural Society.

DISTRICT OF PARRY SOUND

- 141. Armour, Ryerson and Burk's Falls Agricultural Society.
- 142. Dunchurch Agricultural Society.

143. Emsdale Agricultural Society.
144. Foley Agricultural Society.
145. Magnetawan Agricultural Society.
146. McKellar Agricultural Society.
147. Powassan Agricultural Society.
148. Rosseau Agricultural Society.
149. South River Agricultural Society.
150. Strong Agricultural Society.
151. Trout Creek Agricultural Society.

DISTRICT OF RAINY RIVER

152. Emo and District Agricultural Society.

DISTRICT OF THUNDER BAY

153. Hymers Agricultural Society.
154. Oliver Agricultural Society.
155. Upsala Agricultural Society.

DISTRICT OF TIMISKAMING

156. Charlton Agricultural Society.
157. Englehart and District Agricultural Society. O. Reg. 153/77, s. 1.

GRANTS

4.—(1) The amounts of grants made to a society on account of expenditures made for capital improvements and repairs, other than a major undertaking, on the real property of the society in any calendar year,

- (a) shall be not more than 25 per cent of the amounts actually expended by the society on account of the capital improvements and repairs; and
- (b) shall be in the case of a society of,
 - (i) Class A, not more than \$1,500,
 - (ii) Class B, not more than \$900, or
 - (iii) Class C, not more than \$600.

(2) Subject to subsections (3) and (4), the amounts of grants made to a society on account of expenditures made for a major undertaking shall be not more than 25 per cent of the amounts actually expended by the society on account of the expenditure for the major undertaking, but not exceeding,

- (a) in the case of a society of Class A, \$100,000;
- (b) in the case of a society of Class B, \$50,000; or
- (c) in the case of a society of Class C, \$25,000.

(3) No society qualifies for a grant for a major undertaking unless the society,

- (a) submits plans, specifications and the estimated cost of the major undertaking to the Superintendent before any construction of the major undertaking is commenced; and
- (b) obtains from the Superintendent his approval in writing for the major undertaking, or for such amount or proportion of the cost thereof as he determines under subsection (4).

(4) Where the major undertaking may not be used for agricultural purposes only, the amount or proportion of the cost of the major undertaking that is referable to agricultural purposes only shall, for purposes of a grant, be deemed to be the cost of the major undertaking.

(5) Where the amount appropriated by the Legislature for grants under subsection (2) is insufficient to pay the grants in any year, the grants shall be distributed *pro rata* among those societies entitled to receive them and the balance may be paid from amounts appropriated for the purpose in succeeding years. R.R.O. 1970, Reg. 8, s. 4.

5.—(1) Where a society awards prize money for races or trials of speed for horses at an exhibition or fair and the amount of the prize money exceeds 25 per cent of the amount of other prize money awarded by the society in the holding of the exhibition or fair, the excess shall not be used in calculating the amount of any grant.

(2) For the purpose of subsection (1), in calculating the amount of money awarded as prizes for races or trials of speed for horses, the society may deduct from the amount of money awarded as prizes the amount of entry fees received. R.R.O. 1970, Reg. 8, s. 5.

6. Where, during its annual exhibition or fair, a society permits on its premises,

- (a) use of any part of the premises for purposes other than those of the society;
- (b) a lottery conducted for other than charitable or benevolent purposes;
- (c) an indecent show;
- (d) soliciting of funds from the public; or
- (e) an auction sale other than one organized or sponsored by the society,

no grant is payable to the society in respect of the holding of the exhibition or fair. R.R.O. 1970, Reg. 8, s. 6.

7.—(1) Where a society makes expenditures for capital improvements or repairs on land or buildings, no grant is payable to the society in respect of the improvements or repairs unless the society,

- (a) owns the land and buildings; or
- (b) holds an annual fair or exhibition on land owned by a municipality located within the area in which the society carries out its objects and the society holds the fair or exhibition under an agreement for the use of the land and buildings.

(2) Every agreement under clause (1) (b) shall provide that the society is entitled to use the land and buildings on the day or days of the holding of the fair or exhibition each year, for at least ten years from the date of application for the grant. R.R.O. 1970, Reg. 8, s. 7.

DUTIES OF OFFICERS

8. The officers of a society are responsible for the safe custody of,

- (a) deeds, title papers and other documents relating to the property of the society;
- (b) at least one copy of all minutes of proceedings, resolutions and by-laws of the society; and
- (c) books and records of the society. R.R.O. 1970, Reg. 8, s. 8.

9. The secretary of a society shall,

- (a) attend all meetings of the society and keep true minutes thereof;
- (b) conduct the correspondence of the society; and

(c) keep a record of,

- (i) all business transactions of the society,
- (ii) all resolutions passed by the society,
- (iii) all amendments to the by-laws of the society,
- (iv) a list of the members of the society and their addresses,
- (v) a list of the names and addresses of persons to whom prize money is paid and the amounts paid to each person,
- (vi) all reports of committees that may from time to time be appointed by the society, and
- (vii) all annual statements and financial and auditor's reports. R.R.O. 1970, Reg. 8, s. 9.

10. The treasurer of a society shall,

- (a) receive all moneys paid to the society and deposit them to the credit of the society in a chartered bank, as the society may by resolution direct;
- (b) keep the securities of the society in safe custody;
- (c) keep or cause to be kept proper books of account or make or cause to be made entries of all receipts and expenditures of the society;
- (d) prepare the annual financial statement of the society; and
- (e) prepare reports showing the financial position of the society, as the officers from time to time direct. R.R.O. 1970, Reg. 8, s. 10.

REGULATION 13

under the Agricultural Tile Drainage Installation Act

GENERAL

INTERPRETATION

1. In this Regulation,

- (a) "advanced course" means the advanced course of instruction prescribed in this Regulation, or any course considered equivalent thereto by the Director;
- (b) "Drainage Guide" means Publication No. 29 of the Ontario Ministry of Agriculture and Food entitled "Drainage Guide for Ontario";
- (c) "machine" means a machine used in installing a drainage work;
- (d) "primary course" means the primary course of instruction prescribed in this Regulation, or any course equivalent thereto satisfactory to the Director;
- (e) "tile" means tile, pipe or tubing of any material used in the installation of a drainage work. O. Reg. 193/73, s. 1.

2.—(1) An application for a licence to carry on the business of installing drainage works shall be in Form 1.

(2) An application for a licence to be the operator of a machine used in installing drainage works shall be in Form 2.

(3) An application for a licence for a machine used in installing drainage works shall be in Form 3.

(4) An application for the renewal of a licence in Form 4, 5 or 6 that is or has expired shall be made in the form provided therefor by the Director. O. Reg. 193/73, s. 2.

3.—(1) A licence to carry on the business of installing drainage works shall be in Form 4.

(2) A licence to be the operator of a machine shall be in Form 5.

(3) A licence for a machine shall be in Form 6.

(4) A licence in Form 4, 5 or 6 expires with the 31st day of December of the year in which it is issued.

(5) A licence in Form 4 or 5 is not transferable. O. Reg. 193/73, s. 3.

4.—(1) The fee for a licence in Form 4 is,

- (a) \$25 in the case of an applicant or licensee who installed not more than 300,000 feet; and
- (b) \$50 in the case of an applicant or licensee who installed more than 300,000 feet,

of drainage work in the year preceding the year in respect of which the application is made.

(2) The fee for a licence in Form 5 is \$5. O. Reg. 193/73, s. 4 (1, 2).

(3) The fee for a licence in Form 6 is,

- (a) \$100 in the case of a plough-type machine;
- (b) \$50 in the case of any other type of machine; and
- (c) \$10 in the case of any machine mentioned in clause (a) or (b) that, in the opinion of the Director, is used solely for demonstration purposes. O. Reg. 193/73, s. 4 (3); O. Reg. 506/79, s. 1.

5.—(1) The Director may issue a temporary operator's licence to a person who is qualified to be a Class A or Class B machine operator.

(2) A temporary operator's licence,

- (a) shall be in the form provided by the Director; and
- (b) is valid for the period of twenty-eight days next following the date on which it is issued.

(3) No person shall be issued more than two temporary operator's licences in any year.

(4) The fee for a temporary operator's licence is \$2. O. Reg. 193/73, s. 5.

6. The following fees shall be paid in addition to the fees prescribed by sections 4 and 5:

- 1. For an operator's examination.....\$5.00
- 2. For an operator's change of class..... 5.00
- 3. For the transfer of a machine licence..... 5.00

O. Reg. 193/73, s. 6.

7.—(1) The following classes of machine operator are established:

1. Class A.

2. Class B.

3. Class C.

(2) An operator,

(a) who is qualified,

(i) to operate and maintain the machine to be operated by him,

(ii) to set a system of grade control for the machine he operates,

(iii) to interpret drainage plans based upon topographic and profile surveys,

(iv) to implement a drainage work plan, and

(v) to advise on or carry out all other functions connected with the installation of a drainage work;

(b) who has attended the primary and advanced courses and has passed the examinations therefor;

(c) who was previously the holder of a licence as a Class B operator; and

(d) who has had at least seven months previous experience in operating machines in the installation of drainage works,

is a Class A operator.

(3) An operator,

(a) who is not qualified,

(i) to set up a system of grade control for the machine to be operated by him,

(ii) to interpret drainage plans based upon topographic and profile surveys, or

(iii) to implement a drainage work plan;

(b) who is qualified,

(i) to operate and maintain the machine to be operated by him,

(ii) to maintain the grade control established for such machine, and

(iii) to carry out all other duties connected with the installation of a

drainage work except the duties mentioned in clause (a);

(c) who has attended the primary course and has passed the examinations therefor;

(d) who was previously the holder of a licence as a Class C operator; and

(e) who has had at least three months previous experience in operating machines in the installation of drainage works,

is a Class B operator.

(4) An operator,

(a) who is being trained to operate and maintain a machine; and

(b) who has had at least sixty-days previous experience in carrying out other duties connected with the installation of drainage works,

is a Class C operator. O. Reg. 193/73, s. 7.

8.—(1) A licence as a Class A operator is issued on the terms and conditions that, where a licensed Class B or Class C operator is operating a machine under his supervision,

(a) he is present and in actual communication with the Class B operator at least once in every three-hour period; or

(b) he is present with the Class C operator at all times.

(2) A licence as a Class B operator is issued on the terms and conditions that,

(a) where the holder is operating a machine; or

(b) where a Class C operator is operating a machine in the presence of the holder,

a licensed Class A operator is present and in actual communication with him at least once in every three-hour period.

(3) A licence as a Class C operator is issued on the terms and conditions that the holder,

(a) shall operate a machine in the installation of a drainage work only in the presence of an operator licensed as a Class A or Class B operator; and

(b) shall attend the primary course within one year from the date on which the licence was issued. O. Reg. 193/73, s. 8.

9. Where a change in ownership of a machine is made,

- (a) the licence therefor shall remain with the machine; and
- (b) Notice of Transfer in Form 7, and the prescribed transfer fee, shall be sent to the Director within ten days next following the date of transfer. O. Reg. 193/73, s. 9.

10. A licence in Form 4 is issued on the terms and conditions that,

- (a) the holder or a person employed by him on a full-time basis is licensed as a Class A operator or, where the holder is a corporation, it employs on a full-time basis an operator licensed as a Class A operator;
- (b) every person who operates a machine,
 - (i) is the holder of a licence in Form 5, and
 - (ii) complies with the terms and conditions on which the licence is issued; and
- (c) every machine used in installing drainage works is licensed in Form 6. O. Reg. 193/73, s. 10.

11.—(1) Except in the case of machines that, in the opinion of the Director, are used solely for demonstration purposes, every machine shall,

- (a) be capable of excavating a trench or laying tile to a grade that does not deviate from the grade established by the drainage work plan by more than,
 - (i) 15 per cent of the internal diameter of the tile where the diameter is eight inches or less, or
 - (ii) 10 per cent of the internal diameter of the tile, where the diameter exceeds eight inches; and
- (b) for the purpose of excavating trenches, be equipped with a wheel, chain or other device capable of excavating a trench that exceeds the diameter of the tile to be installed by at least six inches. O. Reg. 193/73, s. 11 (1); O. Reg. 506/79, s. 2.

(2) For the purposes of subsection (1),

- (a) the grade deviation allowed by clause (a) of that subsection is subject to the conditions that such deviations,

(i) occur on a gradual basis over a distance of not less than thirty feet, and

(ii) do not occur consecutively above and below the established grade within a distance of 100 feet; and

- (b) the trench width mentioned in clause (b) of that subsection shall be measured at a level above the trench bottom equal to the diameter of the tile. O. Reg. 193/73, s. 11 (2).

12. Where,

- (a) any matter arises for which this Regulation makes no provision; and
- (b) a recommendation respecting such matter is set out in the Drainage Guide,

the Director, in making his decision, may take notice of the recommendation or of any other generally recognized technical facts, information or opinions within his knowledge. O. Reg. 193/73, s. 12.

13.—(1) The Director may, at such times and in such places as he considers advisable, provide courses of instruction as follows:

1. A primary course that includes instruction and practice in one or more of the following:
 - i. basic mathematics.
 - ii. the calculation of grades and grade stake setting.
 - iii. profile and differential levelling.
 - iv. the use of topographic maps.
 - v. drainage technology as contained in the Drainage Guide.
2. An advanced course that includes instruction and practice in one or more of the following:
 - i. mathematics related to area and volume calculations.
 - ii. topographic surveys and readings of topographic maps.
 - iii. the reading of drainage plans and profiles.
 - iv. field surveys.
 - v. the installation of drainage works on the basis of recommendations in the Drainage Guide.

(2) Examinations shall be conducted at the end of a course under the supervision of the instructors. O. Reg. 193/73, s. 13.

14. In addition to the grounds for refusal to renew, suspension or revocation of licences mentioned in section 5 of the Act, the Director may refuse to renew or may suspend or revoke a licence in Form 4 or 5 if, after a hearing,

- (a) he is of opinion that any ground mentioned in section 4 of the Act for refusal to issue such licence exists;
- (b) he finds that the licensee has failed to comply with, perform or carry out any term and condition on which such licence was issued;
- (c) in the case of a person licensed as a Class A operator, the past performance of the licensee affords reasonable grounds for belief that the qualifications therefor do not exist; or
- (d) in the case of a person licensed as a Class B operator, the past performance of the licensee affords reasonable ground for belief that the qualifications therefor do not exist. O. Reg. 193/73, s. 14.

Form 1

Agricultural Tile Drainage Installation Act

APPLICATION FOR LICENCE TO
INSTALL DRAINAGE WORKS

To: The Director,
Food Land Development Branch,
Ministry of Agriculture and Food,
Legislative Buildings,
Toronto.

.....
.....
.....

(name of corporation, partnership or person and if partnership, give names of all partners)

.....
(address)

applies for a licence to carry on the business of installing drainage works under the *Agricultural Tile Drainage Installation Act* and the regulations and in support of this application, the following facts are stated:

1. Name under which business is carried on
.....

2. Number of years engaged in the business of installing drainage works.....

3. Number of feet of drainage work installed in 19__ :.....

4. Description of machines used in installing drainage works:

MAKE	MODEL	YEAR
_____	_____	_____
_____	_____	_____
_____	_____	_____

5. The following machine operators engaged in the business or employed on a full-time basis by the applicant are licensed as Class A operators:

NAME	ADDRESS
_____	_____
_____	_____
_____	_____

6. The licence fee of \$..... accompanies this application.

Dated at....., this..... day of
..... 19...

.....
(signature of applicant)

.....
(title of official signing for a corporation)

O. Reg. 193/73, Form 1.

Form 2

Agricultural Tile Drainage Installation Act

APPLICATION FOR LICENCE AS
A MACHINE OPERATOR

To: The Director,
Food Land Development Branch,
Ministry of Agriculture and Food,
Legislative Buildings,
Toronto.

.....
(name of applicant in full)
.....
(address)

applies for a licence to be the operator of a machine used in installing drainage works under the *Agricultural Tile Drainage Installation Act* and the regulations and, in support of this application, the following facts are stated:

- 1. I have operated machines in the installation of drainage works for a period ofyears.
- 2. I have attended, and passed the examinations therefor:
 - 1. The Primary Drainage Course ()
 - 2. The Advanced Drainage Course ()
 - 3. Other Drainage Courses, as follows:.....
.....
.....
- 3. I have held a licence as a
 - Class A operator.....; (yes or no)
 - Class B operator.....; (yes or no)
 - Class C operator..... (yes or no)
- 4. I am qualified to perform the duties prescribed by the regulations for:
 - 1. A Class A operator ()
 - 2. A Class B operator ()
- 5. I will be operating and maintaining the following types of machines:
.....
.....

- 6. I hereby apply for a licence as a Classoperator.
- 7. The licence fee of \$5 accompanies this application.
Dated at....., this.....day of

....., 19...
.....
(signature of applicant)
O. Reg. 193/73, Form 2; O. Reg. 506/79, s. 3.

Form 3
Agricultural Tile Drainage Installation Act
APPLICATION FOR MACHINE LICENCE

.....
(name of corporation, partnership or person and if a partnership, give names of all partners)
.....
(address)

applies for a licence or licences for the machine or machines described herein for use in installing drainage works under the *Agricultural Tile Drainage Installation Act* and the regulations.

- 1. Description of machines:

MAKE	MODEL	YEAR	SERIAL NO.
.....
.....

- 2. The licence fee or fees of \$..... accompanies this application.
- Dated at....., this.....day of
....., 19...

.....
(signature of applicant)
.....
(title of official signing for a corporation)
O. Reg. 193/73, Form 3.

Form 4
Agricultural Tile Drainage Installation Act
LICENCE TO INSTALL DRAINAGE WORKS
YEAR..... LICENCE No.....

Under the *Agricultural Tile Drainage Installation Act* and the regulations, and subject to the limita-

tions thereof, this licence is issued to
.....
(name)

.....
(address)

carrying on business as.....,
to carry on the business of installing drainage
works.

This licence expires with the 31st day of December,
19...

Issued at Toronto, this.....day of.....,
19...

.....
(Director)

O. Reg. 193/73, Form 4.

Form 5

Agricultural Tile Drainage Installation Act

MACHINE OPERATOR'S LICENCE

YEAR..... LICENCE No.....

Under the *Agricultural Tile Drainage Installation
Act* and the regulations, and subject to the limita-
tions thereof, this licence is issued to

.....
(name) (address)

to operate machines used in installing drainage
works as a Class.....operator.

This licence expires with the 31st day of December,
19...

Issued at Toronto, this.....day of.....,
19...

.....
(Director)

O. Reg. 193/73, Form 5.

Form 6

Agricultural Tile Drainage Installation Act

MACHINE LICENCE

YEAR..... LICENCE No.....

Under the *Agricultural Tile Drainage Installation
Act* and the regulations, and subject to the limita-
tions thereof, this licence is issued to

.....
(name) (address)

for use in installing drainage works of the machine
described below:

MAKE	MODEL	YEAR	SERIAL NO.
------	-------	------	------------

.....

This licence expires with the 31st day of December,
19...

Issued at Toronto, this.....day of.....,
19...

.....
(Director)

O. Reg. 193/73, Form 6.

Form 7

Agricultural Tile Drainage Installation Act

NOTICE OF TRANSFER OF A MACHINE

To: The Director,
Food Land Development Branch,
Ministry of Agriculture and Food,
Legislative Buildings,
Toronto, Ontario.

Under the *Agricultural Tile Drainage Installation
Act* and the regulations, I hereby give notice of the
change of ownership of the machine described below:

LICENCE NO.	MAKE	MODEL	YEAR	SERIAL NO.
-------------	------	-------	------	------------

.....

FROM.....
(signature of licensed owner)

To.....
(name of purchaser)

.....
(address of purchaser)

The transfer fee of \$5 accompanies this notice.

Dated at....., this.....day of
..... 19...

.....
(signature of purchaser)

O. Reg. 193/73, Form 7.

REGULATION 14

under the Ambulance Act

GENERAL

INTERPRETATION

1. In this Regulation, unless the context otherwise requires,

(a) "dispatch centre" means a radio station, within the meaning of the *Radio Act* (Canada), that is equipped to receive calls for ambulance service and to dispatch ambulances by radio or telephone and that is used for such purpose;

(b) "dispatcher" means a person who operates radio or telephone equipment at a dispatch centre for the purpose of receiving calls for ambulance service and dispatching ambulances;

(c) "driver attendant" means a person who, in the course of providing ambulance service to a patient in Ontario,

(i) operates, drives or otherwise has the actual care or control of an ambulance, or

(ii) attends, assists or renders first aid or emergency medical care,

but does not include a physician, intern, nurse, nursing assistant, respiratory technologist or other skilled and duly qualified medical technician who attends on a call for ambulance service with at least two driver attendants for the purpose of rendering specialized health care services to a specific patient;

(d) "emergency" means a situation where delay in responding to a call for ambulance service could endanger the life, limb or a vital organ of a patient;

(e) "emergency medical care assistant" means a driver attendant who,

(i) has successfully completed a course in ambulance and emergency care provided by a College of Applied Arts and Technology or has experience and qualifications approved as equivalent thereto by the Minister or by an official of the Ministry who is authorized by the Minister to grant such approval or is a nurse or a nursing assistant,

(ii) has obtained a pass standing in an emergency medical care examination set by the Director under this Regulation, and

(iii) has worked full-time as a driver attendant in an ambulance service in Ontario for a period of at least twelve months and has demonstrated his competence as such;

(f) "employee" includes an independent contractor and an employee of an independent contractor;

(g) "full-time employment" means any employment that is not part-time employment, and full-time employee has a corresponding meaning;

(h) "intern" means a person who holds a degree in medicine granted by a university in Canada authorized to grant degrees in medicine, or a person holding qualifications approved as equivalent thereto by the Minister or by an official of the Ministry who is authorized by the Minister to grant such approval;

(i) "nurse" means a person who is the holder of a certificate as a registered nurse under Part IV of the *Health Disciplines Act*;

(j) "nursing assistant" means a person who is the holder of a certificate as a registered nursing assistant under Part IV of the *Health Disciplines Act*;

(k) "part-time employment" means employment where,

(i) the hours normally worked in the ambulance service by the employee do not exceed twenty-four per week, or

(ii) the employee is a student employed during a vacation period not exceeding 150 days who has indicated in his application for employment his intention to commence or continue his studies at a university or other educational institution at the end of such vacation period,

and part-time employee has a corresponding meaning;

- (l) "patient" means a person who is sick, injured, incapacitated, in need of medical attention or under medical care, who is transported in an ambulance;
- (m) "physician" means a duly qualified medical practitioner; and
- (n) "public place" means any place, building or public conveyance to which the public habitually resorts or to which the general public are admitted free or upon payment, but does not include a hospital, nursing home or any other health care facility, or any home or other facility for children or for the aged, or any facility for persons with any mental or physical handicaps, or any private residence or boarding house. O. Reg. 599/75, s. 1.

2.—(1) Subject to subsection (2), this Regulation is limited in its application,

- (a) where reference is made to an ambulance, to an ambulance that is a motor vehicle within the meaning of the *Highway Traffic Act*, that is used for ambulance service;
- (b) where reference is made to an ambulance service, to,
 - (i) an ambulance service that provides ambulance services in an ambulance that is a motor vehicle within the meaning of the *Highway Traffic Act*, or
 - (ii) a dispatch centre; and
- (c) where reference is made to an operator, to an operator whose licence is not subject to the condition that ambulance service be provided only in a specific situation authorized by the Director.

(2) Where an operator holds a licence that is subject to the condition that ambulance service be provided only in a specific situation authorized by the Director, he shall comply with every condition specified in his licence. O. Reg. 599/75, s. 2.

PART I LICENCES

3.—(1) An applicant for a licence to operate an ambulance service shall submit to the Director an application therefor in Form 1.

(2) An applicant for a renewal of a licence to operate an ambulance service shall submit to the Director an application therefor in Form 2 not earlier than ninety days and not later than thirty days prior to the date of expiry of the licence.

(3) The fee for a licence to operate an ambulance service, or a renewal thereof, is \$10 and the applicant shall submit the fee with his application for a licence or a renewal thereof.

(4) A licence to operate an ambulance service, or a renewal thereof, shall be in Form 3, and is not transferable.

(5) The operator of an ambulance service shall display his current licence in a conspicuous place at the main premises from which he carries on the ambulance service. O. Reg. 599/75, s. 3.

4. Every licence to operate an ambulance service, or renewal thereof, is subject to the condition that,

- (a) the operator use or permit to be used in the ambulance service he operates, only an ambulance which,
 - (i) is designated on his licence,
 - (ii) is approved by the Director for regular use in the operator's ambulance service, or
 - (iii) is authorized for use during a specific emergency situation by the Director or by the dispatch centre that normally directs the movements of the ambulances of the operator's ambulance service;
- (b) the holder of the licence does not transfer any right, title or interest to the ambulance service; and
- (c) the person named in the licence as operator is in fact the owner and operator of the ambulance service. O. Reg. 599/75, s. 4.

5. Every operator shall comply with every condition specified in his licence or in this Regulation. O. Reg. 599/75, s. 5.

PART II

FEES FOR SERVICE

6. Where a person who is not an insured person within the meaning of the *Health Insurance Act* is provided with service by an ambulance service, such person shall pay to the operator a fee of \$40 and, in addition, an amount of \$1 for each kilometre travelled in excess of forty kilometres. O. Reg. 174/79, s. 1.

PART III

QUALIFICATIONS FOR EMPLOYMENT

ALL EMPLOYEES—FULL-TIME AND PART-TIME

7.—(1) Every driver attendant who is employed in an ambulance service shall,

- (a) hold a valid and subsisting driver's licence, issued under the *Highway Traffic Act*, that authorizes him to drive an ambulance;
- (b) hold a valid and subsisting senior certificate in first aid issued by St. John Ambulance Association, or a standard first aid certificate issued by the Canadian Red Cross Society or hold qualifications approved as equivalent thereto by the Minister or by an official of the Ministry who is authorized by the Minister to grant such approval or be a nurse;
- (c) be free from any communicable disease within the meaning of the *Public Health Act*, and not be a carrier of any such disease; and
- (d) hold a certificate, signed by a physician, stating that the driver attendant is successfully immunized against small pox, tetanus, diphtheria and poliomyelitis or that immunization therefor is contraindicated.

(2) Every driver attendant shall maintain in effect the certificate of immunization referred to in this section or in section 8 unless he is the holder of the physician's certificate stating such immunization is contraindicated. O. Reg. 599/75, s. 6.

NEW EMPLOYEES ONLY

8.—(1) In addition to the requirements of section 7, every person who commences full-time employment as a driver attendant in an ambulance service shall, on the date he commences such employment,

- (a) be at least eighteen years of age;
- (b) hold an Ontario secondary school graduation diploma or academic qualifications approved as equivalent thereto by the Minister or by an official of the Ministry who is authorized by the Minister to grant such approval;
- (c) be able to read, write and speak the English language with reasonable fluency;
- (d) for a period of one year immediately prior to such date, not have had six or more demerit points recorded on his record by the Registrar of Motor Vehicles under the *Highway Traffic Act*;
- (e) for a period of two years immediately prior to such date, not have had his driver's licence suspended under the *Highway Traffic Act*;
- (f) for a period of three years immediately prior to such date, not have been prohibited under the *Criminal Code* (Canada) from driving a motor vehicle in Canada;

- (g) not have been convicted of any crime involving moral turpitude for which he has not been pardoned; and
- (h) produce to the operator a certificate signed by a physician stating he is successfully immunized against smallpox, tetanus, diphtheria and poliomyelitis or that immunization therefor is contraindicated.

(2) In addition to the requirements of section 7, every person who commences part-time employment as a driver attendant in an ambulance service shall, on the date he commences such employment,

- (a) be at least eighteen years of age;
- (b) be able to read, write and speak the English language with reasonable fluency;
- (c) for a period of one year immediately prior to such date, not have had six or more demerit points recorded on his record by the Registrar of Motor Vehicles under the *Highway Traffic Act*;
- (d) for a period of two years immediately prior to such date, not have had his driver's licence suspended under the *Highway Traffic Act*;
- (e) for a period of three years immediately prior to such date, not have been prohibited under the *Criminal Code* (Canada) from driving a motor vehicle in Canada;
- (f) not have been convicted of any crime involving moral turpitude for which he has not been pardoned; and
- (g) produce to the operator a certificate signed by a physician stating he is successfully immunized against smallpox, tetanus, diphtheria and poliomyelitis or that immunization therefor is contraindicated.

(3) A person who,

- (a) while a part-time employee as a driver attendant in an ambulance service is a student to whom subclause 1 (k) (ii) applies; and
- (b) continues to be employed as a driver attendant after the expiry of the vacation period for which he was initially employed,

shall be deemed to have commenced full-time employment at the end of such vacation period.

(4) Every person referred to in subsection (3) who lacks the qualifications for full-time employment prescribed in subsection (1) shall discontinue his employment as a driver attendant forthwith. O. Reg. 599/75, s. 7.

ALL FULL-TIME EMPLOYEES

9. Every driver attendant who is a full-time employee in an ambulance service shall, in addition to the applicable requirements of section 7 and subsection 8 (1),

- (a) be at least eighteen years of age;
- (b) be able to read, write and speak the English language with reasonable fluency; and
- (c) hold a valid and subsisting certificate in the Fundamentals of Casualty Care issued by the Ministry or an equivalent certificate issued by a College of Applied Arts and Technology, or qualifications approved as equivalent thereto by the Minister or by an official of the Ministry who is authorized by the Minister to grant such approval, or be a nurse. O. Reg. 599/75, s. 8.

FUTURE EMPLOYEES ONLY—FULL-TIME

10.—(1) In addition to the requirements of section 7, subsection 8 (1) and section 9, every person, other than an emergency medical care assistant, who commences full-time employment as a driver attendant in an ambulance service shall, on the date he commences employment, have successfully completed a course in ambulance and emergency care provided by a College of Applied Arts and Technology or have experience and qualifications approved as equivalent thereto by the Minister or by an official of the Ministry who is authorized by the Minister to grant such approval, or be a nurse.

(2) Every person referred to in subsection (1) shall, within 150 days after the completion of twelve months of full-time employment as a driver attendant,

- (a) take and obtain a pass standing in an emergency medical care examination set by the Director under this Regulation; and
- (b) obtain a certificate signed by the operator who so employed him showing that the person has completed at least twelve months of full-time employment as a driver attendant and has demonstrated his competence therein,

or discontinue full-time employment as a driver attendant. O. Reg. 599/75, s. 9 (1, 2).

(3) A person who,

- (a) while a part-time employee as a driver attendant in an ambulance service is a student to whom subclause 1 (k) (ii) applies; and
- (b) continues to be employed as a driver attendant after the expiry of the vacation period for which he was initially employed,

shall be deemed to have commenced full-time employment at the end of such vacation period. O. Reg. 599/75, s. 9 (3), *revised*.

(4) Every person referred to in subsection (3) who lacks the qualifications for full-time employment prescribed in section 7, subsection 8 (1), section 9 and subsection (1) of this section shall discontinue his employment as a driver attendant forthwith. O. Reg. 599/75, s. 9 (4).

11.—(1) Where a driver attendant has worked on a full-time basis for an operator of an ambulance service and has demonstrated his competence as a driver attendant, the operator who was his employer shall, on the request of the driver attendant, provide the driver attendant with the certificate he requires for the purposes of section 10.

(2) An operator shall not provide a driver attendant with such certificate unless the driver attendant has, in the opinion of the operator, demonstrated his competence as a driver attendant. O. Reg. 599/75, s. 11.

DISPATCHERS

12. Every dispatcher who commences employment in an ambulance service shall,

- (a) be at least eighteen years of age;
- (b) be able to read, write and speak the English language with reasonable fluency;
- (c) hold an Ontario secondary school graduation diploma or academic qualifications approved as equivalent thereto by the Minister or by an official of the Ministry who is authorized by the Minister to grant such approval;
- (d) hold a valid and subsisting senior certificate in first aid issued by St. John Ambulance Association, or a standard certificate in first aid issued by the Canadian Red Cross Society, or qualifications approved as equivalent thereto by the Minister or by an official of the Ministry who is authorized by the Minister to grant such approval, or be a nurse; and
- (e) hold a valid and subsisting Restricted Radio-telephone Operator's Certificate (Land) issued under the *Radio Act* (Canada) or a certificate of proficiency that is superior thereto. O. Reg. 599/75, s. 12.

MISCELLANEOUS

13.—(1) Subject to subsection (2), where a driver attendant or a dispatcher discontinues his employment with an operator, and commences to be employed by another operator, he shall, at the time he commences employment with such other operator, hold the quali-

fifications for the commencement of employment in an ambulance service prescribed in this Part, which are applicable as of the date he commences employment with such other operator.

(2) Where a driver attendant or dispatcher discontinues full-time employment with an operator and commences full-time employment with another operator, and the Director certifies that such transfer of employment is beyond the control of the employee by reason of changes in ownership or management or in the structure of the ambulance service program, the driver attendant or dispatcher shall not be required to hold the qualifications for the commencement of full-time employment prescribed in this Part on the date he commences full-time employment with such other operator. O. Reg. 599/75, s. 13.

14. Notwithstanding any other provision of this Regulation, any person who is registered as a student in nursing, medicine, ambulance and emergency care or a health discipline approved by the Minister for the purposes of this section at,

- (a) a provincially assisted university;
- (b) a College of Applied Arts and Technology; or
- (c) an institution approved by the Minister for the purpose of this section,

may, in the course of providing ambulance service to a patient in Ontario, attend, assist or render first aid or emergency medical care,

- (d) if done so under the actual supervision of a person qualified under this Regulation;
- (e) if the ambulance is staffed in accordance with this Regulation; and
- (f) if the person does not have and is not a carrier of a communicable disease within the meaning of the *Public Health Act*. O. Reg. 599/75, s. 14.

15.—(1) No operator may employ a driver attendant or a dispatcher unless the person has the qualifications prescribed in this Part.

(2) Every operator shall take reasonable steps to ensure that every driver attendant or dispatcher in his employment is,

- (a) in good health, mentally and physically;
- (b) of good character and habits; and
- (c) a fit and proper person for such employment.

(3) An operator shall not continue to employ a driver attendant on a full-time basis where the

driver attendant is required to discontinue full-time employment under subsection 10 (2). O. Reg. 599/75, s. 15.

PART IV EXAMINATIONS

16.—(1) The Director may set emergency medical care examinations to test the knowledge and proficiency in emergency medical care of emergency medical care assistants and of persons seeking qualification therefor.

(2) The Director or a person or persons designated by him shall examine each person taking an emergency medical care examination and shall assign a pass standing to each examinee who, in the opinion of the examiner, has demonstrated adequate knowledge and proficiency in emergency medical care. O. Reg. 599/75, s. 16.

17.—(1) The Director may, in the manner prescribed, direct any emergency medical care assistant to take an emergency medical care examination set by the Director where,

- (a) the person has not taken any such examination during the four year period immediately prior to the examination date set by the Director; or
- (b) the Director has reasonable grounds for belief that the person may not be competent to perform, with reasonable skill, the duties normally performed by an emergency medical care assistant.

(2) Where,

- (a) the Director directs an emergency medical care assistant to take an emergency medical care examination under subsection (1); or
- (b) A person who has the qualifications described in subclause 1 (e) (i) makes a written request to the Director that he be given notice of the next emergency medical care examination date,

the Director shall cause written notice of his direction and of the time and location of the examination to be given to him.

(3) The notice referred to in subsection (2) shall be given at least sixty days prior to the date of the examination specified in the notice.

(4) Every emergency medical care assistant who is directed under subsection (1) to take an emergency medical care examination, shall,

- (a) attend at the location and at the time specified in the Director's notice, and take such examination;

- (b) establish to the satisfaction of the Director that he was unable to attend due to illness or other reasonable cause; or
- (c) discontinue full-time employment as a driver attendant forthwith.

(5) Every applicant for examination, other than an emergency medical care assistant, shall, at the time of examination, produce the certificate required under subsection 10 (2). O. Reg. 599/75, s. 17.

18.—(1) Where an emergency medical care assistant who is directed under subsection 18 (1) to take an emergency medical care examination does not obtain a pass standing therein, or fails to attend thereat and has satisfied the Director that he was unable to attend due to illness or other reasonable cause, he shall take the second emergency medical care examination set by the Director at the time and location specified in the notice to him.

(2) The Director shall cause written notice of the time and location of the second emergency medical care examination to be given at least sixty days prior to the date thereof to each emergency medical care assistant referred to in subsection (1), and to each person who failed to obtain a pass standing in the first emergency medical care examination set.

(3) Every emergency medical care assistant referred to in subsection (1) who does not obtain a pass standing in the second emergency medical care examination set by the Director shall,

- (a) discontinue full-time employment as a driver attendant forthwith; and
- (b) not recommence full-time employment as a driver attendant thereafter until he has taken an emergency medical care examination set by the Director and obtained a pass standing therein. O. Reg. 599/75, s. 18.

PART V

VEHICLE AND EQUIPMENT STANDARDS

19.—(1) Every operator shall ensure that every ambulance used in the ambulance service he operates,

- (a) is constructed and equipped in accordance with the specifications prescribed in Schedule 1;
- (b) except in respect of an item of ambulance accessory equipment which the Director has authorized the operator to omit, contains the ambulance accessory equipment in the quantities and in accordance with the specifications prescribed in Schedule 2;
- (c) contains the medical equipment in the quantities and in accordance with the

specifications prescribed in Schedule 3; and

(d) except for,

- (i) the equipment required by this subsection or additional quantities thereof where a minimum quantity is specified,
- (ii) specific equipment approved by the Director for use by the operator in or on an ambulance, or
- (iii) a specific item of medical equipment that a physician orders be transported to or with a patient in a specific situation,

contains no other equipment.

(2) Notwithstanding subsection (1), an operator who, on the day this Regulation comes into force, is using an ambulance in his ambulance service that is not constructed in accordance with the specifications prescribed in Schedule 1, may continue to use such ambulance until the Director otherwise orders.

(3) Notwithstanding subsection (1), where an operator cannot readily obtain any item of equipment required by subsection (1), he may, with prior approval of the Director, substitute an item that is equivalent in design and function. O. Reg. 599/75, s. 19.

20. Except for,

- (a) the equipment required or permitted by subsection 19 (1); or
- (b) an item of equipment substituted therefor in accordance with subsection 19 (3),

no operator may acquire by any means whatever any ambulance or ambulance or dispatch equipment unless he obtains the prior approval of the Director. O. Reg. 599/75, s. 20.

21. Every operator who acquires any equipment contrary to section 20 shall permit the Director or an inspector appointed under the Act to remove any such equipment from any ambulance in or on which it is located. O. Reg. 599/75, s. 21.

MAINTENANCE AND REPAIRS

22.—(1) Every operator of an ambulance service shall maintain every ambulance in his ambulance service and the equipment required by section 19,

- (a) in a safe mechanical condition;
- (b) in a clean and sanitary condition; and
- (c) in proper working order.

(2) Every operator who receives a written notice from the Director ordering the operator to effect repairs to an ambulance or to equipment used in his ambulance service shall take all reasonable steps to effect such repairs within forty-eight hours after the receipt of such notice. O. Reg. 599/75, s. 22.

23.—(1) Every operator shall,

- (a) at least once every six months, at intervals not less than 150 days apart, cause each ambulance used in his ambulance service to be inspected at a motor vehicle inspection station licensed under the *Highway Traffic Act*;
- (b) after each such inspection, obtain the safety standards certificate provided for under the *Highway Traffic Act*; and
- (c) within thirty days after each such inspection, file with the Director the safety standards certificate.

(2) Where an inspection made under subsection (1) discloses that an ambulance is not mechanically fit, the operator shall,

- (a) ensure that the ambulance is not used for ambulance service until all repairs required to render it mechanically fit have been made; and
- (b) immediately notify the dispatch centre that normally controls the ambulances used in his ambulance service. O. Reg. 599/75, s. 23.

24. Each member of an ambulance crew who attended on a call where equipment that requires sterilization was used and every operator shall ensure that such equipment is sterilized as soon as is practicable after possible contamination. O. Reg. 599/75, s. 24.

25. No operator and no employee of an operator may install, place or use or permit to be installed, placed or used, in or on any premises or place over which such person has any actual or constructive control, any radiocommunication equipment capable of transmitting on a frequency of 150.100MHz, 149.170MHz, 149.440MHz, 149.410MHz, 149.470MHz, or 149.830MHz except where,

- (a) the equipment is contained in an ambulance under section 19;
- (b) the equipment is located in a dispatch centre licensed under the Act; or
- (c) the Director has expressly authorized it. O. Reg. 599/75, s. 25.

26. Every operator shall take reasonable steps to ensure that every employee complies with section 25. O. Reg. 599/75, s. 26.

27. Where equipment is installed, placed or used contrary to section 25, the operator shall permit the Director or an inspector appointed under the Act to remove it. O. Reg. 599/75, s. 27.

28. No operator may transmit on or otherwise use or permit the use of any frequency in connection with ambulance service unless,

- (a) the frequency is 150.100MHz, 149.170MHz, 149.440MHz, 149.410MHz, 149.470MHz, or 149.830MHz; or
- (b) he has obtained the approval of the Director to the use of such other frequency. O. Reg. 599/75, s. 28.

29. Promptly after the receipt of a directive from the Director respecting the ambulance communication system, every operator shall distribute a copy thereof to each employee who manages or operates radiocommunications equipment. O. Reg. 599/75, s. 29.

30. Every operator shall ensure that all communication equipment under his actual or constructive control is operated in accordance with all applicable Acts of Canada and of Ontario, with all regulations and orders thereunder, and with any instructions and directives issued under authority granted therein. O. Reg. 599/75, s. 30.

PART VI

RETURNS AND REPORTS

EMPLOYMENT RECORDS

31.—(1) Every operator shall keep a register of employees in which is recorded, in respect of each driver attendant and dispatcher,

- (a) name, address and social insurance number of employee;
- (b) date employee commenced employment and current salary;
- (c) employee's driver's licence number and Ontario Ambulance Services Information System number assigned to the employee by the employer;
- (d) experience and qualifications relevant to his employment;
- (e) whether the employee is a full-time or a part-time employee;
- (f) particulars of immunization; and

(g) where applicable, date of and reason for termination of employment.

(2) Every operator shall cause a report in writing to be made to the Director in respect of each such employee,

(a) who is dismissed from employment by reason of incompetence or ill health, no later than thirty days after the last day worked by the employee; or

(b) to whom the operator refuses a certificate required by the employee under subsection 10 (2), no later than thirty days after the date of such refusal.

(3) Every operator shall, within a reasonable time after receiving a written demand therefor from the Director or the Minister, cause to be submitted to the Director or the Minister, as the case may be, such information recorded under this section as is specified in the written demand.

(4) An operator shall retain in respect of each employee the records required by subsection (1) for at least five years following the date the employee leaves the employ of the operator. O. Reg. 599/75, s. 31.

INCIDENT REPORTS

32.—(1) Every operator shall ensure that an incident report is made respecting,

(a) each formal complaint relating to his ambulance service received by him or on his behalf;

(b) each investigation carried out by him or under his authority relating to his ambulance service; and

(c) every unusual occurrence, including unusual delays, suspicious circumstances, equipment deficiencies or interference in the performance of ambulance service, encountered or experienced by him or any of his employees in the course of providing ambulance service.

(2) An operator shall retain a copy of each incident report, whether or not it is an incident report required to be made under this section, for a period of three years after the date of the last notation made therein.

(3) Every operator shall ensure that two copies of each incident report are sent to the Director or to a person designated by the Director for that purpose. O. Reg. 599/75, s. 32.

ACCOUNTING SYSTEM AND REPORTS

33. Every operator shall,

(a) maintain current financial records in accordance with generally accepted accounting principles;

(b) record the receipts, expenditures, assets, liabilities and equity of the ambulance service;

(c) cause financial statements to be prepared at the end of each fiscal year and at the end of each fiscal quarter thereafter;

(d) have the financial records audited yearly by a public accountant, licensed under the *Public Accountancy Act*, and keep with his records relating to his ambulance service the report of the auditor which shall state whether, in the auditor's opinion,

(i) he has received all the information and explanations he has required,

(ii) the financial statements are in accordance with the operator's books and records relating to the ambulance service, and

(iii) the financial statements have been prepared in accordance with generally accepted accounting principles, applied on a basis consistent with that of the previous year; and

(e) where he carries on any business enterprise in addition to his ambulance service,

(i) keep separate books of account and accounting records in respect of the ambulance service, and

(ii) cause the financial statements referred to in clause (c) to be separate in detail from any such business enterprise,

except in the case of an operator who operates a public hospital under the *Public Hospitals Act* or an operator that is a municipality. O. Reg. 599/75, s. 33; O. Reg. 634/78, s. 1.

34. Every operator shall,

(a) within sixty days after the end of each fiscal year, submit to the Director his year end financial statements, prepared in accordance with section 33, on forms provided by the Ministry for that purpose, together with a copy of the auditor's report prepared in accordance with section 33; and

(b) within thirty days after the end of each other fiscal quarter, submit to the Director

his quarterly financial statements on forms provided by the Ministry for that purpose. O. Reg. 634/78, s. 2.

35. Every operator, other than an operator who operates a public hospital under the *Public Hospitals Act* or an operator that is a municipality who carries on any business enterprise in addition to his ambulance service, shall keep separate from any other accounts all bank, trust company, provincial savings office, or similar accounts in which funds respecting his ambulance service are deposited, and shall deposit therein and withdraw therefrom only funds which relate to his ambulance service. O. Reg. 599/75, s. 35.

36.—(1) Every operator who receives funds from the Province of Ontario for ambulance service purposes shall use such funds only for purposes directly related to the provision of ambulance services.

(2) Where the Province of Ontario provides funds to an operator and directs that such funds shall be used for a particular purpose, the operator shall use such funds only for the purpose so specified.

(3) Where the Province of Ontario provides equipment, supplies or other tangible property to an operator, an operator shall use such property only for purposes directly related to the provision of ambulance services unless the Director has approved some other disposition thereof.

(4) Where funds provided by the Province of Ontario are used by an operator to acquire equipment, supplies or any other property, he shall use such property so acquired only for purposes directly related to the provision of ambulance services unless the Director has approved some other disposition thereof. O. Reg. 599/75, s. 36.

37. Every operator shall retain all financial records and documents directly relating thereto for a period of seven years. O. Reg. 599/75, s. 37.

38. Where an operator, other than an operator who operates a public hospital under the *Public Hospitals Act*, or an operator that is a municipality carries on any business enterprise in addition to his ambulance service, he shall ensure that all records relating to his ambulance service, including personnel equipment and supply records, are maintained separate from any other records maintained by him. O. Reg. 599/75, s. 38.

39. Every operator shall maintain a current record of daily hours of work in his ambulance service performed by each of his employees. O. Reg. 599/75, s. 39.

40. Every operator shall make the returns and reports and give such information to the Director respecting the operation of his ambulance service

that the Director specifies in a written notice to the operator. O. Reg. 599/75, s. 40.

41.—(1) Every operator shall identify each invoice, work order and other document relating to maintenance of an ambulance used in his ambulance service,

- (a) by manufacturer's vehicle identification number, where the ambulance is not owned by the Province of Ontario; or
- (b) by the vehicle number attached to the chassis of the vehicle by the Ministry, where the ambulance is owned by the Province of Ontario.

(2) Every operator shall retain each invoice, work order and other document referred to in subsection (1),

- (a) for a period of seven years from the date such invoice, work order or document was made or received; or
- (b) until the Director or an inspector appointed under the Act authorizes the disposal thereof,

whichever first occurs. O. Reg. 599/75, s. 41.

OPERATIONAL AND ACCIDENT REPORTS

42.—(1) Every dispatcher shall, on receiving a call for ambulance services or on being notified of the movement of an ambulance, complete a report thereof on Form 4.

(2) The operator of a dispatch centre shall ensure that such report is disposed of promptly in accordance with Column 2 of Schedule 4. O. Reg. 599/75, s. 42.

43. Each member of an ambulance crew who responds to a call for ambulance service and each operator shall ensure that a report thereof is completed in Form 5 and such report is disposed of forthwith in accordance with Column 2 of Schedule 4. O. Reg. 599/75, s. 43.

44.—(1) Where a driver of an ambulance is directly or indirectly involved in an accident while in charge of an ambulance and,

- (a) the accident is one which he is required to report to a police officer under the *Highway Traffic Act*; or
- (b) the extent of the damage is such that the ambulance could be unavailable for ambulance service for more than four hours,

he shall,

- (c) so notify a dispatcher at the dispatch centre which normally directs the move-

ments of the ambulance, in the most expeditious manner available; and

- (d) forthwith make an accident report to the Director in Form 6 or on a form provided by the Ministry for that purpose. O. Reg. 599/75, s. 44 (1).

(2) In all other cases where a driver of an ambulance is directly or indirectly involved in an accident while in charge of an ambulance which results in damage to the ambulance, the driver shall,

- (a) where the ambulance is owned by the Province of Ontario,

- (i) report the accident forthwith to the nearest provincial or municipal police officer, and

- (ii) within seventy-two hours after the accident make an accident report to the Director in Form 6 or on a form provided by the Ministry for that purpose; or

- (b) where the ambulance is not owned by the Province of Ontario, make a report of the accident to the Director within seventy-two hours after the accident. O. Reg. 599/75, s. 44 (2); O. Reg. 796/75, s. 1.

(3) Every operator shall ensure that his employees comply with sections 42, 43 and this section. O. Reg. 599/75, s. 44 (3).

PART VII

INSURANCE

45. Every operator who uses or permits the use of an ambulance in his ambulance service where the ambulance is not owned by the Province of Ontario shall obtain and maintain in good standing a contract of automobile insurance under Part VI of the *Insurance Act* evidenced by a motor vehicle liability policy whereunder,

- (a) the operator and every driver of the ambulance are insured;
- (b) the minimum liability of the insurer is \$1,000,000 in respect of any one accident;
- (c) the insurer is liable for loss or damage resulting from bodily injury to or the death of any passenger being carried in or upon or entering or getting on to or alighting from the ambulance;
- (d) the insurer is liable for loss of or damage to passenger's property carried in or upon the ambulance; and
- (e) the insurer is liable while the ambulance is used for carrying passengers for compensation or hire. O. Reg. 599/75, s. 45.

PART VIII

MANAGEMENT, OPERATION AND USE

46. An operator shall not refuse and shall not permit any employee to refuse to provide ambulance service unless directed or permitted to do so by a dispatcher. O. Reg. 599/75, s. 46.

47. Each member of an ambulance crew shall ensure,

- (a) that every patient transported in a sitting position in an ambulance wears a safety seat belt or other restraint providing an equivalent degree of safety; and

- (b) that where a patient is transported on a stretcher in an ambulance,

- (i) the patient is adequately secured to the stretcher, and

- (ii) the stretcher is firmly secured in the ambulance. O. Reg. 599/75, s. 47.

48.—(1) Subject to subsection (2), no operator may use or permit the use of an ambulance for any purpose not directly related to the provision of ambulance service.

(2) An operator may use or permit the use of an ambulance to transport medications, medical appliances or human tissue with a patient in an emergency. O. Reg. 599/75, s. 48.

49.—(1) Subject to subsection (2), no operator and no member of an ambulance crew may transport or permit to be transported in an ambulance the remains of any person who a physician has declared dead, or who is obviously dead by reason of decapitation, transection, decomposition or otherwise, unless,

- (a) no patient is transported in the ambulance at the same time;

- (b) the remains of the person are in a public place and it is in the public interest that the remains be removed therefrom; and

- (c) proper arrangements have been made to ensure that an alternative ambulance is readily available for ambulance service during such removal. O. Reg. 599/75, s. 49 (1).

(2) Subsection (1) does not apply where a patient being transported in an ambulance is declared dead by a physician while the ambulance is *en route*. O. Reg. 670/75, s. 1.

(3) Every operator shall ensure,

- (a) that no dispatcher who is his employee gives any instructions to a member of an ambulance crew which are contrary to this section; and
- (b) that each member of an ambulance crew in his ambulance service complies with this section. O. Reg. 599/75, s. 49 (3).

50.—(1) Subject to section 52, the driver of an ambulance in which a patient is transported shall, in an emergency, transport the patient,

- (a) to a facility directed by an attending physician;
- (b) where a direction is not made pursuant to clause (a), to a facility directed by a dispatcher ordering the movements of the ambulance; or
- (c) where a direction is not made under clause (a) or (b), to the nearest facility where the medical attention apparently required for the care of the patient is available.

(2) In a case other than an emergency, where the use of an ambulance is medically necessary, the driver of an ambulance in which a patient is transported shall transport the patient a reasonable distance,

- (a) to a place directed by an attending physician; or
- (b) where a direction is not made under clause (a), to a place directed by a dispatcher ordering the movements of the ambulance.

(3) Notwithstanding subsections (1) and (2),

- (a) where an Act or Regulation, or an order, direction or authorization made thereunder, requires the transportation of a patient to a place other than that prescribed by this Regulation, the driver of an ambulance shall transport the patient in accordance therewith; and
- (b) where an Act or Regulation, or an order, direction or authorization made pursuant thereto, expressly permits the transportation of a patient to a place other than that prescribed by this Regulation, the driver of an ambulance may transport the patient in accordance therewith.

(4) A patient who calls for ambulance service, or any person who calls for ambulance service on behalf of a patient, shall be deemed to have authorized and directed his transportation in accordance with this section.

(5) Subject to subsection (3), where a patient who is transported in an ambulance demands that

he be allowed to remove himself therefrom, the ambulance driver shall, on receiving from the patient or his guardian a release from liability, release the patient at the nearest health facility or into the custody of an apparently responsible adult who agrees to assume responsibility for the patient. O. Reg. 599/75, s. 50.

51. No person shall smoke any cigar, cigarette, tobacco or other substance while in an ambulance. O. Reg. 599/75, s. 51.

52.—(1) Notwithstanding section 50, no operator and no member of an ambulance crew may,

- (a) transport a patient in an ambulance,
 - (i) from Ontario to a place outside of Ontario; or
 - (ii) from a place outside of Ontario to Ontario; or
- (b) proceed in an ambulance to an emergency outside Ontario,

unless he has been authorized to do so by a dispatcher, the Director or an official of the Ministry who is authorized by the Director to grant an authorization.

(2) An operator or an ambulance crew who is directed under section 50 to transport a patient in an ambulance from Ontario to a place outside Ontario may do so only in accordance with subsection (1) of this section.

(3) This section shall not be construed as prohibiting an operator who does not operate an ambulance service in Ontario,

- (a) from transporting a patient into, out of or through Ontario; or
- (b) from entering and providing ambulance services in Ontario when requested to do so by a dispatcher, the Director or an official of the Ministry who is authorized by the Director to make such a request. O. Reg. 599/75, s. 52.

53.—(1) Where in the course of providing ambulance services an operator or a member of an ambulance crew accepts property delivered or entrusted to him for safekeeping, the person to whom the property is delivered or entrusted shall take reasonable care of it.

(2) An operator or a member of an ambulance crew may refuse to accept property for safekeeping. O. Reg. 599/75, s. 53.

54. A driver of an ambulance shall,

- (a) immediately upon the termination of an ambulance trip carefully search the

ambulance for any property lost or left therein by any passenger; and

(b) forthwith deliver any property found by him therein,

(i) to the passenger who lost or left the property therein,

(ii) to the nearest police station, or to a hospital to which the passenger was conveyed, or to the passenger's next of kin, or

(iii) where the passenger has died, to a coroner or a person acting with the authority of a coroner, or to the passenger's next of kin. O. Reg. 599/75, s. 54.

55. Every operator of an ambulance service shall ensure,

(a) that each driver attendant is neat and clean when responding to a call for ambulance service and when transporting a patient;

(b) that every emergency medical care assistant, while on duty, displays in a conspicuous place on the outside of his clothing an insignia bearing the words "Emergency Medical Care Assistant"; and

(c) that no driver attendant, other than an emergency medical care assistant, displays the insignia an emergency medical care assistant is required to display. O. Reg. 599/75, s. 55.

56.—(1) No driver attendant shall,

(a) while he is on duty, take, consume or have in his possession any liquor within the meaning of the *Liquor Control Act*, or any drug which could impair his ability to function as a driver attendant; or

(b) report for duty while under the influence of any liquor within the meaning of the *Liquor Control Act*, or any drug which could impair his ability to function as a driver attendant.

(2) No operator shall permit a member of an ambulance crew to respond to a call for ambulance service while the member is apparently under the influence of such liquor or drug, or suffering from the effects thereof. O. Reg. 599/75, s. 56.

57. Every operator shall ensure that when responding to a call for ambulance service, an ambulance is staffed with at least two driver attendants, each of whom holds the qualifications for employment prescribed in this Regulation. O. Reg. 599/75, s. 57.

58.—(1) An operator shall take all reasonable steps to ensure that where,

(a) his plan for hours of operation and staffing is approved by an authorized official of the Ministry as the basis for financial support by the Province of Ontario for the provision of ambulance services, and the plan provides that ambulance service shall be immediately available during specified periods;

(b) the Director directs him to make his ambulance service immediately available during periods specified by the Director; or

(c) the operator agrees with the Director to make his ambulance service immediately available during periods agreed to by the operator and the Director,

there are on duty in respect of each ambulance immediately available for ambulance service during such periods, at least two driver attendants, each of whom holds the qualifications for employment prescribed in this Regulation.

(2) For the purposes of this section, a driver attendant shall be deemed to be on duty only if,

(a) he is physically present at the ambulance service facilities; or

(b) where he is not physically present, he is required by the operator to hold himself immediately available for a call to work under a call back system and the Director has approved the call back system for use by the operator. O. Reg. 599/75, s. 58.

59.—(1) No person may drive an ambulance that is not available for the provision of ambulance service unless a sign is displayed in a conspicuous manner, both at the front and rear of the vehicle bearing the words "Not in Service" and the words of each sign are clearly visible to the public.

(2) No person may drive an ambulance that is available for the provision of ambulance service unless the staff required by section 57 for responding to a call are present in the ambulance and,

(a) the ambulance is equipped in accordance with this Regulation and the ambulance and its equipment are in the condition and order required by section 22; or

(b) where the ambulance accessory equipment or medical equipment is temporarily deficient, a dispatcher has directed that the ambulance be used to provide ambulance services.

(3) Every operator shall ensure that every ambulance used in his ambulance service is used

only in accordance with this section. O. Reg. 599/75, s. 59.

60. No operator may require or permit any full-time employee while the employee is on duty in the ambulance service to perform any duties which are not directly related,

- (a) to the provision of ambulance services;
- (b) to a dispatch centre;
- (c) to the maintenance, repair, or preparation of ambulance service equipment;
- (d) to the care and security of persons receiving care in a health care facility;
- (e) to the communications need of a health care facility; or
- (f) to public service activities related to emergency health care. O. Reg. 599/75, s. 60.

61. No operator may require, as a condition of full-time employment in his ambulance service, that the applicant for employment agree to perform any duties which would contravene section 60. O. Reg. 599/75, s. 61.

62. Every operator shall ensure that,

- (a) in each ambulance used in his ambulance service, there is displayed in a clearly visible position at the lower left corner of the windshield and on the left side of the rear of the ambulance, the ambulance number designated for the ambulance by the Director;
- (b) that only the ambulance number so designated is used as the ambulance radio call number; and
- (c) only an ambulance in respect of which an ambulance number has been designated by the Director is used to provide ambulance service. O. Reg. 599/75, s. 62.

63. Every operator of an ambulance service shall ensure that,

- (a) each movement of an ambulance used in his ambulance service is reported to the dispatch centre that normally directs the movements of his ambulances;
- (b) staff at such dispatch centre are continuously informed as to the availability of ambulances in his ambulance service; and
- (c) all employees or other persons acting under his direction in his ambulance service

comply with all reasonable directions and instructions respecting the dispatching of ambulances and the ambulance communication system issued by a dispatcher in the area where the ambulance is located at any given time. O. Reg. 599/75, s. 63.

64.—(1) The operator of a dispatch centre shall formulate written operational procedures respecting the method of dispatching and deployment of ambulances in use or intended to be used by his dispatch centre prior to commencing the operation of the dispatch centre.

(2) The operator shall submit the procedures referred to in subsection (1) to the Director for approval prior to commencing the operation of the dispatch centre.

(3) The operator of a dispatch centre shall operate his dispatch centre in accordance with,

- (a) the procedures referred to in this section that are approved by the Director; or
- (b) where the Director approves such procedures subject to variations prescribed by the Director in accordance with the procedures as varied by the Director; or
- (c) where no such procedures are approved by the Director, in accordance with procedures prescribed by the Director.

(4) An operator of a dispatch centre shall obtain the approval of the Director thereto prior to implementing any changes to the procedures required by this section. O. Reg. 599/75, s. 64.

65. Before advertising his ambulance service by any means, an operator shall submit to the Director the proposed form of advertisement and the proposed method of its dissemination. O. Reg. 599/75, s. 65.

66. No operator shall identify or permit to be identified any vehicle as an ambulance, whether by sign, marking, reference to the Ministry or otherwise, unless the vehicle is an ambulance that the operator is authorized to use under clause a of section 4. O. Reg. 599/75, s. 66.

67.—(1) Where an operator intends to terminate his operation of an ambulance service, he shall at least ninety days before the date on which he intends to terminate his operation of the ambulance service, give notice in writing to the Director stating,

- (a) that his operation of the ambulance service is to be terminated;
- (b) the date on which the termination is to occur;
- (c) particulars of any arrangements or plans for the sale, transfer or other disposition

of the ambulance service or any part thereof; and

- (d) where the operator is a corporation, any arrangements or plans for the transfer of shares in the corporation by any shareholder holding or acquiring such shares at any time between the date such notice is given and the date of termination.

(2) Subsection (1) does not apply where the termination of the operation of an ambulance service is the result of,

- (a) a revocation by the Director of the operator's licence to operate the ambulance service;
- (b) an order of the Minister made under section 5 of the Act; or
- (c) a refusal by the Director to renew the operator's licence to operate the ambulance service. O. Reg. 560/77, s. 1, *part*.

68.—(1) Every operator who terminates his operation of an ambulance service shall, prior to such termination,

- (a) deliver or cause to be delivered to such person or place designated in writing by the Director,
 - (i) the register of employees referred to in subsection 31 (1),
 - (ii) the invoices, work orders and other documents referred to in subsection 41 (1) in respect of each ambulance owned by the Province of Ontario,
 - (iii) the reports referred to in sections 42 and 43,
 - (iv) any records, reports, books, documents or recordings that relate directly to any person who has been

provided with ambulance services or to any call for ambulance service,

- (v) all invoices, orders, records and documents relating to equipment, supplies or other property owned by the Province of Ontario that have been in the operator's possession, and

- (vi) any financial or other records or reports relating to the ambulance service not previously submitted to the Director or the Minister under any requirement of this Regulation;

- (b) deliver or cause to be delivered to such person or place designated in writing by the Director or by an official of the Ministry acting under the authority of the Director, or by the Minister, all property in his possession or under his control that is owned by the Province of Ontario;

- (c) deliver or cause to be delivered to the Director closing financial statements for the ambulance service on forms provided by the Ministry for that purpose, together with a copy of an auditor's report that meets the requirements of clause 33 (d); and

- (d) pay to the Treasurer of Ontario the amount of any overpayment made by the Province of Ontario for the provision of ambulance services determined in accordance with clause 4 (1) (f) of the Act.

(2) The requirements of Part VI with respect to the retention or delivery of any report, record, invoice, work order or other document do not apply to any report, record, invoice, work order or other document that has been delivered in accordance with this section or in compliance with any request or demand therefor by the Director or the Minister under the Act or the Regulations. O. Reg. 560/77, s. 1, *part*.

Schedule 1

AMBULANCE SPECIFICATIONS AND EQUIPMENT

1. The minimum external dimensions of a standard ambulance shall be,

- (a) wheel base 125 inches (312.50 centimetres);
- (b) tracking width of the front wheels 68 inches (170.00 centimetres).

2. The minimum external dimensions for an ambulance having a four-wheel drive capability shall be,

- (a) wheel base 127 inches (317.50 centimetres);
- (b) tracking width of the front wheels 66 inches (165.00 centimetres).

3. The internal dimensions of the patient compartment of an ambulance shall provide,
 - (a) a minimum of 53 inches (132.50 centimetres) between floor and ceiling;
 - (b) for the placement and transport of two stretcher patients;
 - (c) for the placement and transport of at least one sitting patient when only one stretcher is in use;
 - (d) for seating in the patient compartment for at least one attendant with one such attendant's seat at the head of the principal or main stretcher patient;
 - (e) readily accessible and sanitary storage space for medical equipment listed in Schedule 3.
4. The internal dimensions of an ambulance shall provide for,
 - (a) a solid full width partition between the patient compartment and driver's area, extending upward to sliding windows of transparent safety glass or equivalent, which conforms to the standards for glazing materials of vehicles prescribed in the regulations under the *Motor Vehicle Safety Act* (Canada), opening to allow verbal communication between the driver and attendant; and
 - (b) easy loading of stretcher patients by means of a door or doors at the rear of the vehicle, and easy loading of ambulatory patients by means of a door or doors on the right side.
5. Any door opening into or out of the patient compartment shall be designed and equipped to permit such door to be opened from the inside of the vehicle, and such opening mechanism shall,
 - (a) contain instructions for the opening thereof on or adjacent thereto; and
 - (b) be designed to prevent inadvertent opening.
6. A lap-type safety seat belt conforming to the standards prescribed in the regulations under the *Motor Vehicle Safety Act* (Canada) shall be provided for each seating position in the vehicle, and such belt locking mechanism and mounting device shall be properly maintained and in good working order.
7. Every ambulance shall provide,
 - (a) adequate comfort and safety for patients being transported with the chassis so sprung as to provide maximum riding comfort in the patient compartment;
 - (b) adequate temperature regulation and ventilation;
 - (c) interior lighting adequate for the care of patients;
 - (d) a rear flood light designed and attached to light the area immediately to the rear of the ambulance automatically upon opening of the rear door or doors; and
 - (e) such storage for the equipment in Schedules 2 and 3 as to prevent or minimize projections and sharp edges, and to keep such equipment readily available for use.
8. Every ambulance shall, subject to the *Highway Traffic Act*, be provided with,
 - (a) a rotating light, (one only) red and white in colour, consisting of not less than three sealed beam units, two of which shall be red, mounted on the roof and visible from the front and rear for at least 150.00 metres, and where the light consists of four sealed beam units, the units shall be so arranged as to alternately display colours of red and white light;
 - (b) an audio warning device which shall automatically produce alternate high and low horn tones, but no other audible warning sound;
 - (c) a public address system;
 - (d) four intermittently flashing lights, mounted on the roof, one on each corner of the vehicle, the two at the front shall simultaneously produce red light only to the front of the vehicle and the two at the rear shall simultaneously produce red light only to the rear of the vehicle; and

- (e) one intermittently flashing red light, mounted laterally centered on the hood of the vehicle, and so arranged as to project a beam of red light through the rear window of a passenger vehicle preceding the ambulance.
9. The controls for the signals and devices in section 8 of this Schedule shall be readily accessible to the driver and operable by him while seated in the driving position.
10. Every ambulance shall be painted white, with a horizontal dark blue band extending along each side of the vehicle, in such a proportion and dimension as is appropriate to the design of the vehicle.
11. Every ambulance shall display the word "Ambulance" in block letters, of red retro-reflective material, at least 7 inches (17.50 centimetres) in height, with the lines making up the letters at least 1 inch (2.5 centimetres) in thickness, on the rear of the vehicle, and where applicable relative to the design of the vehicle, on the front thereof. O. Reg. 599/75, Sched. 1.

Schedule 2

PART I

AMBULANCE ACCESSORY EQUIPMENT

GENERAL

Item	Type	Minimum Number Required	Specifications
1.	Spare tire and wheel and tire changing tools	1	Type suitable to the ambulance in which carried
2.	Logging chain	1	At least 10 feet (3.00 metres) drag link at both ends
3.	Rope	1	100 feet, ½ inch (30.00 metres, 1.25 centimetres)
4.	Flares	4	Red, fusee-type 20 minutes
5.	Hacksaw	1	With 6 spare blades
6.	Spade	1	"D" handle
7.	Pry Bar	1	Minimum 48 inches (120 centimetres) in length. Chisel point.
8.	Crow Bar	1	36 inches (90 centimetres) in length
9.	Portable hand lights	2	Battery operated
10.	Fire extinguisher	1	Rated 6 B.C. by the Underwriter's Laboratories of Canada
11.	Radio equipment		Two-way communication equipment of a type, power and frequency or frequencies approved by the Director or permitted by these regulations
12.	Safety seat belts	2	1-driver 1-co-driver (conforming to the standards required under the <i>Motor Vehicle Safety Act</i> (Canada))

PART II

AMBULANCE ACCESSORY EQUIPMENT

PATIENT CARE

1. One stair chair with two safety retaining straps of a type designed and intended for use in an ambulance.
2. Two stretchers,
 - (a) the first of which shall be of a wheeled design, adjustable to multi-levels and fully contoured for head and lower limb elevation, having two safety retaining straps; and
 - (b) the second of which shall be as prescribed in clause *a*, or be of an emergency type, approved by the Director, with head elevation, having two safety retaining straps.
3. Two stretcher canvasses, or equivalent, with sleeves for removable carrying handles.
4. One pair of carrying handles to fit the stretcher sleeves referred to in section 3 of this Schedule.
5. Lap-type safety seat belts, conforming to the standards prescribed in the regulations under the *Motor Vehicle Safety Act* (Canada), one for each attendant seat and one for each seat position in the patient compartment.
6. One fracture board for stretcher at least 6 feet (1.80 metres) long and 16 inches (40 centimetres) wide, with slots cut in long dimension for hand hold and anchorage.
7. Three safety retaining straps, each at least 6 feet (1.80 metres) long, suitable for use with fracture board,
8. One short fracture board, commonly referred to as a cervical board, 36 inches (90 centimetres) long and 18 inches (45 centimetres) wide, with slots cut in the long dimension for hand hold, of a design and type approved by the Director.
9. Two safety retaining straps, at least 9 feet (2.70 metres) long for use with the short fracture board.
10. Two 4 pound (1.80 kilograms) positioning sand bags.
11. Five blankets.
12. Four sheets, cotton or equivalent.
13. Two sheets, plastic or equivalent.
14. Two pillows – hypoallergenic.
15. Two terry cloth bath towels.
16. Four pillow cases.
17. Two plastic pillow cases.
18. Emesis container.
19. One adjustable, clamp-on type, intravenous pole. O. Reg. 599/75, Sched. 2.

Schedule 3
MEDICAL EQUIPMENT

Item	Type	Minimum Number Required	Specifications
1.	Oxygen Equipment,		
	(a) oxygen cylinders	2	Minimum capacity of 736 litres each (E type) one of which shall be fully charged when responding to a call;
		1	Minimum capacity of 3,453 litres (M type);
	(b) regulator litre flow, metre assembly	2	Of a design approved by the Director;
	(c) humidifier	1	
	(d) mask	1	Medium adult size;
	mask	1	Child size.
2.	Ventilator	1	Self-inflating bag, with non-rebreathing valve, and adult mask, adaptable for use with oxygen;
		1	Limited positive pressure (Flynn, or type approved by the Director as equivalent), complete with medium adult mask and child mask.
3.	Suction apparatus	1	Vacuum operated, vehicle mounted;
		1	Manually operated complete with catheter.
4.	Portable first-aid kit	1	
5.	Airway,		
	(a) oropharyngeal	1	Large size;
	oropharyngeal	1	Medium size;
	oropharyngeal	1	Small size;
	(b) naso-pharyngeal	1	Size 26 Fr.
	naso-pharyngeal	1	Size 30 Fr.
	naso-pharyngeal	1	Size 34 Fr. with water soluble lubricant.
6.	Cervical collar	2	Ministry of Health design or equivalent.
7.	Tongue depressors	10	Individually wrapped.
8.	Mouth gags	2	Padded tongue blades.
9.	Splints		
	— padded where applicable	2	4½ feet (1.35 metres) long, 3 inches (7.50 centimetres) wide,
	— padded where applicable	2	3 feet (.90 metres) long, 3 inches (7.50 centimetres) wide,

Item	Type	Minimum Number Required	Specifications
	— padded where applicable	2	15 inches (37.50 centimetres) long, 3 inches (7.50 centimetres) wide. Must not be self-inflating if inflatable type used.
10.	Hinged half-ring splint with web strap for ankle hitch	1	Type commonly referred to as a Thomas Splint.
11.	Bandages		
	(a) conforming	6	3 inches (7.50 centimetres) wide;
	conforming	6	4 inches (10 centimetres) wide;
	(b) flannelette	6	3 inches (7.50 centimetres) wide;
	flannelette	6	6 inches (15.00 centimetres) wide;
	(c) triangular bandage	12	40" × 40" (100 cm × 100 cm) cut diagonally.
12.	Sterile Dressings,		
	(a) sterile gauze pads	24	4 inches by 4 inches (10 centimetres by 10 centimetres) individually wrapped;
	(b) combine pads or equivalent	12	12 inches by 12 inches (30 centimetres by 30 centimetres);
	(c) sterile pressure dressings with securing bandage attached	12	Ministry of Health type;
	(d) eyepads	6	
13.	Adhesive tape	2	3 inch (7.50 centimetres) rolls.
14.	Bandage scissors	1	
15.	Large safety pins	24	
16.	Obstetrical kit	1	Sterilized.
17.	Burn kit	1	Sterilized.

Schedule 4

DISPOSITION OF FORMS

COLUMN 1		COLUMN 2
Form	Copy Number and Description	Disposition
Form 4		
AS5-D	1 OASIS	Mailed every two weeks to Ministry of Health OASIS.
(Where call received by dispatcher at a Central Dispatch Centre)	2 YELLOW	Retained by dispatch centre.
	3 PINK	Sent to ambulance service performing call.
AS5-D	1 OASIS	Mailed every two weeks to Ministry of Health OASIS.
(Where call received by dispatcher other than at a Central Dispatch Centre)	2 YELLOW	Retained by ambulance service.
	3 PINK	May be discarded.
Form 5		
AS5-A		
(Where destination is billing hospital)	1 OASIS	Deposit at hospital attached to billing copy and update stub.
or		
(Where destination is <i>not</i> billing hospital but origin is)	1 OASIS	Return to origin with billing copy and update stub attached.
or		
(Where destination and origin are not billing hospital)	1 OASIS	Return to ambulance service performing call with billing and update stub attached.
	2 BILLING	Return to ambulance service performing call with billing and update stub attached.
	3L UPDATE	Return to ambulance service performing call with billing and update stub attached.
(Where destination is billing hospital)	3R PATIENT	Handed to person receiving patient.
or		
(Where destination is non-medical)	3R PATIENT	Discard.
or		

COLUMN 1		COLUMN 2
Form	Copy Number and Description	Disposition
(Where operator of ambulance service bills)	3R PATIENT	Given to patient as receipt.
	4 PINK	Retained by ambulance service.

O. Reg. 599/75, Sched. 4.

Form 1

Ambulance Act

APPLICATION FOR LICENCE TO OPERATE AN AMBULANCE SERVICE

1. Name of Ambulance Service _____

Postal Code _____

2. Address of Ambulance Service _____

Ambulance

Business

3. Telephone Numbers _____

4. (a) IF INCORPORATED (Copy of instrument of incorporation to be attached)

Name of Corporation _____

Name of Each Director

Address of Each Director

(b) IF A PARTNERSHIP

Name of Partnership _____

Name of Each Partner

Address of Each Partner

(c) IN ALL SITUATIONS

Name of Operator (Person having daily senior operational control)

Address of Operator

5. AMBULANCES (Not owned by Ontario Government) — Number _____

Insurer _____ Policy Number _____

	P.L. \$ _____	Passenger Hazard	Deductible
Policy Limit		\$ _____	Collision \$ _____
	P.D. \$ _____		Comprehensive \$ _____

6. ACCOMMODATION (Ambulances, Staff, Administrative Office, Dispatch (if any)

Location (Address) _____

Type of Construction _____

	Heated
_____	Yes No
	Type

General Description _____

7. HAS AN APPLICATION TO OPERATE AN AMBULANCE SERVICE EVER BEEN REFUSED OR REVOKED?

(a) For this Service _____

(b) For this Individual, Partner, Corporation, Director _____

8. Name Branch and Location of Bank _____

Phone Number _____

9. Name and Address of Accountant _____

Phone Number _____

10. Dated at _____ this _____ day of _____, 19 _____

(Signature of Operator)

Form 2

Ambulance Act

APPLICATION FOR RENEWAL OF LICENCE TO OPERATE AN AMBULANCE SERVICE

1. Name of Ambulance Service _____

Street & Number City or Town Postal Code

2. Address of Ambulance Service _____

Ambulance No. where applicable Business No.

3. Telephone Numbers _____

4. (a) IF INCORPORATED (Copy of instrument of incorporation to be attached)

Name of Corporation _____

Name of each Director Address of each Director

(b) IF A PARTNERSHIP

Name of Partnership _____

Name of each Partner Address of each Partner

(c) IN ALL SITUATIONS

Name of Operator (Person having daily senior operational control) Address of Operator

5. Ambulances (Not owned by Ontario Govt.) — Number _____

Insurer _____ Policy Number _____

Policy Limits	P.L. \$ _____	Passenger Hazard		Deductible	
	P.D. \$ _____	\$ _____	Collision \$	Comp. \$	

6. Current OASIS Numbers _____

7. Name, Branch, and Location of Bank Phone No.

8. Name and Address of Accountant

Phone No.

Dated at _____ this _____ day of _____, 19____

For Ministry Use Only

Renewal of Licence

Recommended

Not Recommended

Conditions

Required

Ministry

Official

(Signature(s) of Operator(s))

O. Reg. 599/75, Form 2.

Form 3*Ambulance Act*

Licence No.

LICENCE TO OPERATE AN AMBULANCE SERVICE

Pursuant to the *Ambulance Act* and the regulations thereunder, and subject to the terms and conditions contained on the reverse side:

(operator)

(address)

is hereby authorized to operate an ambulance service consisting of _____ ambulances

designated by O.A.S.I.S. ambulance number(s) _____

known as _____

This licence expires on _____ 19____ unless sooner suspended or revoked

Dated at the City of Toronto, this _____ day of _____, 19____

Director

O. Reg. 599/75, Form 3.

Form 4
Ambulance Act

CALL NUMBER	PATIENTS	PRIORITY
<input type="text"/>	<input type="text"/>	<input type="text"/>
VEHICLE NO.	STATION	SERVICE
<input type="text"/>	<input type="text"/>	<input type="text"/>
DISPATCH CENTRE	DISPATCHER	DELAY CODE
<input type="text"/>	<input type="text"/>	<input type="text"/>
PICK UP LOCATION CODE	REMARKS	
<input type="text"/>	<input type="text"/>	
REGION LOCAL METRO		
<input type="text"/>	<input type="text"/>	
DESTINATION LOCATION CODE		
<input type="text"/>	<input type="text"/>	

YEAR	MONTH	DAY	HOUR	MINUTE	
CALL REC'D	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	1
CREW NOTIFIED	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	2
DEPARTED STATION	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	3
TIME	ARRIVED SCENE	<input type="text"/>	<input type="text"/>	<input type="text"/>	4
DEPARTED SCENE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	5
ARRIVED DEST'N	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	6
DEPARTED DEST'N	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	7
RETURNED BASE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	8

1 ORIGINATOR	2 INCOMPLETE CALL	3 DESTINATION	4 HOSPITAL CHOICE	1
DOCTOR	POLICE FIRE	GENERAL	CLOSEST	2
HOSPITAL	DOCTOR	CHRONIC	AVAILABLE SPACE	3
NURSING HOME	PATIENT REFUSED	CONVUL- ESCENT	DOCTOR	4
PATIENT / RELATIVE	HIGHER PRIORITY CALL	PSYCHI- ATRIC	PATIENT	5
OTHER CITIZEN	BY POLICE	NURSING HOME	RELATIVE	6
O.P.P.	BY CITIZEN	RESIDENCE	POLICE	7
OTHER POLICE	BY FIRE DEPT.	DOCTOR'S OFFICE	TYPE OF INJURY	8
FIRE DEPT	OTHER AMBULANCE	OTHER MEDICAL FACILITY	TRAFFIC ROAD CONDITIONS	9
MOTOR LEAGUE	FALSE ALARM	AIRCRAFT	SHARING DISTRIBUTION	0
WELFARE	PATIENT PRONOUNCED DEAD	TRANSPORT TERMINAL	OTHER	
AMBULANCE CREW	VEHICLE FAILURE	MORGUE		
OTHER	OTHER	OTHER		

PATIENT NAME _____

PICK UP LOCATION _____

DEST'N. _____

CALL ORIGINATOR _____

CALL TYPE _____

INSTRUCTIONS (COMMENTS): _____



AS5D AMBULANCE DISPATCH RECORD

- INSTRUCTIONS
- 1) USE AN M PENCIL.
 - 2) MAKE NUMERALS AS ILLUSTRATED ABOVE.
 - 3) ERASE ALL ERRORS COMPLETELY.
 - 4) DO NOT FOLD OR MUTILATE THIS FORM.

Ambulance Act

[illegible]

WHEN A PATIENT IS TRANSPORTED: YOU MUST MARK AT LEAST COL. 1, 2 or 3, 12, 13 & 15

O Reg. 717/79, s. 1.

Form 6

Ambulance Act

AMBULANCE ACCIDENT REPORT

1. Name of Ambulance Service _____ Station or Satellite Location at _____
2. Address _____
3. Name of Employee _____ Address _____
4. Age _____ Date of Birth _____
5. Driver's Licence No. _____
6. Date of Accident _____ Time _____ Location including kilometres _____
_____ to the nearest town or village _____
7. Investigating Police _____ Officer's Name _____ No. _____
8. Ministry owned Ambulance: _____ Yes _____ No _____
Licence No. _____ Min. Veh. No. _____ Radio Call (OASIS) No. _____
9. If privately-owned Ambulance, State Owner _____
Licence No. _____
10. Owner, Other Vehicle or Property _____
Address _____
11. (a) Driver of Other Vehicle _____ Driver Licence No. _____
Address _____
(b) Insurance Company _____ Policy No. _____
12. Make of other Vehicle _____ Licence No. _____
13. Were Lights on Ambulance Vehicle Lighted? _____ Front _____ Rear _____
14. Were Lights on Other Vehicle Lighted? _____ Front _____ Rear _____
15. Approximate Speed of Ambulance _____ Other Vehicle _____
16. Weather Conditions: Rain, Snow, Clear, Fog _____
17. Width of road surface _____ Width of road grade _____
18. Type of Surface _____ Condition: wet, dry, soft, hard, icy, snowpacked, snow-covered, etc. _____
19. Type and Condition of Shoulders: soft earth, hard earth, gravel, stone _____
20. Were Advance Warning Flags, Signs, Flares or Flagman Used? _____

21. (a) Names and Addresses of Other Occupants in Ambulance_____

(b) Were Emergency Lights in Operation?_____

(c) Was Siren in Operation?_____

22. Names and Addresses of Other Occupants in Other Vehicle_____

23. If any of the above were injured, state names, nature of injuries_____

24. Was Other Vehicle or Property Damaged?_____ If so, give description_____

25. Estimated Cost of Repair \$_____

26. Was Ambulance Damaged?_____ If so, give description_____

27. Estimated Cost of Repair \$_____

28. Names and Addresses of Witnesses (other than occupants of vehicles)_____

29. Describe fully how accident happened, stating cause and action taken by driver following accident.
(If insufficient space on this Form, attach separate sheets)

REGULATION 15

under the Anatomy Act

GENERAL

1. The following are designated as schools for the purposes of the Act:

1. Queen's University—Department of Anatomy
2. University of Ottawa—Department of Anatomy
3. University of Toronto—Department of Anatomy
4. University of Western Ontario—Department of Anatomy
5. Canadian Memorial Chiropractic College—Department of Anatomy
6. University of Guelph—Section of Human Anatomy
7. McMaster University—Department of Anatomy
8. University of Waterloo—Section of Human Anatomy. R.R.O. 1970, Reg. 18, s. 1; O. Reg. 772/73, s. 1; O. Reg. 35/78, s. 1.

2. In accordance with section 8 of the Act, each school shall keep the following records:

1. Every certificate for anatomical dissection of an unclaimed body, in Form 2, received by the school.
2. Every certificate for anatomical dissection of a donated body, in Form 3, received by the school.
3. A copy of every receipt for a body, in Form 4, completed by the school.
4. Every notice of disposal of a body, in Form 7, completed by the school.
5. Every identification tag, in Form 8, attached to a body received by the school.
6. Every consent given under the *Human Tissue Gift Act* for use after death of a body received by the school.
7. The burial permit required in connection with the disposal of a body under the *Vital Statistics Act*.
8. An antero posterior photograph and a lateral photograph of the face of each unclaimed body received by the school.

9. A complete set of finger-prints of each unclaimed body received by the school. R.R.O. 1970, Reg. 18, s. 2; O. Reg. 782/80, s. 1.

3. Every local inspector shall ensure that a donated body information report, in Form 1, is completed and kept on file in his office. R.R.O. 1970, Reg. 18, s. 3.

4. Where a local inspector has caused an unclaimed body under his control to be delivered to a school, he shall complete and forward to the school a certificate for anatomical dissection of an unclaimed body, in Form 2. R.R.O. 1970, Reg. 18, s. 4.

5. Where a local inspector has been notified, under subsection 5 (2) of the Act, of a body received for the purposes of anatomical dissection, the local inspector shall, when he has obtained the particulars he requires, complete and forward to the school a certificate for anatomical dissection of a donated body, in Form 3. R.R.O. 1970, Reg. 18, s. 5.

6. Every local inspector shall require the professor of anatomy, or his agent, of a school to which an unclaimed or donated body has been delivered, to complete in duplicate a receipt for a body, in Form 4, and return a copy of the receipt to the local inspector. R.R.O. 1970, Reg. 18, s. 6.

7. Every local inspector or coroner, as the case may be, shall ensure that there is completed and filed in his office a report of an unclaimed body, in Form 5, in respect of every unclaimed body under the control of the local inspector or coroner, as the case may be. R.R.O. 1970, Reg. 18, s. 7.

8. Every local inspector or coroner, as the case may be, shall complete and forward to the clerk of the municipal corporation a report and warrant to dispose of an unclaimed body, in Form 6, in respect of every unclaimed body to be disposed of at the expense of the municipal corporation under section 11 of the Act. R.R.O. 1970, Reg. 18, s. 8.

9. The professor of anatomy, or his agent, of a school shall complete and forward to the general inspector a notice of disposal of a body, in Form 7, in respect of every body to be disposed of by the school. R.R.O. 1970, Reg. 18, s. 9.

10. Every local inspector or coroner, as the case may be, or his agent shall ensure that there is attached to the neck and to a toe of each donated body and of each unclaimed body an identification tag in Form 8, before the body is delivered to a school. O. Reg. 782/80, s. 2.

11. Every local inspector or coroner, as the case may be, shall complete and forward to the general inspector a report of delivery or disposal of a body, in Form 9,

- (a) for each donated body and for each unclaimed body authorized by the local inspector to be delivered to a school; and
- (b) for each unclaimed body requested by the local inspector or coroner, as the case may be, to be disposed of by a municipal corporation. R.R.O. 1970, Reg. 18, s. 11.

12. Every local inspector or coroner, as the case may be, shall complete and forward to the person in charge of a public morgue or private morgue, as the case may be, for the municipality in which a body is found an order for storage of a body, in Form 10. R.R.O. 1970, Reg. 18, s. 12.

13. The general inspector shall submit to the Solicitor General, on or before the 30th day of March in each year, an annual report for the preceding year. O. Reg. 772/73, s. 2.

14. The general inspector shall ensure that a register of all bodies reported to him under the Act and this Regulation is kept. R.R.O. 1970, Reg. 18, s. 15.

15. There shall be paid to a local inspector by a school a fee of \$40 for each body delivered to the school by the inspector. O. Reg. 965/78, s. 1.

16. There shall be paid to a local inspector or coroner by a municipality a fee of \$40 for each body disposed of by the municipal corporation under section 11 of the Act. O. Reg. 782/80, s. 3.

17. On or before the 31st day of January in each year, each school shall pay to the general inspector a fee of \$200. R.R.O. 1970, Reg. 18, s. 18.

Form 1

Anatomy Act

DONATED BODY INFORMATION REPORT

1. Name of deceased.....
(surname) (given names)

2. Last place of residence of deceased.....
(street or rural route)
.....
(city, town or village) (county, etc., or territorial division)

3. Death reported on.....
(day) (month) (year)
at....., by.....
(time a.m. or p.m.) (surname) (given names) (address)

4. Age of deceased.....

5. Sex of deceased.....

6. Birthplace of deceased.....

7. Date of death.....
(day) (month) (year)

8. Cause of death.....

9. School of Anatomy to which body delivered.....

10. Date body delivered to School of Anatomy.....
(day) (month) (year)

11. Burial Permit obtained at.....
(place) (date)

12. Information regarding deceased obtained from.....
 (name in full)

 (address)

Dated at....., this.....day of....., 19...

 (Local Inspector of Anatomy, or his agent)
 at.....
 (address)

R.R.O. 1970, Reg. 18, Form 1.

Form 2

Anatomy Act

CERTIFICATE FOR ANATOMICAL DISSECTION OF AN UNCLAIMED BODY

To the School of Anatomy at.....

This is to certify that I have received all the necessary details and information pertaining to the
 unclaimed body of.....
 (surname) (given names)

Sex of deceased.....

Age of deceased.....

Birthplace of deceased.....

Last place of residence of deceased.....
 (street or rural route)

.....
 (city, town or village) (county, etc., or territorial division)

And this is your authority to proceed with the dissection of the body in accordance with the *Anatomy Act*, if
 the body is not reclaimed before the expiration of the fourteen-day period required by subsection 5 (1) of the
Anatomy Act.

Dated at....., this.....day of....., 19...

 (Local Inspector of Anatomy, or his agent)

at.....
 (address)

R.R.O. 1970, Reg. 18, Form 2.

Form 3

Anatomy Act

CERTIFICATE FOR ANATOMICAL DISSECTION OF A DONATED BODY

To the School of Anatomy at.....

This is to certify that I have received all the necessary details and information pertaining to the
 donated body of.....
 (surname) (given names)

Local Inspector of Anatomy.

Dated at....., this.....day of....., 19...

.....
(Professor of Anatomy, or his agent)

.....
(name of School of Anatomy)

R.R.O. 1970, Reg. 18, Form 4.

NOTE: A copy of this Receipt is to be returned to the Local Inspector of Anatomy.

Form 5

Anatomy Act

REPORT OF UNCLAIMED BODY

1. Name of deceased.....
(surname) (given names)
2. Last place of residence of deceased.....
(street or rural route)
.....
(city, town or village) (county, etc., or territorial division)
3. Death reported by.....
(surname) (given names) (address in full)
4. Age of deceased.....
5. Sex of deceased.....
6. Body is located at.....
(address of public or private morgue)
7. Date deceased was admitted to hospital.....
(day) (month) (year)
8. Date of death.....
(day) (month) (year)
9. Place of death.....
(hospital, home for aged, etc.)
10. Cause of death.....
11. Death reported to a coroner: yes ☐ no ☐
12. Autopsy: yes ☐ no ☐
13. Name of coroner.....
(surname) (given names) (address in full)
14. Death certificate signed by.....
(name and address in full)
.....

.....

.....

Remarks regarding body: (Where a police officer was notified of the death, give the police officer's name, telephone number and detachment; also describe what steps were taken to locate next-of-kin, and what other information has been obtained.)

to.
(person contacted)

on
(date body delivered)

or

on
(date body disposed of)

(Local Inspector of Anatomy, or his agent,
or Coroner)

at.....
(address)

R.R.O. 1970, Reg. 18, Form 5.

NOTE: Body must not be delivered to a School of Anatomy until a period of twenty-four hours has expired.

Form 6

Anatomy Act

REPORT AND WARRANT TO DISPOSE OF AN UNCLAIMED BODY

1. Name of deceased.....
(surname) (given names)

2. Last place of residence of deceased
(street or rural route)

(city, town or village) (county, etc., or territorial division)

3. Age of deceased.....
4. Sex of deceased.....
5. Body of deceased is located at.....
(hospital, public or private morgue, etc.)
6. Death reported by.....
(surname) (given names)
.....
(street or rural route) (city, town or village, etc.)
7. Date of death.....
(day) (month) (year)
8. Place of death.....
(hospital, home for aged, etc.)
9. Autopsy: yes ☐ no ☐
10. Cause of death.....
11. Remarks regarding body.....

Under the authority granted to me by section 11 of the *Anatomy Act*, I hereby direct you to dispose of this body at the expense of the Municipal Corporation of

Dated at....., this....day of....., 19...

.....
(Local Inspector of Anatomy, or his agent,
or Coroner)

at.....
(address)

R.R.O. 1970, Reg. 18, Form 6.

Form 7

Anatomy Act

NOTICE OF DISPOSAL OF A BODY

To the General Inspector of Anatomy:

This is to inform you that the body of.....
(surname) (given names)

Sex of deceased.....

Age of deceased.....

Birthplace of deceased.....

Last place of residence of deceased.....
(street or rural route)
.....
(city, town or village) (county, etc., or territorial division)

will be disposed of by burial ☐

cremation ☐

at.....
(place where body will be disposed of)

on.....
(day) (month) (year)

to conform with section 7 of the *Anatomy Act*.

Dated at....., this.....day of....., 19....

.....
(Professor of Anatomy, or his agent)

.....
(name of School of Anatomy)

R.R.O. 1970, Reg. 18, Form 7.

Form 8

Anatomy Act

IDENTIFICATION TAG

Date....., 19....

Body of.....
(surname) (given names)

of the.....of.....

DELIVERED TO THE SCHOOL OF ANATOMY

AT.....
(name of School of Anatomy)

BY.....
(Local Inspector of Anatomy)

AT.....
(street or rural route) (city, town or village)
.....
(county, etc., or territorial division)

NOTE: DONATED OR UNCLAIMED BODIES:

1. Identification tags shall be attached, before delivery, to the neck and to a toe.
2. Finger prints and photographs shall be taken immediately of unclaimed bodies by the School of Anatomy.

Form 9

Anatomy Act

REPORT OF DELIVERY OR DISPOSAL OF A BODY

To the General Inspector of Anatomy:

On the.....day of....., 19..., I authorized the donated ☐ body of
(date) (month) unclaimed ☐

.....
(surname) (given names)

Sex of deceased.....

Age of deceased.....

Birthplace of deceased.....

Last place of residence of deceased.....
(street or rural route)

.....
(city, town or village) (county, etc., or territorial division)

to be delivered to the School of Anatomy at.....

or to be disposed of at the expense of the Municipal Corporation of.....

Dated at....., this.....day of....., 19...

.....
(Local Inspector of Anatomy, or his agent,
or Coroner)

at.....
(address)

R.R.O. 1970, Reg. 18, Form 9.

Form 10

Anatomy Act

ORDER FOR STORAGE OF A BODY

To the person in charge of the public or private morgue at.....

In accordance with subsection 12 (1) of the *Anatomy Act*, I hereby order you to store the body of

.....
(surname) (given names)

Sex of deceased.....

Age of deceased.....

Last known address of deceased.....
(street or rural route)

.....
(city, town or village) (county, etc., or territorial division)

until such time as other arrangements are made for disposal of the body.

Dated at, this.....day of....., 19...

.....
(Local Inspector of Anatomy, or his agent,
or Coroner)

R.R.O. 1970, Reg. 18, Form 10.

REGULATION 16

under the Animals for Research Act

GENERAL

1.—(1) An application for a licence as an operator of a supply facility shall be made to the Director in Form 1.

(2) A licence as an operator of a supply facility shall be in Form 2.

(3) The fee for a licence as an operator of a supply facility is \$25.

(4) A licence expires with the 31st day of December of the year of issue.

(5) Every licence shall have listed therein the types or species of animals that are bred and reared by the licensee.

(6) The Director shall at any time upon the application of the licensee insert additional types or species of animals in a licence without additional fee.

(7) No licensee shall sell or offer for sale an animal for use in a research facility unless the animal is of a type or species listed in the licence.

(8) A licence is not transferable. O. Reg. 142/71, s. 1.

2.—(1) An application for registration of a research facility shall be in Form 3.

(2) The Director may issue a certificate of registration of a research facility in Form 4.

(3) The fee for registration of a research facility is,

(a) \$50 for one research facility, and

(b) \$25 for each additional research facility under the control of the same operator.

(4) Subject to subsection 4 (2) of the Act, where a research facility does not fully conform to the regulations the Director may register the research facility subject to the condition that the research facility conform fully with the regulations before the date determined by the Director and set out in the registration and any certificate thereof.

(5) Registration of a research facility is subject to the following conditions:

1. The registration expires with the 31st day of December of the year in which registration is made.

2. The operator of a registered research facility shall not purchase or otherwise acquire an animal for use in the research facility from the holder of a licence in Form 2 unless the animal is of a type or species listed on the licence. O. Reg. 142/71, s. 2.

3. No person shall construct, acquire or reconstruct premises for use as a research facility, supply facility or pound without,

(a) notifying the Director of his intention; and

(b) furnishing the Director with a copy of the plans and specifications of the premises proposed to be used, constructed or reconstructed. O. Reg. 142/71, s. 3.

4.—(1) The operator of every research facility shall, prior to the first day of March in every year, submit to the Director an annual report in respect of the preceding calendar year and the report shall contain,

(a) the total number of every species of animal used for research in the research facility in the year;

(b) the total number of dogs and the total number of cats purchased or otherwise acquired from,

(i) other research facilities,

(ii) pounds,

(iii) supply facilities, and

(iv) other sources; and

(c) the total number of dogs and the total number of cats that in any experiment or surgical procedure did not recover from anaesthesia.

(2) The operator of every research facility shall submit to the Director a report setting out,

(a) the names of members of the animal care committee forthwith after the committee is established; and

(b) particulars of every change in membership of the animal care committee, including the name of any new member, forthwith after the change is made. O. Reg. 142/71, s. 5.

5.—(1) The maximum price that shall be paid for dogs or cats by the operators of research facilities under clause 20 (6) (c) of the Act shall be \$6 for each dog and \$2 for each cat.

(2) For the purposes of subsection 20 (9) of the Act, the operator of a pound may require the operator of a research facility to pay not more than \$2 per day or part thereof for each dog and \$1 per day or part thereof for each cat sold to the operator of the research facility respecting its care, food and accommodation but only in respect of the period commencing with the day next following the day that the operator of the research facility is notified that the dog or cat is available for sale and ending with the day that the dog or cat leaves the pound. O. Reg. 142/71, s. 6.

6. A person operating an elementary school or secondary school that contains a research facility is exempt from subsection 4 (1) and section 14 of the Act and from section 4 of Regulation 18 of Revised Regulations of Ontario, 1980, in respect of the research facility subject to the following conditions:

1. The research facility shall be maintained in a sanitary condition at all times, as free as practicable from insects and vermin.
2. The standards of health, welfare and care of animals and the buildings, facilities and equipment provided by any person from whom animals are purchased have been approved by the Director. O. Reg. 142/71, s. 7.

7. Where a research facility is established by an operator and is used by that operator as a research facility for a total period of time not exceeding thirty days in any one year, the operator is exempt from subsection 4 (1) of the Act and from section 4 of Regulation 18 of Revised Regulations of Ontario, 1980, in respect of the premises, subject to the condition that the research facility shall be maintained in a sanitary condition at all times, as free as practicable from insects and vermin. O. Reg. 142/71, s. 8.

8. Where a person who is associated with a research facility and who is conducting research in connection therewith under the jurisdiction of an animal care committee established in connection with the research facility conducts the research on premises not owned or occupied by the operator of the research facility, that person is exempt from subsection 4 (1) of the Act and from section 4 of Regulation 18 of Revised Regulations of Ontario, 1980, in respect of such premises subject to the following conditions:

1. The research facility shall be maintained in a sanitary condition at all times, as free as practicable from insects and vermin.
2. The animal care committee shall, prior to the research being conducted, advise the Direc-

tor in writing of the name of the person conducting the research and the address at which the research is to be conducted.

O. Reg. 142/71, s. 9.

9. Where a person operates on premises not owned by him a research facility under the jurisdiction of an animal care committee solely for the purpose of conducting field trials on live stock, poultry or such other species of animals as the Director may approve, using only a substance or substances the testing of which is required under any law in force in Ontario, that person is exempt from subsection 4 (1) of the Act and from section 4 of Regulation 18 of Revised Regulations of Ontario, 1980, in respect of such premises subject to the following conditions:

1. The research facility shall be maintained in a sanitary condition at all times as free as practicable from insects and vermin.
2. The animal care committee shall, prior to the research being conducted, advise the Director in writing of the name of the person conducting the research, the address at which the research is to be conducted and the number and type or species of animals to be used in the research. O. Reg. 142/71, s. 10.

10. Where a person wishes to purchase or otherwise acquire an animal for use in a research facility and the animal is not of a type that may be readily purchased or otherwise acquired under section 14 of the Act by reason of its species or strain or by reason of any specific disease or condition desired of the animal, the person is exempt from section 14 of the Act but where the animal is a dog or cat the exemption is subject to the following conditions:

1. Prior to purchasing or otherwise acquiring the animal the person shall advise the Director in writing of,
 - i. the number of animals to be purchased or otherwise acquired,
 - ii. the name and address of the person from whom the animal is to be purchased or otherwise acquired, and
 - iii. the reason why the animal may not be readily purchased or otherwise acquired under section 14 of the Act.
2. Prior to purchasing or otherwise acquiring the animal the person shall obtain the permission in writing of the Director therefor. O. Reg. 142/71, s. 11.

11.—(1) Where the operator of a pound has not satisfied all requests referred to in clause 20 (6) (c) of the Act he is exempt from the prohibition in the said subsection (6) against destroying or causing or permitting to be destroyed any dog or cat but only where the dog or cat does not conform with the requirements specified in the requests.

(2) For the purposes of subsection 24 (10) of the Act the treasurer of a municipality that has passed a by-law under which dogs or cats are impounded in a pound, or such person as the treasurer may designate in writing, is prescribed as the person to whom payment shall be made in respect of a dog or cat in the pound. O. Reg. 142/71, s. 12.

12.—(1) An operator of a research facility is exempt from subsection 14 (2) of the Act where,

- (a) he has acquired a dog or cat under clause 20 (6) (c) of the Act;

(b) the research use of the dog or cat has been completed;

(c) in the opinion of the operator of the research facility, the dog or cat is in a state of good health and suitable for one or more of the uses referred to in clause 20 (6) (b) of the Act; and

(d) he disposes of the dog or cat by gift to the operator of the pound from which the dog or cat was acquired,
- (i) for any of the uses referred to in clause 20 (6) (b) of the Act, or

(ii) for euthanasia.

(2) No dog or cat that has been returned to a pound under subsection (1) shall be disposed of to a research facility. O. Reg. 142/76, s. 1.

Form 1

Animals for Research Act

APPLICATION FOR LICENCE AS AN OPERATOR OF A SUPPLY FACILITY

To: The Director, Veterinary Services Branch,
Ministry of Agriculture and Food;
Legislative Building,
Toronto, Ontario M7A 1A2.

.....
(name of applicant)

.....
(address)

applies for a licence as an operator of a supply facility under the *Animals for Research Act* and the regulations and in support of this application the following facts are stated:

1. Location of supply facility:
-
2. Owner of premises, if not the applicant:

-
3. Type or species of animals bred and reared on premises:
4. Operator of the research facility with whom the applicant has a contract:
-

Dated at, this day of, 19...

.....
(signature of applicant)

O. Reg. 142/71, Form 1.

Form 2

Animals for Research Act

LICENCE AS AN OPERATOR OF A SUPPLY FACILITY

Under the *Animals for Research Act* and the regulations, and subject to the limitations thereof, this licence is issued to:

.....
(name)

.....
(address)

to be the operator of a supply facility at

.....
(location)

Type or species of animals bred and reared by the operator

.....

This licence expires with the 31st day of December, 19...

Issued at Toronto, this day of, 19...

.....
Director, Veterinary Services Branch

O. Reg. 142/71, Form 2.

Form 3

Animals for Research Act

APPLICATION FOR REGISTRATION OF RESEARCH FACILITY

To: The Director, Veterinary Services Branch,
Ministry of Agriculture and Food,
Legislative Building,
Toronto, Ontario M7A 1A2.

.....
(name of applicant)
.....
(address)

applies for registration of the research facility or
facilities referred to below under the *Animals for
Research Act*.

<u>Name of Research Facility</u>	<u>Location</u>
1.
2.
3.
4.

Dated at, this day of, 19...
.....
(signature of applicant)

O. Reg. 142/71, Form 3.

Form 4

Animals for Research Act

CERTIFICATE OF REGISTRATION
OF RESEARCH FACILITY

Under the *Animals for Research Act* and the regu-
lations, and subject to the limitations thereof, the
following research facility or facilities are registered:

<u>Name of Research Facility</u>	<u>Location</u>
1.
2.
3.
4.

It is a condition of registration of the following
research facility or facilities that they conform with the
regulations under the *Animals for Research Act* before
the date stated opposite the name of such research
facility or facilities.

<u>Name of Research Facility</u>	<u>Date</u>
1.
2.
3.
4.

This registration expires with the 31st day of
December, 19....

Issued at Toronto, thisday of, 19...

.....
Director, Veterinary Services Branch

O. Reg. 142/71, Form 4.

REGULATION 17

under the Animals for Research Act

POUNDS

1. In this Regulation,

- (a) "anaesthetic" means a procedure that causes the loss of sensation of pain in the whole or any part of the body of an animal and "anaesthesia" and "anaesthetize" have corresponding meanings;
- (b) "communal" means containing more than one animal;
- (c) "environment" means the total of all the conditions and elements that make up the surroundings of an individual animal;
- (d) "euthanasia" means the deliberate infliction of an intended death upon an animal;
- (e) "intraperitoneal" means delivered into the abdominal cavity;
- (f) "intravenous" means delivered into a vein;
- (g) "sanitize" means to clean for the purpose of controlling disease producing organisms and "sanitized" has a corresponding meaning;
- (h) "vermin" means an animal the presence of which may be harmful to the health, comfort or welfare of an animal in a pound. O. Reg. 140/71, s. 1.

2. Every pound shall,

- (a) be located in a place free from conditions that might injuriously affect the sanitary operation of the pound; and
- (b) be constructed in such manner that it is capable of being maintained in a sanitary condition. O. Reg. 140/71, s. 2.

3. Every part of a pound that is adjacent to any building that is part of a pound shall be maintained in a neat and orderly condition free of refuse, debris and vermin. O. Reg. 140/71, s. 3.

4.—(1) This section applies to,

- (a) every room that is used for the housing of dogs or cats or that is occupied at any time by a dog or cat in a pound; and

- (b) every room that is used for storing feed, bedding or waste or for the preparation of food in a pound.

(2) Floors shall be,

- (a) soundly constructed of hard, durable material;
- (b) impervious to water;
- (c) constructed of a material that may be readily sanitized; and
- (d) maintained in a good state of repair free from cracks, holes and other damage.

(3) Where there are floor drains,

- (a) a floor drain and any trench installed in connection therewith that is used for waste disposal shall be flushed at such intervals as may be necessary to prevent any accumulation of waste that might impair the health or welfare of any dog or cat in the room;
- (b) the floor shall be so constructed and maintained that surface liquids thereon will drain into the drain; and
- (c) the operator of the pound shall cause the drains to be examined as often as is necessary to ensure that they are functioning properly, have an adequate water seal and are not harbouring vermin.

(4) Walls shall be,

- (a) soundly constructed of hard, durable material;
- (b) impervious to water to a height adequate for sanitary maintenance;
- (c) constructed of a material that may be readily sanitized; and
- (d) maintained in a good state of repair free from cracks, holes and other damage.

(5) Where there is a door,

- (a) every frame or moulding around the door opening shall be so constructed and maintained that it has no space or spaces capable of harbouring vermin; and

- (b) the door shall be maintained in a good state of repair free from cracks, holes and other damage.

(6) Where it is not practicable to sanitize any equipment that is in the room unless it is removed from the room, the opening of at least one door in the room shall be of sufficient size to permit the removal of the equipment from the room.

- (7) Where there is a window,

- (a) every frame or moulding around the window opening shall be so constructed and maintained that it has no space or spaces capable of harbouring vermin;

- (b) means shall be provided to prevent the effects of direct sunlight through the window;

- (c) the window shall be so constructed and maintained as to prevent the entrance of vermin through the window; and

- (d) the window shall be maintained in a good state of repair free from cracks, holes and other damage.

- (8) Roofs and ceilings shall be,

- (a) soundly constructed; and

- (b) maintained in a good state of repair free from cracks, holes and other damage.

(9) Where any pipe, drain, conduit or other service facility is installed through any floor, wall or ceiling, the place where the pipe, drain, conduit or other service facility enters or leaves the room shall be so sealed as to prevent the entrance of vermin into the room.

(10) Alleyways and service aisles between cages or pens shall be of sufficient width to permit the safe and efficient movement of persons and equipment and shall not be used for storage or accumulation of materials or equipment of any kind.

(11) Every room in a pound shall be maintained in a clean condition.

(12) The operator of every pound shall take all reasonable steps to prevent the spread of and to destroy vermin and invertebrates that may be harmful to the health, comfort or welfare of any dog or cat in the pound. O. Reg. 140/71, s. 4.

5.—(1) Every room that is used for the housing of dogs or cats within a pound shall be equipped with a lighting system that is so designed, constructed and maintained that,

- (a) it distributes light as evenly and with as little glare as possible; and

- (b) it provides adequate light for the proper observation of every animal in the room.

(2) Every room that is used for the housing of dogs or cats within a pound shall be adequately lighted for a continuous period of at least eight hours in every twenty-four hour period. O. Reg. 140/71, s. 5.

6. Every room that is used for the housing of dogs or cats within a pound shall at all times be adequately ventilated for the health, welfare and comfort of every dog or cat therein. O. Reg. 140/71, s. 6.

7. Every room that is used for the housing of dogs or cats within a pound shall at all times be maintained at a temperature suitable for the health, welfare and comfort of every dog or cat therein. O. Reg. 140/71, s. 7.

8.—(1) The operator of every pound shall ensure that there is, in every day, on the premises on which the pound is located, an adequate number of persons competent in the care of dogs and cats to properly care for every dog or cat in the pound. O. Reg. 140/71, s. 8 (1).

(2) Subject to subsection (3), the operator of every pound shall post or cause to be posted a notice in a conspicuous location outside the pound stating the hours and days on which the pound is open to persons who wish to claim any dogs or cats impounded therein and every pound shall be open for such purpose at least once in every day while there is a dog or cat in the pound.

(3) A pound may remain closed on a holiday and on one day in every week that is not a holiday.

(4) Where a pound remains closed on a day that is not a holiday, every unexpired redemption period for any dog or cat in the pound on that day is extended by one day. O. Reg. 387/73, s. 1.

9. Only persons competent to handle dogs and cats shall handle dogs or cats in a pound. O. Reg. 140/71, s. 9.

10.—(1) Every dog or cat in a pound shall be identified by a neckband, individual tag, physical mark or a tag or marking on the cage in which the dog or cat is kept.

(2) The operator of every pound shall maintain within the pound a record of every animal in the pound and shall preserve the record within the pound for at least two years from the date that the animal was last in the pound and the record shall include:

- (a) the sex of the animal;
 - (b) the estimated age and weight of the animal;
 - (c) the colour, markings and any physical abnormalities of the animal;
 - (d) the breed or type of the animal;
 - (e) a record of the circumstances under which the animal came to be in the pound;
 - (f) the time, date and place where the animal was found;
 - (g) the date and time at which the animal arrived at the pound;
 - (h) a record of any tag, name plate or other means of identification on the animal when it came into the pound;
 - (i) where the animal is returned to its owner, the name and address of the owner and the date of return;
 - (j) where the animal is sold or disposed of by gift, the name and address of the person to whom it was sold or disposed of and a statement of the purpose of the sale or disposal;
 - (k) where the animal is sold to the operator of a research facility, the name and address of the research facility and evidence of the sale;
 - (l) where the animal is destroyed, the date on which it is destroyed and a statement setting out the clause of subsection 20 (7) of the Act under which the animal is destroyed.
- O. Reg. 140/71, s. 10.

11. Every cage or pen used in a pound for the housing of dogs or cats shall be so constructed and maintained that,

- (a) every animal in the cage or pen may comfortably,
 - (i) extend its legs to their full extent,
 - (ii) stand,
 - (iii) sit,
 - (iv) turn around, and
 - (v) lie down in a fully extended position;
- (b) it is not likely to harm any animal therein;
- (c) any animal therein cannot readily escape therefrom;

- (d) it minimizes as nearly as practicable the transfer of pathogenic agents; and
- (e) it may be readily sanitized. O. Reg. 140/71, s. 11.

12. Where a group of dogs or cats in a pound is housed in a communal cage, pen or dog run no individual dog or cat, as the case may be, shall be placed in the cage, pen or dog run with the group of dogs or cats where the placing of the individual dog or cat would result in harm to any of the dogs or cats and, where the behavior of the dogs or cats in the cage, pen or dog run is such that harm is likely to result, any dog or cat whose removal will prevent the harm from occurring shall forthwith be removed. O. Reg. 140/71, s. 12.

13.—(1) This section applies to all pens or cages in every pound.

(2) Litter or bedding material in every cage or pen shall be changed as often as is necessary to keep it dry, clean and free of noxious fumes.

(3) Pens or cages and collecting pans for the collecting of excreta and waste shall be clean and any excreta or waste therein removed as often as is necessary for the health and comfort of every dog or cat therein.

(4) Every dog or cat that is housed in a cage or pen shall be removed from its cage or pen and changed to a freshly sanitized cage or pen as often as is necessary for its health and comfort.

(5) No dog or cat shall be placed in a cage or pen that is vacant and of which it has not been the last occupant unless the cage or pen and equipment used in connection therewith have first been sanitized.

(6) Where a cage is cleaned or sanitized the cage rack or portion thereof used in connection with the cage shall be cleaned or sanitized at the same time.

(7) Every animal shall be protected against liquid spray while a cage or pen is being cleaned.

(8) Every device used to supply drinking water to a dog or cat shall be maintained in a sanitary condition and shall be so constructed and maintained as to ensure,

- (a) that the dog or cat is receiving water; and
- (b) the device is functioning properly.

(9) Every container for food or water shall be maintained in a sanitary condition. O. Reg. 140/71, s. 13.

14.—(1) Every dog or cat in a pound shall be supplied with food of a type and in amounts

nutritionally adequate for the dog or cat and that is palatable and free from contamination.

(2) Food and water for a dog or cat in a pound shall be provided in containers or devices that may be readily sanitized and that do not interfere with the activities referred to in clause *a* of section 11 and food shall not be placed directly on the floor of the cage or pen in which the dog or cat is located.

(3) Every dog or cat in a pound shall be supplied with adequate amounts of potable water.

(4) Where a dog or cat is fed with perishable food the remnants of the food shall be removed from the cage or pen every day. O. Reg. 140/71, s. 14.

15.—(1) In every pound, waste materials and excreta shall be collected and disposed of in a sanitary manner.

(2) Subject to the *Dead Animal Disposal Act*, in any pound, the carcass of an animal shall be,

- (a) forthwith removed from its cage or pen; and
- (b) except for the whole or a part of the carcass that is retained in a sanitary manner for research, forthwith disposed of.

(3) Where the carcass of an animal is disposed of and the dead animal is not a dead animal as defined in the *Dead Animal Disposal Act*, the carcass shall be disposed of by,

- (a) burying it with a covering of at least two feet of earth;
- (b) incineration; or
- (c) delivery to a rendering plant,
 - (i) licensed under the *Dead Animal Disposal Act*, or
 - (ii) approved under the *Meat Inspection Act* (Canada) in a vehicle constructed and equipped in accordance with the *Dead Animal Disposal Act*. O. Reg. 140/71, s. 15.

16. In any pound, the operator thereof shall take or cause to be taken all steps practicable to treat and prevent the spread of any disease found in any animal and to prevent distress to any animal. O. Reg. 140/71, s. 16.

17.—(1) Every cat housed in a pound shall be supplied with litter material for the collection of excreta and waste.

(2) Every communal cage and pen used for the housing of cats in a pound shall be equipped with

resting perches so constructed and maintained as to provide clean, dry and safe surfaces of sufficient size to permit the cats to lie down in comfort and the resting perches shall not all be at the same height. O. Reg. 140/71, s. 17.

18.—(1) Where a dog has been housed for twenty-one days in a cage that is not at least twice the height of the dog measured to the point of the withers and the dog has not had reasonable daily access to an exercise area outside of the cage, the dog shall be housed in a cage or pen that is at least twice the height of the dog measured to the point of the withers.

(2) Every pen used for the housing of dogs in any pound shall be so constructed and maintained as to provide a clean, dry and safe surface adequate to permit the dogs to lie down in comfort at all times. O. Reg. 140/71, s. 18.

19. An outdoor dog run in a pound may be used to provide dogs in the pound with exercise subject to the following conditions:

- 1. No dog shall be removed from indoor housing and placed in the outdoor dog run or removed from the outdoor dog run and placed in indoor housing where to do so would result in a change in environment likely to cause harm to the dog.
- 2. The surface on which the dog run is established shall be so maintained as to rapidly drain all excess surface water.
- 3. The dog run shall be so fenced as to prevent any dog from escaping.
- 4. The dog run shall be kept in a clean condition free from any materials or equipment likely to cause harm to a dog.
- 5. Every dog in the dog run shall have access to a shelter that is,
 - (a) readily accessible to the dog;
 - (b) large enough to comfortably accommodate all of the dogs in the dog run;
 - (c) so constructed and maintained as to provide protection from the effects of direct sunlight, precipitation and wind; and
 - (d) that is dry and well drained. O. Reg. 140/71, s. 19.

20.—(1) Where euthanasia is carried out with respect to any dog or cat in a pound, it shall be carried out,

- (a) by a person or persons properly trained in the euthanasia procedure to be used;

(b) in such manner that the death of the dog or cat occurs without unnecessary pain, delay or discomfort; and

(c) in a manner that does not endanger or disturb other animals in the pound.

(2) No person shall use an euthanasia procedure with respect to any dog or cat in a pound unless it is a procedure that is permitted under section 21 or 22 and that is carried out with equipment of a type and used in a manner approved by the Director. O. Reg. 140/71, s. 20.

21.—(1) This section applies to euthanasia of dogs or cats other than by the use of chemicals.

(2) The following euthanasia procedures are permitted:

1. In the case of dogs, killing by means of a captive bolt pistol.
2. Shooting by means of a firearm.
3. Exsanguination, but only where the animal is completely anaesthetized prior to and during the procedure.
4. In the case of dogs, electrocution. O. Reg. 140/71, s. 21.

22.—(1) This section applies to euthanasia of dogs or cats by the use of chemicals. O. Reg. 140/71, s. 22 (1).

(2) The following euthanasia procedures are permitted:

1. Administration of barbiturates intravenously or intraperitoneally.
2. Slow intravenous administration of Hoechst Pharmaceutical product T-61.
3. Administration of chloral hydrate intravenously.
4. Administration of ether by inhalation.
5. Administration of carbon dioxide by inhalation.
6. Administration of chloroform by inhalation.
7. Administration of carbon monoxide by inhalation but only where substantially all impurities have been removed therefrom and the temperature of the carbon monoxide does not exceed 25 degrees centigrade. O. Reg. 140/71, s. 22 (2); O. Reg. 824/78, s. 1.

REGULATION 18

under the Animals for Research Act

RESEARCH FACILITIES AND SUPPLY FACILITIES

1. In this Regulation,

- (a) "anaesthetic" means a procedure that causes the loss of sensation of pain in the whole or any part of the body of an animal and "anaesthesia" and "anaesthetize" have corresponding meanings;
- (b) "communal" means containing more than one animal;
- (c) "environment" means the total of all the conditions and elements that make up the surroundings of an individual animal;
- (d) "euthanasia" means the deliberate infliction of an intended death upon an animal other than death that arises directly as an immediate result of an experimental or testing procedure;
- (e) "game animal" means a game animal or fur-bearing animal as defined in the *Game and Fish Act*;
- (f) "intracardial" means delivered into the heart;
- (g) "intraperitoneal" means delivered into the abdominal cavity;
- (h) "intrathoracic" means delivered into the thoracic cavity;
- (i) "intravenous" means delivered into a vein;
- (j) "live stock" means cattle, goats, horses, sheep or swine;
- (k) "sanitize" means to clean for the purpose of controlling disease-producing organisms and "sanitized" has a corresponding meaning;
- (l) "vermin" means an animal the presence of which may be harmful to the health, comfort or welfare of an animal in a research facility or supply facility. O. Reg. 139/71, s. 1.

2. Every research facility and supply facility shall,

- (a) be located in a place free from conditions that might injuriously affect the sanitary operation of the research facility or supply facility; and

- (b) be constructed in such manner that it is capable of being maintained in a sanitary condition. O. Reg. 139/71, s. 2.

3. Every part of a research facility or supply facility that is adjacent to any building that is part of a research facility or supply facility shall be maintained in a neat and orderly condition free of refuse, debris and vermin. O. Reg. 139/71, s. 3.

4.—(1) This section applies to,

- (a) every room that is used for the housing of animals in a research facility or supply facility or for surgical, experimental or testing procedures involving animals; and
- (b) every room that is used for storing feed, bedding or waste or for the preparation of food in a research facility or supply facility.

(2) Floors shall be,

- (a) soundly constructed of hard, durable material;
- (b) impervious to water;
- (c) constructed of a material that may be readily sanitized; and
- (d) maintained in a good state of repair, free from cracks, holes and other damage.

(3) Where there are floor drains,

- (a) a floor drain and any trench installed in connection therewith that is used for waste disposal shall be flushed at such intervals as may be necessary to prevent any accumulation of waste that might impair the health or welfare of any animal in the room;
- (b) the floor shall be so constructed and maintained that surface liquids thereon will drain into the drain; and
- (c) the operator of a research facility or supply facility shall cause the drains to be examined as often as is necessary to ensure that they are functioning properly, have an adequate water seal and are not harbouring vermin.

(4) Walls shall be,

- (a) soundly constructed of hard, durable material;

- (b) impervious to water to a height adequate for sanitary maintenance;
 - (c) constructed of a material that may be readily sanitized; and
 - (d) maintained in a good state of repair free from cracks, holes and other damage.
- (5) Where there is a door,
- (a) every frame or moulding around the door opening shall be so constructed and maintained that it has no space or spaces capable of harbouring vermin; and
 - (b) the door shall be maintained in a good state of repair free from cracks, holes and other damage.
- (6) Where it is not practicable to sanitize any equipment that is in the room unless it is removed from the room, the opening of at least one door in the room shall be of sufficient size to permit the removal of the equipment from the room.
- (7) Where there is a window,
- (a) every frame or moulding around the window opening shall be so constructed and maintained that it has no space or spaces capable of harbouring vermin;
 - (b) means shall be provided to prevent the effects of direct sunlight through the window;
 - (c) the window shall be so constructed and maintained as to prevent the entrance of vermin through the window; and
 - (d) the window shall be maintained in a good state of repair free from cracks, holes and other damage.
- (8) Roofs and ceilings shall be,
- (a) soundly constructed; and
 - (b) maintained in a good state of repair free from cracks, holes and other damage.
- (9) Light fixtures shall be so constructed and maintained as to be readily sanitized.
- (10) Where any pipe, drain, conduit or other service facility is installed through any floor, wall or ceiling the place where the pipe, drain, conduit or other service facility enters or leaves the room shall be so sealed as to prevent the entrance of vermin into the room.
- (11) Alleyways and service aisles between cages or pens shall be of sufficient width to permit the safe and efficient movement of persons and

equipment and shall not be used for storage or accumulation of materials or equipment of any kind.

(12) Every room in a research facility or supply facility shall be maintained in a clean condition.

(13) The operator of every research facility or supply facility shall take all reasonable steps to prevent the spread of and to destroy vermin and invertebrates that may be harmful to the health, comfort or welfare of any animal in the research facility or supply facility except only that such steps need not be taken to the extent that the presence of such vermin or invertebrates forms a necessary element in any research. O. Reg. 139/71, s. 4.

5. (1) Every room that is used for the housing of animals within a research facility or supply facility shall be equipped with a lighting system that is so designated, constructed and maintained that,

- (a) it distributes light as evenly and with as little glare as possible; and
- (b) it provides adequate light for the proper observation of every animal in the room.

(2) In every twenty-four hour period, every lighting system referred to in subsection (1) shall be so operated as to produce,

- (a) in the case of diurnal animals, a minimum of eight continuous hours of light; and
- (b) in the case of nocturnal animals, a maximum of sixteen continuous hours of light,

for the animals that are housed in the room except only that the system need not be so operated to the extent that the number of hours of light or the absence or reduction thereof forms a necessary element in any research. O. Reg. 139/71, s. 5.

6. Every room that is used for the housing of animals within a research facility or supply facility shall at all times be ventilated by means of an air ventilation system that distributes either fresh air or recirculated air uniformly in the room without drafts so as to provide enough fresh air or recirculated air in the room for the health, welfare and comfort of the animals therein except only that the room need not be so ventilated to the extent that ventilation or the lack of ventilation forms a necessary element in any research. O. Reg. 139/71, s. 6.

7. In any room that is used for the housing of animals within a research facility or supply facility the temperature within the room shall be,

- (a) maintained as constant as may be practicable; and
- (b) suitable for the health, welfare and comfort of every animal that is housed in the room,

except only to the extent that the temperature forms a necessary element in any research. O. Reg. 139/71, s. 7.

8. The air in every room within a building that is part of a research facility or supply facility and that is used for the housing of animals shall be maintained at a relative humidity that is suitable for the health, comfort and welfare of any animal in the room except only to the extent that relative humidity forms a necessary element in any research. O. Reg. 139/71, s. 8.

9.—(1) Where the research facility or supply facility receives animals that have been shipped or transported to the research facility or supply facility,

- (a) the area in which the animals are placed at the time they are received shall be maintained in a sanitary condition;
- (b) except in the case of germ-free or gnotobiotic animals, the animals shall be removed without undue delay from any shipping containers in which they have been shipped or transported;
- (c) the animals shall be examined for disease by a person competent for the purpose as soon after receipt as may be practicable; and
- (d) the operator shall take or cause to be taken all reasonable steps necessary to prevent the escape of the animals.

(2) Where the operator of a research facility or supply facility rejects animals that have been shipped or transported to the research facility or supply facility, the operator shall take, or cause to be taken all steps reasonably necessary to provide for the health, welfare and comfort of the animals until the animals are transported from the premises of the research facility or supply facility or are destroyed. O. Reg. 139/71, s. 9.

10.—(1) The operator of every research facility and every supply facility shall ensure that there is, in the research facility or supply facility, an adequate number of persons competent in the care of animals to properly care for every animal in the research facility or supply facility.

(2) Where the operator of a research facility or supply facility has been notified that animals are being shipped or transported to the research facility or supply facility he shall cause a person to be present at the place where the animals are expected to arrive at such time as is reasonable to anticipate the arrival of the animals. O. Reg. 139/71, s. 10.

11. Only persons competent to handle the species or type of animal being handled shall handle animals in a research facility or supply facility. O. Reg. 139/71, s. 11.

12.—(1) Every dog or cat in a research facility shall be identified by tattoo, neckband, individual tag, physical mark or a tag or marking on the cage in which the animal is kept.

(2) The operator of every research facility shall maintain within the research facility a record of every dog and cat in the research facility and shall preserve the record within the research facility for at least two years from the date that the dog or cat was last in the research facility and the record shall include,

- (a) the sex of the dog or cat;
- (b) the estimated age and weight of the dog or cat;
- (c) the colour, markings and any physical abnormalities of the dog or cat;
- (d) the breed or type of the dog or cat;
- (e) the name of the person from whom the dog or cat was purchased or otherwise acquired and the date thereof where the dog or cat was not born in the research facility;
- (f) any invoice, bill of sale or like record of the purchase of the dog or cat; and
- (g) the allocation of the dog or cat.

(3) The operator of every research facility shall maintain within the research facility a record of all animals in the research facility other than dogs or cats and shall preserve the record within the research facility for at least one year from the date that the animals entered the research facility and the record shall include,

- (a) the date of arrival of the animals;
- (b) the name of the person from whom the animals are purchased or otherwise acquired; and
- (c) the allocation of the animals.

(4) Every licensed operator of a supply facility shall maintain within the supply facility for a period of one year from the date of purchase or sale a record of all animals purchased or sold by him and the record shall include,

- (a) the date of such purchase or sale; and
- (b) the name of the person from whom or to whom the animals were purchased or sold, as the case may be. O. Reg. 139/71, s. 12.

13. Every cage, tank or pen used in a research facility or supply facility for the housing of animals shall be so constructed and maintained that,

(a) except in the case of fish and snakes, every animal in the cage, tank or pen may comfortably,

(i) extend its legs to their full extent,

(ii) stand,

(iii) sit, and

(iv) lie down, and in the case of animals other than live stock, turn around and lie down in a fully extended position.

(b) in the case of fish and snakes, every animal in the cage, tank or pen shall have adequate room for its health, welfare and comfort;

(c) it is not likely to harm any animal therein;

(d) every animal therein may be readily observed unless the natural habits of the animal otherwise require;

(e) any animal therein cannot readily escape therefrom;

(f) it minimizes as nearly as practicable the transfer of pathogenic agents; and

(g) it may be readily sanitized. O. Reg. 139/71, s. 13.

14. Where a group of animals in a research facility or supply facility are housed in a communal cage, tank, pen or enclosed compound, no individual animal shall be placed in the cage, tank, pen or enclosed compound with the group of animals where the placing of the individual animal would result in harm to any of the animals and, where the behavior of animals in any cage, tank, pen or enclosed compound is such that harm is likely to result, any animal or animals whose removal will prevent the harm from occurring shall forthwith be removed. O. Reg. 139/71, s. 14.

15. Pregnant mammals in a research facility or supply facility shall, prior to parturition, be,

(a) so handled as to prevent injury to the animal; and

(b) maintained in a cage or pen that is,

(i) suitably designed for the safe delivery of the young,

(ii) equipped with a floor that is so constructed and maintained that it has a surface that will not cause any injury to the animals therein,

(iii) equipped with a parturition environment of a type suitable for the animal, and

(iv) provided with heat, light and ventilation adequate for the health, comfort and safety of the animal and its young. O. Reg. 139/71, s. 15.

16.—(1) This section applies to all tanks, pens, stalls, cages or enclosed compounds in every research facility or supply facility used for the housing of animals therein, other than a tank, cage, pen or enclosed compound that is so constructed and maintained as to simulate, as closely as practicable, the natural environment of the animal or animals therein.

(2) Litter or bedding material in every cage, pen, stall or enclosed compound shall be changed as often as is necessary to keep it dry, clean and free of noxious fumes.

(3) Tanks, pens, stalls, cages, enclosed compounds and collecting pans for the collection of excreta and waste shall be cleaned and any excreta or waste therein removed as often as is necessary for the health and comfort of every animal therein.

(4) Every animal that is housed in a cage or pen shall be removed from its cage or pen and changed to a freshly sanitized cage or pen as often as is necessary for its health and comfort.

(5) No animal shall be placed in a cage or pen that is vacant and of which it has not been the last occupant unless the cage or pen and equipment used in connection therewith have first been sanitized.

(6) Where a cage is cleaned or sanitized the cage rack or portion thereof used in connection with the cage shall be cleaned or sanitized at the same time.

(7) Every animal shall be protected against liquid spray while a cage, pen or enclosed compound is being cleaned.

(8) Every device used to supply drinking water to an animal shall be maintained in a sanitary condition and shall be so constructed and maintained as to ensure,

(a) that the animal is receiving water; and

(b) that the device is functioning properly.

(9) Every container for food or water shall be maintained in a sanitary condition. O. Reg. 139/71, s. 16.

17.—(1) Every animal in a research facility or supply facility shall be supplied with food of a type and in amounts nutritionally adequate for the species and that is palatable and free from contamination.

(2) Subsection (1) does not apply to an animal that is in a research facility and being used for research in which the diet of the animal forms an essential element of the research but only to the extent that is necessitated by the research.

(3) Water and food, other than fresh vegetable matter, for a mammal or bird in a research facility or supply facility shall be provided in containers or devices that may be readily sanitized and that do not interfere with the activities referred to in clause 13 (a), and food shall not be placed directly on the floor of the cage, pen or enclosed compound in which the animal is located.

(4) Subsection (3) does not apply in the case of,

- (a) young animals;
- (b) germfree or gnotobiotic animals;
- (c) live stock;
- (d) animals housed in a cage where the animals are destroyed not later than ten days after being placed in the cage;
- (e) non-human primates; and
- (f) mink and ferrets where the food is placed on the top of the cage or pen.

(5) Every animal in a research facility or supply facility shall be supplied with adequate amounts of potable water.

(6) Subsection (5) does not apply to an animal that is in a research facility and is being used for research in which the water intake of the animal forms an essential element of the research but only to the extent that is necessitated by the research.

(7) Where an animal in a cage or pen is fed with perishable food, the remnants of the food shall be removed from the cage or pen every day.

(8) Culled vegetable matter or cuttings from institutional kitchens, stores, restaurants and other like sources shall not be supplied to animals in a research facility or supply facility.

(9) Subsections (3) and (7) do not apply to animals that are housed in an environment that is intended to simulate, as closely as possible, the natural environment of the animals. O. Reg. 139/71, s. 17.

18.—(1) In every research facility or supply facility waste materials and excreta shall be collected and disposed of in a sanitary manner.

(2) Subject to the *Dead Animal Disposal Act*, in any research facility or supply facility the carcass of an animal shall be,

- (a) forthwith removed from its cage, tank, pen or enclosed compound; and
- (b) forthwith, except for the whole or a part of a carcass that is retained in a sanitary manner for research other than a *post mortem* examination,
 - (i) disposed of,
 - (ii) taken to a *post mortem* room for *post mortem* examination and, after the *post mortem* examination, forthwith disposed of, or
 - (iii) placed, except in the case of live stock, in a waterproof container and then kept refrigerated until it can be taken to a *post mortem* room for *post mortem* examination and, after the *post mortem* examination, forthwith disposed of.

(3) Where the carcass of an animal is disposed of and the dead animal is not a dead animal as defined in the *Dead Animal Disposal Act*, the carcass shall be disposed of by,

- (a) burying it with a covering of at least two feet of earth;
- (b) incineration;
- (c) delivery to a rendering plant,

(i) licensed under the *Dead Animal Disposal Act*, or

(ii) approved under the *Meat Inspection Act* (Canada), in a vehicle constructed and equipped in accordance with the *Dead Animal Disposal Act*; or

(d) placing the carcass in a disposal pit of a type and constructed in a manner approved by the Director. O. Reg. 139/71, s. 18.

19.—(1) In any research facility or supply facility the operator thereof shall take or cause to be taken all steps practicable to treat and prevent the spread of any disease found in any animal and to prevent distress to any animal except only that such steps need not be taken to the extent that they form a necessary element in research.

(2) The operator of every research facility or supply facility shall provide an inspector with such garments as the operator deems necessary to protect the health of animals in the research facility or supply facility. O. Reg. 139/71, s. 19.

20.—(1) All water provided in any tank, cage or pen for the use of Amphibia in a research facility or supply facility shall be kept free of contamination that is likely to cause harm to the Amphibia.

(2) Every tank, cage or pen used for housing Amphibia in a research facility or supply facility shall be so constructed and maintained as to provide a suitable resting area readily accessible at all times to any Amphibia in the tank, cage or pen.

(3) Live insects provided as food for any Amphibia in a research facility or supply facility shall be so handled as to prevent their escape. O. Reg. 139/71, s. 20.

21.—(1) Every cat received at a research facility, before being used in connection with any research, other than research carried out within ten days of the arrival of the cat and that will result in the death of the cat within that time, shall be,

(a) immunized against, or treated for, disease in such manner as is appropriate to maintain the health and comfort of the cat unless the cat is to be used for research in which the use of a cat that has not been so immunized or treated is a necessary element; and

(b) housed for a sufficient length of time to accustom it to the normal environment provided for cats in the research facility.

(2) Every cat housed in a research facility or supply facility shall be supplied with litter material for the collection of excreta and waste.

(3) Every communal cage and pen used for the housing of cats in a research facility or supply facility shall be equipped with resting perches so constructed and maintained as to provide clean, dry, and safe surfaces of sufficient size to permit the cats to lie down in comfort and the resting perches shall not all be at the same height. O. Reg. 139/71, s. 21.

22.—(1) Every dog received at a research facility, before being used in connection with any research, other than research carried out within ten days of the arrival of the dog and that will result in the death of the dog within that time, shall be,

(a) immunized against or treated for disease in such manner as is appropriate to maintain the health and comfort of the dog unless the dog is to be used for research in which the use of a dog that has not been so immunized or treated is a necessary element; and

(b) housed for a sufficient length of time to accustom it to the normal environment provided for dogs in the research facility.

(2) Where a dog has been housed for twenty-one days in a cage that is not at least twice the height of the dog measured to the point of the withers and the dog has not had reasonable

daily access to an exercise area outside of the cage, the dog shall be housed in a cage or pen that is at least twice the height of the dog measured to the point of the withers.

(3) Every pen used for the housing of dogs in any research facility or supply facility shall be so constructed and maintained as to provide a clean, dry and safe surface adequate to permit the dogs to lie down in comfort at all times. O. Reg. 139/71, s. 22.

23.—(1) Every door in a room in a research facility or supply facility that is used for housing non-human primates shall be equipped with a device adequate to prevent the escape of any such primate from the room.

(2) Every non-human primate shall, forthwith upon arrival at a research facility and at such further intervals as may be appropriate, having regard to all of the circumstances, be tested for tuberculosis in a manner adequate to disclose the presence of tuberculosis in the primate.

(3) Every non-human primate found to have tuberculosis by a test under subsection 2 shall be isolated from other non-human primates that have not been found to have tuberculosis or shall be humanely destroyed except only that such steps need not be taken to the extent that the spread of tuberculosis forms a necessary element in research.

(4) No person who is known to have active tuberculosis shall be employed in the care of non-human primates.

(5) Every non-human primate received at a research facility, before being used in connection with any research, other than research carried out within ten days of the arrival of the non-human primate and that will result in the death of the non-human primate within that time, shall be individually housed for a sufficient length of time to accustom it to the normal environment provided for non-human primates in the research facility.

(6) No person shall house a non-human primate in a restraint chair but a restraint chair may be used to the extent necessitated by the nature of an experiment.

(7) Where non-human primates are housed in a communal cage or pen, not more than twenty-five non-human primates shall be housed in the cage or pen. O. Reg. 139/71, s. 23.

24.—(1) Live animals or insects provided as food for any reptiles in a research facility or supply facility shall be so handled as to prevent their escape.

(2) Every cage in which snakes are housed in a research facility or supply facility shall contain a quantity of suitable materials sufficient to permit snakes to shed their skins in a normal manner.

(3) Where venomous reptiles are housed in a research facility or supply facility,

- (a) every door in any room used for housing such reptiles shall be equipped with an effective locking device; and
- (b) every door referred to in clause *a* shall be kept securely closed when there is no person in the room. O. Reg. 139/71, s. 24.

25.—(1) In any research facility or supply facility an animal may be housed outdoors subject to the following conditions:

- 1. The animal shall not be removed from indoor housing and placed in outdoor housing or removed from outdoor housing and placed in indoor housing where to do so would result in a change in environment likely to cause harm or discomfort to the animal.
- 2. The animal shall be provided with adequate potable water.
- 3. The surface on which the outdoor housing is established shall be so maintained as to rapidly drain all excess surface water that is not required by the species of animal so housed.
- 4. The cage, pen, compound or field in which the animal is kept shall be so fenced as to,
 - (a) protect the animal from predators; and
 - (b) prevent the animal from escaping.
- 5. The cage, pen or compound used for outdoor housing of the animal shall be kept in a clean condition free from any materials or equipment likely to cause harm to the animal.
- 6. The cage, pen, compound or field in which the animal is kept shall have therein shelter,
 - (a) readily accessible to the animal;
 - (b) large enough to comfortably accommodate all of the animals in the cage, pen, compound or field;
 - (c) so constituted as to provide substantial protection from the effects of direct sunlight, precipitation and wind; and
 - (d) that is dry and well drained.
- 7. The animal shall be provided with sufficient clean bedding material to maintain its health, welfare and comfort.

(2) In any research facility, where an animal that is not a domesticated animal is used in a research project, the animal may be housed outdoors, provided that the conditions under which it is housed simulate the natural environment of the animal in all material respects. O. Reg. 139/71, s. 25.

26.—(1) Where surgical procedures are performed on an animal with the intention that the animal recover from anaesthesia, the procedures shall be carried out in accordance with established veterinary practice in a surgery area that is maintained in a sanitary condition and designated for the purpose.

(2) Every surgery area referred to in subsection (1) shall be equipped with all equipment necessary to provide for the health and welfare of the animal during surgery. O. Reg. 139/71, s. 26.

27.—(1) Every research facility in which an animal is subjected to surgical procedures performed with the intention that the animal survive shall have a post-operative recovery area equipped with,

- (a) cages or pens appropriate for the animal, so constructed and maintained as to provide appropriate temperature control, cleanliness, ease of observation, ready access to the animal for emergency and supportive therapy purposes and so constructed and maintained that the animal is not likely to injure itself; and
- (b) sufficient materials and equipment to provide for treatment of an animal during the post-operative period.

(2) During the post-operative recovery period, the person who was responsible for the procedure shall provide or cause to be provided appropriate post-operative care in accordance with established veterinary practices.

(3) No animal shall be removed from the post-operative recovery area until it has recovered from anaesthesia. O. Reg. 139/71, s. 27.

28.—(1) Where euthanasia is carried out with respect to any animal in a research facility or supply facility, it shall be carried out,

- (a) by a person or persons properly trained in the euthanasia procedure to be used;
- (b) in such manner that the death of the animal occurs without unnecessary pain, delay or discomfort; and
- (c) in a manner that does not endanger or disturb other animals in the research facility or supply facility.

(2) No person shall use an euthanasia procedure with respect to any animal in a research facility or

supply facility unless it is a procedure that is permitted under section 29, 30, 31 or 32. O. Reg. 139/71, s. 28.

29.—(1) This section applies to euthanasia of cold-blooded animals other than by the use of chemicals.

(2) The following euthanasia procedures are permitted:

1. In the case of Amphibia and reptiles, the insertion of a sharp instrument between the skull and atlas and into the cranial cavity.
2. In the case of fish, the striking of a strong blow to the head behind the eyes.
3. In the case of all cold-blooded animals, decapitation.
4. In the case of all cold-blooded animals, cervical dislocation. O. Reg. 139/71, s. 29.

30.—(1) This section applies to euthanasia of cold-blooded animals by the use of chemicals.

(2) The following euthanasia procedures are permitted:

1. In the case of all Amphibia or reptiles,
 - (a) injection of barbiturates;
 - (b) injection of procaine hydrochloride;
 - (c) oral administration of tribromoethanol;
 - (d) the administration of chloroform by inhalation;
 - (e) the administration of ether by inhalation; and
 - (f) injection of chlorobutanol saturated solution.
2. In the case of fish,
 - (a) the suspension in water of tricaine methanesulfonate;
 - (b) the suspension in water of 2-methyl-quinoline; and
 - (c) prolonged bubbling into the tank of a high concentration of carbon dioxide.

3. In the case of Amphibia, the suspension in water of tricaine methanesulfonate. O. Reg. 139/71, s. 30.

31.—(1) This section applies to euthanasia of warm-blooded animals other than by use of chemicals.

(2) The following euthanasia procedures are permitted:

1. In the case of all mammals, exsanguination, but only where the animal is completely anaesthetized prior to and during the procedure.
2. In the case of birds and rodents, cervical dislocation.
3. In the case of live stock and dogs, electrocution but only where the electrocution equipment is approved by the Director.
4. In the case of rodents, decapitation, but only with equipment that is approved by the Director. O. Reg. 139/71, s. 31.

32.—(1) This section applies to euthanasia of warm-blooded animals by the use of chemicals. O. Reg. 139/71, s. 32 (1).

(2) The following euthanasia procedures are permitted:

1. Administration of barbiturates intravenously, intracardially, intrathoracically or intraperitoneally.
2. Administration of tribromoethanol rectally or orally other than in the case of dogs.
3. Slow intravenous administration of Hoechst Pharmaceutical product T-61.
4. Administration of chloral hydrate intraperitoneally, intravenously or orally.
5. Administration of ether by inhalation.
6. Administration of carbon dioxide by inhalation.
7. Administration of chloroform by inhalation. O. Reg. 139/71, s. 32 (2); O. Reg. 823/78, s. 1.

REGULATION 19

under the Animals for Research Act

TRANSPORTATION

1. In this Regulation,

(a) "disposable shipping container" means a shipping container that is not a re-usable shipping container;

(b) "live stock" means cattle, goats, horses, sheep or swine;

(c) "re-usable shipping container" means a shipping container that is so designed, constructed and maintained and made of such materials that,

(i) it may be readily sanitized, and

(ii) it does not readily harbour insects or disease-producing organisms;

(d) "sanitize" means to clean for the purpose of controlling disease-producing organisms. O. Reg. 141/71, s. 1.

2. This Regulation applies to the transportation of animals that are used or are intended to be used by a research facility. O. Reg. 141/71, s. 2.

3.—(1) Every vehicle used for transporting animals shall be free from mechanical defects that are likely to impair the health, welfare or comfort of the animals.

(2) Other than in the case of fish, every vehicle shall be equipped to provide adequate amounts of fresh air to all animals in the vehicle without injurious drafts.

(3) The part of every vehicle in which animals are transported shall be maintained at a temperature suitable for the health, welfare and comfort of the animals.

(4) The part of every vehicle in which animals are transported shall be so constructed and maintained as to prevent, so far as may be practicable, the entry of exhaust gases.

(5) The part of every vehicle in which animals are transported shall be so constructed and maintained that it may be readily sanitized. O. Reg. 141/71, s. 3.

4.—(1) This section applies only to animals other than fish and live stock.

(2) Animals shall be shipped in,

(a) cages or re-usable shipping containers;

(b) disposable shipping containers; or

(c) compartments that are constructed as an integral part of the vehicle.

(3) Every cage, shipping container and compartment referred to in subsection (2) shall be,

(a) so constructed and maintained that any animal therein cannot readily escape;

(b) of sufficient size that every animal therein may stand, sit and lie down;

(c) so constructed and maintained that it is not likely to harm any animal therein;

(d) so constructed and maintained that it provides adequate ventilation at all times during transit;

(e) where it is placed above another cage, shipping container or compartment, equipped with a floor that is impervious to moisture and that is so constructed and maintained as to prevent excreta from entering any other cage, shipping container or compartment;

(f) so constructed and maintained that animals therein remain reasonably free of contamination by excreta or vomit; and

(g) so constructed and maintained as to provide for ready access at all times during transit to the animals therein.

(4) Every cage, re-usable shipping container and compartment referred to in subsection (2) shall be maintained in a sanitary condition.

(5) No disposable shipping container shall be used more than once. O. Reg. 141/71, s. 4.

5.—(1) This section applies only to live stock.

(2) The floor of any stall or compartment of any vehicle in which live stock are transported or of any ramp used in connection therewith shall be so constructed and maintained as to provide a surface free from any holes or cracks capable of causing injury to any head of live stock.

(3) Every stall or compartment of any vehicle used for the transportation of live stock and every ramp used in connection therewith shall be free from any projections, holes or objects capable of causing injury to any head of live stock.

(4) Every stall or compartment of any vehicle used for the transportation of live stock shall be supplied with amounts of clean bedding material adequate to provide for the comfort and safety of any live stock therein. O. Reg. 141/71, s. 5.

6.—(1) This section applies only to fish.

(2) Fish shall be transported in a container that is so constructed and maintained that it will contain sufficient water for the needs of the fish therein and will provide sufficient oxygen for the health, welfare and comfort of the fish.

(3) Every fish shall be maintained in an adequate volume of water that is sufficiently oxygenated and of a suitable temperature for the health, welfare and comfort of the fish. O. Reg. 141/71, s. 6.

7. Every vehicle used for the transportation of animals shall, during the time that it is so used, have a covering adequate to prevent the direct entry of sunlight, rain, hail or snow into the part of the vehicle in which the animals are transported. O. Reg. 141/71, s. 7.

8. Where more than one animal is transported in a cage, container, compartment, tank or stall, no individual animal shall be placed therein where the placing of the animal would result in harm to any of the animals and where the behaviour of animals in any cage, container, compartment, tank or stall is such that harm is likely to result, any animal or animals whose removal will prevent the harm from occurring shall forthwith be removed. O. Reg. 141/71, s. 8.

9. Every person who transports animals shall transport them to their destination without undue delay. O. Reg. 141/71, s. 9.

10. All animals while in transit shall be supplied, at such times as are necessary for their health, welfare and comfort, with such quantities of palatable, uncontaminated food or water as are necessary for their health, welfare and comfort. O. Reg. 141/71, s. 10.

11.—(1) Every vehicle that is in use for transporting animals shall have therein a person who is competent to care for the animals while in transit and such person shall carry out or cause to be carried out all reasonable actions necessary to provide for the health, welfare and comfort of the animals in transit and without limiting the generality of the foregoing, such person shall regularly inspect the animals in the vehicle to determine whether any of them are seriously ill or seriously injured and where any animal appears to be seriously ill or seriously injured such person shall arrange for the animal to receive veterinary care as soon as may be practicable or shall forthwith humanely destroy the animal.

(2) The person referred to in subsection (1) shall, when the animals arrive at their destination, ensure that the animals are placed,

- (a) in the custody of a person authorized to take custody of the animals by the person to whom the animals are being transported; or
- (b) in a location in which the health, welfare and comfort of the animals will not be impaired and shall immediately notify the person to whom the animals are being transported. O. Reg. 141/71, s. 11.

REGULATION 20

under the Apprenticeship and Tradesmen's Qualification Act

AIR COOLED AND MARINE ENGINE MECHANIC

INTERPRETATION

1. In this Regulation,

- (a) "certified trade" means the trade of air cooled and marine engine mechanic;
- (b) "training profile" means the training curriculum approved by the Director for the various branches of the certified trade, including the units of study required for in-school and work experience training. O. Reg. 505/80, s. 1.

2. The trade of air cooled and marine engine mechanic is designated as a certified trade for the purposes of the Act. O. Reg. 505/80, s. 2.

3. The certified trade is composed of four branches as follows:

- 1. Branch 1, small engine mechanic.
- 2. Branch 2, marina and small powered equipment mechanic.
- 3. Branch 3, small engine mechanic (construction).
- 4. Branch 4, boat motor mechanic. O. Reg. 505/80, s. 3.

4. An apprentice training program is established for the various branches of the certified trade and shall consist of the number of periods of related training and work experience referred to in section 5,

- (a) in the units of study contained in the training profile or in a program that in the opinion of the Director is equivalent thereto at a location approved by the Director; and
- (b) in work experience training provided by the employer of the apprentice in the units of study contained in the training profile. O. Reg. 505/80, s. 4.

5. An apprentice in the certified trade shall,

- (a) for Branch 1, 2 or 3 complete two periods of 2000 hours per period of related training and work experience in the subjects contained in the training profile for such branch, as the case may be; and
- (b) for Branch 4 complete four periods of 1800 hours per period of related training and work experience in the subjects contained in the training profile for such branch. O. Reg. 505/80, s. 5.

6. Notwithstanding clause 3 (a) of Regulation 36 of Revised Regulations of Ontario, 1980, the Director may permit a person to become an apprentice in the certified trade where he has less than Grade 10 standing. O. Reg. 505/80, s. 6.

7. The rate of wages for an apprentice in the certified trade when not attending a training program at a location approved by the Director, shall be not less than the minimum rate of wages prescribed by the *Employment Standards Act* for employees in the particular branch of the certified trade, as the case may be, plus a minimum of 20 per cent for each period of related training and work experience completed by the apprentice. O. Reg. 746/80, s. 1.

8. The Director may from time to time determine the ratio of apprentices to journeymen who may be employed by an employer in a branch of the certified trade. O. Reg. 505/80, s. 8.

9.—(1) Section 9 and subsection 11 (2) of the Act do not apply to a person who works in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 505/80, s. 9.

10. A certificate of qualification in a branch of the certified trade is not required to be renewed. O. Reg. 505/80, s. 10.

REGULATION 21

under the Apprenticeship and Tradesmen's Qualification Act

ALIGNMENT AND BRAKES MECHANIC

1. In this Regulation,

(a) "alignment and brakes mechanic" means a person engaged in the repair and maintenance of motor vehicles who,

(i) tests for and corrects faulty alignment of wheels, axles, frames and steering mechanisms including wheel balancing, and

(ii) adjusts, disassembles, repairs and reassembles foundation brake systems, and controls and components pertaining to them;

(b) "certified trade" means the trade of alignment and brakes mechanic;

(c) "motor vehicle" means a vehicle propelled by an internal combustion engine, or operated or controlled from a vehicle propelled by an internal combustion engine, that is registered for use on a highway under the *Highway Traffic Act* and is used primarily for the transport of persons, equipment or goods, but does not include a vehicle,

(i) operated only on rails,

(ii) used for transportation solely within an employer's actual place of business, or

(iii) used for farming operations but not used for carrying a load. R.R.O. 1970, Reg. 19, s. 1.

2. The trade of alignment and brakes mechanic is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 19, s. 2.

3. An apprentice training program for the certified trade is established and shall consist of,

(a) training and instruction at full-time educational day classes provided at a College of Applied Arts and Technology or in classes that, in the opinion of the Director, are equivalent thereto; and

(b) in practical training and instruction provided by an employer of the apprentice,

in the subjects contained in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 19, s. 3.

4.—(1) Subject to subsections (2) and (3), an apprentice shall complete three periods of training and instruction of 1800 hours per period.

(2) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma or has Ontario Grade 12 standing in English, Mathematics and Science or has such other academic qualification that, in the opinion of the Director, is equivalent thereto, he shall complete three periods of training and instruction of 1600 hours per period.

(3) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma majoring in auto mechanics or has such other academic qualification that, in the opinion of the Director, is equivalent thereto, he shall complete three periods of training and instruction of 1200 hours per period. R.R.O. 1970, Reg. 19, s. 4.

5. Any person who,

(a) applies in the prescribed form for apprenticeship in the certified trade; and

(b) becomes an apprentice in the certified trade within three months after commencing to work in that trade,

is exempt from subsection 11 (2) of the Act. R.R.O. 1970, Reg. 19, s. 5.

6. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

(a) 50 per cent during the first period of training and instruction;

(b) 70 per cent during the second period of training and instruction; and

(c) 90 per cent during the third period of training and instruction,

of the average rate of wages for journeymen employed by the employer in that trade, or where the employer is the only journeyman employed, of the average rate of wages for journeymen in the area. R.R.O. 1970, Reg. 19, s. 6.

7. The subjects of examination for an apprentice are the subjects set out in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 19, s. 7.

Schedule

ALIGNMENT AND BRAKES MECHANIC

PART 1

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics	Arithmetic	Addition, subtraction and division of whole numbers and fractions, ratio and proportion, areas and volumes.
		Geometry	Lines, planes and angles.
2	Science	Physics Mechanics	Basic laws and principles, formulae. (Given as required in shop instruction.)
3	English	Basic Usage and Business Communications	Trade terminology and usage. Letter and report writing. Work and parts orders. Interpretation and use of manufacturers' manuals.
4	Drafting	Basic Drafting and Interpretation	Preparation of elementary working drawings and dimensioned sketches of automotive components. Interpretation of exploded drawings, electrical and hydraulic circuits and schematics used in manufacturers' manuals.
5	General Shop Practice	Safety	Safety rules and safe operating procedures. First aid. Fire prevention. Use and maintenance of fire-fighting equipment. Handling of gasoline, oils and cleaning solvents. Danger of carbon monoxide fumes. Correct use of lifting and hoisting equipment. Good housekeeping.
		Hand Tools	Selection and use of hammers, punches, chisels, pliers, wrenches, sockets, screwdrivers, hacksaws, files, drifts, scrapers, snips, clamps, drill bits, reamers, vises, taps and dies. Stud extractors. Hones.
		Power Tools	Use and care of portable air and electric drills, impact tools, grinders and disc sanders.
		Benchwork	Cutting with hacksaw, filing, scraping, drilling, use of drill press. Use of bench grinder; Grinding of drill bits, chisels, etc. Fitting bushings, honing, cutting and flaring tubing. Soldering, gasket making. Oxy-acetylene and arc welding and cutting. Brazing techniques. Care and maintenance of welding equipment.
		Measuring Instruments	Use of rules, straight edges and squares. Feeler gauges, calipers, verniers, micrometers. telescopic gauges, dial indicators, trammel and frame gauges.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Fastening Devices	Types of bolts, nuts, studs, screws and tube fittings. Thread identification and classification. Tensile strengths. Installation procedures. Tightening torques. Cutting internal and external threads. Removing broken studs. "Heli-Coil" inserts. Types of rivets, keys, springs, flat and lock washers, snap rings, circlips, cotter pins. Installation and removal. Thread lubricants, sealers and locking compounds.
		General Shop Equipment	Capacities and correct usage of floor cranes, hoists, jacks, stands, hydraulic presses, pullers. Operation and maintenance of degreasing and steamcleaning equipment. Operation and maintenance of air compressors. Capacities and use of tow trucks and related vehicle recovery equipment.
6	Suspension Systems	Front End Geometry	Purpose and definition of caster, camber, toe-in, toe-out, ball joint or kingpin inclination, and turning angles.
		Front Suspension (Solid Axle)	Purpose and application of solid axles. Elliot and Reverse Elliot. Servicing and straightening procedures.
		Leaf Springs	Characteristics of leaf springs, mountings and related parts—single leaf, multi-leaf, and helper springs. Inspection for wear, damage and distortion. Removing, overhauling and reinstalling axles, springs and related parts. Lubrication.
		Front and Rear Independent Suspension	Characteristics of front and rear independent suspensions—coil and leaf spring, torsion bar and air-hydraulic. Inspecting suspension components. Effects of wear and misalignment. Checking suspension mountings. Trimming dimensions. Shock absorbers, stabilizers and radius rods. Overhaul of suspensions and related parts. Removing compressed springs. Replacing bushings. Maintaining preloading. Removing and reinstalling torsion bars. Torquing suspension components. Lubrication. Sealed systems.
		Front and Rear Suspension Systems (Commercial Vehicles)	Purpose and characteristics of commercial vehicle suspensions: leaf springs, coil springs, torsion bars, rubber and air cushion types. Purpose of hangers and suspension control rods. Overhauling of suspensions and related components. Realignment. Lubrication. Effects of heat on suspension components.
		Wheels and Rims	Characteristics of wheels and rims. Drop centre, removable flange and removable rim type wheels. Single and dual wheels. Removing and reinstalling wheels and rims. Handling equipment. Wheel to hub fastening and locating devices. Inspecting, repairing and servicing wheels and rims. Run-out.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Tires and Tubes	Types, sizes, characteristics and application of tires and tubes. Demounting and mounting. Equipment and lubricants. Repair of tires, tubes and valves. Tire gauges and pressures. Safety precautions—tire inflation. Tire wear and irregularities. Use of tread depth gauge. Effects of misalignment. Inspection of tires and tubes for damage, and faults. Tire rotation. Retreads.
		Wheel and Tire Balancing	Effects of imbalance. Static and dynamic. Balancing equipment. Balancing wheels and related parts. Wheel weights. Installation.
7	Brake Systems	Service Brakes	Brake actuating devices. Manual and power assisted. Brake operating systems. Hydraulic, vacuum-hydraulic, air-hydraulic, air, etc. Operation of system components. Inspection procedures. Disassembling and assembling of system components. Cleaning procedures. Relining brake shoes. Reconditioning brake drums and brake discs. Reconditioning wheel cylinders and master cylinders. Lubricating and adjusting wheel bearings. Replacing oil seals. Flushing or bleeding system. Flushing agents. Approved fluids. Servicing and adjustment of brakes. Clearances. Control valve adjustments and settings. Servicing tools and equipment. Road testing.
		Parking Brakes	Brake actuating systems and components. Disassembly, inspection, overhaul and reinstallation. Adjusting and testing.
8	Frames	Standard Type Frames	Construction, materials and characteristics of frames; X-frame, ladder type, perimeter type. Effects of frame damage; diamond, sag, twist, sway and kick-up. Inspection methods. Measuring tools and equipment. Frame straightening and alignment equipment. Frame realignment methods and hook-ups. Crossmember replacement. Rivetting, welding and bolting frame members. Heat straightening. Preventing damage to components.
		Unitized Construction	Types and characteristics of unitized frames and suspension mountings. Unitized frame damage. Inspection methods. Measuring tools and equipment. Straightening and alignment equipment. Replacement and realignment of underbody sections. Heat straightening. Preventing damage to components. Sealing, painting and insulating. Simultaneous front end alignment check, for proofing.
9	Steering Systems	Manual Types	Characteristics of cam and lever, worm and roller, worm and sector, rack and pinion and recirculating ball steering gears. Gear shift controls and attached

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Power Types	mechanisms. Lubricants. Oil sealing. Removal, overhaul and reinstallation of steering columns and box assemblies. Adjusting steering gear boxes, gear shift controls and attached mechanisms. Characteristics of integral and linkage types of power steering systems. Special tools, gauges and equipment. Oil seals and vents. Filling and bleeding systems. Fluids. Adjusting pump drives and belts. Testing pressures and valve operation. Adjustment and centering of control valves. Centering steering on high point. Overhauling power steering systems. Cleaning methods. Removing, overhaul and reinstallation of steering assembly. Alignment and adjustment of steering gear boxes, columns and attached mechanisms.
		Steering Linkage and Alignment	Characteristics of steering linkages, bushings and joints. Wheel alignment; types and use of tools, gauges and equipment to measure caster, camber, balljoint or kingpin inclination, turning angles and toe-in. Correcting alignment angles. Adjustment, shimmiing or bending. Angle correction sequence. Inspecting and overhauling steering linkage and joints. Securing and locking steering components. Lubrication. Sealed systems. Road testing.

PART 2

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	General Shop Practice	General	Safety rules and removal of all safety hazards. Use of hand and power tools, measuring instruments, fastening devices and general shop equipment. (As detailed in Part 1.)
2	Suspension Systems	Front Suspension (Solid Axle) Leaf Springs	Axle removal, overhaul and reinstallation. Straightening operations; Correction of caster, camber and king-pin inclination. Lubrication. Single leaf, multi-leaf and helper springs; mountings and related components. Inspecting, removing, overhauling and reinstalling. Lubrication.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		Front and Rear Independent Suspensions	Coil and leaf spring, torsion bar and air-hydraulic systems. Suspension mountings. Trimming dimensions. Overhaul of suspensions and related components; shock absorbers, stabilizers and radius rods. Removing compressed springs and related parts. Replacing bushings; maintaining preloading. Torsion bar replacement. Torquing suspension components. Assembly realignment. Lubrication; sealed systems.
		Front and Rear Suspension Systems (Commercial Vehicles)	Leaf and coil spring, torsion bar, rubber and air cushion types. Overhaul of suspensions and related components, hangers and suspension control rods. Assembly realignment. Lubrication.
		Wheels and Rims	Removal, repair, servicing and reinstallation. Handling equipment. Checking run-out.
		Tires, Tubes and Valves	Demounting, inspection, repair and mounting. Equipment and lubricants. Tire inflation precautions. Recognition of tire wear, faults and misalignment. Tire rotation.
		Wheel and Tire Balancing	Use of on and off-vehicle balancing equipment. Installation of weights.
3	Brake Systems	Service Brakes	Manual and power assisted; hydraulic, vacuum-hydraulic, air-hydraulic, air operated. Disassembly, inspection, overhaul or reconditioning and reinstallation. Cleaning operations. Relining brake shoes. Reconditioning brake drums and discs, wheel cylinders and master cylinders. Lubricating and adjusting wheel bearings. Replacing oil seals. Flushing and bleeding systems. Flushing agents. Approved fluids. Servicing and adjustment. Control valve adjustments and settings. Road testing.
		Parking Brakes	Brake actuating systems and components. Inspection, overhaul or reconditioning. Adjusting and testing.
4	Frames	Standard Type	Determination of frame damage. Inspection. Frame straightening and alignment. Rivetting, welding and bolting frame members. Crossmember replacement. Heat straightening.
		Unitized Construction	Damage inspection. Straightening and alignment. Replacement and realignment of underbody sections and suspension mountings. Front end alignment proofing check. Heat straightening. Sealing, painting and insulating.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
5	Steering Systems	<p>Manual Types</p> <p>Power Types</p> <p>Steering Linkage and Alignment</p>	<p>Cam and lever, worm and roller, worm and sector, rack and pinion recirculating ball types. Gear shift controls and attached mechanisms. Removal, overhaul and reinstallation of steering box and column assemblies. Lubrication. Alignment and adjustment. Road testing.</p> <p>Integral and linkage types. Filling and bleeding systems. Approved fluids. Adjusting pump drives and belts. Special tools, gauges and equipment. Testing pressures and valve operation. Adjustment and centering of control valves. Centering steering on high point. Removal, overhaul and reinstallation of power steering systems. Alignment and adjustment. Road testing.</p> <p>Use of tools, gauges and equipment to measure caster, camber, ball joint or king-pin inclination, turning angles and toe-in. Correction of alignment angles by adjustment, shimming or bending. Correction sequence. Inspection and overhaul of steering linkage and joints. Securing and locking steering components. Sealing and lubrication; sealed systems. Road testing.</p>

R.R.O. 1970, Reg. 19, Sched.

REGULATION 22

under the Apprenticeship and Tradesmen's Qualification Act

AUTO BODY REPAIRER

1. In this Regulation,

(a) "auto body repairer" means a person engaged in the repair of motor vehicles who,

- (i) hammers out dents in body panels, fenders and skirting,
- (ii) files, grinds, sands, fills and finishes ready for priming, any dented, welded or pieced area,
- (iii) by heat treatment, shrinks or stretches metal panels,
- (iv) welds breaks in body areas,
- (v) tests for and corrects faulty alignment of frames,
- (vi) paints and glazes, and
- (vii) removes and installs body parts;

(b) "certified trade" means the trade of auto body repairer;

(c) "motor vehicle" means a vehicle propelled by an internal combustion engine, or a vehicle operated or controlled from a vehicle propelled by an internal combustion engine, that is registered for use on a highway under the *Highway Traffic Act* and is used primarily for the transport of persons, equipment or goods but does not include a vehicle,

- (i) operated only on rails,
- (ii) used for transportation solely within an employer's actual place of business, or
- (iii) used for farming operations but not used for carrying a load. R.R.O. 1970, Reg. 20, s. 1.

2. The trade of auto body repairer is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 20, s. 2.

3. An apprentice training program for the certified trade is established and shall consist of,

(a) training and instruction at full-time educational day classes provided at a College of Applied Arts and Technology or in classes that, in the opinion of the Director, are equivalent thereto; and

(b) practical training and instruction provided by an employer of the apprentice,

in the subjects contained in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 20, s. 3.

4.—(1) Subject to subsection (2), an apprentice shall complete four periods of training and instruction of 1800 hours per period.

(2) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma majoring in auto body repair or has such other qualification that, in the opinion of the Director, is equivalent thereto, he shall complete four periods of training and instruction of 1400 hours per period. R.R.O. 1970, Reg. 20, s. 4.

5. A person holding a certificate of qualification in the trade of automotive painter may qualify for examination for a certificate of qualification in the trade of auto body repairer by becoming indentured as an auto body repairer apprentice and completing the final three periods of training and instruction of 1800 hours per period in the subjects contained in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 20, s. 5.

6. No person shall become an apprentice in the certified trade unless he has successfully completed Grade 8 in Ontario or has such other academic qualification that, in the opinion of the Director, is equivalent thereto. R.R.O. 1970, Reg. 20, s. 6.

7. Any person who,

(a) applies in the prescribed form for apprenticeship in the trade; and

(b) becomes an apprentice in the certified trade within three months after commencing to work in that trade,

is exempt from subsection 11 (2) of the Act. R.R.O. 1970, Reg. 20, s. 7:

8. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

- (a) 50 per cent during the first period of training and instruction ;

(b) 60 per cent during the second period of training and instruction ;

(c) 80 per cent during the third period of training and instruction ; and

(d) 90 per cent during the fourth period of training and instruction ,
- of the average rate of wages for journeymen employed by the employer in that trade or, where the employer is the only journeyman employed, of the average rate of wages for journeymen in the area. R.R.O. 1970, Reg. 20, s. 8.

9. The subjects of examination for an apprentice are the subjects set out in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 20, s. 9.

Schedule

AUTO BODY REPAIRER

PART 1

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics	Arithmetic Geometry	Addition, subtraction and division of whole numbers and fractions, ratio and proportion, areas and volumes. Lines, planes and angles.
2	Science	Physics Mechanics	Basic laws and principles, formulae. (Given as required in shop instruction.)
3	English	Basic Usage and Business Communications	Trade terminology and usage. Letter and report writing. Work and parts orders. Interpretation and use of manufacturers' manuals.
4	General Shop Practice	Safety Hand Tools Power Tools	Safety rules and safe operating procedures. First aid. Fire prevention. Use and maintenance of fire-fighting equipment. Handling of gasoline, oils, paints, thinners and solvents. Dangers of spontaneous combustion. Danger of carbon monoxide fumes. Correct use of lifting and hoisting equipment. Good housekeeping. Selection and use of screwdrivers, hammers, dollies, spoons, calking irons, picks, wrenches, sockets, pliers, vise-grips, clamps, files, chisels, snips, drifts, panel cutters, punches, hacksaws, drill bits, reamers, taps and dies, stud extractors. Door and regulator handle removal tools, putty knives, scrapers, blowgun, paint brushes and striping tools. Care and use of air and electric drills, impact tools, nibblers, disc and orbital sanders, polishers.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Benchwork Operations	Cutting with hacksaw, filing, drilling; use of drill press and bench grinder; grinding of drill bits, chisels, etc. Soldering. Oxy-acetylene and arc welding and cutting. Brazing. Spot welding. Care and maintenance of welding equipment.
		Measuring Instruments	Use of rules, straight-edges and squares. Frame, trammel and track gauges.
		Fastening Devices	Types of bolts, nuts, studs, screws, speed nuts, trim clips, T-bolts, and tube fittings. Thread identification and classification, tensile strengths. Installation procedures. Cutting internal and external threads. Removing broken studs. Types of rivets, keys, springs, flat and lock washers, snap rings, circlips, cotter pins. Installation and removal. Thread lubricants and sealers.
		General Shop Equipment (Paint-Shop Equipment under "Refinishing")	Capacities and correct usage of floor cranes, hoists, jacks, stands and hydraulic presses. Care and use of hydraulic and air-hydraulic body jacking equipment, frame straightening and alignment racks. Bending brakes and rolls. Holding units or fixtures for doors, hoods and truck lids. Power hacksaws. Operation and maintenance of degreasing and steam cleaning equipment.
5	Body Repair	Metal Forming (Steel)	Panel forming. Flanging and forming contours with hand tools. Forming rocker panels, headlight repair caps, door panels and rear quarter repair panels.
		Normalizing (Steel)	Metal Bumping. Dressing high and low contour panels. Unlocking metal. Direct hammering. Indirect hammering. Spring hammering. Picking and filing. Line filing. X-filing. Cross-filing. Metal finishing. Correct use of disc sander.
		Shrinking (Steel)	Heat temperature. Shrinking with hammer and dolly. Shrinking without dolly. Quenching.
		Metal Working (Aluminum)	Roughing out panels; use of mallet or rubber hammer. Dressing damage. Shrinking. Annealing. Finishing.
		Filling Preparation	Dressing damaged areas. Welding. "Sinking" weld. Surface preparation.
		Body-Solder Filling	Fluxes. Composition of solders. Grading. Types. Temperatures—Solidus and Pasty Ranges. Tinning methods (Steel). Tinning methods (Aluminum); Flux and non-flux methods. Solder Paddling. Types of wood paddles; care and lubrication. Vertical, horizontal and overhead application. Heat control. Finishing of solder-filled areas.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		<p>"Cold Filling" (Steel and Aluminum) and Fibreglas Body Repair</p> <p>Door, Hood and Truck Lid Damage</p> <p>Major Body Shell Damage</p>	<p>Use of epoxy resins, fibreglas and polyester fillers. Hardeners. Heat application. Gelcoats. Pot life. Preparation of damaged areas, mixing, application, "lay-up" and finishing methods.</p> <p>Holding units and fixtures. Damage correction sequence. Aligning and straightening procedures. Use of hydraulic body jacking equipment.</p> <p>Damage correction sequence. Use of hydraulic body jacking equipment to correct body alignment. Measuring checking procedures. Diagonal measurements. Door, windshield and rear windshield fit checks. Simultaneous body and frame straightening in cases of major damage and unitized construction. Rough-out and repair of inner construction prior to removal or repair of damaged outer panels.</p>
6	Panel Replacement	<p>Hoods</p> <p>Front Fenders</p> <p>Bumpers</p> <p>Door Panels</p> <p>Rear Quarter Panels</p> <p>Trunk Lids</p> <p>Roof Panels</p>	<p>Alignment of hood to vent panel, fenders and hood lock. Adjust in hinges. Shimming. Application of sound deadening materials.</p> <p>Alignment of front fender to door panel and hood; Adjustment. Replacement of front fender inner panel. Radiator Cradle support—Replacement methods, Adjustment, Shimming. Grille replacement; Hood latch adjustment.</p> <p>Replacement of arms. Adjustment and alignment. Use of heat. Replacement of face bars.</p> <p>Removal of trim, weather stripping, hardware and old panel. Installation and fitting of new panel. Fitting and adjusting doors. Tack welding. Metal finishing. Application of sound deadening materials. Replacement of trim, hardware, and weather stripping.</p> <p>Alignment of panel to trunk lid, door and inner panel. Installation methods. Quarter inner panel (wheel housing) replacement methods. Rocker panel replacement methods.</p> <p>Adjustment and fitting. Torsion bar adjustment. Shimming. Heating hinges. Application of weather stripping. Trunk latch adjustment.</p> <p>Removal of roof area garnish mouldings, rear and front windshields, headliner and insulation. Drilling and cutting of welds. Roof panel removal. Positioning of new panel, aligning to fit doors, body panels, and glass. Welding in position. Reinstallation of roof insulation, headliner, windshields and garnish mouldings.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
7	Glass Replacement	Windshields	Bonded and Rubber insert type: Removal and re-installation. Sealing windshield. Types of inserts. Moulding installation. Fasteners.
		Door, Vent and Rear Quarter Glass	Removal and replacement of trim, hardware, glass and accessories. Adjustment of channels, regulators and power assisted mechanisms.
8	Trim Replacement	Headliners	Removal and reinstallation of headliners. Shrinking and care of headliner. Repair procedures.
		Interior Trim	Removal and reinstallation of interior trim. Shampooing. Recovering panels. Upholstery repairs.
		Seat Frame and Track Repair	Seat and upholstery removal. Repair methods. Upholstery replacement and reinstallation of seat. Seat track types and maintenance.
9	Hardware Replacement	Hardware	Door locks and handles, trunk latches; removal and replacement. Lubrication. Minor repairs. Striker plates; Removal and replacement, Adjustment, Diagnosing adjusting faults. Door hinges—Reconditioning or replacement. Freeing seized hinges. Adjustment. Door checks—removal and installation. Adjustment and lubrication. Moulding and Ornaments: removal and reinstallation. Sealing.
10	Lights	Light Assembly Replacement	Removal and reinstallation of light assemblies and headlight buckets. Sealing. Replacement of seal beam units; Use of headlight aiming equipment. Electrical wiring; Soldering. Resin flux. Solderless connections. Tests for correct light operation. Grounding.
11	Cooling System	Radiator Repairs	Types of radiators. Cleaning acids and fluxes. Solders and soldering methods. Cleaning cores and Testing. Automatic transmission oil coolers. Pressure cap specifications. Recoring procedures. Testing, painting and reinstallation. Automatic transmission fluid level checks. Antifreeze solutions. Testing. Radiator hoses and clamps, Sealers, Replacement. Thermostats; Function, Removal, testing and replacement.
12	Front End Alignment	Principles	Steering geometry. Definition of caster, camber, king-pin and ball-joint inclination and toe-in. Principles of front-end alignment machine operation.
		Wheels and Tires	Wheel straightening. Tire demounting and mounting. Wheel balancing. Static. Dynamic.
13	Frames	Standard Frame Damage	Construction and characteristics of frames: X-frame, ladder type, perimeter type. Effects of damaged frames. Diamond, sag, twist, sway and kick-up. Inspection methods. Measuring tools and equipment. Frame straightening and alignment methods

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Unitized Construction Damage	and equipment. Rivetting, welding and bolting frame members. Crossmember replacement. Heat straightening. Types and characteristics of unitized frames and suspension mountings. Damage inspection. Straightening and alignment methods and equipment. Replacement and realignment of underbody sections. Simultaneous front end alignment proofing check. Heat straightening. Sealing, painting and insulating.
14	Estimating	Body Repair Estimating Procedures	Preparing estimates. Hidden damage. Average operation times. Labour, material and overhead costs. Typical estimates on collision repair jobs. Use of flat rate manual.
15	Body Shop Management	Quality Control Discipline and Public Relations	Quality of workmanship. Acceptable standards. Legal implications of safe quality workmanship. Employees' attitude towards employer, insurance adjuster, customers and fellow workers.

AUTOMOTIVE REFINISHING

16	Spray Painting Equipment	Paint Spray Guns	Types, principles of operation, component parts, gun conditions and remedies. Material container types. Spray gun maintenance. Types, construction, and use of air and fluid hoses, connections, couplings and adaptors. Pressure drop.
		Transformers (Regulators and Condensers)	Types and purpose. Installation. Minimum pipe sizes. Pressure drop. Moisture and oil problems. Maintenance procedures.
		Air Compressors	Types and purpose, single and 2-stage: components, C.F.M. capacities. Installation and basic maintenance.
		Respirators and Masks	Organic vapor and dust types. Correct usage and servicing.
		Spray Booths	Types, purpose and operation. Dry and wash types. Special spray booth features. Lights, filters, fans. Maintenance procedures.
		Drying Equipment	Convection (Direct heat) and radiation (Infra-Red) drying and baking ovens. Operation and maintenance. Portable drying equipment.
17	Spraying Techniques	Critical Factors	Importance of correct gun type, fluid tip and air cap combination, fluid and spreader adjustment and atomizing air pressure. Spray patterns. Gun position; distance, stroking, triggering, speed and overlap. Practice spraying of various shaped panels in horizontal and vertical positions.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
18	Surface Preparation Materials	Types, Purpose, Description and Correct Usage	Paint finish cleaning solvents. Metal conditioners. Waterproof and dry type sandpapers, portable sander discs; grain, backing and bonding. Paint removers. Hot and cold stripping. Sand blasting, power and manual sanding. Masking materials—tapes, paper, compounds. Masking machines, "Tack-rags".
19	Surface Preparation	Preparation Procedures	Determination of surface condition. Surface analysis. Adhesion testing. Preparation of surfaces in good and poor condition and "green" or freshly painted surfaces. Masking and sanding techniques. "Featheredging". Paper grade. Wet or dry, hand or power sanding. Blowing and "Tacking". Metal conditioning. Wax, silicone and metal conditioner removal.
20	Refinishing Materials and Methods	Purpose, Description Characteristics and Application Methods	Primers, primer - surfacers, putty, sealers, solid colours and metallics. Colour material formulation; acrylic enamels and lacquers, alkyd (PX) and nitro-cellulose lacquers. Drying characteristics. Effects of temperature and humidity. Thinners or reducers. Formulation; accelerators and retarders. Mixing and reduction. Viscosity checks. Straining. Tests for paint type (old finish). Paint compatibility—intermixing, etc. Factors affecting refinish colour match. Colour codes. Use of silicone additives. Force drying and baking; baking converters. Rubbing and polishing compounds. Hand and machine application.
		Paint Finish Conditions	Identification of paint conditions. Causes and corrective action. Colour coat mil thickness requirements and measurement.
		Spot Repair and Touch-up	Use of enamels, acrylics and lacquers for spot repairs and touch-up. Blending to reduce or eliminate contrast.
		Clean-Up Operations	Removal of overspray from glass, chrome and paint. Effects of solvents on plastic trim. Tire dressings.
21	Paint Finish Deterioration	Causes of Deterioration	Identification of adverse effects of elements and materials on paint finish.
22	Paint Finish Care	Purpose and Use of Polishes and Cleaners	Wax and silicone—wax types. Effects of cleaners and polishes on acrylics, lacquers and enamels. Polishing requirements and precautions for newly refinished vehicles. Paint finish maintenance.
23	Specialty Refinishing	Materials and Procedures	Refinishing of galvanized outer panels and anodized aluminum moulding insert areas. Multi-colour spatter finishes (trunk interiors, floors, etc.) Simulated vinyl hard top finishes. Striping; use of masking tape; lining brush and wheel machine. Application of decals and transfers. "Two-toning".

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
24	Estimating and Shop Management	Estimating and Factors to be Considered	Estimating procedures; condition of previous paint job. Average operation times. Labour, material, overhead costs. Use of flat rate manual. Typical estimates and costing of complete or partial paint jobs.
		Quality Control	Quality of workmanship. Acceptable standards.

PART 2

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	General Shop Practice	General	Safety rules and removal of all safety hazards. Use of hand and power tools, measuring instruments, fastening devices and general shop equipment. Benchwork operations. (As detailed in Part 1.)
2	Body Repair	Panel Forming	Forming repair panels with hand tools.
		Panel Repair (Steel)	Roughing out and dressing damaged areas. Skrink-ing. Picking and filing. Metal finishing.
		(Aluminum)	Roughing out and dressing damaged areas. Shrink-ing. Annealing. Finishing.
		Body-Solder Filling	Filling preparation. Dressing. Welding. Surface preparation. Tinning steel and aluminum panels. Solder Paddling. Finishing filled areas.
		"Cold filling" (Steel and Aluminum) and Fibreglas Body Repair	Use of epoxy resins, fibreglas and polyester fillers. Preparation of damaged areas, mixing, application, "lay-up" and finishing.
		Door, Hood and Truck Lid Damage	Determination of damage correction sequence. Aligning and straightening. Use of hydraulic body jacking equipment and holding units and fixtures for off vehicle repairs.
		Major Body Shell Damage	Determination of damage correction sequence. Use of hydraulic body jacking equipment to correct body alignment. Measurement checking. Door, wind-shield and rear windshield fit checks. Simultaneous body and frame straightening (major damage and unitized construction).

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
3	Panel Replacement	Hoods	Installation and alignment of hood and hood lock. Hinge adjustment.
		Front Fenders	Installation and alignment; adjustment. Replacement of front fender inner panel. Replacement of radiator cradle supports. Grille replacement; hood latch adjustment.
		Bumpers	Replacement of arms. Adjustment and alignment. Replacement of face bars.
		Door Panels	Removal of trim, weather stripping, hardware and damaged panel. Installation of new panel. Fitting and adjusting doors. Tack welding. Metal finishing. Application of sound deadening materials. Replacement of trim, hardware, and weather stripping.
		Rear Quarter Panels	Removal of damaged panel. Alignment of new panel and installation. Quarter inner panel (wheel housing) replacement. Rocker panel replacement.
		Trunk Lids	Adjustment and fitting. Torsion bar adjustment. Application of weather stripping. Latch adjustment.
		Roof Panels	Removal of roof area garnish mouldings, windshields, headliner and insulation. Drilling and cutting of welds and roof panel removal. Aligning new panel to fit doors, body panels, and glass. Welding. Re-installation of insulation, headliner, windshields and garnish mouldings.
4	Glass Replacement	Windshields	Removal and reinstallation of bonded and rubber insert types. Sealing.
		Door, Vent and Rear Quarter Glass	Removal and replacement of trim, hardware, glass and accessories. Adjustment of channels, regulators and power assisted mechanisms.
5	Trim Replacement	Headliners and Interior Trim	Removal and reinstallation. Headliner shrinking and care. Shampooing. Recovering trim panels. Headliner and upholstery repairs.
		Seat Frame and Track Repair	Seat and upholstery removal. Repairs to frame. Upholstery replacement and reinstallation of seat. Seat track maintenance.
6	Hardware Replacement	Hardware	Door locks and handles, trunk latches; removal and replacement. Lubrication. Minor repairs. Striker plates; Removal and replacement, adjustment, diagnosing adjusting faults. Door hinges: Reconditioning or replacement. Freeing seized hinges. Adjustment. Door checks: removal and installation. Adjustment and lubrication. Mouldings and Ornaments: removal and reinstallation. Sealing.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
7	Lights	Light Assembly Replacement	Removal and reinstallation of light assemblies and headlight buckets. Sealing. Replacement of seal beam units; Headlight aiming. Electrical wiring; soldering, solderless connections, insulating. Testing for correct light operation.
8	Cooling System	Radiator Repairs	Solder repairs to tanks and cores. Cleaning cores and testing. Testing automatic transmission oil coolers. Familiarization with pressure cap specifications. Recoring; testing, painting and reinstallation. Automatic transmission fluid level checks. Testing antifreeze solutions. Replacement of radiator hoses and clamps. Thermostats; removal, testing and replacement.
9	Wheels and Tires	Servicing	Wheel straightening. Tire demounting and mounting. Wheel Balancing.
10	Frames	Standard Frame Damage	Determination of frame damage. Inspection. Frame straightening and alignment. Rivetting, welding and bolting frame members. Crossmember replacement. Heat straightening.
		Unitized Construction Damage	Damage inspection. Straightening and alignment. Replacement and realignment of underbody sections. Need for front end alignment proofing check. Heat straightening. Sealing, painting and insulating.
11	Estimating	Body Repair Estimating	Preparing estimates. Costing collision repair jobs. Use of flat rate manual.
12	Body Shop Management	Quality Control	Acceptable standards of workmanship. Legal implications of safe quality workmanship.
		Discipline and Public Relations	Attitude towards employer, insurance adjuster, customers and fellow workers.

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13	Spray Painting Equipment	Use, Operation and Maintenance	Familiarization with use, operation and maintenance of spray guns, air and fluid hoses and fittings, transformers, air compressors, spray booths, respirators and masks. Drying and baking ovens and portable drying equipment.
14	Surface Preparation	Surface Condition	Analysis of surface condition. Identification of adverse effects of elements and materials on paint finish. Testing for adhesion, paint types, finish age and silicones.
		Preparation Procedures	Removal of mouldings, trim, hardware and emblems as required.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
			<p>Selection and use of paint finish cleaning solvents, paint removers if required and baking equipment for "Green" or freshly painted vehicles.</p> <p>Blowing and masking. Spot sanding and feather-edging of damaged or repaired areas, or complete overall sanding as required. Selection and use of dry or waterproof sandpapers by hand or power sanding.</p> <p>Selection and use of metal conditioners.</p> <p>Spot or overall application of primers and primer surfacers as required.</p> <p>Final complete overall sanding and primer touch-up of bare metal.</p>
15	Refinishing Operations	<p>Colour Match</p> <p>Mixing and Reduction</p> <p>Additives and Viscosities</p> <p>Testing and Checking Procedures</p> <p>Application of Sealer and Finish Coats</p> <p>Paint Finish Conditions</p> <p>Spot Repair and Touch-up</p> <p>Drying or Baking</p> <p>Polishing Lacquers</p> <p>Clean-up</p>	<p>Refinish colour matching and tinting. Use of colour codes.</p> <p>Selection of thinners or reducers. Mixing and reduction of sealers, acrylic enamels and lacquers, alkyd (PX) and nitro-cellulose lacquers; solid colours and metallics.</p> <p>Use of accelerators and retarders, silicone additives and baking converters. Checking viscosities. Straining.</p> <p>Testing gun operation and spray pattern. Adjusting atomizing and fluid pressures, Checking spray booth light and exhaust fan operation. Rechecking masking and installing wheel covers. Blowing-down and "tacking".</p> <p>Spray application of sealers and finish materials in accordance with manufacturer's recommendations.</p> <p>Familiarization with causes of paint conditions, and corrective action.</p> <p>Blending of finishing coats into adjacent areas to reduce or eliminate contrast.</p> <p>Air dry, force dry or baking of finish coats according to type of material applied. Removal of masking materials.</p> <p>Hand or power application of rubbing compounds or polishes.</p> <p>Removing overspray from glass, chrome, paint and trim. Applying tire dressings. Replacing moulding, etc.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
16	Paint Finish Care	Use of Polishes and Cleaners	Familiarization with polishing requirements and precautions for newly refinished vehicles and effects of cleaners and polishes on acrylics, lacquers and enamels.
17	Specialty Refinishing	Materials and Procedures	Refinishing of galvanized outer panels and anodized aluminum moulding insert areas. Application of multicolour spatter finishes (trunk interiors, floors, etc.), simulated vinyl hard top finishes. Striping. Application of decals and transfers. "Two-toning".
18	Estimating and Shop Management	Estimating Procedures	Preparation of estimates. Costing of complete or partial paint jobs. Use of flat rate manual. Acceptable standards of workmanship.

R.R.O. 1970, Reg. 20, Sched.

REGULATION 23

under the Apprenticeship and Tradesmen's Qualification Act

AUTOMOTIVE MACHINIST

INTERPRETATION

1. In this Regulation,
under clause 11 (4) (b) or (c) of the Act shall submit to
 - (a) "automotive machinist" means a person who reconditions and rebuilds internal combustion engines and associated components, power trains, brake system components and suspension system components;
 - (b) "certified trade" means the trade of automotive machinist. O. Reg. 864/80, s. 1.
2. The trade of automotive machinist is designated as a certified trade for the purposes of the Act. O. Reg. 864/80, s. 2.
3. An apprentice training program is established for the certified trade and shall consist of four periods of related training and work experience training of 1,800 hours per period,
 - (a) in courses provided at a location approved by the Director in the units of study contained in Schedule 1; and
 - (b) in work experience training provided by the employer of the apprentice in the units of study contained in Schedule 2. O. Reg. 864/80, s. 3.
4. The subjects of examination for an apprentice in the certified trade are the units of study contained in Schedules 1 and 2. O. Reg. 864/80, s. 4.
5. Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of the apprentice's regular hours shall be included in computing the hours spent by the apprentice in work experience training. O. Reg. 864/80, s. 5.
6. The rate of wages for an apprentice in the certified trade whether for his regular daily hours of work or for hours of work in excess of his regular daily hours shall not be less than,
 - (a) 60 per cent during the first period;
 - (b) 70 per cent during the second period;
 - (c) 80 per cent during the third period; and

(d) 90 per cent during the fourth period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in the certified trade and with whom the apprentice is working. O. Reg. 864/80, s. 6.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where an employer is a journeyman in the trade, one apprentice plus an additional apprentice for each additional journeyman employed by that employer and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, an apprentice for each journeyman employed by that employer and with whom the apprentice is working. O. Reg. 864/80, s. 7.

8. Notwithstanding section 7, on the recommendation of the provincial advisory committee or a local apprenticeship committee approved under the Act for the certified trade, the Director may determine the ratio of apprentices who may be employed by an employer in the certified trade. O. Reg. 864/80, s. 8.

9. The Director shall issue a progress record book to an apprentice who shall record his related training and work experience training time and the apprentice shall be responsible for the safe-keeping of the progress record book. O. Reg. 864/80, s. 9.

10. An applicant for a certificate of qualification in the certified trade who is required to satisfy the Director

the Director proof of experience within the trade that, in the opinion of the Director, is equivalent to work experience training described in the units of study in Schedule 2. O. Reg. 864/80, s. 10.

11.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 864/80, s. 11.

12. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 864/80, s. 12.

Schedule 1

AUTOMOTIVE MACHINIST

In-School Training

ITEM	COLUMN 1	COLUMN 2
	Unit of Study	Instruction to be given
1	Safe Practices	Identify safety and health hazards. Use of appropriate fire extinguishers.
2	Hand and Power Tools	Identify, use, and maintain hand and power tools.
3	Measuring Devices	Identify, use, and maintain measuring devices.
4	Shop Equipment	Identify, use, and maintain shop equipment.
5	Machine Shop	Perform cutting, drilling, re-surfacing, grinding, boring, honing, knurling and threading operations.
6	Engines	Operating principles, repair and overhaul of engines and components.
7	Brakes	Operating principles, repair and overhaul.
8	Welding	Fundamental principles of joining, welding, fusing and cutting metals using oxyacetylene, electric arc and soldering equipment.
9	Trade Calculations	Trade related arithmetic, sciences and schematics.
10	Trade Communications	Effective communication, trade related reports, forms and technical publications.

O. Reg. 864/80, Sched. 1.

Schedule 2
AUTOMOTIVE MACHINIST
Work Experience Training

ITEM	COLUMN 1	COLUMN 2
	Unit of Study	Instruction to be given
1	Safe Practices	Be aware of shop hazards and safety rules.
2	Hand and Power Tools	Practice the use and maintenance of hand and power tools.
3	Measuring Devices	Practice the use and maintenance of measuring devices.
4	Shop Equipment	Practice the use and care of shop equipment.
5	Machine Shop	Practice the use and care of machine shop equipment.
6	Engines	Practice in the repair and overhaul of engines.
7	Brakes	Practice in the repair and overhaul of brakes.
8	Welding	Practice joining, welding, fusing and cutting metals using oxyacetylene, electric arc and soldering equipment.

O. Reg. 864/80, Sched. 2.

REGULATION 24

under the Apprenticeship and Tradesmen's Qualification Act

AUTOMOTIVE PAINTER

1. In this Regulation,

(a) "automotive painter" means a person engaged in the refinishing of motor vehicle bodies who,

(i) sands, spot fills, primes and paints,

(ii) dries or bakes newly painted surfaces,

(iii) masks and tapes for multi-tone paint work and protective requirements,

(iv) applies decals, transfers, stencils and other types of identification to finished paint work,

(v) mixes paint and components and matches colours, and

(vi) refinishes galvanized outer panels and anodized aluminum moulding;

(b) "certified trade" means the trade of automotive painter;

(c) "motor vehicle" means a vehicle propelled by an internal combustion engine, or operated or controlled from a vehicle propelled by an internal combustion engine, that is registered for use on a highway under the *Highway Traffic Act* and is used primarily for the transport of persons, equipment or goods but does not include a vehicle,

(i) operated only on rails,

(ii) used for transportation solely within an employer's actual place of business, or

(iii) used for farming operations but not used for carrying a load. R.R.O. 1970, Reg. 22, s. 1.

2. The trade of automotive painter is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 22, s. 2.

3. No person shall become an apprentice in the certified trade unless he has successfully completed

Grade 8 in Ontario or has such other academic qualification that, in the opinion of the Director, is equivalent thereto. R.R.O. 1970, Reg. 22, s. 3.

4. An apprentice training program for the certified trade is established and shall consist of,

(a) training and instruction at full-time educational day classes provided at a College of Applied Arts and Technology or in classes that, in the opinion of the Director, are equivalent thereto; and

(b) practical training and instruction provided by an employer of the apprentice,

in the subjects contained in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 22, s. 4.

5. An apprentice shall complete two periods of training and instruction of 1800 hours per period. R.R.O. 1970, Reg. 22, s. 5.

6. Sections 9 and 10 and subsections 11 (2) and (4) of the Act do not apply to any person who works or is employed in the certified trade. R.R.O. 1970, Reg. 22, s. 6.

7. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

(a) 60 per cent during the first period of training and instruction; and

(b) 80 per cent during the second period of training and instruction,

of the average rate of wages for journeymen employed by the employer in that trade or, where the employer is the only journeyman employed, of the average rate of wages for journeymen in the area. R.R.O. 1970, Reg. 22, s. 7.

8. The subjects of examination for an apprentice are the subjects set out in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 22, s. 8.

9. A certificate of qualification in the certified trade remains in force until cancelled or suspended in accordance with the regulations. R.R.O. 1970, Reg. 22, s. 9.

Schedule

AUTOMOTIVE PAINTER

PART 1

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics	Arithmetic	Addition, subtraction and division of whole numbers and fractions, ratio and proportion, areas and volumes.
		Geometry	Lines, planes and angles.
2	Science	Physics Mechanics	Basic laws and principles, formulae. (Given as required in shop instruction.)
3	English	Basic Usage and Business Communications	Trade terminology and usage. Letter and report writing. Work and parts orders. Interpretation and use of manufacturers' manuals.
4	General Shop Practice	Safety	Safety rules and safe operating procedures. First aid. Fire prevention. Use and maintenance of firefighting equipment. Handling of gasoline, oils, paints, thinners and solvents. Dangers of spontaneous combustion. Danger of carbon monoxide fumes. Correct use of lifting and hoisting equipment. Good housekeeping.
		Hand Tools	Care and use of hammers, screwdrivers, wrenches, sockets, pliers, vise-grips, drill bits, hacksaws, putty knives, scrapers, paint brushes, blowgun and striping tools.
		Power Tools	Care and use of bench grinders, air and electric drills, orbital and disc sanders, polishers and impact tools.
		Fastening Devices	Purpose and types of bolts, nuts, studs, screws, speed nuts, trim clips, flat and lock washers, etc. Installation and removal.
		General Paint-Shop Equipment	Capacities and correct usage of hoists, jacks, stands. Operation and maintenance of degreasing and steam-cleaning equipment.
5	Spray Painting Equipment	Paint Spray Guns	Types, principles of operation, component parts, gun conditions and remedies. Material container types. Spray gun maintenance. Types, construction, and use of air and fluid hoses, connections, couplings and adaptors. Pressure drop.
		Transformers (Regulators and Condensers)	Types and purpose. Installation. Minimum pipe sizes. Pressure drop. Moisture and oil problems. Maintenance procedures.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Air Compressors	Types and purpose, single and 2-stage: components, C.F.M. capacities. Installation and basic maintenance.
		Respirators and Masks	Organic vapor and dust types. Correct usage and servicing.
		Spray Booths	Types, purpose and operation. Dry and wash types. Special spray booth features. Lights, filters, fans. Maintenance procedures.
		Drying Equipment	Convection (Direct heat) and radiation (Infra-Red) drying and baking ovens. Operation and maintenance. Use of portable drying equipment.
6	Spraying Techniques	Critical Factors	Importance of correct gun type, fluid tip and air cap combination, fluid and spreader adjustment and atomizing air pressure. Spray patterns. Gun position; distance, stroking, triggering, speed and overlap. Practice spraying of various shaped panels in horizontal and vertical positions.
7	Surface Preparation Materials	Types, Purpose, Description and Correct Usage	Paint finish cleaning solvents. Metal conditioners. Waterproof and dry type sandpapers, portable sander discs; grain, backing and bonding. Paint removers. Hot and cold stripping. Sand blasting, power and manual sanding. Masking materials—tapes, papers, compounds. Masking machines. "Tack-rags".
8	Surface Preparation	Preparation Procedures	Determination of surface condition. Surface analysis. Adhesion testing. Preparation of surfaces in good and poor condition and "green" or freshly painted surfaces. Masking and sanding techniques. "Featheredging". Paper grade; Wet or dry, hand or power sanding. Blowing and "Tacking". Metal conditioning. Wax, silicone and metal conditioner removal. Removal and reinstallation of exterior trim, emblems, hardware, and light assemblies. Elementary electrical wiring and testing procedures.
9	Refinishing Materials and Methods	Purpose, Description, Characteristics and Application Methods	Primers, primer-surfacers, putty, sealers, solid colours and metallics. Colour material formulation; acrylic enamels and lacquers, alkyd (PX) and nitro-cellulose lacquers. Drying characteristics. Effects of temperature and humidity. Thinners or reducers. Formulation; accelerators and retarders. Mixing and reduction. Viscosity checks. Straining. Use of silicone additives. Tests for paint type (old finish). Paint compatibility—intermixing, etc. Factors affecting refinish colour match. Colour codes. Matching and tinting. Force drying and baking; use of baking converters. Rubbing and polishing compounds; Hand and machine application.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Paint Finish Conditions	Identification of paint conditions. Causes and corrective action. Colour coat mil thickness requirements and measurement.
		Spot Repair and Touch-up	Use of enamels, acrylics and lacquers for spot repairs and touch-up. Blending to reduce or eliminate contrast.
		Clean-Up Operations	Removal of overspray from glass, chrome and paint. Effects of solvents on plastic trim. Tire dressings.
10	Paint Finish Deterioration	Causes of Deterioration	Identification of adverse effects of elements and materials on paint finish.
11	Paint Finish Care	Purpose and Use of Polishes and Cleaners	Wax and silicone-wax types. Effects of cleaners and polishes on acrylics, lacquers and enamels. Polishing requirements and precautions for newly refinished vehicles. Paint finish maintenance.
12	Specialty Refinishing	Materials and Procedures	Refinishing of galvanized outer panels and anodized aluminum moulding insert areas. Multi-colour spatter finishes (trunk interiors, floors, etc.) Simulated vinyl hard-top finishes. Striping; use of masking tape, lining brush and wheel machine. Application of decals and transfers. "Two-toning".
13	Estimating and Shop Management	Estimating and Factors to be Considered	Estimating procedures; condition of previous paint job. Average operation times. Labour, material, overhead costs. Use of flat rate manual. Typical estimates and costing of complete or partial paint jobs.
		Quality Control	Quality of workmanship. Acceptable standards.

PART 2

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	General Shop Practice	General	Safety rules and removal of all safety hazards. Use of hand and power tools, fastening devices and general paint-shop equipment. (As detailed in Part 1.)

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
2	Spray Painting Equipment	Use, Operation and Maintenance	Familiarization with use, operation and maintenance of spray guns, air and fluid hoses and fittings, transformers, air compressors, spray booths, respirators and masks. Drying and baking ovens and portable drying equipment.
3	Surface Preparation	<p>Surface Condition</p> <p>Preparation Procedures</p>	<p>Analysis of surface condition. Identification of adverse effects of elements and materials on paint finish. Testing for adhesion, paint types, finish age and silicones.</p> <p>Removal of mouldings, trim, hardware and emblems as required.</p> <p>Selection and use of paint finish cleaning solvents, paint removers if required and baking equipment for "Green" or freshly painted vehicles.</p> <p>Blowing and masking. Spot sanding and feather-edging of damaged or repaired areas, or complete overall sanding as required. Selection and use of dry or waterproof sandpapers by hand or power sanding.</p> <p>Selection and use of metal conditioners.</p> <p>Spot or overall application of primers and primer surfacers as required. Mixing and reduction.</p> <p>Final complete overall sanding and primer touch-up of bare metal.</p>
4	Refinishing Operations	<p>Colour Match</p> <p>Mixing and Reduction</p> <p>Additives and Viscosities</p> <p>Testing and Checking Procedures</p> <p>Sealer and Finish Coats</p> <p>Paint Finish Conditions</p>	<p>Refinish colour matching and tinting. Use of colour codes.</p> <p>Selection of thinners or reducers. Mixing and reduction of sealers, acrylic enamels and lacquers, alkyd (PX) and nitro-cellulose lacquers; solid colours and metallics.</p> <p>Use of accelerators and retarders, silicone additives and baking converters. Checking viscosities. Straining.</p> <p>Testing gun operation and spray pattern. Adjusting atomizing and fluid pressures. Checking spray booth light and exhaust fan operation. Rechecking masking and installing wheel covers. Blowing-down and "tacking".</p> <p>Spray application of sealers and finish materials in accordance with manufacturer's recommendations.</p> <p>Familiarization with causes of paint conditions, and corrective action.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		Spot Repair and Touch-up Drying or Baking Polishing Lacquers Clean-up	Blending of finishing coats into adjacent areas to reduce or eliminate contrast. Air dry, force dry or baking of finish coats according to type of material applied. Removal of masking materials. Hand or power application of rubbing compounds or polishes. Removing overspray from glass, chrome, paint and trim. Applying tire dressings. Reinstallation of mouldings, trim, hardware, etc. and light assemblies as required. Testing for correct light operation.
5	Paint Finish Care	Use of Polishes and Cleaners	Familiarization with polishing requirements and precautions for newly refinished vehicles and effects of cleaners and polishes on acrylics, lacquers and enamels.
6	Specialty Refinishing	Materials and Procedures	Refinishing of galvanized outer panels and anodized aluminum moulding insert areas. Application of multi-colour spatter finishes (trunk interiors, floors, etc.), simulated vinyl hard-top finishes. Striping. Application of decals and transfers. "Two-toning".
7	Estimating and Shop Management	Estimating Procedures Quality Control Discipline and Public Relations	Preparation of estimates. Costing of complete or partial paint jobs. Use of flat rate manual. Acceptable standards of workmanship. Attitude towards employer, insurance adjuster, customers and fellow workers.

REGULATION 25

under the Apprenticeship and Tradesmen's Qualification Act

BAKER

INTERPRETATION

1. In this Regulation,

(a) "certified trade" means the trade of baker;

(b) "training profile" means the training curriculum approved by the Director for the certified trade, including the units of study required for in-school and work experience training. O. Reg. 265/78, s. 1.

2. The trade of baker is designated as a certified trade for the purpose of the Act. O. Reg. 265/78, s. 2.

3. The certified trade is composed of two branches:

1. Branch 1 is a junior baker.

2. Branch 2 is a baker. O. Reg. 265/78, s. 3.

4. An apprentice training program for the certified trade is established and shall consist of,

(a) training and instruction at full-time educational day classes provided at a college of applied arts and technology in the units of study contained in the training profile for a junior baker or a baker, as the case may be, or in programs that, in the opinion of the Director, are equivalent thereto; and

(b) in work experience training provided by the employer of the apprentice in the units of study contained in the training profile for a junior baker or a baker, as the case may be. O. Reg. 265/78, s. 4.

5. An apprentice in the certified trade shall,

(a) for Branch 1, complete a period of 2,000 hours of training and instruction; and

(b) for Branch 2, complete three periods of training and instruction of 2,000 hours per period. O. Reg. 265/78, s. 5.

6.—(1) No person shall become an apprentice in the certified trade unless he has successfully completed,

(a) for a junior baker, Grade 8 in an Ontario elementary school or such other academic

qualification that, in the opinion of the Director, is equivalent thereto; and

(b) for a baker, Grade 10 in an Ontario secondary school or such other academic qualification that, in the opinion of the Director, is equivalent thereto.

(2) Notwithstanding subsection (1),

(a) a person who has graduated in a course of study for the trade of baker conducted at an educational institution approved by the Director may be registered as an apprentice in Branch 2 of the certified trade and such hourly credits as the Director may determine may be granted to the apprentice for the successful completion of such a course of study; and

(b) a person who has satisfied the Director that he has been continuously engaged in the trade of baker for the period of one or more years may be registered as an apprentice in Branch 2 of the certified trade and such hourly credits as the Director may determine may be granted to the apprentice for work performed or experience gained in the certified trade. O. Reg. 265/78, s. 6.

7. The examination for an apprentice in the certified trade shall be,

(a) for Branch 1, on the units of study contained in the training profile for a junior baker; and

(b) for Branch 2, on the units of study contained in the training profile for a baker. O. Reg. 265/78, s. 7.

8. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours or for hours in excess of his daily hours, shall not be less than,

(a) 65 per cent during the first period;

(b) 75 per cent during the second period; and

(c) 85 per cent during the third period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that

trade and with whom the apprentice is working.
O. Reg. 265/78, s. 8.

9. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the certified trade, one apprentice plus an additional apprentice for each journeyman employed by the employer in that trade and with whom the apprentice is working; or
- (b) where the employer is not a journeyman in the certified trade, one apprentice for each journeyman employed by the employer in that trade and with whom the

apprentice is working. O. Reg. 265/78, s. 9.

10. The Director shall issue a progress record book to each apprentice and the apprentice shall record therein the time he spends in related training and work experience, and the apprentice shall be responsible for keeping the progress record book up-to-date and for its safekeeping. O. Reg. 265/78, s. 10.

11. Sections 9 and 10 and subsections 11 (2) and (3) of the Act do not apply to any person who works or is employed in the certified trade. O. Reg. 265/78, s. 11.

12. A certificate of qualification in Branch 1 or 2 of the certified trade is not required to be renewed. O. Reg. 265/78, s. 12.

REGULATION 26

under the Apprenticeship and Tradesmen's Qualification Act

BRICK AND STONE MASON

INTERPRETATION

1. In this Regulation,

(a) "brick and stone mason" means a person who,

(i) constructs, erects, installs and repairs with brick, concrete block, insulation and other masonry units, walls, arches, paving, floors, fireplaces, chimneys, smoke-stacks and other structures,

(ii) cuts and trims all brick, concrete block and other masonry units by hand tools and power activated equipment,

(iii) lays firebrick and other refractory materials to walls, arches and floors in the construction of furnaces or to lining furnaces and retorts or to enclosing boilers, tanks and heat treating furnaces,

(iv) has a comprehensive knowledge of tools to perform in the trade,

(v) reads and understands blueprints, sketches, specifications, codes and manufacturers literature used in the layout and erection of a structure;

(b) "certified trade" means the trade of brick and stone mason. O. Reg. 19/76, s. 1.

2. The trade of brick and stone mason is designated as a certified trade for the purposes of the Act. O. Reg. 19/76, s. 2.

3.—(1) No person shall become an apprentice in the certified trade unless he has successfully completed grade 8 in Ontario or has such other academic qualification that in the opinion of the Director is equivalent thereto.

(2) Notwithstanding subsection (1), a person who has,

(a) graduated in a course for the trade of brick and stone mason offered in the occupational program of a junior or special vocational school; and

(b) been recommended to the Director by the Principal of the school where he completed the course for enrollment as an apprentice in the certified trade,

may be registered as an apprentice in the certified trade. O. Reg. 19/76, s. 3.

4. An apprentice training program is established for the certified trade and shall consist of four periods of related training and work experience training of 1,400 hours per period,

(a) at full time educational day classes provided at a college of applied arts and technology or in courses that, in the opinion of the Director, are equivalent thereto in the subjects contained in Schedule 1; and

(b) in practical work experience training provided by the employer of the apprentice in the subjects contained in Schedule 2. O. Reg. 19/76, s. 4.

5. Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of his regular daily hours of work experience training shall be included in computing the hours spent in related training and work experience training. O. Reg. 19/76, s. 5.

6. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedules 1 and 2. O. Reg. 19/76, s. 6.

7. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

(a) 40 per cent during the first period;

(b) 60 per cent during the second period;

(c) 70 per cent during the third period;

(d) 80 per cent during the fourth period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 19/76, s. 7.

8. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

(a) where the employer is a journeyman in the trade, one apprentice plus one additional apprentice for every five journeymen employed by that employer in the trade and with whom the apprentice is working;

(b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus one additional apprentice for each additional five journeymen employed by that employer in the trade and with whom the apprentice is working. O. Reg. 19/76, s. 8.

9. Notwithstanding section 8, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 19/76, s. 9.

10. The Director shall issue a progress record book to each apprentice and the apprentice shall record therein the time that he spends in related training and work experience and the apprentice shall be responsible for the safekeeping of his progress record book. O. Reg. 19/76, s. 10.

11.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 19/76, s. 11.

12. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 19/76, s. 12.

	COLUMN 1	COLUMN 2	COLUMN 3
ITEM	Course	Subject	Instruction To Be Given
1	Mathematics (Trade Related)	Mathematics	Addition, subtraction, multiplication, division of whole numbers, fractions, decimals. Metric system; conversion methods. Weights and measures. Ratio and proportion. Percentage. Areas, volumes, linear mensuration. Elementary geometry.
2	Business Communications	General	Vocabulary and organizational structure of the industry. Trade terminology and usage. Reading comprehension; use of trade publications, manuals, specifications. Sentence and paragraph structure. Trade related letter, memoranda writing, completion of forms, reports, job descriptions, requisitions, orders. Oral communication.
3	Drafting and Blueprint Reading	Blueprints Basic Drafting Techniques	Reproduction process. Working drawings. Reading and interpretation of frame, masonry and concrete construction plans; materials, construction members, dimensioning, sections, elevations, details, scales, schedules, architectural standard symbols. Masonry principles and bonds. Types of walls, corners, chimneys, fireplaces, arches, piers, footings, reinforced masonry. Specifications. Modular co-ordination: identification, terminology, history. Need for co-ordination. Details, grids and units. Quantity take-off methods for calculating exact amount of modular and non-modular materials, joint thickness and mortar types. Maintaining production rates, times, schedules. Use of lines, scales, views, projections, sections, developments, dimensions, lettering, symbols. Preparation of elementary working drawings; floor plans for masonry construction, brick coursing for window and door openings, wall section and details, sections and details for steel frame construction. Dimensioned sketches. Material estimates.
4	General Trade Practice	Safety	Safety rules and safe operating procedures. Protective clothing and equipment. First aid. Fire prevention; location, use and maintenance of fire fighting equipment. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . The <i>Building Code Act</i> . Handling and storage of flammable liquids, gases, and chemicals. Safe use of lifting, hoisting and scaffolding equipment, electric tools, welding equipment. Temporary heating equipment. Ventilation. Dermatitis protection. Good housekeeping.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
4		Hand Tools	Care and use of mason's trowels, caulking and pointing trowels, jointing tools, mason's hammer and bolster or brickset. Combination levels and plumb rules, steel squares. Folding rules and tapes, mason's line, plumb bob, line pins, corner blocks. Brushes. Floats, edgers and groovers screeds and darbies. Mortar hoe and board, shovels, gauge rods or storey poles.
		Power Tools and Equipment	Care and use of portable electric and bench masonry saws. Powered mortar mixers. Power or manual pallet lifters. Hoists. Brick and mortar buggies. Mixing box, sand box and screen. Scaffolding; staging frames and planking, ladders, swing-stages. Safety belts and lifelines. Temporary heating equipment. Water drums, hose, pails. Wheelbarrows.
		Mortar	Preparation; selection of materials, types and requirements for sand, lime, cement and water. Screening sand; screen size, measuring and checking to specifications. Mixing mortar; mix types and specifications, proportions by volume and weight. Adding methods. Aging before use. Acid resisting and refractory mortars. Strength, bond, durability, workability, shrinkage, water retentivity. Hand and power mixing. Admixtures; types, specifications, quantities, when to add. Plasticizers accelerators, retardants, water-proofing and colouring agents, epoxies.
		Materials	Origin, manufacture, identification, properties, types and use of brick, structural tile, concrete block, natural and manufactured stone, refractories. Protective coverings. Cavity and veneer wall ties, horizontal joint reinforcements, rigid and flexible anchors, control and expansion joint fillers. Weep hole vents. Furring clips, nailing strips, flashings. Damp-proofing, caulking materials, rigid and pour type insulation.
		Courses	Types, characteristics and uses; header, stretcher, rowlock (rolok), soldier courses. Closures.
		Joints	Mortar joints; strength of bond, mortar thickness, correct application. Bed, head, bed and head backing, cross and closure joints. Parging. Joint finishing or tooling; flush, raked, concave and "V" tooled joints.
		Bonds	Principles, common types and uses; running or stretcher, common, English, English cross or Dutch, Flemish and stack bonds. Ornamental bonds.
		Gauging	Layout and use of storey pole or gauge rods, modular and non-modular measuring devices.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
5	Blockwork	<p>Foundation Walls</p> <p>(General)</p> <p>(Layout)</p> <p>(Wall Elevation)</p> <p>(Construction Details and Procedures)</p> <p>(Pre-liminaries)</p> <p>(Corners and Leads)</p> <p>(Laying Concrete Blocks)</p> <p>(Sills)</p> <p>(Anchoring Frames)</p>	<p>Selecting, locating and storing material: blueprint reading for type of materials, work location. Effect of weather and moisture on materials, protection methods. Specifications for different masonry units and uses. Estimating materials. Preparing mortar to specifications.</p> <p>Establishing base or building line from street line and locating front corner points: blueprint reading for building location. Relevant building codes. Permanent and temporary bench marks. Use of transit and tapes. Marking methods. Squaring corners from building line and measuring side and back lines: blueprint reading to locate sides and back of building. Relevant building codes. Use of transit and tapes. Marking methods. Use of mason's square. Squaring a building.</p> <p>Establishing finished foundation wall elevation: blueprint reading, use of transit or dumpy level. Periodic checks of elevations and levels.</p> <p>Positioning mortar and masonry materials: specifications for type of block, mortar, reinforcing. Site ordering of materials.</p> <p>Laying-out bond, establishing openings and tying-in partitions: blueprint reading for location. Bond types. Use of special units, corners and jumbs. Blueprint reading for coursing and height of openings. Use of mason's rule. Marking of storey pole or gauge rod. Cutting concrete blocks. Use of power-driven masonry saw, brick hammer, set or bolster. Electrical power requirements.</p> <p>Building corners and leads: specifications for bond type and gauge. Trowel use. Correct method of spreading mortar. Use of mason's level or plumb rule, storey pole or gauge rod. Placing reinforcing in bed joints: specifications, plain or patented type reinforcing. Stretching and sighting line: use of line pins, corner line blocks, marked line.</p> <p>Laying concrete blocks to line. Use of trowel. Correct method of spreading mortar. Use of mason's level or plumb rule, storey pole or gauge rod. Jointing methods. Making provision to tie-in partitions: blueprint reading for location. Tying-in or bonding methods.</p> <p>Flashing beneath sills: flashing material types and methods. Setting sills: blueprint reading for sill type. Spreading mortar for different sill types. Safe handling of single unit sills.</p> <p>Anchor types and methods.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
5		(Lintels)	Making concrete lintels: specifications for type required. Reinforcing method. Curing time. Placing lintels: angle-iron or other steel, reinforced masonry unit-type, reinforced concrete type. Determining type on architectural and structural drawings from specifications. Bedding and shoring methods. Use of level, setting to line. Trade terminology, specifications for steel shapes.
		(Finishing)	Making bond beam to close-off top of wall, specification and blueprint reading for type required. Placing reinforcing. Parging and waterproofing foundation walls: use of parge, membrane and patented methods. Insulation: use of loose fill, plank, or perimeter types.
		Exterior Walls (Construction Details and Layout)	Blueprint and specification reading for site location, type and size of wall, C.S.A. and A.S.T.M. Material specifications. Calculation of block and mortar material quantities. Mortar preparation area and material storage. Laying out exterior wall line on foundation wall from known reference point, marking corner points of exterior wall. Squaring corners and establishing other wall lines and finished wall height from blueprints.
		(Preliminaries)	Preparing mortar to specifications. Laying out horizontal coursing, locating and marking openings, intersecting walls, control and expansion joints from blueprints. Purpose, type and application of control and expansion joints, correct tool use. Laying out storey pole or gauge rod from blueprints for vertical coursing, wall height, sill and openings height if applicable.
		(Building Walls)	Placing specified base flashings or damp proof course. Cause and control of efflorescence. Building corners or leads by spotting blocks at corner points. Use of mason's line. Setting, levelling and plumbing units to height. Establishing bond, cutting units and maintaining bond pattern. Laying blocks to line. Provision of weep holes; purpose, specified type, position and frequency. Finishing and pointing joints to specifications. Building-in masonry ties, furring, clips, reinforcements and accessories, rough bucks, steel frames for openings, to blueprints and specifications. Tying-in or bonding intersecting walls. Purpose and provision of chases or recesses. Blueprint reading for location and size. Liaison with other trades.
		(Erecting Scaffolds)	Scaffolding types, erecting, supporting and anchoring methods. Safe working procedures. Predetermining finished wall heights and required scaffolding changes for work progress.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
5		Miscellaneous Details	<p>Building corbels and offsets: blueprint reading for location, design. Limit of total extension to wall thickness. Limit of corbel per course.</p> <p>Setting sills, lintels, ornamental stone or terracotta: blueprint and specification reading for type. Handling single units.</p> <p>Bedding, levelling and setting to line. Buttress types: vertical, battered, flying and corner. Pilaster types: one side of wall, two sides of wall, corner.</p> <p>Building buttresses or pilasters: use of adjustable plumb-rule or batterstick. Angles. Stress and strength of materials.</p> <p>Positioning and setting miscellaneous metal work, building in mechanical services and conduit, blueprint reading for types and location. Trade terminology.</p> <p>Anchoring roof plate or wall plate: use of anchor bolts. Bolt types and holding qualities.</p> <p>Placing beam fill: purpose and usage.</p> <p>Construction joints: saw-cutting existing structure for use of copper bellows. Toothing blocks to existing structure.</p>
		Interior Block Walls	<p>Laying-out work: blueprint and specification reading for details of walls: location, construction, materials and finish.</p> <p>Preparing mortar and adhesives to specifications.</p> <p>Bonding into existing work: use of ties or anchors. Essential filling of joints. Strength of mortar. Block bonding, indents, toothing. Building firestops: blueprint reading to determine where necessary. Relevant building code.</p> <p>Building-in rough bucks or steel frames: anchor types and methods. Building-in nailing strips, plugs, metal furring clips and reinforcing where necessary: specification and blueprint reading for type and location. Holding qualities of nailing strips, furring clips, plugs. Building walls faced on both sides: using two or more units plumbed on each face of wall. Types of bond. Building-in conduit and miscellaneous metal work: blueprint reading for type and location.</p> <p>Cutting block units for interior work: use of power-driven masonry saw. Care in handling units for decorative work. Insulating, fire-proofing, sound-proofing walls.</p>
6	Brickwork	Exterior Walls (Construction Details and Layout)	<p>Blueprint and specification reading for site location, type and size of wall. C.S.A. and A.S.T.M. Material specifications. Calculation of masonry and mortar material quantities. Mortar preparation area and material storage.</p> <p>Laying out exterior wall line on foundation wall from known reference point, marking corner points of exterior wall. Squaring corners and establishing other wall lines and finished wall height from blueprints.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
6		(Preliminaries)	<p>Preparing mortar to specifications. Laying out horizontal coursing in dry bond, locating and marking openings, intersecting walls, control and expansion joints from blueprints. Purpose, type and application of control and expansion joints, correct tool use.</p> <p>Laying out storey pole or gauge rod from blueprints for vertical coursing, wall height, sill and openings height if applicable.</p>
		(Building Walls)	<p>Placing specified base flashings or damp proof course. Cause and control of efflorescence.</p> <p>Building corners or leads by spotting bricks at corner points. Use of mason's line. Setting, levelling and plumbing units to height.</p> <p>Establishing bond, cutting units and maintaining bond pattern. Laying masonry units to line. Provision of weep holes; purpose, specified type, position and frequency. Finishing and pointing joints to specifications.</p> <p>Building-in masonry ties, furring, clips, reinforcements and accessories, rough bucks, steel frames for openings, to blueprints and specifications. Tying-in or bonding intersecting walls.</p> <p>Purpose and provision of chases or recesses. Blueprint reading for location and size. Liaison with other trades.</p> <p>Flashing and topping of free-standing walls: checking specifications and blueprints for type and method.</p>
		Miscellaneous Details	<p>Building corbels and offsets: blueprint reading for location, design. Limit of total extension to wall thickness. Limit of corbel per course.</p> <p>Setting sills, lintels, ornamental stone or terracotta: blueprint and specification reading for type. Bedding, levelling and setting to line. Buttress types: vertical, battered, flying and corner. Pilaster types: one side of wall, two sides of wall, corner.</p> <p>Building buttresses or pilasters: use of adjustable plumb-rule or batterstick. Angles. Stress and strength of materials.</p> <p>Positioning and setting miscellaneous metal work, building in mechanical services and conduit, blueprint reading for types and location. Trade terminology. Anchoring roof plate or wall plate. Use of anchor bolts. Bolt types and holding qualities. Placing beam fill. Purpose and usage. Construction joints: saw-cutting existing structure for use of copper bellows. Toothing masonry to existing structure.</p>
		(Repair Work)	<p>Cutting out defective joints and sections of masonry units: checking structural function of unit to be repaired. Inspecting work to determine sections to be repaired. Establishing staging requirements. Specifications for depth of deteriorated mortar and mortar type. Use of portable-type saw with abrasive blade. Safety precautions. Use of jointing chisel and mash hammer. Purpose and importance of wetting. Placing new masonry units: setting, plumbing and levelling</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
6			to maintain original bond and pattern. Cutting units to fit. Matching old work. Filling joints and pointing to match existing joints: types of mortar and joints, use of pointing tools. Caulking materials and tools. Shoring, needling and underpinning. Checking specifications for strength of materials and mortars. Methods of placing and fastening. Distance on centres. Use of jacks and wedges. Effects of vibration. Safety code.
		(Reinforced Masonry)	Purposes, design, construction. Placing steel: specification and blueprint reading for design and placing of steel. Laying brick, block or tile: determining joint thickness to ensure proper bonding and coverage of steel in grouting process. Grouting wall: mixing grout. Limitations of grout flow. Inspection area.
		(Cleaning Masonry)	Specifications for solution to be used and method. Mixing and application of acid or detergent solutions. Safety regulations and precautions.
		Interior Walls (Masonry Partition Construction)	Laying-out work: blueprint and specification reading for details of walls: location, construction, materials and finish. Preparing mortar and adhesives to specifications. Bonding into existing work: use of ties or anchors. Essential filling of joints. Block bonding, indents, toothing. Building firestops: blueprint reading to determine where necessary. Relevant building code. Building-in rough bucks or steel frames: anchor types and methods. Building-in nailing strips, plugs, metal furring clips and reinforcing where necessary: specification and blueprint reading for type and location. Building walls faced on both sides: using two or more units plumbed on each face of wall. Types of bond. Building-in conduit and miscellaneous metal work: blueprint reading for type and location. Cutting masonry units for interior work: use of power-driven masonry saw. Care in handling units for decorative work. Insulating, fire-proofing, sound-proofing walls.
		Paving Brick	Laying-out work: checking specifications for materials and patterns. Bonds. Cutting for special layouts. Building code requirements. Building steps, pavements and patios: special mortar required for unusual exposure to weather. Foundations, underbed and drainage. Use of level. Determining grades, rise and tread.
		Decorative Masonry	Building decorative masonry: checking specifications and blueprints. Bonds. Patterns. Blending colours. Combining different units in one wall. Jointing. Flashing and topping anchoring specified. Using coloured mortars: checking specifications for correct additives and proportions used. Correct mixing method.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
6			Building glass block panels, placing reinforcing and expansion strips, installing louvres and ventilators, jointing and cleaning: checking specifications and blueprints for: size of openings and blocks, patterns, type of block and correct way to lay, mortar. Use of reinforcing and expansion strip, weather-seals and purpose. Limitations in use.
		Chimneys (Specifications, Construction Procedures)	Laying-out work: blueprint reading for location. Specifications for materials. Use of mason's rule. Relevant building code. Flue capacities and efficiency. Building abutments: selection and use of masonry materials. Design to carry fireplace on floor above. Corbelling to carry fireplace hearth. Miscellaneous ironwork, cleanouts, breechings, thimbles: types and location. Correct anchoring methods. Building-in flue linings: checking specifications and blueprints. Vitrified clay flue lining. Firebrick. Bedding, jointing. Relevant building code. Building withes or midfeathers: relevant building code. Tying or bonding masonry work in chimney. Placing flashings: purpose and materials used, details and application methods. Constructing offset flues: mathematics, angles to perpendicular. Relevant building code. Corbelling to increase chimney size: limit of total extension to wall thickness. Limit of corbel per course. Topping-out chimney: methods and types. Mortar specifications for rigorous conditions. Setting chimney tops: types and purpose, centered and plumbed. Benching mortars. Building with refractory units: blueprint reading for location and types. Specifications. Properties. Availability. Use of special shapes.
		Arches (Design) (Construction)	Laying-out work: blueprint reading for type, location, span, rise and depth of arch. Various designs of arches. Setting and removing centres: use of plumb-rule and level. Use of folding wedges for easy removal without disturbing green brickwork. Factors in construction. placing and removal of centres. Determining spring line, cutting skewback: use of power-driven masonry saw. Use of brick hammer, set or bolster. Safe practices. Laying-up arch: use of centre point or points to line up joints. Tapering bricks or stone for uniform thickness of joints. Use of trammel.
		Fireplaces (Design and Construction Details)	Laying-out work: specifications and blueprint reading for type, location and design. Relevant building code. Placing ash dump, building fireback and setting damper: firebrick use for back hearth, cutting methods. Use of fireclay or high temperature cement. Factors relating to finished opening width: finished opening

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
6			<p>height. Depth of backhearth. Width of back of fireback. Vertical and sloping height of fireback. Width and height of throat. Smoke shelf width. Damper size required, placing height. Ash dump location.</p> <p>Building-in steel fireplace form: checking specifications for types, installation methods.</p> <p>Building masonry facing and mantel: checking specifications. Selection of units for quality. Anchoring to rough brickwork.</p>
7	Specialty	<p>Prefabricated Masonry Panels</p> <p>(Installation)</p> <p>Stonework</p> <p>Pre-cast Concrete</p> <p>Insulation</p> <p>Refractories</p>	<p>Types and characteristics: partial brick and stone panels with styrofoam-plywood combination backing. Full brick, stone and block construction panels. Anchoring methods, specifications, manufacturers installation instructions.</p> <p>Partial brick and stone panels: lining-up, nailing and use of adhesives. Finishing joints. Full brick, stone and block panels: procedures for setting up control, form and grouting jigs. Stripping form jigs. Laying-out and building panels into place. Hoisting by cast-in plates or bolts. Levelling and plumbing. Placing of reinforcing rods, anchor bolts, bracing plates.</p> <p>Arc or resistance welding of plates. Welding requirements, structural welding qualifications. Placing grout by hand or power equipment.</p> <p>Types of walls: random rubble, coursed rubble, field stone, pre-cut and pre-cast stone. Ashlar patterns. Raking joints. Mixing mortar or adhesives. Setting natural and artificial stone and pre-cast shapes: cutting, handling, anchoring and placing stone, bond stones and bond courses, quoins, capping for pier, coping, trim. Use of wood wedges or lead shims.</p> <p>Blueprint and specification reading for types of pre-cast lintels, beams, joists and wall units (manufactured or job-site "tilt-up" construction). Hoisting into place by cast-in anchors. Plumbing and levelling. Tying wall units together with cast-in-place columns or pilasters.</p> <p>Types and characteristics: loose fill (pour type), rigid (plank).</p> <p>Installation procedures and adhesives. Applications for cavity walls, interior walls, refractory and refrigeration work. Specification reading for type and attachment method.</p> <p>Blueprint and specification reading for type of boiler setting or furnace, size and type of wall. Calculation of refractory and fireclay materials. Provision of storage area.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
7			Preparation of fireclay, refractory cements, adhesives and epoxies. Laying out walls, locating expansion joints, recesses for intersecting walls. Placing required insulation. Locating burner cones. Determining location of baffles. Laying out arches. Application of plastics, refractory cements, adhesives and epoxies. Correct location of deadplates and openings.
		Tile and Spectraglaze	Building walls of plain or glazed facing tiles or blocks: blueprint and specification reading for location and type. Use of power-driven masonry saw. Use of special shapes.

O. Reg. 19/76, Sched. 1.

Schedule 2**BRICK AND STONE MASON****Work Experience Training**

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	Trade Practices (As detailed in Schedule 1)	General	Safety rules and removal of all hazards. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . The <i>Building Code Act</i> . Care and use of hand tools, power tools and equipment. Portable electric masonry saws. Temporary heating equipment. Scaffolding, staging frames, planking, ladders, swing-stages. Lifting and hoisting equipment.
		Mortar	Preparation; material, types and requirements. Screening sand. Mixing mortar to specifications. Acid resisting and refractory mortars. Familiarization with strength, bond, durability, workability, shrinkage, water retentivity. Hand and power mixing. Admixtures; use of plasticizers, accelerators, retardants, waterproofing and colouring agents, epoxies.
		Materials	Identification, use and handling of brick, structural tile, concrete block, natural and manufactured stone, refractories. Cutting operations. Cavity and veneer wall ties, horizontal joint reinforcements, rigid and flexible anchors, control and expansion joint fillers. Weep hole vents. Furring clips, nailing strips, flashings. Damp-proofing, caulking materials, rigid and pour type insulation.
		Courses	Use of header, stretcher, rowlock (rolok), soldier courses. Closures.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1		Joints	Making mortar joints; bond, mortar thickness, correct application. Use of bed, head, bed and head backing, cross and closure joints. Joint finishing or tooling; flush, raked, concave and "V" tooled joints. Parging.
		Bonds	On-site application of masonry principles. Use of running or stretcher, common, English, English cross or Dutch, Flemish and stack bonds. Ornamental bonds.
		Gauging	Layout and use of storey pole or gauge rods, modular and non-modular measuring devices.
2	Blueprint Reading (As detailed in Schedule 1)	General	Familiarization, interpretation and use of architectural and structural drawings of frame, masonry, concrete and reinforced masonry construction: sections, elevations, details, scales, schedules, architectural standard symbols. Building codes. Types of walls, corners, chimneys, fireplaces, arches, piers and reinforced masonry. Specifications. Quantity take-off: calculating quantities of modular and non-modular materials, joint thicknesses. Modular co-ordination: on-site application, terminology. Details, grids and units.
3	Blockwork (As detailed in Schedule 1)	Foundation Walls (General)	Selecting, estimating, locating, storing and protecting material. Preparing mortar.
		(Layout)	Establishing base or building line, locating front corner points. Squaring corners, measuring side and back lines. Squaring a building. Finished foundation wall elevation.
		(Construction)	Laying-out bond. Cutting concrete blocks. Building corners and leads. Placing reinforcing in bed joints. Laying blocks to line. Jointing. Tying-in or bonding partitions. Flashing beneath sills. Setting sills. Anchoring frames. Making concrete lintels. Placing lintels, bedding and shoring, levelling, setting to line.
		(Finishing)	Making bond beam to close-off top of wall. Placing reinforcing. Parging and water-proofing foundation walls. Insulation.
		Exterior Walls (Layout)	Calculation of material quantities. Laying out exterior wall line. Marking corner points. Squaring corners, establishing wall lines, finished wall height. Preparing mortar. Laying out horizontal coursing, openings, intersecting walls, control and expansion joints.
		(Building Walls)	Placing base flashings or damp proof course. Building corners or leads. Setting, levelling and plumbing to height. Establishing bond, cutting blocks, maintaining bond pattern. Laying to line. Finishing and pointing

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
3		<p>(Miscellaneous Details)</p> <p>Interior Block Walls</p>	<p>joints. Building-in masonry ties, furring clips, reinforcements and accessories, rough bucks, steel frames for openings. Tying-in or bonding intersecting walls. Provision of chases or recesses. Liaison with other trades. Erecting scaffolding, supporting and anchoring. Safe working procedures.</p> <p>Building corbels and offsets. Setting sills, lintels, ornamental stone or terracotta. Bedding, levelling and setting to line. Building buttresses and pilasters. Positioning and setting miscellaneous metal work, building-in mechanical services, conduit. Anchoring roof or wall plate. Placing beam fill. Construction joints: saw-cutting existing structure for copper bellows. Tothing blocks to existing structure.</p> <p>Laying out work: preparing mortar and adhesives. Bonding into existing work. Filling joints. Block bonding, indents, tothing. Building firestops. Building-in rough bucks or steel frames. Building-in nailing strips, plugs, metal furring clips and reinforcing. Building walls, faced, plumbed both sides. Building-in conduit, miscellaneous metal work. Cutting blocks for interior work. Insulating, fire-proofing, sound-proofing walls.</p>
4	Brickwork (As detailed in Schedule 1)	<p>Exterior Walls (Layout)</p> <p>(Building Walls)</p> <p>Miscellaneous Details</p>	<p>Calculation of material quantities. Laying out exterior wall line. Marking corner points. Squaring corners, establishing wall lines, finished wall height. Preparing mortar. Laying out horizontal coursing in dry bond, openings, intersecting walls, control and expansion joints.</p> <p>Placing base flashings or damp proof course. Building corners or leads. Setting, levelling and plumbing to height. Establishing bond, cutting bricks, maintaining bond pattern. Laying to line. Finishing and pointing joints. Building-in masonry ties, furring clips, reinforcements and accessories, rough bucks, steel frames for openings. Tying-in or bonding intersecting walls. Provision of chases or recesses. Flashing and topping of free-standing walls. Liaison with other trades.</p> <p>Building corbels and offsets. Setting sills, lintels, ornamental stone or terracotta. Bedding, levelling and setting to line. Building buttresses and pilasters. Positioning and setting miscellaneous metal work, building-in mechanical services, conduit. Anchoring roof or wall plate. Placing beam fill. Construction joints: saw-cutting existing structure for copper bellows. Tothing masonry to existing structure. Installing insulation. Cleaning Masonry. Mixing and application of acid or detergent solutions.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
4			Repair work. Cutting out defective joints and sections of masonry units. Inspecting work to be repaired. Staging. Removing deteriorated mortar. Placing new masonry units: setting, plumbing, levelling to original bond and pattern. Cutting units to fit. Matching old work. Filling joints and pointing. Caulking materials. Shoring, needling and underpinning. Reinforced Masonry. Placing steel. Laying brick, block or tile. Grouting walls.
		Interior Walls (Masonry Partition Construction)	Laying out work: preparing mortar and adhesives. Bonding into existing work. Filling joints. Block bonding, indents, toothing. Building firestops. Building-in rough bucks or steel frames. Building-in nailing strips, plugs, metal furring clips and reinforcing. Building walls, faced, plumbed both sides. Building-in conduit, miscellaneous metal work. Cutting masonry units for interior work. Insulating, fire-proofing, sound-proofing walls.
		Paving Brick	Laying out work. Building steps, pavements and patios. Foundations, underbed and drainage. Determining grades, rise and tread.
		Decorative Masonry	Building decorative masonry. Combining different units in one wall. Jointing. Flashing and topping anchoring. Coloured mortar use. Building glass block panels, placing reinforcing and expansion strips, installing louvres and ventilators, jointing and cleaning. Use of reinforcing and expansion strip, weather-seals.
		Chimneys	Laying out work. Building abutments. Corbelling for fireplace hearth. Installation of miscellaneous ironwork, cleanouts, breechings, thimbles. Building-in flue linings. Bedding, jointing. Building withes or midfeathers. Tying or bonding masonry work in chimney. Placing flashings. Constructing offset flues. Corbelling to increase chimney size. Topping-out chimney. Setting chimney tops. Building with refractory units.
		Arches	Laying-out work. Construction, placing and removal of centres. Determining spring line, cutting skewback. Laying-up arch. Tapering bricks or stone. Use of trammel.
		Fireplaces	Laying-out work. Placing ash dump, building fire-back and setting damper. Firebrick cutting. Building-in steel fireplace form. Building masonry facing and mantel.
5	Specialty (As detailed in Schedule 1)	Prefabricated Masonry Panels	Installation of partial brick and stone panels: lining-up, nailing and use of adhesives. Finishing joints. Full brick, stone and block panels: setting up jigs. Stripping form jigs. Laying-out and building panels into place. Levelling and plumbing. Placing of reinforcing rods, anchor bolts, bracing plates. Welding of plates. Placing grout.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
5		Stonework	Building walls of random rubble, coursed rubble, field stone, pre-cut and pre-cast stone. Ashlar patterns. Raking joints. Mixing mortar or adhesives. Cutting, handling, anchoring and placing stone, bond stones and bond courses, quoins, capping for pier, coping, trim.
		Pre-cast Concrete	Building-in pre-cast lintels, beams, joists and wall units (manufactured or job-site "tilt-up" construction). Hoisting into place. Plumbing and levelling. Tying wall units together with cast-in-place columns or pilasters.
		Insulation	Installation for cavity walls, interior walls, refractory and refrigeration work.
		Refractories	Calculation of refractory and fireclay materials. Preparation of fireclay, refractory cements, adhesives and epoxies. Laying out walls, locating expansion joints, recesses for intersecting walls. Placing insulation. Locating burner cones and baffles. Laying out arches. Locating deadplates and openings.
		Tile and Spectraglaze	Building walls of plain or glazed facing tiles or blocks. Use of power-driven masonry saw. Use of special shapes.

O. Reg. 19/76, Sched. 2.

REGULATION 27

under the Apprenticeship and Tradesmen's Qualification Act

CEMENT MASON

1. In this Regulation,

- (a) "certified trade" means the trade of cement mason;
- (b) "cement mason" means a person who,
 - (i) does concrete finishing by hand or with mechanical equipment, including the application of curing and surface treatments,
 - (ii) does all phases of waterproofing and restoration of concrete,
 - (iii) does rubbing-up and repairing of hardened concrete surfaces,
 - (iv) places and finishes epoxy, plastic and other composition materials, and
 - (v) finishes and exposes aggregate in pre-cast and architectural concrete.

2. The trade of cement mason is designated as a certified trade for the purpose of the Act. O. Reg. 165/72, s. 2.

3.—(1) No person shall become an apprentice in the certified trade unless he has successfully completed Grade 8 in Ontario or has such other academic qualification that, in the opinion of the Director, is equivalent thereto.

(2) Notwithstanding subsection (1), a person who has,

- (a) graduated in a course for the trade of cement mason offered in the occupational program of a Junior or Special Vocational School; and
- (b) been recommended to the Director by the principal of the school where the person has completed the course for enrollment as an apprentice in the certified trade,

may be registered as an apprentice in that trade. O. Reg. 165/72, s. 3.

4.—(1) An apprentice training program is established for the certified trade and shall consist of three periods of related training and work experience of 2000 hours each,

(a) at full time educational day classes provided at a College of Applied Arts and Technology in the subjects contained in Schedule 1 or in courses that, in the opinion of the Director, are equivalent thereto; and

(b) in work experience provided by the employer of the apprentice in the subjects contained in Schedule 2.

(2) The total hours of related training and work experience shall be assigned as set out in schedules 1 and 2. O. Reg. 165/72, s. 4.

5. The subjects of examination for an apprentice in the certified trade are the subjects contained in schedules 1 and 2. O. Reg. 165/72, s. 5.

6. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or hours in excess of his regular daily hours shall be not less than,

- (a) 60 per cent for the first period of related training and work experience;
- (b) 75 per cent for the second period of related training and work experience; and
- (c) 90 per cent for the third period of related training and work experience,

of the average hourly rate of wages or its equivalent for a journeyman employed by the employer in that trade and with whom the apprentice is working. O. Reg. 165/72, s. 6.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for every four journeymen employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus an additional apprentice for each additional four journeymen employed by that employer in the trade and with whom the apprentice is working. O. Reg. 165/72, s. 7.

8. Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of his regular daily

hours of work experience shall be included in computing the hours spent by him in related training and work experience. O. Reg. 165/72, s. 8.

9. The Director shall issue a progress record book to an apprentice for the purpose of recording his related training and work experience time and the apprentice shall be responsible for the safekeeping of his progress record book. O. Reg. 165/72, s. 9.

10. A contract of apprenticeship shall be entered into by every apprentice with the local apprenticeship committee for the trade established under the Act in the area in which his apprenticeship originates and the apprentice shall be responsible for preparing the reports of his work experience as prescribed in his progress record book for submission to the local apprenticeship committee. O. Reg. 165/72, s. 10.

11. The local apprenticeship committee shall be responsible for periodic review of the progress of an apprentice and for ensuring that the apprentice obtains the range of related training and work experience as prescribed by this Regulation. O. Reg. 165/72, s. 11.

12.—(1) Section 9 and subsections 11 (2) and (4) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 165/72, s. 12.

13. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 165/72, s. 13.

Schedule 1
CEMENT MASON
Related Training

ITEM	COLUMN 1	COLUMN 2
	Subject	Instruction to be Given
		Total Hours 636
1	Mathematics	Arithmetical processes; lines, angles, areas, volumes, fractions, decimals, ratio, proportion, weights and measure, solution of formulas, equations and problems related to cement masonry work.
2	Science	Physical and chemical properties and characteristics of materials, coarse and fine aggregate, cements, plastics, admixtures, mastics, surface hardeners and treatments, joint fillers, waterproofing; fundamentals of quality concrete; sampling, testing and evaluation of test results.
3	Drafting	Blueprint reading, sketching and fundamentals of architectural drawings.
4	Trade Theory	Layout and concrete construction, slab on grade and suspended; walls, roofs, bases, stairs, pavements, sidewalks, curbs, gutters, tanks, waterproofing, pointing and caulking, uses of composition materials and decorative applications. Shotcreting methods, pressure grouting methods. Characteristics, care and use of trade tools and equipment.
5	Industrial Economics	As related to the preparation, application, repair and maintenance; estimating from construction drawings and specifications; job organization and supervision.
6	Safety and Building Codes	The <i>Occupational Health and Safety Act</i> , building codes relevant to the trade, safe practices.

Schedule 2

CEMENT MASON

Work Experience

ITEM	COLUMN 1	COLUMN 2
	Subject	Work Instruction and Experience
1	<p>CONCRETE FINISHING</p> <p>Job Layout and Planning</p> <p>Mixing, Placing, Curing and Protecting</p> <p>Finishing Concrete</p> <p>Safety Requirements</p>	<p>Total Hours 1750</p> <p>Checking granular base. Checking formwork. Checking or setting of formwork, screeds, bulkheads. Checking location of steel reinforcing and mesh. Checking location of fastening devices. Preparation of concrete base to receive mono or separate toppings. Checking levels, heating facilities and temporary lighting. Ordering materials.</p> <p>Evaluating mix specifications. Mixing concrete. Placing concrete. Mixing and application of coloured hardeners. Mixing and application of metallic and non-metallic surface hardeners. Application of curing and sealing compounds. Placing and finishing concrete base. Sampling and testing of concrete for quality control.</p> <p>Hand finishing using straight edge, darby, hand float, hand trowel. Edging and jointing. Power floating. Power trowelling. Power screeding. Power chipping and grinding. Sand blasting. Acid etching. Exposed aggregate finishing. Texturing and patterning exposed concrete with various form lining materials. Broom, burlap and belt finishing using portable and mobile power grinder. Using portable and mobile saws for cutting concrete. Using scarifying machines. Using power operated routers. Making construction and expansion joints. Maintenance of equipment.</p> <p><i>The Occupational Health and Safety Act</i> Safe practices of the trade.</p>
2	<p>WATERPROOFING, DAMP-PROOFING AND RESTORATION</p> <p>Preparation</p>	<p>Total Hours 1214</p> <p>Removal of wires, wall ties, bolts and foreign material, lime, form oils from concrete walls and floors. Tracing sources of leakage. Preparation and application of hot plugs. Temporary form work, screeds and scaffolding. Removal of toppings and mortars on floors, walls or other surfaces and scarifying to receive new materials. Removal and reinstallation of bleed and drain system for waterproofing purposes. Preparation of walls, floors and other surfaces. Routing and raking of joints to receive grouting or pointing materials. Preparation of waterproofing material:</p>

ITEM	COLUMN 1	COLUMN 2
	Subject	Work Instruction and Experience
	<p>Application</p> <p>Safety Requirements</p>	<p>Membrane materials. Metallic waterproofing. Topping materials. Asphalt and other bituminous coatings, hot or cold, including reinforcing membrane and protective surface coatings. Clear and opaque weather-proofing and water repellent material on concrete or masonry. Waterproofing and weatherproofing material by hand, pneumatic or mechanical means. Use of hot and cold joint sealants. Care and use of shotcreting methods and equipment. Care and use of pressure grouting methods and equipment.</p> <p><i>The Occupational Health and Safety Act</i> Safe practices of the trade.</p>
3	<p>RUBBING-UP</p> <p>Job Planning</p> <p>Installation of Scaffolding</p> <p>Field Practices</p> <p>Safety Requirements</p>	<p>Total Hours 1350</p> <p>Examination of surfaces. Ordering and selection of materials.</p> <p>Hanging scaffolding. Sheave blocks and tackle. Barricades. Rigid scaffolding.</p> <p>Mixing of cement mortar. Preparation of surfaces to receive cement-base materials including removal of form ties, nails and wires. Chipping, cleaning of foreign materials. Patching, pointing and caulking. Grinding. Brushing. Rubbing. Bush hammering. Power chipping and grinding. Sand blasting. Acid etching. Grouting and dry packing. Patching exposed aggregate surfaces. Curing and washing. Care and use of shotcreting methods and equipment. Care and use of pressure grouting methods and equipment.</p> <p><i>The Occupational Health and Safety Act</i> Safety practices of the trade.</p>
4	<p>ARCHITECTURAL PRECAST AND CAST IN SITU CONCRETE</p> <p>Preparation and Finishing</p> <p>Installation</p> <p>Safety Requirements</p>	<p>Total Hours 350</p> <p>Selection of materials. Screeding and finishing. Broadcasting of decorative chips in exposed concrete. Application and stripping of surface retardants. Bush hammering. Acid etching. Repairing of damaged precast concrete components.</p> <p>Cleaning and trimming. Mixing grouting materials. Placing precast sections. Grouting. Pointing. Caulking. Cleaning.</p> <p><i>The Occupational Health and Safety Act</i> Safety practices of the trade.</p>

ITEM	COLUMN 1	COLUMN 2
	Subject	Work Instruction and Experience
5	COMPOSITION MATERIALS	Total Hours 700
	Job Planning	Examination of surfaces. Ordering of materials. Establishing areas, lines and levels.
	Preparation	Masking and protection. Preparation of existing or new surfaces to receive materials. Heating of materials. Mixing hot asphalt.
	Application	Screeding and trowelling. Hot asphalt. Cold mastic. Magnesium oxychloride flooring. Plastic flooring, polyester, epoxy, polyurethane and rubber based. Finishing of hot asphalt, cold mastic and composition materials.
	Safety Requirements	The <i>Occupational Health and Safety Act</i> Safety practices of the trade.

O. Reg. 165/72, Sched. 2.

REGULATION 28

under the Apprenticeship and Tradesmen's Qualification Act

CONSTRUCTION BOILERMAKER

INTERPRETATION

1. In this Regulation,

- (a) "certified trade" means the trade of construction boilermaker;
- (b) "training profile" means the training curriculum approved by the Director for the certified trade, including the units of study required for in-school and work experience training. O. Reg. 266/78, s. 1.

2. The trade of construction boilermaker is designated as a certified trade for the purpose of the Act. O. Reg. 266/78, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of four periods of related training and work experience training of 1,650 hours for each period,

- (a) at full-time educational day classes provided at a college of applied arts and technology in the units of study contained in the training profile or in a program, that in the opinion of the Director, is equivalent thereto; and
- (b) in work experience training provided by the employer of the apprentice in the units of study contained in the training profile. O. Reg. 266/78, s. 3.

4. The examination for an apprentice in the certified trade shall be based on the units of study contained in the training profile. O. Reg. 266/78, s. 4.

5. Every apprentice in the certified trade shall be in good physical health and shall provide medical proof thereof. O. Reg. 266/78, s. 5.

6. No apprentice shall be permitted to engage in the certified trade unless he is capable of climbing to and manoeuvring at heights commonly experienced in the certified trade. O. Reg. 266/78, s. 6.

7. Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of his regular daily hours of practical work experience training up to the maximum of sixty hours per week shall be included in computing the hours spent in related and work experience training. O. Reg. 266/78, s. 7.

8. The Director shall issue a progress record book to an apprentice in the certified trade for the purpose of recording the time spent by the apprentice in respect of related training and work experience and the apprentice shall be responsible for keeping the progress record book up-to-date and for its safe-keeping. O. Reg. 266/78, s. 8.

9. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours or for hours in excess of his regular daily hours, shall be not less than,

- (a) 60 per cent during the first 1,650 hours of related training and work experience training;
- (b) 70 per cent during the second 1,650 hours of related training and work experience training;
- (c) 80 per cent during the third 1,650 hours of related training and work experience training; and
- (d) 90 per cent during the fourth 1,650 hours of related training and work experience training.

of the average rate of wages for journeymen employed by the employer in that trade, or where the employer is the only journeyman employed, of the average rate of wages for journeymen in the certified trade. O. Reg. 266/78, s. 9.

10. Subject to section 11, the number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for each additional three journeymen employed by the employer in that trade and with whom the apprentice is working; or
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus an additional apprentice for each additional three journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 266/78, s. 10.

11. Notwithstanding section 10, on the recommendation of the Provincial Advisory Committee

or the local apprenticeship committee approved under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 266/78, s. 11.

12.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 266/78, s. 12.

13.—(1) Where an applicant for a certificate of qualification, who is not the holder of a certificate of apprenticeship in the trade, supplies evidence satisfactory to the Director of having been con-

tinuously engaged in the trade as a journeyman in Ontario or elsewhere for a period of two years in excess of the apprenticeship period for the trade, the Director shall permit the applicant to write an examination for a certificate of qualification.

(2) Where an applicant for a certificate of qualification referred to in subsection (1) passes such examination as is prescribed by the Director, the Director, upon payment of the prescribed fee, shall issue the applicant a certificate of qualification.

(3) The examination prescribed by the Director in subsection (2) for a certificate of qualification in the certified trade shall be based on the units of study contained in the training profile. O. Reg. 266/78, s. 13.

REGULATION 29

under the Apprenticeship and Tradesmen's Qualification Act

CONSTRUCTION MILLWRIGHT

1. In this Regulation "certified trade" means the trade of construction millwright. O. Reg. 543/72, s. 1.

2. The trade of construction millwright is designated as a certified trade for the purposes of the Act. O. Reg. 543/72, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of four periods of related training and work experience training of 2000 hours per period,

(a) at full time educational day classes provided at a College of Applied Arts and Technology in the subjects contained in Schedule 1 or in courses that, in the opinion of the Director, are equivalent thereto; and

(b) in work experience training provided by the employer of the apprentice in the subjects contained in Schedule 2. O. Reg. 543/72, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedules 1 and 2. O. Reg. 543/72, s. 4.

5. Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of his regular daily hours of work experience training shall be included in computing the hours spent by him in work experience training. O. Reg. 543/72, s. 5.

6. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours of work or for hours of work in excess of his regular daily hours of work shall not be less than,

- (a) 60 per cent during the first period;
- (b) 70 per cent during the second period;
- (c) 80 per cent during the third period; and
- (d) 90 per cent during the fourth period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 543/72, s. 6.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

(a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for every four journeymen employed by that employer in the trade and with whom the apprentice is working; and

(b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus an additional apprentice for each additional four journeymen employed by that employer in the trade and with whom the apprentice is working. O. Reg. 543/72, s. 7.

8. The Director shall issue a progress record book to an apprentice for the purpose of recording his related training and work experience training time and the apprentice shall be responsible for the safekeeping of his progress record book. O. Reg. 543/72, s. 8.

9. An applicant for a certificate of qualification in the certified trade who is required to satisfy the Director under clause 11 (4) (b) or (c) of the Act shall submit to the Director proof of experience within that trade which, in the opinion of the Director, is equivalent to work experience training described in the subjects contained in Schedule 2. O. Reg. 543/72, s. 9.

10.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 543/72, s. 10.

11. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 543/72, s. 11.

Schedule 1
CONSTRUCTION MILLWRIGHT
 Related Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics (Trade Related)	Mathematics	Addition, subtraction, multiplication, division of whole numbers, fractions, decimals. Metric system; conversion methods. Weights and measures. Ratio and proportion. Percentage, discounts, simple interest. Areas, volumes, linear, angular mensuration. Square root. Scale conversion. Algebra fundamentals; simple equations, formulae, shop calculations. Trigonometry; right angled and oblique triangles, formulae, shop calculations.
2	Science (Trade Related)	Physics	Force; principle of moments, triangle of forces, graphic representation. Strength of materials; stress and strain, factor of safety. Young's modulus of elasticity. Basic electricity; amperes, voltage, resistance, Ohm's Law. Electron flow. Electromagnetism. Series and parallel circuits. Voltage drop. Conductors and insulators. Heat; temperature scales, quantity, heat effects. Properties of materials; basic metallurgy, ferrous and non-ferrous metals, heat treatment. Principle of machines; mechanical advantage, efficiency, velocity ratio, lever, wheel and circle, inclined plane, screw jack; gear, belt and chain drives. Friction; laws, effects, co-efficients. Work; energy and power, units, horsepower calculations.
3	English	Usage and Business Communication	Reading comprehension. Trade terminology, usage. Sentence, paragraph structure. Letter, report writing. Work and parts orders. Interpretation and use of manufacturer's manuals and job specifications. Oral communication.
4	Drafting and Blueprint Reading	Basic Drafting and Interpretation	Use of lines, views, projections, sections, developments, dimensions, lettering, material symbols. Threads and fasteners. Fits and tolerances. Surface finish. Material specifications, structural steel shapes. Piping and welding drawings and symbols. Preparation of elementary trade related working drawings, dimensioned sketches. Reading and interpretation of machine drawings, floor plans and elevations, specifications, material estimates.
5	Trade Practice General	Safety	Safety rules and safe operating procedures. Protective clothing and equipment. First aid. Fire prevention; location, use and maintenance of fire fighting equipment. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . The <i>Building Code Act</i> . Handling and storage of flammable liquids, gases, materials. Static electricity hazards. Sparkproof tool use. Safe use of lifting and hoisting equipment, pneumatic and electric tools, welding equipment. Tank interior and manhole work precautions. Warning and tagging procedures. Dermatitis protection. Good housekeeping.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Hand Tools	Selection, care and use of hammers, screwdrivers, files, chisels, scrapers, wrenches, sockets and attachments, torque wrenches, pipe wrenches, pliers, drifts, vises, clamps. Hand shears and snips. Hand drills and braces, drill bits, reamers, broaches, stocks and dies, taps. Hacksaws, jewellers saws, coping saws. Wood saws; cross-cut, rip and coping. Metal stamps.
		Portable Power Tools	Care and use of air/electric drills, impact tools, circular and sabre saws, shears, nibblers, grinders.
6	Trade Practice Measuring Devices	External Measurement (Rules)	Types and usage; flexible, spring tempered, folding, tape, hook, shrinkage, keyseat. Fractional, decimal, metric calibrations.
		(Outside Calipers)	Spring, thread, firm-joint, lock-joint, transfer. Dimension transfer to micrometers, verniers, inside calipers.
		(Micrometers)	Outside micrometers; checking and adjustment procedures. Measurement over rollers, balls, pins.
		(Vernier Tools)	Calipers, depth gauges, gear-tooth verniers, bevel protractors, inclinometers, height gauges. Checking, adjusting for accuracy.
		Internal Measurement (Inside Calipers)	Types and usage; spring, firm-joint, lock-joint, transfer. Small hole and telescopic gauges. Inside calipers, vernier calipers, inside micrometers.
		(Depth Gauges)	Micrometers, verniers, rule-type gauges.
		(Gauge Blocks)	Types and use for slot and groove measurement. Feeler gauge use.
		Angular Measurement	Types and use of protractors, sine bars, angle gauges, bevels, inclinometers, optical instruments.
		Comparative Measurement (Squares)	Types and usage; try-square, combination, block, cylinder and optical. Checking methods.
		(Dial Indicators)	Types and usage. Accuracy checking methods.
		(Gauge Blocks)	Types and use. Accuracy standards. Use of clamps, scribes, caliper ends. Checking procedures for internal and external dimensions, hole centers, micrometers.
		(Straight edges)	Types and usage; fish-back, knife, dovetail, square, vee, combination. Use with feeler gauges, gauge blocks, dial indicators, surface plates, vee blocks, levels. Checking flat surfaces using marking, light, feeler gauges, dial indicators.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		(Optical Instruments)	Types and applications; toolmaker's microscope, auto-collimator, alignment telescope. Use with precision flats, mirrors, optical squares, targets. Optical measurement principles.
		(Alignment of Surfaces)	Alignment purpose; static, moving. Checking alignment of parallel surfaces, right angles; adjacent surfaces, flats and vees; rotating components, spindles; bores. Effect on alignment of temperature, load, wear, vibration, foundation settling, distortion of castings.
7	Trade Practice Layout	Layout Tables	Types and use of mounting clamps, vises, angle plates, magnetic clamps. Work clamping procedures for rigidity, accuracy, finished surfaces. Avoiding distortion and slippage.
		Surface Preparation	Layout fluids and coatings for machined, non-ferrous and non-metallic surfaces. Application by brush, dip, spray, flooding. Coating removal methods. Hazards of acid use.
		Layout Techniques (Straight Lines)	Methods and drawing interpretation for location, accuracy, machining, operation sequence.
		(Angular Lines)	Methods to ensure accuracy. Checking by indicating, projection, comparison. Complementary and compound angles.
		(Circular Layout)	Types and use of dividers and trammels. Establishing center points. Enscribing arcs from holes; use of ball centers, false center plates. Transferring layouts from drawings, other layouts, components. Subdividing arcs, circles; dividing head use.
		(Hole Location)	Drawing interpretation for location, hole dimensions, accuracy. Locating and scribing hole center points. Use of co-ordinates and projections.
		(Keyways, Slots, Grooves)	Drawing interpretation for location, accuracy, dimensions, shape. Laying out keyways; use of key seat rules, vee blocks, surface gauges, center square. Laying out tee slots, internal slots and grooves, angular grooves and slots, annular grooves, recesses, shoulders.
8	Power Tools	Cutting Oils	Types and properties of cutting oils and soluble emulsions. Use for cooling, lubrication, flushing chips, rust protection.
		Power Saws	Types, care and use of reciprocating, circular and band saws for material cut-off. Blade selection factors, mounting methods. Tooth direction, tension, band-saw guide settings. Circular saw peripheral accuracy.
		(Contour Sawing)	Use of regular metal, wood and friction cutting bandsaws. Blade selection factors.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Power Shears	Types, capacities, care and use of squaring, plate, roll and combination shears.
		Drill Press	Types, care and use of sensitive, bench, pillar, column, radial, multi-unit and multi-spindle drills. Chucks, collets and taper shanks.
			Use of tapping heads, floating holders, stud-drivers, quick-release chucks and torque-limiters (tapping). Techniques for drilling, countersinking, spot-facing and counterboring. Reaming. Trepanning. Honing, lapping and polishing. Grinding drill bits.
		Lathes	Types, care and use of bench, engine, toolroom, turret, capstan, automatic, polishing, woodworking lathes. Work holding devices; chucks, collets, face-plates, centers, mandrels. Accessories; cutting tools, tool holders, tool posts, steady rests, follower rests, driving dogs and carriers. Carrier plates, carriage stops. Cutting tool grinding. Techniques for turning, facing, boring, drilling and reaming, threading, filing and scraping, polishing, burnishing, lapping, knurling, keyway cutting, spring winding.
		Grinders	Types, care and use of portable, pedestal, bench, belt and surface grinders. Abrasives, grades, speeds. Wheel and belt guards. Work holding devices. Work rests (off-hand work), wheel dressing and balancing equipment. Coolant supply. Dust extractors.
		(Off Hand Work)	Use of bench and pedestal grinders, portable (heavy duty, right angle, pencil, precision) and belt (vertical, horizontal, combination) types.
		(Surface Grinding)	Types, care and use of reciprocating surface grinders. Work-holding devices, magnetic chucks, sine chucks, vises and clamps.
		Milling Machines	Types, care and use of horizontal, vertical, universal, production milling machines. Work holding devices; vises (plain, swivel, universal), chucks, angle plates, clamps and hold downs. Accessories; arbors, indexing heads, rotary tables, auxiliary heads (angle and universal milling, slotting attachments). Cutters; plain, slab, inserted tooth, shell, end mills, keyway cutters.
		Shapers and Slotters	Types, care and use. Work holding devices. Indexing tables and heads. Cutting tools and holders.
9	Fabrication Material Preparation	Selection	Interpretation of drawings and specifications; fabrication type, construction methods, material types and quantities. Use of metal warehouse stock lists and handbooks; common structural shapes, plate and sheet, bar stock. Available sections, sizes and finishes.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Cutting Operations	Stock section, size, dimensions, pieces required and cutting tolerances. Jig and fixture use for duplicate pieces. Methods and equipment for shearing, sawing, abrasive cutting, scoring and snapping. Dressing raw edges by filing, grinding, chipping, tumbling.
		Cleaning and Finishing	Surface preparation by pickling, sand or shot blasting, wire brushing and scraping, grinding or sanding: use of scaling tools.
10	Fabrication Forming and Bending Procedures	Sheet Metal	Types, care and use of apron, press, box and pan brakes. Straight and tapered rolls. Universal forming machines.
		Bar-stock, Plate and Structural Shapes	Types, care and use of forming and bending equipment, tools and accessories. Cold working techniques for short, long and reverse bends, angles, radii, offsets, hooks and eyes. Springback allowances. Hot working techniques; correct temperature, overheating effects, localizing heat. Temperature indicating pencils.
		Tubing and Hollow Sections	Types, care and use of hand and power tube bending tools and equipment. Bending procedures. Filling with sand, lead and resin. Use of spring and stationary mandrels. Bend centers.
		Heat Treatment	Purpose and procedures for heating and quenching, hardening tool steel, tempering, case-hardening, annealing, normalizing, stress-relieving.
		Hardness Testing	Purpose, care and use of Rockwell, Brinell, Scleroscope, Vickers and portable hardness testers.
		Non-Destructive Testing	Use of magnetic particle, fluorescent, ultrasonic, dye penetrant methods. Hydrostatic testing. Radiography.
11	Fabrication Erection Procedures	Handling and positioning	Types, care and safe use of cranes, chain and rope blocks, lift-trucks, dollies, rollers and trucks, slings and grab hooks. Holding work during assembly, alignment, welding and drilling. Use of clamps, angle plates, magnetic blocks, positioning tables, tack welds, temporary bolts and screws. Aligning components with squares, straight-edges, precision levels, feeler gauges and optical instruments; use of wedges, shims and packing blocks.
		Welding and Brazing	Types and use of welding and brazing rods, electrodes and fluxes. Set-up, operation and maintenance of arc, oxy-acetylene and resistance welding equipment. Flame cutting, welding and brazing. Joint preparation. All-position welding techniques. Distortion prevention and correction.
		Soldering	Soft soldering techniques and uses; solder alloys, fluxes. Types and use of gas torches, soldering bits, heated baths and muffles. Hard soldering techniques and uses; solder alloys, fluxes.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Fastening	Installation tools and procedures for threaded fasteners; bolts and nuts, cap screws, machine screws, set screws, studs and self-tapping screws. Plain and lock washers. Rivets, pins (plain, roll and tapered), circlips, springs, keys (feather, gib and woodruff) explosive fasteners (pins and studs).
		Adhesives	Types, characteristics and uses; glues, cements, resins and plastics (thermosetting, thermoplastic). Bonding and cementing metal to metal, metal to rubber, metal to plastics and ceramics.
12	Bearings	Plain Types (Selection)	Purpose, types, characteristics and uses. Plain and flanged bushings; thrust, pre-lubricated (impregnated). Adjustable; half bearings with caps, split tapered sleeve, tapered bore, segmental, self-adjusting (spring and hydraulic). Bearing Materials. Lubrication methods. Locating bearings with lock screws, bolted flange, keys, dowels or plugs, wedges, lock-nuts, bonding agents.
		(Fitting and Adjusting)	Procedure for boring, reaming, scraping, filing. Oil-grooving purpose; chiselling, filing, scraping and machining methods. Bearing adjustment purpose, procedures, fits and clearances.
		Anti-Friction Types (Selection)	Purpose, principles and applications. Construction; inner and outer races, rolling member, axial races (thrust). Cartridge bearing types, features and applications. Pillow block, flanged, block, cylindrical. Self-aligning ball, spherical roller and spherical housing types.
		(Inspection)	Diagnosing common operating symptoms. Bearing cleaning methods.
		Bearing Installation and Removal (Plain and Anti-Friction)	Supporting bearings, shafts, collars and gears. Types and use of arbor press, forcing press, portable screw and hydraulic jacking and pulling devices, impact tools, hammers and drifts. Use of heat and refrigeration, lubricants and anti-galling compounds.
13	Seals	Static Seals	Types, characteristics, applications. Sheet and moulded gaskets, ropes, tapes, rings. Gasket and ring materials. Cut, folded, laminated, reinforced types. Use of O, D, X, square, internal vee rings as static seals. Seal selection and installation procedures.
		Dynamic (Sliding Seals)	Types, characteristics, applications. Braided, moulded, O, T, X rings, plastic compounds. Moulded packings; chevron, U and V cup, flange, special patented shapes. Selection and installation procedures.
		Rotary Seals	Types, characteristics, purpose. Braided or woven, lip type oil and grease seals, moulded, mechanical, O rings. Selection and installation procedures for pump shafts, shaft extensions from gear cases, valve stems, rotary actuators, turbines and motors.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
14	Shafting and Couplings	Shafting	Types and applications. Rigid, hollow, flexible, non-metallic. Checking straightness with dial indicators, feeler gauges, precision levels, V blocks, optical instruments.
		(Installation)	Alignment methods using dial indicators, taut wire lines, levels, optical instruments. Installation by fitting into bearings, through housings, vertical shafting.
		(Repairs)	Surface cleaning by turning, grinding, polishing, filing, shot or sandblasting. Building up worn shafts by welding, metallizing, plating, sleeving, knurling. Straightening shafts by pressing and jacking, weld build-up and turning, rotary straighteners.
		Couplings	Purpose and use of solid, flexible, universal, friction, compression, magnetic, fluid type couplings.
		(Installation)	Positioning on shafts with hand or power presses, jacks, hydraulic injection. Aligning keyways. Locating components with set screws, cotters, taper pins. Heating and cooling assembly techniques. Aligning couplings with dial indicators, straight edges, feeler gauges, calipers, wedges.
		(Removal)	Use of hand or power presses, gear pullers, strong backs, hydraulic ejection. Use of heat or cooling, penetrating oils.
		Splines and Keyways	Purpose and use of straight, involute, shallow, intermediate or deep splines. Fitting by grinding, scraping, lapping, filing, polishing techniques. Purpose and use of keys; straight (single and double), taper, woodruff, gib, sliding, tangential types. Fitting and installing by machining, chipping, filing, grinding. Removing keys by drilling and tapping, jack screws, gibs and wedges, drifts.
15	Clutches	General	Types and purposes; friction, mechanical, fluid, magnetic, over-running clutches. Methods of mounting on shafts and holding in position. Types of operating devices. Mountings. Balancing requirements.
16	Drives	V-Belt Drives	Types, sizes and purpose of drives and single and multi-groove sheaves. Locating, aligning and fastening sheaves with keys and keyways, taper hubs, set screws. V-belt types, care, applications and installation. Tensioning methods. Checking drives for wear, incorrect tension, efficiency. Removing sheaves with pullers.
		Flat Belt Drives	Types and purpose. Flat and crowned face, compound, cone type pulleys. Mounting and aligning; straight and right angle drives. Belt types and installation; joining by endless splice, lacing, fasteners. Care and tensioning methods.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Special Belt Drives	Types, purpose and installation; high capacity, multiple, adjustable length V-belts. Variable speed drive belts, elastic tension flat belts, timing belts.
		Chain Drives	Types and purpose. Single and multiple sprockets; standard hub designations, mounting and locating, fastening, aligning procedures. Chain types, care and applications. Roller and silent chain, conveyor chains. Roller chain components; split and solid rollers, rivetted, cotter pin, coupling links, standard attachments. Chain installing procedure; tension on vertical drives. Servicing procedures; checking chain wear, tension. Sprocket wear, alignment. Removing sprockets, repairing broken chains.
		Friction Drives	Types and purpose of spur, bevel, wedge faced, grooved friction drives. Locating, fastening, aligning wheels. Wheel contact methods in eccentric and screw thread engagement boxes.
		Gear Drives	Gear types and purpose; spur; worm, helical, bevel, internal, spiral, hypoid. Gear trains; gear and pinion, worm and pinion, rack and pinion, epicyclic (planetary), differential. Gear drive installation methods. Locating, fastening, aligning gears. Servicing and checking for gear wear, backlash, alignment. Gear removal methods.
		(Speed Reducers)	Types, purpose and characteristics; worm, helical, spiral gear, single and multiple reduction. Assembly types and purpose; parallel shaft, right angle shaft (intersecting and non-intersecting) horizontal and vertical output, gear-motor, torque arm. Installation and servicing procedures.
17	Mechanisms	Levers	Simple lever types and uses; first, second and third class, straight and bent lever. Applications of levers for slider crank mechanisms, drag link, crank and rocker. Sliding, swinging and turning blocks. Whitworth quick return, toggle joint, others. Installing, joining, fastening levers. Servicing and checking for wear, incorrect adjustment, backlash.
		Cams	Types and purpose. Radial; tangential, face, constant diameter, mushroom, toe and wiper. Cylindrical; solid cylinder, end and barrel cams, thrust bearings. Cam motion types and applications; uniform velocity and acceleration, harmonic, dwells. Reciprocating and oscillating follower motions; flat face, straight and tapered roller followers.
		(Installation and Maintenance)	Locating and fastening cams. Aligning with followers. Correct rotation. Checking for cam wear, speed, follower pressure, backlash. Cam and follower removal methods.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Power Screws	Types, purpose and applications; simple, compound, differential, single and multiple start, right and left hand square, acme and buttress threads. Thrust bearing importance. Installation procedures; alignment, backlash adjustment. Maintenance procedures. Checking alignment, screw, nut and bearing wear. Split nut use.
		Mechanical Springs	Types, purpose and applications. Helical springs (compression, extension, torsion) Cone, double cone and keg springs. Volute springs. Spiral, clock or power springs. Leaf springs (elliptical types). Disc (Belleville) and ring springs. Spring installation methods. Use of compressing and stretching tools.
18	Hydraulics	Pumps	Types, operation and applications; centrifugal, reciprocating, positive displacement, gear, screw, lobe, diaphragm, steam injector, jet, self-priming, air lift. Types of drives. Installation procedures; foundation types, grouting methods, shims, alignment. Starting and operating; rotation, priming. Maintenance; correcting non-delivery, insufficient capacity, vibration, heating up, noise.
		Hydro-Pneumatic Accumulators	Types, purpose and applications; diaphragm, bag or bladder, single and double shell piston, air bottle. Use as power storage chamber, system pressure compensator, fluid dispenser, transfer barrier, shock and vibration absorber. Installation and maintenance; regular charging importance, relieving pressure before disassembly. Bladder, diaphragm, O ring and valve replacement.
		Valves and Controls (Directional Control)	Types and purpose; 2, 3, 4 way, special porting, 5 and 6 way. Construction and applications of spool, packed plunger, rotary, ball, poppet, sliding plate, check (ball, cone, poppet and swing) types.
		(Pressure Control)	Types and purpose; relief, pressure reducing, sequence, counterbalancing, unloading, prefill and combination.
		(Flow Control)	Type and purpose; needle or restrictor fixed and variable flow pressure compensated, deceleration.
		(Servo Valves)	Types and applications; flapper nozzle, jet nozzle, spool, combinations.
		(Valve Actuating Methods)	Manual, mechanical. Hydraulic and pneumatic pilots. Solenoid and solenoid pilots.
		(Installing Valves and Controls)	Installation by threaded valve parts, flanged connections or ground surfaces for subplate, panel or manifold mounting.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Valve Installation (General)	Valve types, care and applications; gate, globe, plug, bell, diaphragm, needle, butterfly. Flow direction. Component construction features. Operator types and uses; manual, diaphragm, air motor, hydraulic or pneumatic piston, electric motor operated valve control. Valve connection types and uses; flanged, screwed, butt and socket welded. Gasket installation. Valve maintenance; correcting malfunctions due to dirt, wire drawing, mechanical wear, pitting, corrosion, erosion.
		(Control Devices)	Types and function of limit controls; electric, hydraulic, pneumatic. Lever, cam, roller actuators. Pressure switch types, functions, accuracy limits; bellows (or diaphragm), piston, bourdon tube. Pneumatic recorders and controllers; on-off, proportional, reset, rate. Installation, checking and adjustment procedures. Types and characteristics of electrical control devices; relays, timers, transformers, fuses, push buttons, rheostats, breakers, photoelectric cells.
		Piping	Pipe and tube cutting, threading and bending. Piping and hose installation and joining by flanges, threads and couplings, compression and flared tube connections, bell and spigot joints, clamps. Welding, brazing and soldering.
		Reservoirs	Types, purpose and construction features. Locating and mounting; integral with machine, or separate. Accessibility for filling, periodic cleaning and draining.
		Filters	Types, purpose and applications; metal screen, magnetic, adsorbent, absorbent. Construction and filter materials. Filter locating and mounting for accessibility. Use of by-pass or dual filters. Filter cleaning factors.
		Heat Exchangers	Types, purpose and characteristics; water to oil (shell and tube, plate, inner fin), air to oil. Locating and mounting; integral with machine, central system. Accessibility for cleaning and repairs. Cleaning methods.
		Hydraulic Cylinders	Types and characteristics; single and double ended, single and double acting, telescoping, special types. Installation of foot, flange, rabbet, center line, clevis and trunnion mounted types. Packings and seals. Purpose and use of cushions; adjustable, non-adjustable, one or both ends. Cylinder dismantling and re-assembly, replacing packings and rings.
		Rotary Actuators	Types and applications; single or multiple vane, helix, rack. Installation of flange, foot and end mounting types.
		Hydraulic Motors	Types and applications; gear (spur, helical, internal), vane, piston (radial, axial). Installation and mounting methods.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Boosters (Intensifiers)	Types, purpose and applications; single stroke, reciprocating. Use for air to oil and oil to oil pressure increase. Installation methods; integral with machine, separate.
19	Pneumatics	Compressors	Types and purpose; vertical or horizontal, radial, single and two stage, vane or piston, dry wall, air or water cooled, turbo. Installation and mounting. Auxiliary equipment. Foundation requirements; locating anchor bolts, grouting, concrete setting time. Drive alignment. Packing and gasket types and uses. Pre-start up inspection; scale and dirt removal from pipes. Cooling water, rotation, lubrication. Maintenance; correcting overheating, vibration, low or high pressure. Routine interval inspections for packing adjustments, lost motion (pins and bearings), air valve carbon deposits, crankcase oil level, oil changes, safety valves.
		(Air Receivers)	Types, purpose and applications; horizontal, vertical. Use for pressure fluctuation reduction, moisture removal. Installation factors; close proximity to compressor, safety valve importance, drainage piping. Maintenance procedures.
		(Air Intake Filters)	Types and applications; dry (throw away, cleanable elements), oil bath, oil wetted. Installation factors; cool air, protection from elements and industrial contaminants, accessibility. Cleaning and replacement methods.
		Valves and Controls	Types, purpose and applications; pneumatic directional pressure and flow control valves. Pneumatic control pressure switches, limit controls. Pressure, vacuum and combination gauges. Installation procedures. Pneumatic recorder and controller types; purpose and applications; on-off, proportional, reset, rate. Use for liquid level, pressure, vacuum, flow, temperature, humidity. Mounting, connecting and adjusting procedures.
		Piping	Inspection and maintenance; leak checking methods. Oil, moisture and dirt removal methods; use of separator, felt filter, combination condenser and filter, desiccant filter (automatic and manual).
		Air Cylinders	Types, purpose and applications; single and double ended, single and double acting, telescoping, special types. Packings and seals. Installation of foot, flange, rabbet, center line, clevis and trunnion mounted cylinders. Correct alignment. Maintenance procedures; dismantling and reassembling cylinders, replacing packings, seals and rings.
		Air Motors	Types, purpose and applications; vane, lobe, axial and radial piston, turbine. Installation of flange, foot and threaded body types. Inspecting and replacing packings.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Rotary Actuators	Types and applications; single or multiple vane, helix, rack. Installation of flange, foot and end mounting types.
		Miscellaneous Devices (Portable Air Tools)	Types and applications; rotating (drills, grinders, screwdrivers, wrenches), percussion (chipping hammers, scalers), paint spray equipment. Servicing procedures.
		(Air Line Controls)	Types and purpose of filter-lubricator-regulator assemblies. Installation and servicing. Routine inspections for drain or change filter, lubrication, pressure.
		Fans and Blowers	Types and applications; ventilation, material handling, induced and forced draft. Fan and drive types. Mounting and installing on standard concrete or wood base, spring or shock absorbing mount, integral with ductwork. Fan and drive alignment. Maintenance procedures; effects and correction of misalignment, bent shaft, unbalance, loose anchor bolts, weak or inadequate foundation, rotor loose on shaft, loose bearing bolts, other vibration sources.
20	Lubrication	Lubricating Oils	Types and purpose; circulating, gear, machine or engine, spindle, steam cylinder oils, wire rope lubricant. Heat transfer. Oiling device types and applications; hand oil cans, oilers (sight feed, syphon wick, bottom feed, pad, bottle, ring, chain, collar), hand and power force feed, oil mist, bath, splash, gravity and pressure circulating, automatic metered.
		Greases	Types, purpose, classifications; soap thickened petroleum oil, synthetic. Selection factors. Types and application of grease cups and fittings, hand and automatic hydraulic pressure guns, centralized greasing systems (single, dual line).
		Inspection and Maintenance	Routine checks; oil level and temperature, operation of oiling and centralized greasing systems, machine operation. Filter cleaning or replacement. Repairing grease pumps and fittings.
21	Foundation	Layout	Drawing and specification interpretation for; location, service requirements (air, power, water, drains, ventilation), space requirements, foundation details and types; concrete (plain, reinforced), steel, wood. Foundation layout and locating procedures; excavation, formwork, levels, anchors. Datum line use for offsets, levels, base lines. Formwork and bracing allowances. Draining excavations.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Anchors	Types, purpose and selection; solid, sleeve, through, cinch, leaded. Protection during machine installation. Drawing interpretation for location, position tolerances, level. Use of layout tools, wood and steel templates. Isolation joint allowances for springs, felt or cork pads, wood blocking. Anchor installation procedures; drilling holes in concrete or masonry, steel, wood. Stud gun use precautions.
		Levelling	Drawing interpretation for foundation level and relationship to external benchmark, grout allowances. Types, purpose, care and use of precision and surveyor's levels, straightedges, tapes, optical instruments. Setting-up and sighting procedures. Making and using simple liquid levels. Installation of levelling pads. Anchor projection above base.
22	Rigging	Hoists (Selection)	Types, applications, care and use of hand operated hoists; rope blocks, gear, link and roller chain. Electric and pneumatic powered hoists. Safety hook types; swing, spring loaded, counterweighted tongue. Hoist capacities, lift height. Rope, chain, cable strengths; handbook use.
		(Hanging Hoists)	Support member strengths; professional advice. Additional supporting methods. Tripods and A frames. Hanging hoists by slings, scissors clamps. Preventing unhooking. Pre-operation inspection.
		(Lifting and Pulling)	Load weight estimating. Load balance center. Moving techniques; drifting (2 or more hoists), balancing (auxiliary hoist), on inclined planes. Handling long equipment; upending, laying down. Loading on and off railroad cars, platform trailers, ramps. Use of winches and snatch blocks. Hand signals. Regular hoist inspection and maintenance; effects of improper operation.
		Slings, Ropes and Attachments	Types, care and use; rope, cable, chain (plain, monel, stainless) slings. Thimbles, clamps, shackles, spreader and equalizer bars, special lifting devices. Manufacturers specifications for sling member angles and safe loads. Rope, cable, chain, shackle strengths. Cable clamp clamping strengths. Splice types and strengths; long, short, end-to-end, thimble. Installing, positioning, lashing and slings for balanced and unbalanced loads. Results of sharp bends and kinks. Equipment and hand protection. Joining cables with clamps. Knot tying methods; slack take-up and stretch allowances.
		(Sling and Rope Maintenance)	Manufacturers specifications and procedures for testing, heat treating (chains), inspection, replacement. Storage methods; results of dampness, corrosive conditions.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Jacks	Types, care and use; ratchet, screw, hydraulic. Heavy equipment moving techniques; solid footing, jack positioning and support, blocking up, preventing equipment damage. Angle jacking, blocking and shimming. Correct jack bar length.
		(Maintenance)	Regular inspections. Proper lubrication. Types of lubricants and hydraulic oils. Hydraulic jacks; types and care of valves, hoses and fittings. Replacing oil seals. Purging air from system. Mechanical jacks; maintenance of screws, ratchet teeth, pawls, pins and keys, caps and toes.
		Rollers	Types, care and use; wood, steel (solid, hollow pipe), special roller units. Skids and skid plates; lubricants. Controlling loads on slopes. Changing direction. Floor and equipment protection; roller size and spacing, runner types. Safety precautions.
		Scaffolds	Types, care and use; ladders and planking. Platform scaffolds; single and multiple plank (wood, metal), rigid platform, ladder and plank. Hanging scaffolds; single rope support, needle beams, rope blocks. Swing limiting methods. Types, sizes, care and use of standard unit scaffolds. Assembly of multiple units. Use of all safety devices; assembly and wheel locks, guard rails, rigid ladders, braces, plank positioning cleats.
23	Location and Levelling	Alignment (Machine Sections)	Drawing interpretation for location, connection types, alignment techniques; benchmarks and tolerances. Component heights. Care and use of squares, straight-edges, precision and surveyors levels, feeler gauges, optical instruments. Taut wire lines. Use of dowel pins and drift pins; jacks, hoists, winches. Shimming materials. Misalignment and fastener tightening effects.
		(Drives)	Location, center distances, drive arrangements, alignment tolerances. Drive types and uses; chain, flat and V belt, gear. Fixed, sliding base, hinged, spring tension installation methods. Drive aligning tools. Misalignment and fastener tightening effects.
		Levelling	Component heights, levelling surfaces, tolerances. Use of levelling devices; levelling pads, wedges, jack screws, shims. Levelling tools and instruments. Locating reference points; benchmarks, center and datum lines, reference planes. Service line drainage. Incorrect levelling, fastener tightening effects.
		Fasteners (Selection)	Types, uses and selection; bolts, cap screws. Lag, high-tensile and fitted bolts, studs, special (shock, vibration). Thread specifications, fits, clearances. Mating surface conditions. Locking device types and uses; set screws, solid or cotter pins, clamping nuts, plastic or nylon inserts, lock washers, snap rings. Locking compounds.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		(Installation)	Installation wrenches and techniques. Tightening torques. Improper tightening effects. Shock dampening devices and tensioning methods; rubber, cork, felt pads. Rubber in shear, springs. Deterioration by oil, grease, corrosion. Damaged fastener removal; use of nut splitters, bolt and stud extractors, drilling and plugging.
		Grouting	Grouting methods; mix types and application. Eliminating voids.
24	Run-in Procedures	Pre-Start Inspection (Components)	Checking drawings for location, completeness and positioning of installation and components. Correct installation of fasteners and guards. Lubricant types and quantities. Component alignment, levelling. Lubricating and cooling devices. Power supply. Belt and chain tensions, gear clearances. Bearing and clutch adjustments. Machine and site clean up. Co-ordination with other trades.
		(Services)	Inspection of hook-ups for air, gas, water, oil, steam, drainage and electrical services. Installation and functioning of filters, switches. Traps, fusing devices, relief valves, speed controls. Lubrication, hydraulic and pneumatic systems and components.
		Start up Procedures	Drawing and specification interpretation for operation and limitations of controls and safety devices. Pressure settings. Equipment rotation. Precautions in starting up machines. Activating pressure systems; checking and setting controls, pressures. Lubricant flow and pressure tests. Diagnosing abnormal vibration, leakage, noise, pressures, temperatures.
		Adjustment and Testing	Determination of clearances and tolerances, operating temperatures and pressures, normal power requirements. Test equipment and adjustment procedures for cam action, crank throws, sliding member clearances, bearings, clutches, limits of travel, speeds, temperatures, flows, pressures, current and voltage, vibration. Results of improper adjustments.
25	Conveyors	Belt Conveyors	Types, purpose, construction materials; flat and troughed belt. Idlers and pulleys. Screw and gravity take-ups. Installation; location, height, erection methods. Frame levelling and alignment. Belt installation, splicing, fastening. Inclined conveyors; use of differential brake or pawl and ratchet. Installation of trippers, plows, chutes, skirt boards. Hydraulic and centrifugal clutch drives. Air and electric clutches and brakes. Speed regulation, lubrication methods. Installation of guards.
		(Maintenance)	Take-up adjustments. Belt wear and replacement checks. Causes and correction of belt slippage, poor tracking. Regular lubrication. Keeping pulleys clean. Replacing guards.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Roll Conveyors	Types, purpose, construction; gravity, live roller, roller spiral, spring mounted. Tubing, piping, integral and outboard bearings. Location, assembly and installation methods. Aligning and levelling frame, roller drive (belt, chain and sprockets, motor and speed reducer). Clutches and brakes (air, electric), overrunning clutches. Variable speed drives. Conveyor auxiliaries; frogs, switches (2 way, 3 way and multiple), turntable, chutes, hinged section or transfer. Stop types and adjustments; air cushioned, normally closed, motor operated, pneumatic brake, foot, handle or cable operated brake, combination brake-stop. Conveyor curves; tapered, straight or concave and chain driven roller. Lubrication methods. Variable speed drives.
		(Maintenance)	Checking and replacing worn bearings, belt, chain, clutch and brake parts. Correcting faulty belt tracking. Routine lubrication. Guard replacement. Familiarization with electric, pneumatic and hydraulic components.
		Screw Conveyors	Types and use for conveying, metering, feeding. Screw types and purpose; standard, short or long, single or multiple pitch. Right or left hand, right and left hand. Tapered variable pitch. Tapered double cut, cut and folded, cut with paddles. Locating, assembly methods. Installation, alignment of trough, screw and drive. Loading and unloading conveyor. Lubrication methods.
		(Maintenance)	Periodic inspection and lubrication. Replacing worn bearings, screw, drive. Replacing drive guard.
		Bucket Elevators	Types and use of centrifugal and positive discharge, spaced and continuous bucket, vertical, inclined elevators. Chain and belt carriers. Bucket types and uses. Elevator locating and assembly methods. Installing and aligning frame and drive. Belt and bucket fastening methods. Take-up adjustments. Preventing reversal with differential brake, pawl and ratchet. Lubrication methods.
		(Maintenance)	Routine inspection and lubrication. Adjusting belt tension. Replacing worn belt, buckets, bearings, drive. Replacing guards.
		Miscellaneous Conveyors	Types, purpose and operation; en masse, drag chain, flight, pallet, trolley, vertical lift, pusher bar, cable, monorail. Chains and sprockets. Drawing and manual use for locating, assembly, operation. Installing and aligning frame, conveyor chain or cable, drive. Lubrication methods. Loading and unloading.
		(Maintenance)	Routine inspection and lubrication. Replacing worn chains and cables, flights, buttons, hooks, bearings, drives. Take-up adjustment. Replacing guards.

Schedule 2

CONSTRUCTION MILLWRIGHT

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	Trade Practice (as detailed in Schedule 1)	General	Safety rules and removal of all hazards. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . The <i>Building Code Act</i> . Care and use of hand and portable power tools and equipment, measuring devices. Layout techniques. Set-up and operation of power saws and shears, drills, lathes, grinders, milling machines, shapers and slotters. Fabrication techniques; forming and bending sheetmetal; barstock, plate and structural shapes; tubing and hollow sections. Heat treatment, hardness and non-destructive testing. Work erection, handling and positioning. Welding, brazing and soldering. Use of fastenings and adhesives.
2	Bearings	General	Plain bearings; selection, installation, locating, oil grooving. Fitting and adjusting. Bearing removal. Anti-friction bearings; selection and installation. Pre-loading and adjustment. Removing, cleaning, re-packing.
3	Seals	General	Familiarization with types, applications. Installation of static, dynamic and rotary seals. Seal removal and replacement.
4	Shafting and Couplings	General	Checking shaft straightness. Installation and alignment. Maintenance and repairs; surface cleaning, building-up worn shafts, straightening. Installation of solid, flexible, universal, friction, compression, magnetic and fluid couplings. Removal and repair. Fitting splines and installation of straight, taper, woodruff, gib, sliding and tangential keys. Key removal.
5	Clutches	General	Installation of friction, mechanical, fluid, magnetic and over-running clutches, mountings and operating devices. Balancing, adjustment and maintenance.
6	Drives	General	Installation and alignment of V, flat and special belt drives. Roller, silent and conveyor chain drives, friction and gear drives, speed reducers. Maintenance and repairs.
7	Mechanisms	General	Installation of levers, cams and followers, power screws, mechanical springs. Adjustments and maintenance.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
8	Hydraulics	Hydraulic Systems	Familiarization with principles. Making up piping, tubing, hoses and fittings. Installation of pumps, accumulators, reservoirs, filters, heat exchangers, cylinders, rotary actuators, motors, boosters. Valves and controls, actuators, pilots, limit controls, pressure switches, recorders and controllers, electrical control devices. Starting up, priming, testing and adjustments. Periodic servicing. Maintenance and repairs.
9	Pneumatics	Pneumatic Systems	Familiarization with principles. Installation of compressors, fans, blowers and drives. Air receivers and intake filters, valves and controls, pressure switches and limit controls, gauges, recorders and controllers. Piping. Cylinders and motors, rotary actuators, air line controls. Starting-up, testing and adjustment. Periodic servicing, maintenance and repairs, including portable pneumatic tools and paint spraying equipment.
10	Lubrication	Lubricants and Systems	Familiarization with oil and grease types, classification and applications. Installation of oiling devices and systems. Centralized greasing systems and fittings. Routine checks of lubrication systems, machine operation. Servicing and preventive maintenance.
11	Foundation	Layout Anchorage and Levelling	Drawing and specification use for foundation details, and service requirements. Datum line use for offsets, levels, base lines. Excavation, formwork and bracing, draining. Installation of anchors. Isolation joint allowances. Levelling; setting up and sighting, foundation level, external benchmark, grout allowances. Liquid level use. Installation of levelling pads.
12	Rigging	General	Equipment hoisting, drifting, balancing. Lifting, rolling, skidding. Blocking and loading operations. Hand signal use. Safe use of hand, electric and pneumatic hoists. Winches and snatch blocks. Slings, ropes, cables, chains and attachments. Mechanical and hydraulic jacks. Rollers and skids. Scaffolding. Rigging equipment inspection, testing, maintenance and storage.
13	Location and Levelling	General	Alignment, levelling and installation of machine sections, components and drives to drawings and specifications. Grouting. Fastener installation, torquing, locking.
14	Run-in	Inspection and Start up	Pre-start inspection of equipment installation, components, systems, service hook-ups, safety devices and controls, to drawings and specifications. Clean up and trades co-ordination. Start up operations; precautions. Tests and adjustments. Diagnosing and correcting abnormal operating conditions.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
15	Conveyors	General	Installation, levelling and alignment of belt, roll, screw and bucket conveyors, miscellaneous conveyors; en masse, drag chain, flight, pallet, trolley, vertical lift, pusher bar, cable, monorail. Drive systems and controls. Servicing and maintenance.

O. Reg. 543/72, Sched. 2.

REGULATION 30

under the Apprenticeship and Tradesmen's Qualification Act

COOK

INTERPRETATION

1. In this Regulation,

(a) "certified trade" means the trade of cook;

(b) "cook" means a person who,

(i) prepares and assembles complete breakfasts, short order grill, sandwiches, simple salads, simple desserts, vegetables and non-alcoholic beverages,

(ii) carves cooked meats, poultry, fish and game,

(iii) cooks complete breakfasts, short order grill, simple desserts and vegetables,

(iv) has a working knowledge of table service, soups and sauces, salads and dressing, weights and measures, hygiene, equipment handling, sanitation, safety and equipment,

(v) prepares a complete meal, desserts, pastries, salads, salad dressing, hot and cold buffets, baked foods and soups and sauces,

(vi) cuts meat, poultry, fish and game, and

(vii) has a knowledge of stock control, receiving, issuing, menu planning, food costing and purchasing.
O. Reg. 915/76, s. 1.

2. The trade of cook is designated as a certified trade for the purpose of the Act. O. Reg. 915/76, s. 2.

3.—(1) The certified trade is composed of two branches.

(2) Branch 1 is an assistant cook as set out in subclauses 1 (b) (i) to (iv).

(3) Branch 2 is a cook as set out in subclauses 1 (b) (i) to (vi). O. Reg. 915/76, s. 3.

4. An apprentice training program for the certified trade is established and shall consist of,

(a) training and instruction in full-time programs provided at an educational institu-

tion, or in programs that, in the opinion of the Director, are equivalent thereto, in the courses contained in items 1 to 13 of Schedule 1 for assistant cook, and items 1 to 23 of Schedule 1 for cook;

(b) for assistant cook, practical training and instruction provided by the employer of the apprentice in the courses contained in Schedule 2, except those annotated "advanced"; and

(c) for cook, practical training and instruction provided by the employer of the apprentice in all the courses contained in Schedule 2. O. Reg. 915/76, s. 4.

5. An apprentice in the certified trade shall,

(a) for Branch 1, complete a period of 2,000 hours of training and instruction; and

(b) for Branch 2, complete three periods of training and instruction of 2,000 hours per period. O. Reg. 915/76, s. 5.

6.—(1) A graduate of a course in cooking conducted at an educational institution may be enrolled as an apprentice and upon enrollment may be granted such hourly credits as may be determined by the Director.

(2) A person who has one or more years experience as a cook may be enrolled as an apprentice and upon enrollment may be granted such hourly credits as may be determined by the Director. O. Reg. 915/76, s. 6.

7. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

(a) 65 per cent during the first period;

(b) 75 per cent during the second period; and

(c) 85 per cent during the third period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 915/76, s. 7.

8. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the certified trade, one apprentice plus an additional apprentice for each journeyman employed by the employer in the certified trade and with whom the apprentice is working; or
- (b) where the employer is not a journeyman in the certified trade, one apprentice for each journeyman employed by the employer and with whom the apprentice is working. O. Reg. 915/76, s. 8.

9. The Director shall issue a progress record book to each apprentice and the apprentice shall record therein the time he spends in related training and work experience, and the apprentice shall be responsible for the safekeeping of his progress record book. O. Reg. 915/76, s. 9.

10. Sections 9 and 10 and subsections 11 (2) and (3) of the Act do not apply to any person who works or is employed in the certified trade. O. Reg. 915/76, s. 10.

11. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 915/76, s. 11.

12. A person who was employed under an existing contract of apprenticeship in the trade of chef before the 17th day of November, 1976, and who completes the apprentice training program for the certified trade of cook, Branch 2, and passes such final examinations as are prescribed by the Director on or after the 17th day of November, 1976, is entitled to be issued a certificate of apprenticeship and a certificate of qualification in the certified trade of chef. O. Reg. 791/77, s. 1.

Schedule 1

COOK

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Sanitation Safety and Equipment	Personal Hygiene	Basic rules. Necessity for enforcement. Dangers. Accepted check list for personal hygiene and safety.
		Cleaning and Maintenance	Cleaning and maintaining establishment, equipment, storage and waste disposal areas in accordance with applicable regulations and other established standards. Recognition of food-borne diseases from improper cleaning and maintenance.
		Detergents and Pesticides	Basic chemical content. Toxic qualities. Uses and limitations. Scheduling usage for maximum effectiveness.
		Kitchen Safety	Accepted safety procedures. Safe working habits. Safe operation of machines to manufacturer's safety standards. Potential hazards; recognition and action.
		Sanitation Code	Sanitation requirements for general construction, floors, walls and ceilings. Plumbing-general, water supply, ice, sewage. Food waste and garbage disposal. Insect and rodent control. Correcting possible health hazards in equipment installations, cooking or service equipment. Instituting and maintaining good housekeeping and maintenance.
		<i>The Public Health Act</i>	Contents, meaning and requirements of Regulation 840 of Revised Regulations of Ontario, 1980 made under the <i>Public Health Act</i> . Operating in accordance with requirements.
		Food Poison Prevention	Elimination of infectious diseases. Fundamentals of personal hygiene for all personnel. Customer service factors. Correct handling of food; internal distribution, storage, preparation. Destruction of re-frozen and damaged cans. Maintaining correct temperature for food before cooking or service.
		Skill and Equipment Availability	Detailed processes and needed skills for food preparation. Menu adjustment for lack of skills. Selection of equipment and labour saving devices. Co-ordination of labour and machinery for highest economical productivity.
2	Cold Larder	Dishwashing	Operation and maintenance of dishwashers. Use of detergents and additives.
		Pre-Cooking Preparation	Pre-cooking preparation theory for meat, seafood and poultry. Identification of meat grades. Anatomy of beef, veal, lamb and pork carcasses. Characteristics and uses of wholesale and retail cuts of meat. Cut, trim and make ready meat cuts. Safe

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
			use and maintenance of meat cutting tools and equipment. Identification of seafood types, characteristics and usage. Preparation and make ready for cooking or service. Identification of poultry, components, characteristics and menu application. Preparation as required, ready for cooking.
		Sandwiches	Identification of sandwich types. Selection of correct bread, filling and filling ingredients. Ingredient texture. Equipment for cutting and spreading. Sandwich garnishes.
		Fruit Preparation	Selection of correct ingredients and make ready to recipe. Preparation for service or cooking.
		Cheese	Identification of main classifications, types, taste and appearance characteristics. Usual forms for presentation. Make ready and garnish cheese trays. Selection of accompaniments.
		Simple Salads	Identification of lettuce types and simple salads. Product availability. Ingredient selection. Unit cost. Qualities of product. Preparation to recipe, selection of correct garnish and dressing. Making simple basic dressings.
3	Vegetables	Preparation	Washing; selection of correct methods, equipment, tools or chemical. Prewashing preparatory techniques. Examining for cleanliness. Peeling; selection of correct methods, equipment or tools. Removing outer layer with minimum wastage. Cutting; menu requirement, pre-determined sizes. Selection, operation and maintenance of tools and equipment. Pre-cutting preparation. Seeding; vegetables requiring seed removal. Preparation and seed removal with minimum wastage.
		Cooking Methods	Selection of suitable vegetables and ingredients; selection and operation of correct cooking equipment, tools and utensils for cooking method specified. Preparation and cooking techniques. Use of cooking time chart and tables. Correct temperature. Recognizing the correct degree of doneness. Presentation methods. Cooking vegetables by: boiling, roasting, steam cooking, grilling, saute-ing, deep-frying, baking, braising, pressure cooking, blanching and glazing. Incorporating restriction of fat, salt, sugar, spices, for cooking diet recipes.
4	Seafood	Preparation	Cleaning; anatomy of seafood, necessary cleaning methods, correct cleaning tool selection. Cutting; menu requirements, correct cutting equipment and tools. Portion size required. Filleting; anatomy of fish, correct tool selection, correct filleting techniques. Breeding; selection of correct type and cut of fish, menu requirements, correct ingredients. Correct breeding techniques. Batter; fish cut selection. Dipping techniques. Dripping of surplus batter.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Cooking Methods	Selection of suitable seafood types and ingredients; selection and operation of correct cooking equipment, tools and utensils for cooking method specified. Preparation and cooking techniques. Use of seafood cooking time chart and tables. Correct temperature. Recognizing the correct degree of doneness. Cooking fish and seafood by: baking, steaming, boiling, grilling, pan-frying, deep-frying, broiling, pressure cooking, glazing.
5	Poultry	Preparation	Cleaning; anatomy of each poultry species. Feather removal methods, singeing skin surface. Evisceration. Neck removal. Making ready for cooking or further preparation. Cutting poultry into standard cuts. Breading; selection of correct type and cut of poultry, breading ingredients. Correct breading techniques for menu requirements. Batter; selection of correct type and cut of poultry. Battering techniques. Dripping of surplus batter.
		Cooking Methods	Selection of correct types and cuts of poultry, ingredients. Selection and operation of correct cooking equipment, tools and utensils for cooking method specified. Preparation and cooking techniques. Use of poultry cooking time chart and tables. Correct temperature. Recognizing the correct degree of doneness. Cooking poultry by: broiling, roasting, simmering, grilling, pan-frying (saute), deep-frying, braising, pressure cooking, blanching.
6	Meat and Offal	Broiling (Open Fire)	Selection of suitable cuts of meat. Cooking evenly on both sides to customer's request. Recognizing degree of doneness.
		Roasting	Selection of suitable cuts of meat. Selection and use of roasting pan with rack, skillet, meat thermometer, necessary accessories. Preparatory methods and techniques. Use of roasting time and temperature chart. Recognizing correct degree of doneness.
		Grilling (Solid Cooking Surface) and Pan-Frying	Selection of suitable meat portions. Selection, use and operation of grilling and pan-frying aids and equipment. Preparatory methods and techniques. Cooking evenly on both sides to customer's request.
		Carving	Selection of suitable meat, correct carving tools. Correct carving techniques. Meat portions. Carving to customer's request and menu specifications.
		Barbecue	Meat selection. Selection, set-up and use of barbecue equipment. Preparatory methods and techniques. Cooking meat uniformly to customer's request.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Boiling	Selection of suitable cuts of meat and ingredients. Selection and operation of correct equipment. Preparatory methods. Recognizing correct degree of doneness. Appropriate accompaniments.
7	Soups and Sauces	Stirring	Selection and use of correct equipment and tools. Correct stirring techniques. Stirring frequency requirements for each soup and sauce.
		Straining	Selection and use of correct tools. Straining techniques. Straining off unrequired portion of mixture.
		Skimming	Selection and use of correct tools. Skimming techniques. Skimming with minimum wastage.
		Making Stock	Ideal ingredients. Type of stocks and reductions. Simmering time for correct results. Making ready for use or storage.
		Basic Sauces and Au Jus	Appropriate sauce or au jus for each dish where applicable. Necessary ingredients. Preparation to recipe. Correct garnish; adding where applicable. Serving correctly.
		Thick and Thin Soups	Basic ingredients. Methods of making each thick and thin soup. Relating necessary garnish to finished product required. Serving different soups in correct manner and container.
8	Farinaceous Products	Pasta	Different "Pasta" products. Manufacturing methods. Menu applications. Correct cooking methods. Accompaniments for correct service.
		Pancakes	Types of pancake dishes. Recipes and ingredients. Accompaniments. Correct cooking methods.
		Cereals	Different cereal grains. Carbohydrate, fat and protein content. Use as fillers and binders. Cold Breakfast cereals. Preparation and cooking of fine and whole grain cereals.
		Rice	Types of rice. Different menu applications. Correct preparatory methods and cooking techniques. Selection and operation of equipment. Testing for correct degree of doneness.
9	Elementary Baking	Mixing Ingredients	Correct ingredient proportions per recipe. Selection and use of tools and equipment. Correct mixing method, techniques and conditions; time, temperature, speed. Correct consistency of mixture.
		Kneading Dough	Selection and use of tools and equipment. Kneading techniques; stretching, folding. Effects of kneading.
		Shaping	Selection and use of tools and equipment. Shaping methods; moulding, dividing, planning, rolling. Applicable shaping techniques.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Pies and Tarts	Baking theory and methods. Know when crust is cooked. Filling shells and make ready for service.
		Rolls	Baking theory. Types of rolls; shape, ingredients, preparatory techniques. Correct baking method, temperature and equipment. Correct finished appearance and doneness.
		Cookies	Basic types. Correct ingredients and preparatory techniques. Correct baking method, temperature and equipment. Correct finished appearance and doneness.
		Cakes	Baking theory. Cake types, ingredients, preparatory techniques. Correct baking method, temperature and equipment. Recognizing correct doneness. Basic cake icing methods.
		Desert Preparation	Types of desserts; pudding, baking items, gelatins, fruit, ice cream. Ingredient selection for dessert type to recipe. Preparatory methods including baking, where applicable. Decorating techniques, use of correct mould or dessert dish. Applicable appropriate accompaniments.
10	Short Order Items	Menu Items	Menu. Appropriate ingredients. Preparatory methods and cooking techniques where applicable. Selection and operation of equipment. Determining cooking doneness for each item.
		Convenience Foods	Available forms and items. Manufacturer's specifications. Preparatory methods. Selection of correct equipment for cooking where applicable and cooking method. Recognizing correct degree of doneness required.
11	Non-Alcoholic Beverages	Tea and Coffee Making	Ingredients selection to customer's requirements and manufacturer's specifications. Operation and maintenance of beverage making equipment to manufacturer's specifications.
		Hot Drinks	Best method for making to customer's requirements. Operation and maintenance of equipment to manufacturer's specifications, where applicable.
		Cold Drinks	Making cold beverages to customer's requirements and manufacturer's specifications. Ingredient selection. Selection and operation of suitable equipment.
12	Menu Planning	Weighing and Measuring Food	Standard imperial and metric weights and measures units. Calculation of quantities using basic mathematics; addition, subtraction, multiplication and division, fractions and decimals. Selection of correct measuring equipment for quantity and accuracy, minimal wastage. Graduation of scales and measuring cups.
		Recipe Conversion	Reading recipes. Conversion of recipes to smaller or larger quantities. Conversion multiplicant.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Menu Writing (Including Dietetic)	Basic menu types. Four main types of diet; diabetic, restricted sodium, restricted fat, gastric. Acceptable cooking methods for therapeutic diets. Daily changes. Restricting menu to customer's requirements, available equipment. Variety to meet need, time of day. Varying texture and colour on plate items. Menu order of items. Marketing process; attractive language. Menu selection for time of year.
		Nutrition	Canada Food Guide; food groups for balanced diets. Balancing menus for nutritional value. Preserving food values by correct storage, preparation, cooking.
		Menu Terminology	Chemical change of food by heat, cold or storage. Understanding and meaning of glossary of culinary terms.
13	Table Service	Waiting on Tables	Basic theory. Menu items. Ingredients in each dish. Writing customer's requirements. Correct cutlery setting. Correct accompaniments for each dish. Serving food, customer satisfaction. Preparing bill. Clearing table. Opening and closing duties.
		Cashier Duties	Operating cash registers. Totalling customer's checks. Giving correct change. Maintaining sales records.
14	Sanitation	Basic Chemistry	Types of harmful chemical changes caused by bacteria. Types and characteristics of toxins, chemical poisons and micro-organisms. Controlling transmission of infectious diseases.
		Rodents and Insects	Methods of detecting presence. Conditions encouraging rodents and insects. Preventative measures through building construction and program prevention.
		Equipment Temperatures	Correct temperature of operation. Fahrenheit and Celsius unit charts. Cooking temperatures to destroy micro-organisms. Cold temperatures to preserve and store foods without spoilage.
		Equipment Maintenance	Basic components of major equipment. Construction materials. Necessary maintenance to ensure sanitation. Potential maintenance problems. Identification and reporting of minor breakdowns.
15	Cold Larder (Advanced)	Appetizers	Preparation theory. Basic types of hot and cold cocktails, canapes, hors d'oeuvres, accompanying sauces. Applicable ingredients and cooking process. Correct presentation. Appropriate accompaniments.
		Salad Dressings	Appropriate dressings, ingredients and methods of making standard salad dressings.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Salads	Identification of cooked, moulded, special salads. Applicable recipes and preparation methods. Necessary dressing or other accompaniment. Presentation techniques and appearance of different salads.
		Potential Waste Usage	Theory of complete utilization of products. Areas of potential waste; bones, fat, over production. Use for standard food preparation. Effects of waste on overall costs.
		Buffet	Theory of buffet arrangements. Decoration of buffet platters, designing centre pieces. Economical item arrangement in buffet set-ups.
		Butchery	Theory of handling and butchering meat carcasses. Safety. Use and maintenance of cutting tools and equipment. Anatomy of carcasses. Reducing carcasses to standard wholesale and retail cuts, menu requirements.
		Ice Carving	Theory. Designing ice carvings. Selection of chisels. Carving techniques.
16	Vegetables (Advanced)	Garnishes and Variations	Menu item. Correct garnish requirement and ingredients. Preparatory techniques. Cooking technique and recognition of doneness.
		Stuffed Preparations	Menu item. Preparation of vegetable. Ingredient selection. Preparatory techniques. Method of mixing and cooking ingredients where applicable. Correct vegetable and ingredient combination. Correct final presentation methods.
		Fritters and Croquettes	Ingredients. Preparatory techniques. Required portion size. Selection of correct equipment and cooking method. Recognition of correct amount of doneness.
		Fancy Potatoes	Menu requirement. Necessary ingredients. Selection of correct equipment. Necessary preparatory and cooking techniques. Recognition of correct amount of doneness.
17	Seafood (Advanced)	Seafood Selection	Theory of seafood selection, including crustaceans, molluscs and fish. Recognition of different types. Market forms of seafood. Grading. Menu applications. Preparation methods. Cooking or presentation methods.
18	Meat and Poultry	Game Birds	Game birds legally available for sale. Seasonal availability of fresh game. Game bird types, grades, menu applications. Preparatory methods for cooking.
		Stuffed Preparations	Selection of correct stuffing, dressing, farces, duxelles according to customer's requirements and recipe. Appropriate stuffing. Ingredients and preparation methods.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Specialty Dishes (Meat and Poultry)	Menu requirement. Reading recipe. Selection of correct ingredients. Necessary preparation techniques. Selection of correct equipment and cooking techniques. Recognition of correct doneness.
19	Soups and Sauces (Advanced)	Special and Cold Soups, Cold Sauces	Menu item. Necessary ingredients. Preparatory techniques. Selection of correct equipment. Correct cooking techniques. Texture and correct degree of doneness. Correct presentation for service methods.
		Secondary Sauces	Menu item. Correct sauce and ingredients, equipment and tools for each item. Preparatory techniques and cooking where applicable. Correct service method.
20	Desserts	Dessert Sauces	Menu item. Necessary ingredients. Preparatory techniques. Selection of correct equipment and cooking techniques. Correct texture. Correct presentation for service methods.
		Advanced Desserts	Menu item. Necessary ingredients. Preparatory techniques. Selection of correct cooking techniques and equipment. Correct texture. Correct presentation for service methods.
21	Stock Control Receiving and Issuing	Goods Inspection	Necessity to inspect goods. Reading purchase requisition. Following purchase specifications. Systematic regulation of incoming and outgoing goods. Checking required quality and quantity. Significance of signing supplier's invoice.
		Storage Consideration	Storage types. Type required for each item. Correct temperature for storage areas, maintenance, minimum facilities. Correct placement of foods to avoid spoilage.
		Stock Rotation	Entry date of each item of goods and storage life. Organization of storage area to use old stock first.
		Stock Records	Recording; in-coming and out-going inventories for each item, current market prices, purchase source, destination of issues. Keeping stock cards up to date.
		Stock Turnover	Knowledge of stock. Advising menu maker of non-moving items. Advising purchasing agent of stock requirements and movements. Stock adjustment to economical levels. Avoiding loss or spoilage.
		Stock Security	Maintaining goods flow control. Eliminating unauthorized entry. Proper locking and surveillance facilities to eliminate pilferage.
22	Food Costing	Standard Yield and Portion Control	Purchasing food; after cooking yield and loss through shrinkage. Shrinkage and loss through other chemical change. Predetermined portion sizes to maintain required cost. Control and correction of excessive shrinkage. Institution of recipes and specifications. Waste elimination.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
23	Food Purchasing	Food Selection	Characteristics of food products used in kitchen. Selection of applicable classifications, grades and cuts of food. Detection of deteriorated or sub-standard food items.
		Food Specifications	Calculating quantities from menu, storage, other kitchen requirements. Yield calculations. Setting standard food specifications. Storage life of food items under different conditions. Quantity to be purchased.
		Market Evaluation	Establishing market analysis for economical purchasing procedure. Feasibility of using alternative products.
		Ordering	Establishing order placing procedure. Systemized handling of purchasing documents, delivery methods and cost calculation.

O. Reg. 915/76, Sched. 1.

Schedule 2**COOK****Work Experience Training**

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	Sanitation Safety and Equipment (As detailed in Schedule 1)	General	Familiarization with basic rules of personal hygiene. Cleaning and maintaining establishment, equipment, storage and waste disposal areas in accordance with applicable regulations and established standards. Detergent and pesticide use and limitations. Kitchen safety procedures. Safe working habits. Safe operation of machines. Sanitation Code requirements for general construction, plumbing, water supply, ice, sewage. Food waste and garbage disposal. Insect and rodent control. Good housekeeping and maintenance. Familiarization with contents, meaning and requirements of Regulation 840 of Revised Regulations of Ontario, 1980, made under the <i>Public Health Act</i> . Food poison prevention. Correct handling of food; internal distribution, storage, preparation. Co-ordination of labour and machinery for highest economical productivity. Operation and maintenance of dishwashers.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
2	Cold Larder (As detailed in Schedule 1)	General	Pre-cooking preparation of meat, seafood and poultry. Sandwich making. Preparing sandwich garnishes. Fruit preparation. Cheese selection, make ready and garnish cheese trays. Preparation of simple salads to recipe, correct garnish and dressing. Making basic dressings.
3	Vegetables (As detailed in Schedule 1)	General	Preparation; washing, peeling, cutting, seeding. Cooking vegetables by; boiling, roasting, steam-cooking, grilling, saute-ing, deep-frying, baking, braising, pressure cooking, blanching and glazing.
4	Seafood (As detailed in Schedule 1)	General	Preparation; cleaning, cutting to menu requirements and portion size. Filleting, breading, batter. Cooking fish and seafood by; baking, steaming, boiling, grilling, pan-frying, deep-frying, broiling, pressure cooking, glazing.
5	Poultry (As detailed in Schedule 1)	General	Preparation; cleaning, making ready for cooking or further preparation. Standard cuts. Breading to menu requirements. Batter. Cooking poultry by; broiling, roasting, simmering, grilling, pan-frying (saute), deep-frying, braising, pressure cooking, blanching.
6	Meat and Offal (As detailed in Schedule 1)	General	Broiling (open fire). Roasting. Grilling (solid cooking surface) and pan-frying. Barbeque. Boiling and preparing accompaniments. Carving to customer's request and menu specifications.
7	Soups and Sauces (As detailed in Schedule 1)	General	Stirring, straining, skimming. Making stock for use or storage. Preparing basic sauces and au jus, thick and thin soups.
8	Farinaceous Products (As detailed in Schedule 1)	General	Familiarization with "Pasta" products, cooking and preparing accompaniments. Making pancakes and accompaniments. Preparing and cooking fine and whole grain cereals. Preparing and cooking rice to menu requirements.
9	Elementary Baking (As detailed in Schedule 1)	General	Mixing ingredients to recipe. Kneading dough. Shaping. Baking pies and tarts, rolls, cookies, cakes. Icing cakes. Dessert preparation; puddings, baking items, gelatins, fruit, ice cream. Use of correct mould or dish. Decorating. Preparing accompaniments.
10	Short Order Items (As detailed in Schedule 1)	General	Preparation of short order items to menu. Preparation and cooking of convenience foods where applicable.
11	Non-Alcoholic Beverages (As detailed in Schedule 1)	General	Tea and coffee making, preparing hot and cold drinks to customer's requirements and specifications.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
12	Menu Planning (As detailed in Schedule 1)	General	Weighing and measuring food. Standard units. Calculation of quantities using basic mathematics. Selection of correct measuring equipment. Converting recipes to smaller or larger quantities. Menu writing (including Dietetic). Nutrition; use of Canada Food Guide. Balancing menus for nutritional value. Preserving food values by correct storage, preparation, cooking. Familiarization with menu terminology, glossary of culinary terms.
13	Table Service (As detailed in Schedule 1)	General	Waiting on tables. Cashier duties.
14	Sanitation (As detailed in Schedule 1)	General	Basic chemistry. Rodent and insect detection and prevention. Equipment operating temperatures. Equipment maintenance.
15	Cold Larder (Advanced) (As detailed in Schedule 1)	General	Appetizers; preparation of hot and cold cocktails, canapes, hors d'oeuvres, accompanying sauces. Making standard salad dressings, cooked, moulded, special salads. Potential waste usage. Buffet arrangements platters, centre pieces. Ice carving. Handling and butchering meat carcasses.
16	Vegetables (Advanced) (As detailed in Schedule 1)	General	Preparing garnishes and variations. Preparing stuffed preparations, fritters and croquettes, fancy potatoes.
17	Seafood (Advanced) (As detailed in Schedule 1)	General	Seafood selection, including crustaceans, molluscs and fish.
18	Meat and Poultry (As detailed in Schedule 1)	General	Familiarization with legal and seasonal availability of fresh game. Game bird types, grades, menu applications. Preparing for cooking. Preparing correct stuffing, dressing, farces, duxelles to customer's requirements and recipe. Preparing specialty dishes (meat and poultry).
19	Soups and Sauces (Advanced) (As detailed in Schedule 1)	General	Preparing special and cold soups, cold sauces. Secondary sauces.
20	Desserts (As detailed in Schedule 1)	General	Menu item. Preparation of dessert sauces and advanced desserts. Correct presentation for service.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
21	Stock Control Receiving and Issuing (As detailed in Schedule 1)	General	Goods inspection. Storage considerations. Stock rotation. Stock records. Stock turnover. Stock security.
22	Food Costing (As detailed in Schedule 1)	Standard Yield and Portion Control	Familiarization with yield and loss through shrinkage. Predetermined portion sizes. Institution of recipes and specifications. Waste elimination.
23	Food Purchasing (As detailed in Schedule 1)	General	Food selection. Food specifications. Market evaluation. Ordering.

O. Reg. 915/76, Sched. 2.

REGULATION 31

under the Apprenticeship and Tradesmen's Qualification Act

DRY CLEANERS

1. In this Regulation,

- (a) "certified trade" means the trade of dry cleaner;
- (b) "dry cleaner" means a person who understands and is capable of carrying out the process of,

- (i) cleaning garments in either manual or automatic equipment by immersion and agitation or by immersion only in volatile solvents, including but not being restricted to solvents of the petroleum distillate type, the coal tar distillate type, the chlorinated hydrocarbon type and including any or all of the processes incidental to cleaning garments by immersion in volatile solvents,
- (ii) wet cleaning of garments by immersion in water or by the application, manually or by any mechanical device, of water or any detergent and water, or by spraying or brushing the garments with water and any detergent or with water vapour or with chemicals and water or steam,
- (iii) pressing or finishing, or both, being the process of restoring garments to their original shape, dimensions or contour or to the condition in which the garments were received from the customer or as directed by the customer, and including the removal of wrinkles, stresses, bulges and impressions, imprint marks and shine from garments by the application, either manually or mechanically and with or without dry or wet cleaning, of pressure, heat, moisture, water vapour or steam,
- (iv) removing spots or stains or localized areas of soil from garments before or after the garments are dry or wet cleaned or by manual or mechanical means, other than dry or wet cleaning, such as by brushing or spraying with water detergents and volatile or inflammable solvents or with chemicals or both,

- (v) repairing, being the process of making alterations as required by the customer to garments, such as by minor repairs and alterations, by reaffixing, replacing or restoring buttons and other fastening devices and decorative materials to the garments either before or after one of the processes referred to in this clause,
- (vi) identification of fabrics, fabric construction, designs and finishes,
- (vii) cleaning shirts by immersion in water, including the use of washing formulae and chemicals, and of special finishes and a knowledge of the control of water and temperature, the operation of necessary equipment and the control of quality in the proper processing and finishing of shirt laundry, and
- (viii) basic management, production, quality control, garment identification, pricing, packaging and servicing to the customer. R.R.O. 1970, Reg. 30, s. 1.

2. The trade of dry cleaner is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 30, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of four periods of training and instruction of 900 hours each,

- (a) at full-time educational day classes provided at a College of Applied Arts and Technology, or an equivalent course of training and instruction approved by the Director; and
- (b) in practical training and instruction provided by an employer of the apprentice. R.R.O. 1970, Reg. 30, s. 3.

4. An apprentice who completes the four periods of training and instruction referred to in section 3 is exempt from clause 14 (a) of the Act. R.R.O. 1970, Reg. 30, s. 4.

5. The subjects of examination for an apprentice are the subjects set out in column 1 of the Schedule. R.R.O. 1970, Reg. 30, s. 5.

6. Any person who is engaged in the certified trade is exempt from subsections 11 (2) and (4) of the Act. R.S.O. 1970, Reg. 30, s. 6.

7. A holder of a certificate of qualification in the certified trade of dry cleaner is exempt from the provisions of section 23 of Regulation 36 of Revised Regulations of Ontario, 1980. R.R.O. 1970, Reg. 30, s. 7.

8. The Act and this Regulation do not apply to persons employed in an industrial plant or institution established for a purpose other than carrying on the business of dry cleaning. R.R.O. 1970, Reg. 30, s. 8.

Schedule

DRY CLEANERS

In School Training and Work Instruction and Experience

ITEM	COLUMN 1	COLUMN 2
	Subject Matter	Instruction to be Given
1	Dry Cleaning	Synthetic and petroleum cleaning systems. Prespotting. Garment serviceability.
2	Finishing and Pressing	Heavies. Silks. Furs. Household. Fabric construction and identification.
3	Spotting	Spotting chemicals, formulae and techniques. Finishes. Furs. Dyes. Sizings. Fabric construction and identification. Garment serviceability. Wet cleaning. Dry cleaning operation. Prespotting.
4	Tailoring	Install zippers. Half pockets. Alter buttons, hems. Lengthen and shorten garments. Other minor repairs and alterations.
5	Maintenance	The maintenance and repair of equipment commonly used in dry cleaning plants.
6	Shirt Processing	Formulae. Finishes.
7	Sales and Production Management	Sales. Delivery. Identification of garments. Cash control. Store routine. Pricing. Packaging. Applied public relations. Production. Quality control.

R.R.O. 1970, Reg. 30, Sched.

REGULATION 32

under the Apprenticeship and Tradesmen's Qualification Act

ELECTRICIAN

INTERPRETATION

1. In this Regulation,

- (a) "certified trade" means the trade of electrician;
- (b) "electrician" means a person who,
 - (i) lays out, assembles, installs, repairs, maintains, connects or tests electrical fixtures, apparatus, control equipment and wiring for systems of alarm, communication, light, heat or power in buildings or other structures,
 - (ii) plans proposed installations from blueprints, sketches or specifications and installs panel boards, switch boxes, pull boxes and other related electrical devices,
 - (iii) measures, cuts, threads, bends, assembles and installs conduits and other types of electrical conductor enclosures that connect panels, boxes, outlets and other related electrical devices,
 - (iv) installs brackets, hangers or equipment for supporting electrical equipment,
 - (v) installs in or draws electrical conductors through conductor enclosures,
 - (vi) prepares conductors for splicing of electrical connections, secures conductor connections by soldering or other mechanical means and reinsulates and protects conductor connections, or
 - (vii) tests electrical equipment for proper function,

but does not include a person who is permanently employed in an industrial plant at a limited purpose occupation in the electrical trade. O. Reg. 20/76, s. 1.

2.—(1) The certified trade is composed of two branches.

(2) Branch 1 is the trade of a construction and maintenance electrician as defined in subclause 1 (b) (i).

(3) Branch 2 is the trade of a domestic and rural electrician who performs the work of an electrician in the construction, erection, repair, remodelling or alteration of houses, multiple dwelling buildings containing six or fewer dwellings, or buildings or structures used for farming, or who performs maintenance to electrical equipment in houses, multiple dwelling buildings containing six or fewer dwellings or farms. O. Reg. 20/76, s. 2.

3. The trade of electrician is designated as a certified trade for the purposes of the Act. O. Reg. 20/76, s. 3.

4. An apprentice training program is established for the certified trade and consists of five periods of related training and work experience training of 1,800 hours for each period for Branch 1 and four periods of related training and work experience training of 1,800 hours for each period for Branch 2,

(a) at full time educational day classes provided at a college of applied arts and technology or in courses that, in the opinion of the Director, are equivalent thereto in the subjects contained in Schedule 1; and

(b) in practical training and instruction provided by the employer of the apprentice in the subjects contained in Schedule 2. O. Reg. 20/76, s. 4.

5. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedules 1 and 2. O. Reg. 20/76, s. 5.

6. The holder of a certificate of qualification in Branch 2 of the certified trade is entitled to a certificate of qualification in Branch 1 of the certified trade upon completion of a further period of training and instruction of 2,000 hours that shall include a course of study approved by the Director. O. Reg. 20/76, s. 6.

7.—(1) The rate of wages for an apprentice in the certified trade whether for his regular daily hours of work or for hours of work in excess of

his regular daily hours of work shall not be less than,

- (a) 40 per cent during the first period;
- (b) 50 per cent during the second period;
- (c) 60 per cent during the third period;
- (d) 70 per cent during the fourth period; and
- (e) 80 per cent during the fifth period,

of the average hourly rate of wages or its equivalent for journeymen in that trade employed by the employer with whom the apprentice is working.

(2) The rate of wages for a Branch 2 Electrician during the 2,000 hour period of training and instruction mentioned in section 6 shall be not less than 80 per cent of the wages for a Branch 1 Electrician. O. Reg. 20/76, s. 7.

8. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade one apprentice plus an additional apprentice for each three journeymen in the trade employed by that employer;
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman in the trade employed by the employer plus an additional apprentice for each additional three journeymen in the trade employed by that employer. O. Reg. 20/76, s. 8.

9. Notwithstanding section 8, the Director may determine the ratio of apprentices to journeymen

who may be employed by an employer in the certified trade. O. Reg. 20/76, s. 9.

10. Any person who,

- (a) applies in the prescribed form for apprenticeship in the certified trade; and
- (b) becomes an apprentice in the certified trade within three months after commencing to work in that trade,

is exempt from subsection 11 (2) of the Act. O. Reg. 20/76, s. 10.

11. The Director shall issue a progress record book to each apprentice and the apprentice and employer shall record therein the time that the apprentice spends in related training and work experience and the apprentice shall be responsible for the safekeeping of his progress record book. O. Reg. 20/76, s. 11.

12. An applicant for a certificate of qualification in the certified trade shall submit to the Director evidence satisfactory to the Director of,

- (a) his successful completion of the apprenticeship training program described in section 4; or
- (b) his engagement in the certified trade as a journeyman for a period at least equivalent to the total number of hours of which the apprenticeship training program consists. O. Reg. 20/76, s. 12.

Schedule 1

ELECTRICIAN

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics (Trade Related)	Circuit Calculations	Addition, subtraction, multiplication, division of whole numbers, fractions, decimals. Metric system; conversion methods. Weights and measures. Ratio and proportion. Percentage. Areas, volumes, linear, angular mensuration. Square root. Scale conversion. Algebra fundamentals; linear equations, formulae, shop calculations. Trigonometry; right angled and oblique triangles, formulae, shop calculations.
2	English (Trade Related)	Industry Communications	Vocabulary and organizational structure of the industry. Reading comprehension; use of trade publications, manuals. Sentence structure, grammar, punctuation, composition. Trade related letter, memoranda writing, completion of forms, reports, job descriptions, requisitions, orders. Oral communication.
3	Science (Trade Related)	Physics and Chemistry	Properties of matter; mass, density. Properties and strength of materials; elasticity, plasticity, ductility, malleability. Tensile, shear, compressive stresses, factor of safety. Work, energy and power; units, potential and kinetic energy, torque, horsepower. Principle of machines; mechanical advantage, lever, inclined plane, pulley, screw. Gear, belt and chain drives. Friction; laws, effects, co-efficients, lubricants and viscosity. Centre of gravity. Static and dynamic balance. Heat; effects, temperature, thermometers, pyrometers, scales and conversion. Quantity, units, transfer laws. Change of state; solid, liquid, vapour. Gas laws; temperature, pressure, volume relationship. Refrigeration cycle. Pressure; atmospheric and absolute, indicating instruments, pressure and vacuum gauges, manometers. Hydrodynamics; fluid mechanics, flow, pressure and head differences, Pascal's Law. Light; reflection, diffusion, transmission, refraction, absorption, polarization. Sound; transmission, decibels. Basic metallurgy; ferrous and non-ferrous metals, heat treatment. Galvanic corrosion. Characteristics and dielectric properties; elastomers, synthetic rubbers and fibres, plastics (thermoplastics, thermosets) ceramics, varnishes, lacquers, organic solvents, acids, oils.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
4	Electrical Theory	D.C. Fundamentals	Electron theory. Current flow. Ampere. Static electricity. Volt. Ohm's Law. Series, parallel and series-parallel circuits. Conductors and insulators. Joule's Law. Wire size, circular and square mill. Wire resistance, temperature. Voltage drop. Kirchhoff's Laws. Power and energy. Watts. Magnetism. Magnetic devices. Measuring instruments. Electrolysis. Chemical cells. Ionization. Conduction in gases and vacuum. Chemical energy of batteries. Storage cells. Small sources of E.M.F; thermocouples, photoelectric cells. Piezoelectricity. Electric heating and lighting, resistors and alloys. Light sources, measurement. Electromagnetic induction. Lenz's Law. D.C. generators. Self induction. Mechanical motion from electrical energy. D.C. motor calculations. D.C. shunt, series, compound motors. D.C. motor starters and automatic motor control.
		A.C. Fundamentals	Voltage sinewave, cycle, frequency, other wave forms. A.C. circuits containing resistance. Rectifiers. Inductance in A.C. circuits. Series circuits; resistance and impedance. Capacitors and capacitive reactance. Capacitors in A.C. circuits. Series circuits, resistance, inductance and capacitive reactance. Co-ordination and effects of short circuit and interrupting capacity within a system. A.C. parallel circuits. Three phase systems. A.C. instruments and meters. A.C. generator. Transformers. Transformer connections for three phase. Instrument and auto transformers. Three phase induction motor. Synchronous motor. Three phase motor controls. Single phase motors.
		Basic Electronics	Vacuum tube fundamentals, amplifiers, oscillators, rectifiers. Cathode ray tube. Semi-conductors; atomic structure, transistor amplifiers and oscillators. Printed circuits. Silicon-controlled rectifiers.
5	Prints and Installation Methods	General	Reproduction process. Basic drawing and sketching. Scaling drawings. Architectural symbols, coding, abbreviations. Change notices and orders. Revisions. Site plans. Transmittals, shop and as-built drawings. Specifications. Architectural plan views, elevations, details, concrete and structural drawings. Electrical and mechanical construction drawings and specifications; legends and notes, revisions, site plans, 1—line drawings, riser diagrams. Material take-off. Telephone, fire alarm, intercom, miscellaneous systems. Slab layout. Setting sleeves. Residential, commercial, industrial services. Sub-stations. Grounding and bonding. Pole line work and overhead wiring and lighting drawings, layout and code book use. Disconnect switches, and fuses, panels and breakers. Switch boards, motor control centres. Branch circuit wiring; systems and circuitry. Schematics; symbols, coding, legends, notes, sketching, circuit analysis.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
6	Safety	General	<p>Safety rules and safe operating procedures. Protective clothing and equipment. First aid. Fire protection; location, types, use and maintenance of fire fighting equipment.</p> <p><i>The Occupational Health and Safety Act. The Workmen's Compensation Act. The Electrical Safety Code made under the Power Corporation Act.</i></p> <p>Handling and storage of flammable liquids, gases, acids, materials. Static electricity hazards. Spark-proof tool use. Safe use of hand tools, lifting, hoisting and rigging equipment, portable pneumatic and electric tools, electrical equipment and explosive actuated tools, welding equipment. Tank interior and manhole work precautions. Warning and tagging procedures. Radiation hazards. Good housekeeping.</p>
7	Layout Procedures	<p>Basic Measuring Tools</p> <p>Layout Techniques</p>	<p>Measuring with rule, scale, inside and outside calipers, micrometer, vernier calipers, height and depth gauges. Inspecting with a dial indicator. Fits and clearances.</p> <p>Laying out benchwork; use of bench layout tools, clamping devices. Laying out plates, frames, panels, boxes, enclosures, wiring runs, tubing, conduit. Laying out installations; use of layout tools, laying out conduit run, power supply, power panel, machinery, apparatus, lighting installations.</p>
8	Trade Tools and Procedures	<p>Non-Cutting Tools</p> <p>Cutting Tools</p> <p>Drilling and Reaming Techniques</p> <p>Threading Techniques</p> <p>Bending and Forming Techniques</p> <p>Fastening Techniques</p> <p>Miscellaneous Procedures</p>	<p>Holding work. Selecting and using hammers, screw drivers, wrenches and pliers. Identification of equipment.</p> <p>Selecting and using hacksaws, wood-cutting and masonry saws. Selecting, care and use of files. Cutting materials with hand cutting tools. Undercutting operations. Selecting and using chisels.</p> <p>Selecting and maintaining portable hand drills, twist drills and bits. Drilling holes with portable drills and drill presses. Reaming.</p> <p>Selecting threading tools. Threading externally with hand dies. Threading pipe. Threading internally with hand taps.</p> <p>Bending conduit. Bending bus bar. Fabricating a junction box.</p> <p>Selecting and installing fasteners. Bonding metals and other materials. Soldering with an iron, gun and torch. Brazing, gas and arc welding, flame cutting.</p> <p>Grinding with an offhand grinder. Levelling with a spirit level, water level and transit. Using wire pulling systems. Pulling operations.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
9	Rigging	General	Erecting platform scaffolds. Erecting unit-type scaffolds. Selecting and hanging hoists. Selecting, installing and maintaining ropes and slings. Erecting ladders.
10	Conduits, Raceways and Busways	General	Interpretation of drawings, specifications, codes and standards, manufacturers handbooks for type, size, location, application, fittings.
		Rigid Building Conduit	Selection, cutting and joining, bending and forming conduit. Installing fittings. Fastening and supporting conduits, installing methods.
		Flexible Conduit and Fittings	Selection and installation methods.
		Surface Raceways	Selection and installation methods.
		Cable Trays and Ladders	Selection and installation methods.
		Non-Metallic Underground Duct	Selection, cutting, joining and connecting. Installation methods
		Underfloor Duct, Cellular Floor Duct, Trench Duct	Selection and installation methods.
		Busways	Selection and installation methods.
11	Wire and Cable	General	Interpretation of drawings, schematics, specifications, relevant codes, standards and regulations, applications.
		Wire and Cable Pulling, Terminating and Testing	Pulling in wire. Terminating wire and cable. Testing wire and cable insulation. Circuit finding.
		Extra Low Voltage Wiring	Selection and installation methods.
		Non-Metallic Sheathed Cable	Selection and installation methods. Connecting and insulating joints in boxes.
		Building Cables	Selection, application and installation methods. Installing armoured cable. Connecting cable to boxes.
		Underground Cable	Selection. Placing cable in trenches. Installing cable in manholes and transformer vaults.
		Free Air Conductors	Selection. Application. Installation methods.
		High and Extra High Voltage	Selection of high voltage wiring. Application and installation methods.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
12	Insulation	General	Interpretation of drawings, schematics, specifications, codes, manufacturers catalogues and service manuals for insulation type and application. Applying tape to conductors. Removing tape. Applying rigid insulation. Applying insulating liquids, paints, varnishes. Dipping and baking. Insulation tests. Insulation maintenance; cleaning, drying, repairing methods.
13	Bearings, Couplings, Shafts, Seals, Drives and Isolators	Miscellaneous Procedures	Lubrication; lubricant types and applications. Installation; interpretation of drawings, manufacturers specifications and handbooks for installation methods. Maintaining and repairing; servicing, removing, installing and testing.
14	Storage Batteries	General	Interpretation of drawings, specifications, manufacturers catalogues, service manuals, nameplate data. Selection, installing, removing, and servicing primary cells and storage cells.
15	Test and Measurement	General	Interpretation of drawings, nameplate data, service manuals. Relevant codes and regulations. Testing and measuring; types, characteristics, uses and calibration of equipment and devices. Testing for continuity. Measuring and calculating resistance. Measuring voltage, current. Measuring speed, checking mechanical balance. Measuring power and frequency. Determining phase sequence. Miscellaneous; taking torque measurements. Determining wave form with an oscillograph and oscilloscope.
16	Service Control and Protective Devices	General	Interpretation of drawings, specifications, manufacturers catalogues, service manuals, nameplate data. Relevant codes, regulations, and standards.
		Switchgear	Selection and installation methods. Maintaining oil type and air type switchgear.
		Switches	Selection and installation methods. Inspection and maintenance procedures.
		Transformers	Selection, installation and connecting methods. Maintenance procedures.
		Switchboard Meters	Measuring power with switchboard meters.
		Fuses and Circuit Breakers	Selection and installation methods. Maintenance procedures. Selective co-ordinating of interrupting capacity of current limiting or short circuiting devices within one system.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
16		Overload Devices	Selection and installation methods. Maintenance procedures.
		Network Balance	Balancing factors and procedures.
17	Conversion	General	Interpretation of drawings, specifications, schematics, installation and service manuals, nameplate data. Relevant codes and standards.
		Mechanical Devices	Selection and installation of conversion machines. Servicing converters and motor generator sets. Repairing conversion machines.
		Electronic Devices	Selection and installation of electronic conversion devices. Servicing and repairing rectifiers.
18	Illumination	General	Interpretation of drawings, specifications, manufacturers catalogues and service manuals, nameplate data. Relevant codes and regulations, Use of hand books, tables, sliders, light meters.
		Incandescent Lighting	Selection and installation methods. Maintenance and servicing procedures.
		Fluorescent Lighting	Selection and installation methods. Maintenance and servicing procedures.
		Quartz, Metal Arc and Vapour Lighting	Selection and installation methods. Maintenance and servicing procedures.
19	Heating and Cooling	General	Interpretation of drawings, schematics, specifications, manufacturers catalogues, service manuals, nameplate data. Relevant codes, standards and regulations.
		Electric Heating	Selection and installation methods. Repair and servicing procedures.
		High Frequency Heating	Selection and installation methods. Servicing and repair procedures.
		Air Conditioning and Refrigeration	Servicing and repairing electrical components.
20	Motors and Generators	General	Interpretation of blueprints, shop drawings, specifications, manufacturers catalogues, service manuals, schematics. Relevant codes, standards and regulations.
		Installation Techniques	Selection. Installing, wiring and connecting motors and generators.
		Maintenance Techniques	Lubricating motors and generators. Repairing, cleaning and servicing motor and generator components.
21	Control Devices	General	Interpretation of blueprints, shop drawings, specifications, manufacturers catalogues, service manuals, schematics. Relevant codes, standards and regulations.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
21		Logic	Selection of logic control systems. Installation methods. Testing, maintenance and repair procedures.
		Magnetic	Selection, installation and servicing procedures.
		Energy Conversion	Selection and installation methods. Repair and servicing procedures.
		Sensing Transducers	Selection and installation methods. Repair and replacement procedures.
		Solid State Control	Selection and installation methods. Repair and servicing procedures.
22	Control Systems	General	<p>Interpretation of drawings, specifications, manufacturers catalogues, service manuals, handbooks, nameplate data. Relevant codes, standards and regulations for components.</p> <p>Hydraulic, pneumatic and electronic control systems; selection and installation methods. Repair procedures.</p>
23	Auxiliary Systems and Equipment	General	<p>Interpretation of schematic and layout drawings, specifications, manufacturers handbooks. Relevant codes and standards.</p> <p>Procedures for installing auxiliary systems. Installing and repairing detection and monition systems, time and program systems, communication systems.</p>
24	Measuring Devices	General	<p>Interpretation of drawings, specifications, manufacturers catalogues, service manuals, handbooks, nameplate data. C.S.A. and underwriters approval. Weights and measures legislation.</p> <p>Selection and installation procedures for measuring and recording devices and transducers for; temperature, pressure, volume, flow, weight, linear measurement. Miscellaneous instruments for density, specific gravity, air condition, pH, gas analysis. Calibrating and adjusting, repair and servicing procedures.</p>

Schedule 2

ELECTRICIAN

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	Trade Practices (as detailed in Schedule 1)	General	<p>Safety rules and removal of all hazards. The <i>Occupational Health and Safety Act</i>. The <i>Workmen's Compensation Act</i>. The Electrical Safety Code made under the <i>Power Corporation Act</i>.</p> <p>Care and use of hand and power tools and equipment, test instruments, measuring and layout tools. Lay-out, cutting, drilling, reaming, threading, forming and bending. Fastening, welding, soldering. Grinding. Levelling. Wire and cable pulling. Riggering.</p>
2	Electrical Theory (as detailed in Schedule 1)	General	Familiarization with basic theory, D. C. fundamentals, A.C. fundamentals, basic electronics. Application to residential, commercial and industrial installations. Related formulae and calculations. Applicable codes, standards and regulations.
3	Prints and Installation Methods (as detailed in Schedule 1)	General	Interpretation and use of architectural, electrical, mechanical and structural drawings, specifications, change notices, shop and as-built drawings.
4	Conduits, Raceways and Busways	General	Installation of rigid building conduit, flexible conduit and fittings, surface raceways, cable trays and ladders, non-metallic underground duct. Underfloor duct, cellular floor duct and trench duct, busways.
5	Wire and Cable	General	Wire and cable pulling, terminating and testing. Circuit finding. Installation of extra low voltage wiring, non-metallic sheathed cable, building cables, underground cable, free air conductors. High and extra high voltage wiring.
6	Insulation	General	Taping conductors and removing tape. Applying rigid insulation. Applying insulating liquids, paints, varnishes; dipping and baking. Insulation testing and maintenance.
7	Bearings, Couplings, Shafts, Seals, Drives and Isolators	General	Lubrication. Installation. Maintaining and repairing; Servicing, removing, installing and testing.
8	Storage Batteries	General	Installation, removal and necessary servicing of primary cells and storage cells.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
9	Test and Measurement	General	Continuity testing. Measuring and calculating resistance. Measuring voltage, current. Measuring speed, checking mechanical balance. Measuring power and frequency. Determining phase sequence. Miscellaneous; taking torque measurements. Determining wave form with an oscillograph and oscilloscope. Use of test equipment and devices.
10	Service Control and Protective Devices	General	Installation of oil type and air type switchgear. Switches. Transformers. Switchboard meters. Fuses. Circuit breakers. Overload devices. Inspection and maintenance. Network balancing.
11	Conversion	Mechanical Devices	Installation of conversion machines. Servicing and repair of converters and motor generator sets.
		Electronic Devices	Installation of electronic conversion devices. Servicing and repair of rectifiers.
12	Illumination	General	Installation of incandescent and fluorescent lighting, quartz, metal arc and vapour lighting systems. Maintenance and servicing.
13	Heating and Cooling	General	Installation of electric and high frequency heating and electrical components of air conditioning and refrigeration systems. Servicing and repair operations.
14	Motors and Generators	General	Installation, wiring and connecting of motors and generators. Lubrication, repair, cleaning and servicing motor and generator components.
15	Control Devices	General	Installation of logic, magnetic, energy conversion devices, sensing transducers, solid state control. Testing, repair, replacement and servicing.
16	Control Systems	General	Installation of hydraulic, pneumatic and electronic control systems. Maintenance and repairs.
17	Auxiliary Systems and Equipment	General	Installation of auxiliary systems. Detection and monitoring, time and program and communication systems. Maintenance and repairs.
18	Measuring Devices	General	Installation of measuring and recording devices and transducers for; temperature, pressure, volume, flow, weight, linear measurement. Miscellaneous instruments for density, specific gravity, air condition, pH, gas analysis. Calibrating and adjusting, repair and servicing.

REGULATION 33

under the Apprenticeship and Tradesmen's Qualification Act

FARM EQUIPMENT MECHANIC

1. In this Regulation,

- (a) "certified trade" means the trade of farm equipment mechanic;
 - (b) "farm equipment" means machinery and equipment used in farming operations but does not include motor vehicles or trailers registered for use on a highway under the *Highway Traffic Act*;
 - (c) "farm equipment mechanic" means a person who,
 - (i) inspects, disassembles, adjusts, repairs, overhauls, assembles or re-assembles and tests farm equipment,
 - (ii) inspects, tests, adjusts, and replaces components of self-contained coolers used on the farm exclusively for farm produce, and
 - (iii) installs, inspects, maintains and removes automotive-type air-conditioning and heating systems for operator cabs on farm equipment.
- O. Reg. 395/71, s. 1.

2. The trade of farm equipment mechanic is designated as a certified trade for the purposes of the Act. O. Reg. 395/71, s. 2.

3. Sections 9 and 10 and subsections 11 (2), (3) and (4) of the Act do not apply to a person who works or is employed in the certified trade. O. Reg. 395/71, s. 3.

4. An apprentice training program for the certified trade is established and shall consist of,

- (a) training and instruction at full-time educational day classes provided at the Ontario Agricultural College in the subjects contained in Schedule 1 or in courses that, in the opinion of the Director, are equivalent thereto; and
- (b) practical training and instruction provided by the employer of the apprentice in the subjects contained in Schedule 2. O. Reg. 395/71, s. 4.

5.—(1) Subject to subsections (2), (3), (4) and (5) an apprentice shall complete five periods of training and instruction of 1800 hours per period.

(2) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma or has Ontario Grade 12 standing in English, Mathematics and Science or has such other academic qualification that, in the opinion of the Director, is equivalent thereto, he shall complete five periods of training and instruction of 1400 hours per period.

(3) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma or has Ontario Grade 12 standing in English, Mathematics and Science or has such other academic qualification that, in the opinion of the Director, is equivalent thereto and also has successfully completed a pre-apprenticeship program approved by the Director, he shall complete five periods of training and instruction of 1300 hours per period.

(4) Where the apprentice has successfully completed Grade 10 in Ontario or has such other academic qualification that, in the opinion of the Director, is equivalent thereto and also has successfully completed a pre-apprenticeship program approved by the Director, he shall complete five periods of training and instruction of 1700 hours per period.

(5) Where the apprentice holds a certificate of qualification in the trade of motor vehicle mechanic or in the trade of heavy duty equipment mechanic, he shall complete the fourth and fifth periods of training and instruction of 1800 hours per period. O. Reg. 395/71, s. 5.

6. Notwithstanding subsection 5 (5), a holder of a certificate of qualification in the trade of motor vehicle mechanic or in the trade of heavy duty equipment mechanic shall be eligible for examination for a certificate of qualification in the certified trade by submitting written evidence, satisfactory to the Director, of having had at least two years experience in the certified trade. O. Reg. 395/71, s. 6.

7. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours or for hours in excess of his regular daily hours, shall not be less than,

- (a) 50 per cent during the first period of training and instruction;
- (b) 60 per cent during the second period of training and instruction;
- (c) 70 per cent during the third period of training and instruction;

- (d) 80 per cent during the fourth period of training and instruction; and
- (e) 90 per cent during the fifth period of training and instruction,

of the average rate of wages for journeymen employed by the employer in that trade, or where the employer is the only journeyman, of the average rate of wages for journeyman in the area. O. Reg. 395/71, s. 7.

8. The subjects of examination for an apprentice and for a certificate of qualification in the certified trade are the subjects contained in Schedules 1 and 2. O. Reg. 395/71, s. 8.

9. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

(a) where the employer is a journeyman in the certified trade, one apprentice plus an additional apprentice for each journeyman employed by the employer in the certified trade and with whom the apprentice is working; or

(b) where the employer is not a journeyman in the certified trade, one apprentice for each journeyman employed by the employer in the trade and with whom the apprentice is working. O. Reg. 395/71, s. 9.

10. A certificate of qualification in the certified trade remains in force until cancelled or suspended in accordance with the regulations. O. Reg. 395/71, s. 10.

Schedule 1**FARM EQUIPMENT MECHANIC****In-School Training**

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics	Arithmetic	Fractions, decimal, ratio and proportion, percentage, measurement. Metric system-conversion factors.
		Algebra	Related formula manipulation.
2	Science	Physics	Forces and their affects, friction, mechanical power transmission and heat energy. Velocity and acceleration. Force, mass and motion. Mechanical advantage, efficiency and horsepower ratings. Stresses and strains. Strength of materials. Heat and gases: coefficients of expansion (metals, alloys, coolants), effects of temperature and pressure changes.
3	General Shop Practice	Hand and Power tools	Basic hand tools: selection, care and use of hammers, wrenches, pliers, files, hacksaws, chisels, punches and twist-drills. Basic operation of machine tools such as lathe, grinder, drill press. Operation of portable power tools such as drills, grinders, impact wrenches, etc. Uses of hand and power tools in repairing, reconditioning or replacement of mechanical parts and components. Repair innovations required in field situations.
		Benchwork	Layout and fitting. Soldering techniques, measuring tools such as rules, squares, feeler stock, calipers, verniers and micrometers. Fitting components and related parts; tolerances and clearances involved.
		Blueprint Reading	Elementary Blueprint reading and isometric sketching techniques. Interpretation of schematic diagrams and exploded views related to typical farm equipment.
		Fastening Devices	Types of bolts, nuts, studs, screws and fittings. Thread identification. Tensile strengths and torquing. Cutting internal and external threads. Types of rivets, keys, springs, flat and lock washers and circlips. Thread lubricants.
		Safety	Safety rules and safe operating procedures. First aid (basic) and fire prevention. Toxic and explosive material. Good housekeeping.
		Welding	Oxyacetylene and arc welding and cutting techniques. Selection, use and care of equipment. Brazing and silver soldering. Fitting and joint preparation, metal identification. Position welding, hard facing, cutting and non-ferrous alloys. Repairing or rebuilding damaged or worn castings and ferrous components of farm machinery (engine components and agricultural machinery).

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
4	Internal Combustion Engines	Principles, Types, Uses and Major Systems	Elementary theory of operation of 2 and 4 stroke cycles. Gasoline and diesel engines theory. Application to agricultural equipment. Identification and characteristics and functions of fuel, lubrication, cooling, electrical and exhaust systems.
		Fuel Systems	Carburetion principles. Fuel/air ratio. Vapourization and atomization. Mixtures. Detonation and pre-ignition. Fuel pump types and their operation. Fuel tanks, filters and lines. Venting. Single barrel carburetors, up, side and down draft, characteristics, and operation. Fuel injection systems, their components and operation. Servicing and repair procedures.
		Diesel Engines	Detailed examination of Diesel engines, principles and components. Inspection, calibration and repair of fuel systems with particular emphasis on pumps and injectors.
		Lubrication Systems	Types of engine lubrication systems—wet and dry sump. Splash and dip feeds. Oil pump types. Pressure indication and control. Crankcase ventilation. Servicing and repair procedures. Lubricants applicable-characteristics and classifications.
		Cooling Systems	Air and liquid cooling. Radiators, thermostats, hose, pumps, and fans. System servicing and repair.
		Electrical System	Basic electrical fundamentals. Units of electricity, Ohm's Law. Electron flow. Series and parallel circuits. Voltage drop electrical measurement. Typical internal combustion engines electrical circuits. Switches and instruments used in engines. Batteries, ignition coils primary and secondary circuits. Spark plugs, distributors, alternators, generators and regulators. Starter motors. Servicing, repair and overhaul procedures.
		Repair and Overhaul Procedures	Complete repair and overhaul of gasoline and diesel engines, including lubrication, cooling and fuel systems. Pump timing and injection cleaning. Trouble shooting techniques.
5	Hydraulics	Principles and Components	Basic hydraulic principles. Pascal's Law. Typical systems arrangement. Components and their operation such as pumps, cylinders, valves, filters, lines, reservoirs, accumulators and couplings. Hydraulic fluid, seals and packing.
		Tractor and Agricultural Machinery Systems	Inspecting, servicing, repairing and overhauling procedures for complete hydraulic systems used in tractors and farm machinery. Trouble shooting techniques.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
6	Farm Tractors	Servicing, Repair and Overhaul	Inspection, servicing, repair and overhaul procedures for tractor components such as clutches, gear transmissions, differentials, brakes and steering systems. Trouble shooting.
7	Agricultural Machinery	Principles and Types	Variety of farm machinery and their functions under local and Ontario conditions. Principles of operation and types of plows, discs, seeders, sprayers, fertilizer spreaders, combines, mowers, conditioners, forage harvesters, balers.
		Assembly and Operation	Assembly techniques for various machines and components. Use of proper tools and handling equipment. Importance of following manufacturer's manuals. Adjustments and checks involved. Fits, clearances, tolerances, torques.
		Inspection, Repair and Overhaul	Pre-delivery inspection requirements, routine servicing and periodic maintenance criteria. Proper operating requirements for various types of machines. Adjustments. Repair and overhaul procedures applicable.
8	Estimating and Shop Management	Estimating and Ordering	Economic principles in repair procedures. Labour, material and overhead. Typical estimating techniques. Parts ordering, stock procedures, inventory control. Shop organization.
		Quality Control	Awareness of manufacturing methods. Acceptable standards.
		Public Relations	Employee attitude, responsibility. Warranties, complaints, courtesy. Communications.
9	Soils and Crops	Soils	General nature of soils. Changes due to cultivation. Relationship between water, soils and plants. Organic matter, fertilizer mixtures and programs for various crops. Soil management—heavy, light and medium texture soils. Soil conservation and erosion. Farm planning.
		Crops	Ontario basic grain and forage crops: principles and practices, local applications. Types of crops, their classification importance, adaptation and rotation. Climatic factors locally and Southern Ontario. Growing season, crop distribution and varieties. Tillage and cultivation factors. Seed bed preparation and seeding methods. Weed control. Crop harvesting techniques.
10	Air-Conditioning and Refrigeration	Automatic Air-Conditioning Systems	Types of cab air-conditioning systems. Principles of operation, inspection, service and repair procedures.
		Self-Contained Cooling Systems	Types of self-contained coolers used for milk, fruit, eggs and vegetables. Principles of operation, inspection, servicing and repair procedures.

Schedule 2

FARM EQUIPMENT MECHANIC

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	General Shop Practice	Safety	Safety rules and safe operating procedures. First Aid. Fire prevention. Use and maintenance of fire-fighting equipment. Handling of gasoline, fuel oils, lubricants and cleaning solvents. Danger of carbon monoxide fumes. Correct use of lifting and hoisting equipment. Good housekeeping.
		Hand Tools	Selection and use of hammers, punches, chisels, pliers, wrenches, sockets, screwdrivers, hacksaws, files, drifts, scrapers, snips, clamps, drill bits, reamers, vises, taps and dies. Stud extractors. Hones.
		Power Tools	Use and care of portable air and electric drills, impact tools, grinders. Machining tool operations of lathe, power hacksaw, grinder, drill press, etc.
		Benchwork	Cutting with hacksaw, filing, scraping, drilling, use of drill press. Use of bench grinder. Grinding of drill bits, chisels, etc. Fitting bearings; bushings; honing; cutting and flaring tubing. Soldering. Gasket making. Oxyacetylene and arc welding and cutting. Brazing techniques. Care and maintenance of welding equipment.
		Measuring Instruments	Use of rules, straight edges and squares. Feeler gauges, calipers, verniers, micrometers, telescopic gauges, dial indicators, trammel gauges, pressure gauges.
		Fastening Devices	Purpose and types of bolts, nuts, studs, screws and tube fittings. Thread identification and classification. Tensile strengths. Installation procedures. Tightening torques. Cutting internal and external threads. Removing broken studs. "Heli-Coil" inserts. Purpose and types of rivets, keys, springs, flat and lock washers, snap rings, circlips, cotter pins. Installation and removal. Thread lubricants, sealers, and locking compounds.
		General Shop Equipment	Capacities and correct usage of floor cranes, hoists, jacks, stands, blocking, shop and portable hydraulic presses and pullers. Operation and maintenance of degreasing and steam-cleaning equipment and air compressors. Capacities and use of tow trucks and related recovery equipment.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
2	Internal Combustion Engines	Operation, Testing and Adjustment (Gasoline & Diesel)	Familiarization with engine types, components and correct operation. Recognition of abnormal engine noises and exhaust. Vacuum and compression testing. Identification of effects of cylinder and bearing wear, defective valves, gaskets, seals, incorrect valve timing, lubricant and coolant temperatures on engine performance. Torquing heads and manifolds. Adjusting valve lash.
		Engine Reconditioning	Engine and component disassembly, cleaning, inspection, repair, reconditioning or replacement. Boring, sleeving, honing, grinding, alignment and fitting operations. Re-assembly of engines and components. Fits, clearances and tolerances. Valve timing. Torquing. Engine testing.
		Lubricants	Familiarization with lubricant characteristics, classifications and ratings; contamination and deterioration, frequency of change intervals.
		Lubricating Systems	Familiarization with types, operation and requirements. Servicing, overhaul or replacement of pumps, screens, oil lines and filters. Testing servicing and adjustment of pressure regulators, controls and crankcase ventilation systems.
		Cooling Systems	Air and liquid cooled pressurized systems. Inspection, testing, overhaul or replacement of blowers, fans, water pumps, drives, radiators, shrouds and shutters, manifolds, thermostats, hoses and connections, temperature indicators, immersion heaters, transmission oil coolers, filter units. Radiator reverse flushing and flow-testing; use of cleaning agents, coolant additives, sealers. Testing anti-freeze solutions.
		Fuel Systems (Gasoline)	Mechanical fuel pumps, vacuum and electric. Testing, repair, overhaul or replacement of pumps, tanks and supply lines. Carburetors; types, operation, circuits and systems. Air Cleaners. Testing, adjusting, cleaning, overhaul and tune-up operations.
		Fuel Injection Systems	Pre-combustion chambers, air cells, energy cells. Dual fuel engines. Manifolds. Air cleaners. Air heaters. Blowers and turbo-chargers. After-coolers. Fuel tanks, lines, air traps, filters, water traps, primary transfer pumps, pressure regulating valves. Hydraulic, distributor, pressure-time injection pumps. Hydraulic, mechanical P.T., unit injectors. Fuel injection and air induction system inspection, adjustment, overhaul and testing operations. Timing and calibrating pumps and testing injector operation. Bleeding systems. Timing pumps to engines. Governors and controls. Speed/load adjustments and overhaul operations. Shutting-down over-speeding engines.

ITEM.	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
3	Belt and Chain Drives	Installation and Maintenance	Inspecting, installing, aligning and adjusting; "V" belts, pulleys, chains and sprockets.
4	Exhaust Systems	Mufflers, Pipes & Components	Back pressure checks. Replacing exhaust systems.
5	Electrical Systems	Electrical Circuits	Identification, tracing and testing of circuits. Use of voltmeters, ammeters, and ohmmeters. Joining, splicing, soldering and insulating wires and cables. Removal and installation of terminals, connectors, plugs, resistance, fuses, circuit breakers, conduit.
		Switches and Instruments	Switches, relays and gauges, meters, indicator lights, rheostats, resistors, capacitors and semi-conductors. Testing, repair and replacement.
		Batteries	Inspection, testing and maintenance. Use of voltmeters, ammeters, load resistances and hydrometers. Battery charging. Activation of dry-charged batteries. Battery heaters.
		Coil Ignition Systems	Ignition coil inspection, testing and replacement. Testing primary and secondary circuits. Replacement of primary and high tension wiring, primary circuit switches and resistors. Distributor tests. Inspection and overhaul procedures. Lubrication. Installation and timing. Synchronizing dual points and distributors. Engine speed adjustments.
		Magnetos, Impulse Couplings	Inspection, testing, adjusting overhaul, and timing.
		Spark Plugs	Analyzing deposits. Testing, cleaning, gapping and installing.
		Charging Systems D.C. Generators A.C. Generators	Inspection and testing of generators, alternators, regulators, relays, wiring and ground circuitry. Removing, overhauling or replacing and re-installing. Polarizing generators. Lubrication. Replacing transistor diodes. Bench testing and adjustment of regulators and relays.
		Starter Motors	Inspecting and testing starting circuits, motors, drive units, switches, solenoids, cables and wiring. Removing, overhauling, testing and re-installing. Lubrication.
		Special Starting Systems	Series parallel and magnetic switch systems. Diesel starting aids: glow plugs, air heaters, flame primers, ether capsules. Air and hydraulic starter motor systems. Testing, repairing or replacing components.
		Lights	Circuits. Bulb and seal beam units. Lenses and holders. Signal lights; flasher units. Aiming, testing, installing and repairing lights and wiring.
		Heaters & Defrosters	Testing, adjustment or replacement of blower motors, actuating or control systems.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
5	Electrical Systems (cont'd.)	Horns	Electric and air/vacuum types. Electric circuits and relays, air/vacuum horn, horn controls. Testing, adjusting or replacement.
		Windshield Wipers and Washers	Electric single and multi-speed air/vacuum types. Speed controls and washers. Overhaul, repair or replacement.
6	Power Trains	Clutches	Single and multi-plate; mechanical and hydraulic operated controls; servicing and adjustment. Inspection, overhauling and re-installation. Control adjustments and clearances. Testing.
		Manual Shift Transmissions	Standard transmissions; constant mesh and sliding gear. Direct and remote controls, power assist mechanisms, overdrives, auxiliary drives. Servicing and adjustments. Removal, inspection, overhaul and re-installation. Control adjustments. Lubrication. Testing.
		Drive Shafts	Open drive shafts, center or support bearings, universal joints, flexible couplings slip joints and enclosed drive lines. Dis-assembly, overhaul or relubing; re-assembly and re-installation.
		Axles and Differentials	Live axles. Multi-speed, tandem drive, trans-axles, standard and torque proportioning differentials, front driving axles, wheel planetary drives. Axle and differential control mechanisms; mechanical, electrical, air or vacuum operated. Testing, adjusting overhaul procedures. Axle bearings. Removing, relubing, replacing, adjusting or torquing. Oil seal replacement. Removing, overhauling and reinstalling axles and differentials. Lubrication.
7	Running Gear	Front Suspension (Solid Axle)	"I" beam and trunnion mounted types. "A" frames, radius rods. Servicing and straightening procedures. Correction of caster, camber, toe-in, and kingpin inclination.
		Suspension Systems	Leaf springs, helper springs, mountings and related parts. Coil spring, torsion bar and air/hydraulic, nitrogen/hydraulic suspension systems. Shock absorbers, stabilizers, hangers and suspension control rods. Inspecting, overhauling suspensions and related components. Torquing. Lubrication.
		Chassis and Main Frames	Wheeled equipment. Crawler-base equipment; "A" frames, base, arch and deck frames. Equalizer bars. Pivot shafts. Draw bars. Articulated frames. Inspection, repair and aligning. Heat straightening. Rivetted, welded and bolted frame repairs.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
7	Running Gear (cont'd.)	Steering Systems	Cam and lever, worm and roller, worm and sector, re-circulating ball types. Steering linkage, bushings and joints. Pumps, control valves and steering cylinders. Leaning wheel mechanisms. Multi-wheel steering. Inspection, adjustment and over-haul operations.
		Wheel and Rims	Removing and re-installing wheels and rims. Inspecting, repairing and servicing. Checking run-out.
		Tire and Tubes	Inspection and identification of tire wear and faults. De-mounting and mounting tires. Tire, tube and valve repair. Inflation precautions. Tire weighting to improve traction.
8	Brake Systems	Service Brakes	Hydraulic, air, air-hydraulic, and electric systems. Air compressors, unloader valves, governors, reservoirs; emergency relay valves, treadle controls, quick release valves, protection valves, low pressure indicators, flexible hoses and fittings. Brake chambers, slack adjusters, brake shoes and linings, anchor pins, camshafts, brake drums. Master cylinders and wheel cylinders. Inspection, overhaul, re-conditioning, re-assembly adjustment and testing of brake assemblies and systems.
9	Air-Conditioning and Refrigeration	Automotive Type Air-Conditioning Systems	Inspection, servicing and repair of cab air-conditioning systems and components.
		Self-Contained Cooling Systems	Inspection, servicing and repair of milk, fruit, egg and vegetable coolers.
10	Hydraulics	Basic Principles	Hydraulic principles; Pascal's Law. Basic hydraulic systems and schematics. Applications. Safe working practices.
		Pump Units	Vane, gear and piston pumps. Positive displacement, fixed and variable delivery. Inspection, testing and overhaul.
		Hydraulic Cylinders	Single and double acting, single and double end. Cushion rings and plungers. Seals and packings. Inspection, servicing and overhaul.
		Hydraulic Valves and Lines	Flow; check, flow-control, divider, types. Pressure; relief (simple and compound) differential, modulating, safety, types. Control; spool, 2-way, 4-way, types. Inspection, testing, servicing and overhaul procedures. Hydraulic lines, hoses and fittings. Installation and maintenance operations.
		Reservoirs and Accumulators	Reservoir cleans-out, filters, strainers, baffles, breathers. Fluid coolers. Heaters. Spring loaded and gas charged (nitrogen) accumulators. Servicing and overhaul operations.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
10	Hydraulics (cont'd.)	Hydrostatic Drives	Prime movers, pumps, motors, valve controls. Constant torque/variable horsepower, constant horsepower/variable torque, variable horsepower/variable torque types. Servicing and overhaul operations.
11	Agricultural Machinery	Field Equipment	Mowers, planters, sprayers, balers, forage harvesters, mixer-grinders, combines, etc. Principles of operation, inspection, repair and overhaul procedures.
		Accessories and Equipment	Inspection, repair and overhaul operations. Repair or replacement of cutting edges and wear points. Adjustment and overhaul of controls. Blocking and loading operations.

O. Reg. 395/71, Sched. 2.

REGULATION 34

under the Apprenticeship and Tradesmen's Qualification Act

FITTER (STRUCTURAL STEEL/PLATEWORK)

INTERPRETATION

1. In this Regulation,

- (a) "certified trade" means the trade of fitter (structural steel/platework);
- (b) "fitter (structural steel/platework)" means a person who,
 - (i) reads and interprets drawings, specifications and bills of material, reference charts and tables,
 - (ii) selects mechanical measuring, checking, layout tools and devices,
 - (iii) assembles metal plates and metal sections to form a complete unit, to the limits of accuracy shown on the shop drawings, connecting components by tack welding or bolting,
 - (iv) performs measuring, checking, layout operations and selects work piece materials and is familiar with the operation of straightening machines and equipment, and
 - (v) safely turns and handles individual pieces or complete assemblies using cranes or other lifting equipment,

but does not include a person or class of persons in a limited purpose occupation that, in the opinion of the Director, does not equate with the definition of fitter (structural steel/platework). O. Reg. 990/80, s. 1.

2. The trade of fitter (structural steel/platework) is designated as a certified trade for the purposes of the Act. O. Reg. 990/80, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of three periods of related training and work experience training of 1800 hours per period,

- (a) in courses provided at a location approved by the Director in the units of study contained in Schedule 1; and
- (b) in work experience training provided by the employer of the apprentice in the units of study contained in Schedule 2. O. Reg. 990/80, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the units of study contained in Schedules 1 and 2. O. Reg. 990/80, s. 4.

5. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours of work or for

hours of work in excess of his regular daily hours of work, shall not be less than,

- (a) 60 per cent during the first period;
- (b) 70 per cent during the second period;
- (c) 80 per cent during the third period of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade. O. Reg. 990/80, s. 5.

6. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade one apprentice plus an additional apprentice for each additional journeyman employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for each journeyman employed by that employer in the trade and with whom the apprentice is working. O. Reg. 990/80, s. 6.

7. Notwithstanding section 6, on the recommendation of the Provincial Advisory Committee or a local apprenticeship committee appointed under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 990/80, s. 7.

8. The Director shall issue a progress record book to an apprentice for the purpose of recording his related training and work experience training time and the apprentice shall be responsible for keeping his progress record book up-to-date and for its safekeeping. O. Reg. 990/80, s. 8.

9. An applicant for a certificate of qualification in the certified trade who is required to satisfy the Director under clause 11 (4) (b) or (c) of the Act shall submit to the Director proof of experience within the trade that, in the opinion of the Director, is equivalent to work experience training described in the units of study contained in Schedule 2. O. Reg. 990/80, s. 9.

10.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 990/80, s. 10.

11. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 990/80, s. 11.

Schedule 1

FITTER (STRUCTURAL STEEL/PLATEWORK)

In-School Training

	COLUMN 1	COLUMN 2
Item	Unit of Study	Instruction to be Given
1.	Administration	To familiarize the apprentice with school administrative procedures.
2.	Safety	Safe work habits. Personal protective clothing. Precautionary measures against accidents. Safe use of power tools and equipment. <i>Occupational Health and Safety Act, Workmen's Compensation Act.</i>
3.	Measuring and Layout Tools	Care and use of trade related measuring tools.
4.	Trade Tools	Care and use of trade related hand and power tools.
5.	Trade Machinery	Care and use of trade related power operated machinery.
6.	Layout and Fitting	Layout and fitting of beams, columns, detail and plate work. Alignment, levelling, fitting and assembly of structural steel/platework fabrications.
7.	Fasteners and Fastening Techniques	Identification and use of fastening devices and anchors common to the trade.
8.	Materials handling	Proper use of lifting and moving devices. Load weight and balance. Hand signals. Principles and practices of safe slinging and hoisting.
9.	Heat Distortion and Heat Straightening	Causes of distortion. Methods of controlling heat distortion. Heat straightening.
10.	Interpretation of Shop Drawings	Principles of drawing and sketching. Interpretation of shop drawings, welding symbols, bevels and abbreviations. Types and characteristics of structural shapes.
11.	Bending and forming	Principles and practices of material bending. Layout for bending. Allowances for material loss.
12.	Template Development	Types and uses of templates. Making templates, jigs and fixtures.
13.	Plate Development	Cylinder, hopper and cone development. Transition pieces.
14.	Oxy-Fuel Gas Cutting	Proper use of hand cutting and machine cutting equipment.
15.	Inspection	Knowledge of visual, dimensional, mechanical, pressure and non-destructive examination techniques.
16.	Arc Welding	Identification and use of arc welding equipment. Techniques of tack welding, Joint preparation and fit up.
17.	Trade Calculations	Trade related mathematical calculations. Common and decimal fractions. Squaring methods. Metric conversion.
18.	Trade Communications	Effective communications . Trade terminology.

Schedule 2

FITTER (STRUCTURAL STEEL/PLATEWORK)

Work Experience Training

	COLUMN 1	COLUMN 2
Item	Unit of Study	Work Experience Training
1.	Safety & Plant Orientation	Knowledge of safe practices. Recognition and removal of hazards. Protective clothing and equipment. Good housekeeping.
2.	Measurement and Layout Tools	Identification, selection, care and use of tapes, rules, squares, bevel squares, straightedges, calipers, dividers, trammels, transits, centre punches, chalk lines, plumbs, levels, protractors, micrometers.
3.	Hand Tools	Care and use of hammers, sledges, chisels, hacksaws, taps and dies, drills, files, drifts, punches, prybars, bolt cutters, wrenches. Familiarization with tool crib procedures.
4.	Power Tools	Identification, selection, care and use of impact wrenches, torque wrenches, portable electric drills, grinders, tube expanders, chippers, reamers.
5.	Trade Machinery	Familiarization with the set-up operation, and capacities of plate and structural steel fabrication machinery.
6.	Material Handling	Identification, selection, care and safe operation of material handling equipment. Material slinging and moving procedures. Erection and use of ladders and scaffolds. Identification and use of slings, hooks, hoists, jacks, rollers, roller conveyors, ropes and cables. Hand signals. Determining weights of loads.
7.	Layout	Interpretation of drawings, specifications and bills of material. Determination of work procedures and operations sequence. Material recognition and selection factors. Use of shop formulae to locate lines, centres, angles, bends and radii, allowing for shrinkage and expansion. Applications of patterns and templates. Layout of structural steel fabrications and platework. Use of jigs and fixtures for repetition production.
8.	Oxy-Fuel Gas Equipment	Set-up, operation and maintenance of equipment. Oxy-fuel gas heating. Torch cutting.
9.	Arc Welding	Familiarization with shielded metal arc welding (SMAW) and gas metal arc welding (GMAW). Familiarization with the control of distortion by the proper sequence of weld, straightening and stress-relieving. Tack welding of low carbon steels and alloy steels.
10.	Fitting and Assembling	Alignment, levelling, fitting and assembly of structural steel/platework fabrications.
11.	Fastening	Familiarization with types, sizes and uses of bolts, washers, anchor bolts, studs, pins and rivets. Determining the hole tolerances. Torquing techniques.
12.	Inspection	Familiarization with visual, dimensional, mechanical, pressure and non-destructive examination techniques.

REGULATION 35

under the Apprenticeship and Tradesmen's Qualification Act

FUEL AND ELECTRICAL SYSTEMS MECHANIC

1. In this Regulation,

(a) "certified trade" means the trade of fuel and electrical systems mechanic;

(b) "fuel and electrical systems mechanic" means a person engaged in the repair and maintenance of motor vehicles who,

(i) repairs and adjusts fuel systems,

(ii) installs, repairs and removes ignition systems, generators, alternators, starters, coils, panel instruments, wiring and other electrical systems and equipment,

(iii) performs a complete tune-up of an engine, and

(iv) installs, inspects, maintains and removes motor vehicle air-conditioning systems;

(c) "motor vehicle" means a vehicle propelled by an internal combustion engine, or a vehicle operated or controlled from a vehicle propelled by an internal combustion engine, that is registered for use on a highway under the *Highway Traffic Act* and is used primarily for the transport of persons, equipment or goods but does not include a vehicle,

(i) operated only on rails,

(ii) used for transportation solely within an employer's actual place of business, or

(iii) used for farming operations but not used for carrying a load. R.R.O. 1970, Reg. 32, s. 1.

2. A fuel and electrical systems mechanic may also,

(a) repair, change and balance wheels and tires;

(b) change oil in motor vehicles or lubricate motor vehicles, including lubricating the front wheel bearings and drive shaft;

(c) supply motor vehicles with anti-freezing solutions;

(d) replace cooling-system hoses, engine-driven belts, and thermostats; and

(e) perform any other duties normally performed by a service station attendant. R.R.O. 1970, Reg. 32, s. 2.

3. The trade of fuel and electrical systems mechanic is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 32, s. 3.

4. An apprentice training program for the certified trade is established and shall consist of,

(a) training and instruction at full-time educational day classes provided at a College of Applied Arts and Technology or in classes that, in the opinion of the Director, are equivalent thereto; and

(b) in practical training and instruction provided by an employer of the apprentice,

in the subjects contained in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 32, s. 4.

5.—(1) Subject to subsections (2) and (3), an apprentice shall complete three periods of training and instruction of 1800 hours per period.

(2) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma or has Ontario Grade 12 standing in English, Mathematics and Science or has such other academic qualification that, in the opinion of the Director, is equivalent thereto, he shall complete three periods of training and instruction of 1600 hours per period.

(3) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma majoring in auto mechanics or has such other academic qualification that, in the opinion of the Director, is equivalent thereto, he shall complete three periods of training and instruction of 1200 hours per period. R.R.O. 1970, Reg. 32, s. 5.

6. Any person who,

(a) applies in the prescribed form for apprenticeship in the certified trade; and

(b) becomes an apprentice in the certified trade within three months after commencing to work in that trade,

is exempt from subsection 11 (2) of the Act. R.R.O. 1970, Reg. 32, s. 6.

7. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

- (a) 50 per cent during the first period of training and instruction;
- (b) 70 per cent during the second period of training and instruction; and

(c) 90 per cent during the third period of training and instruction,

of the average rate of wages for journeymen employed by the employer in that trade or, where the employer is the only journeyman employed, of the average rate of wages for journeymen in the area. R.R.O. 1970, Reg. 32, s. 7.

8. The subjects of examination for an apprentice are the subjects set out in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 32, s. 8.

Schedule

FUEL AND ELECTRICAL SYSTEMS MECHANIC

PART 1

In-School Training

Item	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics	Arithmetic	Addition, subtraction and division of whole numbers and fractions, ratio and proportion, areas and volumes.
		Geometry	Lines, planes and angles.
2	Science	Physics Mechanics	Basic laws and principles, formulae. (Given as required in shop instruction.)
3	English	Basic Usage and Business Communications	Trade terminology and usage. Letters and report writing. Work and parts orders. Interpretation and use of manufacturers' manuals.
4	Drafting	Basic Drafting and Interpretation	Preparation of elementary working drawings and dimensioned sketches of automotive components. Interpretation of exploded drawings, electrical and hydraulic circuits and schematics used in manufacturers' manuals.
5	General Shop Practice	Safety	Safety rules and safe operating procedures. First aid. Fire prevention. Use and maintenance of fire-fighting equipment. Handling of gasoline, oils and cleaning solvents. Danger of carbon monoxide fumes. Correct use of lifting and hoisting equipment. Good housekeeping.
		Hand Tools	Selection and use of hammers, punches, chisels, pliers, wrenches, sockets, screwdrivers, hacksaws, files, drifts, scrapers, snips, clamps, drill bits, reamers, vises, taps and dies. Stud extractors. Hones.

Item	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Power Tools	Use and care of portable air and electric drills, impact tools.
		Benchwork	Cutting with hacksaw, filing, scraping, drilling, use of drill press. Use of bench grinder; grinding of drill bits, chisels, etc. Fitting bushings, honing, cutting and flaring tubing. Soldering, gasket making. Oxy-acetylene and arc welding and cutting. Brazing techniques. Care and maintenance of welding equipment.
		Measuring Instruments	Use of rules, straight edges and squares. Feeler gauges, calipers, verniers, micrometers, telescopic gauges, dial indicators and pressure gauges.
		Fastening Devices	Purpose and types of bolts, nuts, studs, screws and tube fittings. Thread identification and classification. Tensile strengths. Installation procedures. Tightening torques. Cutting internal and external threads. Removing broken studs. "Heli-Coil" inserts. Purpose and types of rivets, keys, springs, flat and lock washers, snap rings, circlips, cotter pins. Installation and removal. Thread lubricants, sealers and locking compounds.
		General Shop Equipment	Capacities and correct usage of floor cranes, hoists, jacks, stands, hydraulic presses, pullers. Operation and maintenance of degreasing and steamcleaning equipment. Operation and maintenance of air compressors. Capacities and use of tow trucks and related vehicle recovery equipment.
6	Internal Combustion Engines	Principles, Types and Definitions	Principles of operation. 2 and 4 stroke cycles. Engine types—single and multi-cylinder, in-line, slanted, "V" types, flat or pancake. Definition of bore, stroke, combustion, piston displacement, clearance volume, swept volume, compression ratios and pressures, horsepower, torque. Engine formulae. Heat transfer. Combustion chamber design and efficiency.
		Engine Components	Types, purpose and function of major engine components: Cylinder blocks. Pistons, connecting rod and crankshaft assemblies. Bearings. Cylinder heads, valves and valve trains. Gaskets. Manifolds. Flywheels. Effects of cylinder wear and defective valves, etc., on engine performance. Valve timing. Torquing procedures. Engine testing. Vacuum and compression tests. Valve lash.
		Types and Classification of Lubricants	Characteristics of lubricants: Detergent, non-detergent, S.A.E. viscosity ratings, A.P.I. classification. Additives. Oil contamination and deterioration.
		Lubricating Systems	Types of engine lubricating systems, pumps, screens and filters; full-flow and by-pass types. Pressure indication and control. Crankcase ventilation. Servicing and overhaul procedures.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Cooling Systems	Air and liquid cooled systems. Blowers, water pumps, fans and drives. Radiators. Thermostats. Hoses and connections. Temperature indicators. Automatic transmission coolers. Pressurized systems. Coolant, additives, sealers and antifreeze. Cleaning agents. Reverse flushing. Radiator flow testing. Immersion heaters. System repair and overhaul procedures.
		Fuel Systems (Gasoline)	Mechanical fuel/vacuum and electric pumps. Pressure, volume and vacuum tests. Tanks and supply lines. Repair and overhaul procedures. Carburetion; Fuel/air ratio. Characteristics of carburetors. Single, double and 4-barrel types. Up-draft, side and down draft, etc. Carburetor operation; atomization, vapourization, weight of fuel and air, venturi. Carburetor circuits and systems. Float, choke, idle, main-metering, power and accelerating circuits. Heat riser valves, heat insulators and choke tubes. Cleaning and overhaul procedures. Cleaning solvents. Effects of carburetor adjustments on engine performance. Tachometer and vacuum gauges. Effects of percolation, altitude and atmospheric changes, valve overlap and excess heat, incorrect float level. Balancing multi-carburetors. Adjustments to electrical mechanisms, switches, operating linkage. Effect on automatic transmission operation. Locating excess vacuum leaks. Torquing intake manifolds. Effect of air cleaners on engine performance. Analyzing exhaust gases. Relationship between air fuel mixture and exhaust gas. Tune-up procedures. Testing, maintaining and replacing positive crankcase ventilation systems, dash pots, throttle return checks, anti-stall devices.
		Fuel Injection Systems	Characteristics and operation of fuel injection systems, injectors and pumps. Governors. Fuel filters. Servicing and overhauling fuel injection systems. Test equipment and test procedures. Cleanliness. Fuel injection timing. Air induction systems. Starting systems. Shutting down runaway engines.
		Fuel Systems (Liquefied Petroleum Gas and Vaporizing Oils)	Use and operation of L.P.G. systems. Charging L.P.G. tanks. Principles of operation using vaporizing oils.
7	Belt Drives	"V" Belt Installation	Characteristics of "V" Belts. Inspecting, installing and adjusting.
8	Exhaust Systems	Mufflers, Resonators, Exhaust and Tail Pipes	Features of exhaust systems, single, dual and resonators with mufflers. Dual exhaust systems, cross-over pipes and heat riser passages. Back pressure checks. Emission control systems; inspection and servicing.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
			Characteristics of insulators, hangers, brackets and clamps. Replacing complete exhaust systems or parts. Expansion and contraction. Stress relieving of system. Exhaust gas leaks.
9	Electrical Systems	<p>Basic Electricity</p> <p>Automotive Electrical Circuits</p> <p>Switches and Instruments</p> <p>Batteries</p> <p>Ignition Systems (Conventional Distributors)</p> <p>Ignition Coils</p>	<p>Definition of amperes, voltage, resistance, Ohm's Law. Electron flow. Electro-magnetism. Series and parallel circuits. Voltage drop. Use of voltmeter, ammeter and ohmmeter. Conductors and insulators.</p> <p>Characteristics of typical circuits. Voltages and currents. Ground circuits. Automotive wire and cables. Insulation materials. Flexibility. Resistance. Joining, splicing and soldering of wires and cables. Insulating. Removal and installation of terminals, connectors and plugs. Effects of temperature, shorts, grounds, poor connections. Resistances and fuses. Identification and tracing of circuits.</p> <p>Function of automotive electrical switches, relays and instruments. Indicator lights. Rheostats, resistors, capacitors and semi-conductors. Test, repair and replacement procedures.</p> <p>Principles, characteristics and function of lead acid batteries. Electro-chemical action. Electrolyte. Voltage developed. Ampere hour ratings. Sulfation. Inspection, testing and maintenance. Use of voltmeters, ammeters, load resistances and hydrometers. Battery charging. Charging rates. Charging and handling hazards. Dry-charged batteries. Activation procedures.</p> <p>Function, mounting and driving of distributors. Single, tandem, double headed, dual contact points, impulse generators for semi-conductor systems, etc. Internal electrical circuits. Cam lobes, single and double contact points, dwell angle, condensers. Centrifugal and vacuum advance. Secondary voltage distribution. Radio suppression. Ignition timing. Distributor tests on and off vehicle. Distributor inspection and overhaul procedures. Replacement of shafts and bushings; contact point cleaning, replacement and adjustment, alignment and spring tension, gap-dwell settings; lubrication of cams, pivots and advance mechanisms. Installation and timing. Synchronizing dual points and distributors. Engine speed settings.</p> <p>Characteristics and function. Coil polarity, secondary voltage range, internal and external resistors, temperature effects. Saturation period and coil output. Coil Testing equipment; output, insulation and polarity tests.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Primary Circuit Switches and Resistors	Characteristics. Safety features—automatic transmission and theft protection. By-passing primary circuit resistance for starting.
		Primary and Secondary Circuits	Testing primary and secondary circuits. Effects of suppression equipment on tests. Arcing corrosion. Replacement of primary and high tension wiring.
		Transistor and Transistorized Ignition Systems	Characteristics and application of diodes and transistors used in automotive ignition systems. Transistor and transistorized systems. Fundamentals of operation. Timing procedures. Test equipment. Testing and repair procedures.
		Spark Plugs	Characteristics and operation. Ionization, negative polarity, temperature control and heat ranges. Radio suppression. Analyzing deposits. Testing, cleaning, filing, setting and installing. Tightening torques.
		D. C. Charging Systems (Generators)	Characteristics. Internally and externally grounded fields. Positive and negative grounded systems. Generator construction. Principles of generator operation. Electro-magnetic induction. Electrical and magnetic circuits. Commutation.
		Regulators	Construction features. 2 and 3 unit, double contact, heavy duty and carbon pile regulators. Principles of operation. Voltage and current regulation; cut-out relays. Temperature compensation.
		A. C. Charging Systems (Alternators)	Characteristics. Internally and externally grounded fields. Positive and negative ground systems. Internally and externally grounded systems. Alternator construction. Principles of operation. Electromagnetic induction. Electrical circuits ("Y" and delta). Magnetic circuits. Rectification. Current limitation. A.C. regulators and relays; Vibrating contact, transistorized, transistor types. Principles of regulator and relay operation. Voltage regulators, field relays, indicator light relays. Temperature compensation.
		Inspection, Testing, and Repair	Inspection, and test procedures for generators, alternators, regulators, relays, wiring and ground circuitry. On and off vehicle tests. Removing, disassembling, cleaning, overhauling, testing and re-installing generators, alternators, regulators and relays. Cleaning agents. Lubricants. Polarizing generator. Contact cleaning, replacing and adjusting. Air gap adjustments. Replacing transistors and diodes. Bench testing and adjustment of regulators and relays.
		Starter Motors	Characteristics. Construction features. Principles of operation. Electro-magnetism. Electric circuits, magnetic circuits. Series and compound cranking

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Special Starting Systems	motors. Commutation. Operation of starter motor drive units. Bendix, Dyer, over-running clutch, etc. Flywheel ring gears. Operation of motor solenoids and switches. Solenoid circuits. Neutral safety switch. Inspecting and testing starting circuits; motors, solenoids, cables and wiring. Removing, disassembling, cleaning, overhauling, testing and reinstalling. Cleaning agents. Lubricants. Testing and servicing component parts of motor.
		Lights	Operating principles. Series parallel switches. Series parallel and magnetic switch systems. Diesel fuel preheating systems (Glow Plugs). Testing, repairing or replacing components.
		Horns	Type and characteristics of lights. Rating of bulbs and seal beam units. Candle power, and wattage. Lenses and holders. Signal lights; flasher units, radio interference. Series and parallel circuits. Circuit fuses. Ground circuits. Aiming, testing, installing and repairing lights.
		Electric Windshield Wipers	Characteristics. Electric and air/vacuum types. Horn operation. Electrical circuits and relays. Amperage draw. Air/vacuum horn controls. Fuses. Inspecting and adjusting horns.
		Windshield Washers	Characteristics and operation; electric single and multi-speed and vacuum types. Drives and linkage. Arms and blades. Speed control. Fuses. Washer cycling. Overhaul and repair procedures. Replacing and adjusting wiper blades and arms.
		Power-Assist Systems	Characteristics. Automatic operation and cycling. Manual operation. Installing, repairing or replacing windshield washers and controls. Aiming fluid nozzles.
		Heaters and Defrosters	Characteristics of electrical and electro-hydraulic power assist mechanisms and circuits. Windows, tailgates, convertible tops, seats, etc. Inspection, servicing and overhaul.
10	Air-Conditioning and Refrigeration Systems	Refrigeration Principles	Types, characteristics and operation. Component features. Methods of testing, adjustment or replacement of blower motors, actuating and control systems.
			Heat transfer; conduction, convection, radiation. British thermal units. Latent heat of vaporization; effects of liquid change to vapor and vapor to liquid. Effects of pressure on boiling point and condensation. Refrigerant. The basic refrigeration system. Air induction and condensation removal systems.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		System Components	Types, characteristics and operation. Drive units, compressors and clutch drives, condensers, receivers, expansion valves, evaporators, control valves, thermostatic controls, blowers, electrical circuits. Refrigerant (Freon - 12), refrigeration oils, pressure lines and fittings.
		Inspection and Maintenance	Safety precautions and correct use of safety equipment. Inspection, testing, adjustment, overhaul and replacement procedures. Use of gauges and test equipment. Importance of exercising system. Oil level checks and replenishment procedures. Testing for leaks. Purging, evacuating and recharging procedures. Procedures for installation and removal of motor vehicle air-conditioning and refrigeration systems.
11	Lubrication	Types and Classification of Lubricants	Identification, properties and characteristics of oils: Heavy duty (detergent), regular (non-detergent). S.A.E. viscosity ratings. A.P.I. classifications. Other types of oils and greases. Additives. Frequency of change intervals.
		Engine Lubricating Systems	Function. Lubricant feeds, oil pumps, pressure control. Inspection procedures. Detection of leaks. By-pass and full-flow oil filters; maintenance and replacement. Flushing lubricating systems. Correct levels. Positive crankcase ventilation systems; inspection, testing and servicing.
		Open Drive Shafts	Characteristics; support bearings, universal joints, slip joints. Lubrication and sealing. Disassembly, relubing, reassembly and reinstallation. Torquing universal trunnions.
		Driving Axles and Differentials	Characteristics; gears and bearings. Oil sealing and venting. Lubricants. Filling and checking oil levels.
		Standard Transmissions	Characteristics; gears, bearings, components. Lubricants. Draining and refilling. Correct levels.
		Automatic Transmissions	Characteristics of operation. Cleanliness. Transmission fluids. Oil seals and vents. Draining, refilling and checking fluid levels.
		Suspension Systems	Lubricating suspension components and friction proofing spring leafs. Sealed systems.
		Steering Systems A (Manual)	Characteristics of steering box gearing. Lubricants. Filling and checking levels.
		B (Power)	Characteristics of power steering systems. Oil seals and vents. Types of fluid, capacities. Filling and checking system levels.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		C (Linkages)	Characteristics; bushings and joints. Methods of sealing and lubricating movable steering joints. Sealed systems.
		Front Wheel Bearings	Types and characteristics. Lubrication; adjusting or torquing. Replacing oil seals.
		Generators, Alternators, Starters	Types and characteristics of bearings used. Bushes, ball bearings; lubricated and prepacked lubricant type. Correct type and amount of lubricant where necessary.
		Miscellaneous Linkage and Cables	Throttle, clutch, gearshift, and emergency brake linkage. Lubricant and lubrication methods where necessary.
		Carburetor Air Cleaners	Types and characteristics of air cleaners and filters. Inspection, maintenance and replacement.
		Lubrication Certification	Certification of lubricant and filter changes and relubing of bearings and components. Extended warranties.
	Wheels and Tires	Wheels and Rims	Types and characteristics; single and dual. Removal and installation. Wheel wrenches. Wheel to hub fastening and locating devices. Handling heavy wheels and tires. Inspecting and servicing. Run-out.
		Tires, Tubes and Valves	Types, sizes, characteristics and application. Demounting and mounting. Equipment and lubricants. Repairing tires, tubes and valves. Tire inflation precautions. Inspection for damage, wear and faults. Tire rotation. Retreads.
		Balancing Wheels and Tires	Wheel balancing equipment. Balancing wheels and related parts. Static and dynamic balance. Weight installation.
	Running Maintenance Inspections	Inspection Procedure	Development of quick visual checking procedures for excessive wear and looseness in steering linkage, components and wheel bearings. Buckled wheels, broken springs or leafs, weak shock absorbers and worn mountings. Defective clutch, service or emergency brake operation. Defective engine and transmission mountings. Worn or loose universal joints. Worn or defective tires, tubes and valves. Misalignment. Faults in exhaust systems. Defective lights, batteries and hold-downs, wiring and cables. Coolant, oil and fluid leaks. Deteriorated hoses, loose clamps, damaged lines. Loose or worn "V" belts. Defective windshield wipers and washers. Overdue lubrication requirements, oil and air-filter changes. Reporting of defects or conditions.

PART 2

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	General Shop Practice	General	Safety rules and removal of all safety hazards. Use of hand and power tools, measuring instruments, fastening devices and general shop equipment. Benchwork operations. (As detailed in Part 1)
2	Internal Combustion Engines	Types, Components and Operation	Familiarization with engine types, components and correct operation. Recognition of abnormal engine noises and causes. Vacuum and compression testing. Identification of effects of cylinder wear, defective valves and gaskets and incorrect valve timing on engine performance. Torquing heads and manifolds. Adjusting valve lash.
		Lubricants	Familiarization with lubricant characteristics, classifications and ratings; contamination and deterioration, frequency of change intervals.
		Lubricating Systems	Familiarization with types, operation and requirements. Servicing or replacement of full-flow and by-pass filters. Testing, servicing and adjustment of pressure indicators and controls and positive crankcase ventilation systems.
		Cooling Systems	Air and liquid cooled pressurized systems. Inspection, testing, overhaul or replacement of blowers, fans, water pumps, drives, radiators and caps, thermostats, hoses and connections, temperature indicators, immersion and hot water heaters, automatic transmission oil coolers. Radiator reverse flushing and flow-testing; use of cleaning agents, coolant additives, sealers, Testing anti-freeze solutions.
		Fuel Systems (Gasoline)	Mechanical fuel/vacuum and electric pumps. Tests for pressure, vacuum and volume. Repair, overhaul or replacement of pumps, tanks and supply lines. Familiarization with principles of carburetion and characteristics of carburetors, types, operation, circuits and systems; heat riser valves, heat insulators, choke tubes, dash pots, throttle return checks, anti-stall devices and air cleaners. Testing, adjusting, cleaning and overhaul procedures.
		Tune-Up and Test Procedures	Use of electrical analyzers, vacuum gauges, tachometers and timing lights to adjust idle speeds and mixtures, analyze exhaust gases, locate excess vacuum leaks, balance multi-carburetors, check and correct ignition timing and operation, adjust electrical mechanisms, switches and operating linkage. Dynamometer testing to determine engine horsepower and torque output.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		Fuel Injection Systems	Servicing and overhauling fuel injection systems. Test equipment and testing operations. Injection timing. Servicing and overhauling starting systems. Shutting down runaway engines.
		Fuel Systems (Liquefied Petroleum Gas and Vaporizing Oils)	Use and operation of liquefied petroleum gas and vaporizing oil systems. Charging L.P.G. tanks.
3	Belt Drives	"V" Belts	Inspecting, installing and adjusting.
4	Exhaust Systems	Mufflers, Resonators, Exhaust and Tail Pipes	Back pressure checks. Replacing complete exhaust systems or parts. Stress relieving. Emission control systems; inspection and servicing.
5	Electrical Systems	Automotive Electrical Circuits	Identification, tracing and testing of circuits. Use of voltmeters, ammeters and ohmmeters. Joining, splicing and soldering wires and cables. Insulating. Removal and installation of terminals, connectors, plugs, resistances and fuses.
		Switches and Instruments	Switches, relays and instruments, indicator lights, rheostats, resistors, capacitors and semi-conductors. Testing, repair and replacement.
		Batteries	Inspection, testing and maintenance. Use of voltmeters, ammeters, load resistances and hydrometers. Battery charging. Activation of dry-charged batteries.
		Ignition Systems (Conventional Distributors)	Single, tandem, double headed, dual contact points, impulse generators (semi-conductor systems), etc. Distributor tests on and off vehicle. Inspection and overhaul procedures. Replacement of shafts and bushings. Contact point cleaning, replacement and adjustment. Lubrication. Testing and replacement of condensers, rotors, caps, centrifugal and vacuum advance mechanisms and radio suppressors. Installation and timing. Synchronizing dual points and distributors. Engine speed adjustments.
		Ignition Coils	Inspection, testing and replacement. Use of coil testing equipment; output; insulation and polarity tests.
		Primary and Secondary Circuits	Testing primary and secondary circuits. Replacement of primary and high tension wiring, primary circuit switches and resistors.
		Transistor and Transistorized Ignition Systems	Familiarization with principles of operation. Ignition timing. Use of test equipment. Testing, repair and overhaul procedures.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		Spark Plugs	Familiarization with types, temperature control and heat ranges. Analyzing deposits. Testing, cleaning, gapping and installing. Torquing.
		Charging Systems D.C. (Generators) A.C. (Alternators)	Inspection and testing of generators, alternators, regulators, relays, wiring and ground circuitry. On and off vehicle tests. Removing, disassembling, cleaning, overhauling, testing and reinstalling generators, alternators, regulators and relays. Lubrication. Polarizing generator. Contact cleaning, replacement and adjusting. Air gap adjustments. Replacing transistors and diodes. Bench testing and adjustment of regulators and relays.
		Starter Motors	Inspecting and testing starting circuits, motors, drive units, switches, solenoids, cables and wiring. Removing, disassembling, cleaning, overhauling, testing and reinstalling. Lubrication.
		Special Starting Systems	Series parallel and magnetic switch systems. Diesel fuel preheating systems (Glow Plugs). Testing, repairing or replacing components.
		Lights	Lighting circuits. Bulbs and seal beam units. Lenses and holders. Signal lights; flasher units. Aiming, testing, installing and repairing lights and wiring.
		Horns	Electric and air/vacuum types. Electrical circuits and relays. Air/vacuum horn controls. Testing, adjusting or replacement.
		Windshield Wipers	Electric single and multi-speed and vacuum types. Speed controls and washer cycling. Overhaul, repair or replacement.
		Windshield Washers	Installing, repairing or replacing windshield washers and controls. Aiming fluid nozzles.
		Power-Assist Systems	Inspection, servicing and overhaul of electrical and electro-hydraulic power assist mechanisms and circuits; windows, tailgates, convertible tops, seats, etc.
		Heaters and Defrosters	Testing, adjustment or replacement of blower motors, actuating or control systems.
6	Air-Conditioning and Refrigeration Systems	Inspection and Maintenance	Familiarization with safety precautions and use of safety equipment. Inspection, testing, adjustment, overhaul or replacement of drive units, compressors and clutch drives, condensers, receivers, expansion valves, evaporators, control valves, thermostatic controls, blowers, electrical circuits, pressure lines and fittings, refrigerant. Oil level checks and replenishment. Purging, evacuating and recharging operations. Installation and removal of motor vehicle air-conditioning and refrigeration systems.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
	Lubrication	Lubricants	Familiarization with characteristics, classification and ratings; contamination and deterioration, frequency of change intervals.
		Engine Lubricating Systems	Detection of leaks. By-pass and full-flow oil filters; inspection, maintenance and replacement. Flushing lubricating systems. Checking levels. Testing and servicing P.C.V. systems.
		Drive Shafts	Open drive shafts; support bearings, universal joints, slip joints. Disassembly, relubing, reassembly and reinstallation. Torquing.
		Axles and Differentials Standard Transmissions	Lubricants. Draining, filling and checking fluid levels.
		Automatic Transmissions	Automatic transmission fluids. Draining, refilling and checking fluid levels.
		Suspension Systems	Lubricating suspension components; friction proofing spring leafs. Sealed systems.
		Steering Systems (Manual)	Lubricants. Filling and checking steering box lubricant levels.
		(Power)	Fluid types; capacities. Filling and checking system levels.
		(Linkages)	Relubricating, adjusting or torquing. Oil seal replacement.
		Generators, Alternators, Starters	Correct type and amount of lubricant where necessary.
		Miscellaneous Linkage and Cables	Throttle, clutch, gearshift, and emergency brake. Lubricants; and lubrication where necessary.
	Wheels and Tires	Wheels and Rims	Removal and installation. Inspecting and servicing wheels and rims. Checking run-out.
		Tires, Tubes and Valves	Demounting and mounting. Inspection for damage, wear and faults. Repairing tires, tubes and valves. Inflation precautions. Tire rotation.
	Running Maintenance Inspections	Wheel and Tire Balancing	Use of on and off vehicle balancing equipment. Installation of weights.
		Inspection Procedures	Quick visual checking to ascertain excessive wear, damage, defective operation, deterioration, leaks, overdue lubrication requirements, filter changes and P.C.V. servicing. Reporting conditions.

REGULATION 36

under the Apprenticeship and Tradesmen's Qualification Act

GENERAL

1. This Regulation applies to any trade for which an apprentice training program is established. R.R.O. 1970, Reg. 33, s. 1.

2. An application for apprenticeship in a trade shall be in Form 1. R.R.O. 1970, Reg. 33, s. 2.

3. No person shall become an apprentice in a trade unless he;

(a) is at least sixteen years of age and has Grade 10 standing or other qualifications determined by the Minister as equivalent thereto; or

(b) has the qualifications that are prescribed in the regulations for the trade. R.R.O. 1970, Reg. 33, s. 3.

4.—(1) An applicant for apprenticeship in a trade or for a certificate of qualification shall, if requested by the Director, produce a certificate of his birth for inspection.

(2) Where the Director is satisfied that the apprentice is unable to produce a certificate of his birth, the Director may accept as proof,

(a) one item of Class A evidence of birth as prescribed in section 8 of Regulation 942 of Revised Regulations of Ontario, 1980,

(b) two items of Class B evidence of birth as prescribed in section 10 of Regulation 942 of Revised Regulations of Ontario, 1980. R.R.O. 1970, Reg. 33, s. 4.

5. Sections 9 and 10 and subsection 11 (2) of the Act do not apply to persons,

(a) permanently employed in an industrial plant while performing work entirely within the plant and premises or on the land appertaining thereto, except work performed in the maintenance and repair of motor vehicles, trailers or conversion units registered for use on a highway under the *Highway Traffic Act*; or

(b) while engaged in a trade or occupation that in the opinion of the Director is not one in respect of which compliance with sections 9 and 10 and subsection 11 (2) of the Act is required. R.R.O. 1970, Reg. 33, s. 5.

TRAINING AND INSTRUCTION

6. An apprentice in a trade shall complete to the satisfaction of the Director such apprentice training program as is established for the trade. R.R.O. 1970, Reg. 33, s. 6.

7.—(1) Every employer in a trade shall,

(a) provide an apprentice with practical training and instruction; and

(b) permit the apprentice to attend such educational classes as are prescribed by an apprentice training program established for the trade.

(2) Where the employer is unable to provide an apprentice with practical training and instruction, the employer and the apprentice shall each forthwith notify the Director. R.R.O. 1970, Reg. 33, s. 7.

8.—(1) The regular daily hours of practical training and instructions of an apprentice shall not begin sooner or end later in each day than the regular daily working hours of the journeyman with whom the apprentice is working.

(2) Any hours worked by an apprentice in excess of his regular daily hours of practical training and instruction shall not be included in computing the hours spent in training and instruction, unless otherwise prescribed or approved by the Director. R.R.O. 1970, Reg. 33, s. 8.

9.—(1) Hourly credits as the Director determines may be granted to an applicant for a certificate of apprenticeship or qualification,

(a) for the successful completion of a course of study or training; or

(b) for work performed or experience gained in the trade prior to the application.

(2) No credits shall be granted under subsection (1) unless the applicant,

(a) supplies documentary evidence satisfactory to the Director of the completion of the course of study or training, or of the work performed or the experience gained, as the case may be; or

(b) passes such tests or examinations as are required by the Director. R.R.O. 1970, Reg. 33, s. 9.

10.—(1) Unless otherwise prescribed, the rate of wages for an apprentice whether for his regular daily hours or for hours in excess of his regular daily hours shall be not less than,

- (a) 40 per cent during the first period;
- (b) 50 per cent during the second period;
- (c) 60 per cent during the third period;
- (d) 70 per cent during the fourth period; and
- (e) 80 per cent during the fifth period,

of the average rate of wages for journeymen employed by the employer in that trade, or where the employer is the only journeyman employed, of the average rate of wages for journeymen in the area.

(2) Unless otherwise prescribed, the number of apprentices who may be employed by an employer in a trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for each additional three journeymen employed by the employer in that trade and with whom the apprentice is working; or
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus an additional apprentice for each additional three journeymen employed by the employer in that trade and with whom the apprentice is working. R.R.O. 1970, Reg. 33, s. 10.

11.—(1) A contract of apprenticeship shall be in Form 2.

(2) The apprentice shall use to the best of his ability any facilities provided for technical instruction.

(3) The apprentice shall obey all lawful orders given to him by the employer or by a person delegated by the employer to supervise the work and training of the apprentice.

(4) The apprentice shall furnish to the employer satisfactory reasons for any absence from his employment.

(5) The employer shall not employ any person in the trade other than a journeyman while the apprentice is idle. R.R.O. 1970, Reg. 33, s. 11.

12.—(1) A transfer of a contract of apprenticeship shall be in Form 3.

(2) The employer to whom the contract is transferred shall perform the contract as fully and completely as if he were the employer with whom the contract was made. R.R.O. 1970, Reg. 33, s. 12.

CERTIFICATES

13. A certificate of apprenticeship shall be in Form 4. R.R.O. 1970, Reg. 33, s. 13.

14.—(1) Where an apprentice has completed an apprentice training program, and has passed such final examinations as are prescribed by the Director, the Director shall issue a certificate of apprenticeship to the apprentice.

(2) Where an examination for a certificate of apprenticeship in a trade has been established as an Interprovincial Standards Examination and, where an apprentice obtains more than 69 per cent on that examination, he shall be awarded the Interprovincial seal on his certificate.

(3) Where a certificate of apprenticeship is obtained before an Interprovincial Standards Examination for the trade is established, the holder of the certificate may write the examination referred to in subsection (2) and if he obtains more than 69 per cent on that examination he shall be awarded the Interprovincial seal on his certificate. R.R.O. 1970, Reg. 33, s. 14.

15.—(1) An application for a certificate of qualification in a trade designated as a certified trade under section 11 of the Act shall be in Form 5.

(2) An application for renewal of a certificate of qualification in a trade designated as a certified trade under section 11 of the Act shall be in Form 6.

(3) A certificate of qualification shall be in Form 7. R.R.O. 1970, Reg. 33, s. 15.

16.—(1) Where an applicant for a certificate of qualification is the holder of a certificate of apprenticeship in the trade issued under the Act or a predecessor of the Act, the Director may, upon payment of the prescribed fee, issue to the applicant, without examination, a certificate of qualification.

(2) Where an applicant for a certificate of qualification is the holder of a certificate of apprenticeship in the trade that is issued by another Province and that bears a seal awarded for passing an Interprovincial Standards Examination, the Director may, upon payment of the prescribed fee, issue to the applicant, without examination, a certificate of qualification.

(3) Where an applicant for a certificate of qualification is required to write an examination, he shall pay the fee prescribed therefor.

(4) Where an applicant for a certificate of qualification who is not the holder of a certificate of apprenticeship in the trade,

- (a) has attended a trade school licensed under the Act and has completed the period of

training and instruction provided by the trade school;

- (b) after graduation from the licensed trade school, works as an apprentice in the trade for a period prescribed by the Director; and
- (c) passes such examination as is prescribed by the Director,

the Director may, upon payment of the prescribed fee, issue to the applicant a certificate of qualification. R.R.O. 1970, Reg. 33, s. 16.

17.—(1) Where an applicant for a certificate of qualification who is not the holder of a certificate of apprenticeship in a certified trade,

- (a) has successfully completed a training program approved by the Director as an alternative to an apprentice training program established for a certified trade;
- (b) satisfies the Director that he has been continuously engaged in the alternate training program for a period equal to or greater than the apprenticeship training period prescribed by regulation for the certified trade; and
- (c) passes such examination as is prescribed by the Director in the certified trade,

the Director may, upon payment of the prescribed fee, issue to the applicant a certificate of qualification.

(2) Where an applicant for a certificate of qualification who is not the holder of a certificate of apprenticeship in a certified trade,

- (a) has successfully completed a training program approved by the Director as an alternative to an apprentice training program established for a certified trade;
- (b) satisfies the Director that he has been continuously engaged in the alternate training program but where the period of training in the alternate training program is less than the apprenticeship training period prescribed by regulation for the certified trade; and
- (c) passes such examination as is prescribed by the Director in the certified trade,

the Director may, upon payment of the prescribed fee issue to the applicant a provisional certificate of qualification valid until the expiry date specified thereon.

(3) Where an applicant for a certificate of qualification referred to in subsection (2) satisfies the Director that the total period of time that he has been continuously engaged in the alternate training program and as a journeyman in the certified trade equals or is greater than the apprenticeship training period prescribed by regulation for the certified trade, the Director may,

upon payment of the prescribed fee, issue to the applicant, without examination a certificate of qualification. O. Reg. 89/80, s. 1.

18. An applicant for a certificate of apprenticeship or a certificate of qualification who has failed to pass an examination may rewrite the examination at such times and places as are fixed by the Director. R.R.O. 1970, Reg. 33, s. 17.

19. An applicant for a certificate of apprenticeship or a certificate of qualification who fails to pass on rewriting the examination referred to in section 18 on two occasions shall attend and complete such training courses as the Director may determine before being permitted to rewrite the examination a third time. R.R.O. 1970, Reg. 33, s. 18.

20. Where an applicant for a certificate of qualification, who is not the holder of a certificate of apprenticeship in the trade, supplies evidence satisfactory to the Director of having been continuously engaged in the trade as a journeyman in Ontario or elsewhere for a period equal to or greater than the apprenticeship period prescribed for the trade, the Director may issue to the applicant a provisional certificate of qualification valid until the expiry date specified thereon. R.R.O. 1970, Reg. 33, s. 19.

21. Where an applicant for a certificate of qualification referred to in section 20 passes such examination as is prescribed by the Director, the Director may, upon payment of the prescribed fee, issue to the applicant a certificate of qualification. R.R.O. 1970, Reg. 33, s. 20.

22. A provisional certificate of qualification shall be in Form 8. R.R.O. 1970, Reg. 33, s. 21.

23.—(1) Where a certificate of qualification that is force on the 1st day of April, 1979 expires and is renewed, it shall be renewed for a period to and including the birthday of the holder next following or his third birthday next following as the Director may determine and any subsequent renewal shall be for a period of three years expiring on the birthday of the holder thereof.

(2) Unless otherwise prescribed by regulation, a certificate of qualification issued after the 1st day of April, 1979 expires on the birthday of the holder next following or his third birthday next following as the Director may determine.

(3) Where a certificate of qualification mentioned in subsection (2) expires and is renewed it shall be renewed for a period of three years expiring on the birthday of the holder thereof. O. Reg. 126/79, s. 1.

(4) A certificate of qualification may be renewed by the holder upon application and payment of the prescribed fee to the Director.

(5) Upon renewal of a certificate of qualification, a seal provided by the Director indicating the year for

which the certificate is renewed shall forthwith upon its receipt by the applicant be affixed to the certificate of qualification in the space provided thereon. R.R.O. 1970, Reg. 33, s. 22 (4, 5).

24. Where a person proves to the satisfaction of the Director that,

- (a) his certificate of qualification has been lost or destroyed; or
- (b) his name has been changed,

the Director shall issue to him a duplicate certificate of qualification. R.R.O. 1970, Reg. 33, s. 27.

25. The holder of a certificate of qualification shall carry the certificate on his person and, when requested to do so, produce to a person designated by the Director, the certificate of qualification or such other evidence of qualification as the Director may prescribe. R.R.O. 1970, Reg. 33, s. 28.

26. Where a person, after applying for or receiving a certificate of qualification, changes his address he shall within fifteen days thereafter notify the Director in writing of his former and new addresses and, where he has received the certificate, the number thereof. R.R.O. 1970, Reg. 33, s. 29.

REGISTRATION OF EMPLOYERS

27. When requested by the Director, every employer and self-employed person engaged in a trade shall complete and file a registration of employers and self-employed persons in Form 9. R.R.O. 1970, Reg. 33, s. 30.

FEES

28. Fees payable under this Regulation are as follows:

- 1. For registration of an applicant entering a modular training program for any trade\$ 5
- 2. For registration of a contract of apprenticeship\$10
- 3. For examination for a certificate of qualification in a trade\$15
- 4. For an examination for accreditation in a modular training program\$ 3
- 5. Except as is provided for in paragraph 6 for an initial certificate of qualification or a renewal of a certificate of qualification, 75 cents per month or any portion thereof during the period of its validity, but in no case shall the fee exceed \$25 for any period of not more than thirty-six months.
- 6. For a certificate of qualification issued to any person who works or is employed in a certified trade and is exempted by regulation from the application of sections 9 and 10 and subsections 11 (2), (3) and (4) of the Act\$15
- 7. For the issuance of a certificate of accreditation\$10
- 8. For a duplicate copy of a certificate of qualification\$ 5
- 9. For a replacement or a duplicate copy of a progress record book\$ 5
- 10. For a demonstration of skills test\$15
- 11. For a progressive achievement test to a person lawfully admitted to Canada as a visitor with student authorization under paragraph 10 (a) or (b) of the *Immigration Act, 1976* (Canada)\$15

O. Reg. 126/79, s. 2.

Form 1

Apprenticeship and Tradesmen's Qualification Act

APPLICATION FOR APPRENTICESHIP IN THE TRADE OF

(Trade name)(Date)

TO BE COMPLETED BY APPLICANT:

Surname .....	..... Social Insurance No.
Given names and initials .....	..... Telephone No.
Street No. and Name	
Apt. No., Box No., R.R. No. ....	..... day month year Date of Birth
City or Town	
Township .....	..... (signature of applicant)

EMPLOYED BY:

Name of Business	
Street Address	
City or Town	
Telephone No. ....	..... day month year Start of Employment
	..... (signature of employer)

Outline relevant trade experience, proof of employment and education, on reverse side of this application, giving full details including dates and names of employers.

FOR DEPARTMENTAL USE ONLY:

..... Counsellor Name	..... Credited hours
..... Counsellor Signature	..... Periods in Program
..... Counsellor Code	..... Hours per period
..... Receipt No.	..... Hours per week
..... Verification Signature	

Contracts Forwarded

Effective Date day month year

Contract No.....

Area Code.....

Mailing Code.....

(REVERSE)

PROOF OF EDUCATION

SCHOOLING					
	School Name	Location (City/County, etc.)	Successfully Completed Grade	Completed Mo. Yr.	Certificate or Diplomas Awarded
Elementary..					
Secondary...					
Academic...					
Vocational...					
Technical...					
Subject(s) Specialized.....					P.A.T. Results.....
COURSES ATTENDED—List all training (other than school)			COMMENTS (Counsellor)		

DETAILS OF EXPERIENCE

	Name of Business or Firm	Business Address	Employed		Cr. Hrs.	Type of Work Performed
			From Month/Year	To Month/Year		
Current or Last
1st Previous
2nd Previous
3rd Previous
Employer Signature:					TOTAL	.....
Supervising Counsellor:						

R.R.O. 1970, Reg. 33, Form 1.

Form 2

Apprenticeship and Tradesmen's Qualification Act

CONTRACT OF APPRENTICESHIP

Contract No.

THIS CONTRACT OF APPRENTICESHIP MADE this day of, 19....,
under the *Apprenticeship and Tradesmen's Qualification Act*,

BETWEEN hereinafter called the Apprentice,

— and —

..... hereinafter called the Employer,

— and —

(where the apprentice is under twenty-one years of age)

the Parent, Guardian, or Judge.

WITNESSETH that the Apprentice and the Employer agree as follows:

1. The Apprentice agrees to faithfully serve the Employer as an Apprentice and in accordance with the *Apprenticeship and Tradesmen's Qualification Act* and the regulations for a period of training and

instruction of.....hours in the trade of.....

2. The Employer agrees to faithfully train and instruct the Apprentice in the trade of.....
and to pay the Apprentice wages at the following rates:

For the first.....hours,% of the journeyman's rate.

For subsequent hourly periods and in the following sequence,

.....hours at.....%

.....hours at.....%

.....hours at.....%

.....hours at.....%

.....hours at.....%,

of a journeyman's rate of wages in the trade.

IN WITNESS WHEREOF the parties have signed.

WITNESS:

.....
Employer

.....
Address of Employer

.....
Apprentice

.....
Address of Apprentice

.....
Parent, Guardian or Judge

.....
Address of Parent, Guardian or Judge

Approved and Registered this.....day of....., 19.....

.....
Director

Termination.....Date.....Cancellation.....Date.....

Transfer.....Date.....Transfer.....Date.....

Transfer.....Date.....Transfer.....Date.....

R.R.O. 1970, Reg. 33, Form 2.

Form 3

Apprenticeship and Tradesmen's Qualification Act

TRANSFER OF CONTRACT OF APPRENTICESHIP

In the Trade of..... Contract No.....

THE CONTRACT OF APPRENTICESHIP made between.....
the Apprentice, of.....and
(address)

....., the Employer, of.....
(address)

dated the.....day of....., 19.... and the mutual rights, benefits and obligations
contained therein are hereby transferred to.....of.....
(address)

The said apprenticeship having commenced on the.....day of....., 19....,
has continued during.....periods of.....hours, and the said Apprentice has com-
pleted the following hours at the indicated percentages of the average rate of wages for journeymen employed
by the Employer in the said trade or of the average rate of wages for journeymen in the area, as the case may be:

-hours during the first period at.....%
-hours during the second period at.....%
-hours during the third period at.....%
-hours during the fourth period at.....%
-hours during the fifth period at.....%

Dated this.....day of....., 19....

IN WITNESS WHEREOF the parties have signed.

WITNESS:

.....
Employer transferring contract
.....
Employer to whom contract is transferred
.....
Apprentice

(and where the Apprentice is under twenty-one years of age)

.....
Parent, Guardian or Judge
.....
Address of Parent, Guardian or Judge

Form 4

Apprenticeship and Tradesmen's Qualification Act

CERTIFICATE OF APPRENTICESHIP

Certificate No.

THIS IS TO CERTIFY THAT
having complied with the *Apprenticeship and Tradesmen's Qualification Act* and the regulations is issued this

Certificate of Apprenticeship in the trade of

Dated at Toronto, this.....day of....., 19....

.....
(signature of issuer)

R.R.O. 1970, Reg. 33, Form 4.

Form 5

Apprenticeship and Tradesmen's Qualification Act

APPLICATION FOR CERTIFICATE OF QUALIFICATION IN THE CERTIFIED TRADE OF

(Trade name).....(Date).....

TO BE COMPLETED BY APPLICANT:

Surname

.....
Social Insurance No.

.....
Given name and initials

.....
Telephone No.

Street Address

.....
day month year

City or Town

Date of Birth

Township

.....
(signature of applicant)

EMPLOYED BY:

Name of Business

Street Address

City or Town

Are you self-employed? ☐ No ☐ Yes

Have you been An Apprentice in Ontario? ☐ No ☐ Yes

(Specify)

.....
Contract or Diploma No.

Do you hold an Ontario Certificate of Qualification in any other trade? ☐ No ☐ Yes

(Specify)

.....
Certificate No.

.....
Trade Name

Do you hold a Certificate of Qualification issued by any other Province? ☐ No ☐ Yes—Attach original or copy of certificate(s) to this application.

FEE: Application Fee of \$5.00, payable to "TREASURER, PROVINCE OF ONTARIO".

Send MONEY ORDER or CERTIFIED CHEQUE.

Fee will be applied to issuance of certificate or examination.

Outline experience on reverse side of this application giving full details of employment including dates and names of employers.

FOR DEPARTMENTAL USE ONLY:

	Effective Date	.....	.....	.....
		day	month	year
.....	Certificate No.	.....	
Authorizing Signature	Area Code	.....	
	Mailing Code	.....	

(REVERSE)

DETAILS OF EXPERIENCE

PROOF OF —must accompany this application EXPERIENCE —proof may be in any of the following forms:	PLEASE LIST DETAILS OF RELATED EXPERIENCE AND COURSES
1. Letters of reference from former and present employers (written on company letterhead) giving,	.....
(a) the exact dates of employment; and	.....
(b) a detailed description of the type of work per- formed.	.....
OR	.....
2. A letter of reference from the business agent of a Union, where this procedure has been given prior approval by the Industrial Training Branch.	.....
3. If you are unable to obtain the above proofs, a statutory declaration, notarized by a Notary Public or Commis- sioner for taking affidavits, must be obtained, listing,	.....
(a) your present and former employers;	.....
(b) exact dates of employment; and	.....
(c) detailed description of the type of work performed.	.....
4. Original or copy of any Out-Of-Province Certificate.	.....
NOTE: The above documents will be returned when this application has been evaluated.	.....

	Name of Business or Firm	Business Address	Employed		Type of Work Performed
			From Month/Year	To Month/Year	
Current or Last					
1st Previous					
2nd Previous					
3rd Previous					
4th Previous					

R.R.O. 1970, Reg. 33, Form 5.

Form 6

Apprenticeship and Tradesmen's Qualification Act

APPLICATION FOR RENEWAL OF A CERTIFICATE OF QUALIFICATION

Under the *Apprenticeship and Tradesmen's Qualification Act* and the regulations, I apply for a renewal of my Certificate of Qualification in the trade of.....

My Social Insurance No. is.....

Dated.....day of....., 19.....

Applicant Signature.....

If change in name or address, please complete below

Surname.....

Given names or initials.....

Street Address.....

City.....

THIS SPACE FOR DEPARTMENTAL USE ONLY

Date approved.....

New serial No.....

Date issued.....

R.R.O. 1970, Reg. 33, Form 6.

Form 7

Apprenticeship and Tradesmen's Qualification Act

CERTIFICATE OF QUALIFICATION

Certificate No.....

THIS IS TO CERTIFY THAT.....

having complied with the *Apprenticeship and Tradesmen's Qualification Act* and the regulations is issued this Certificate of Qualification in the certified trade of.....

Dated at Toronto, this.....day of....., 19....

.....
(signature of issuer)

R.R.O. 1970, Reg. 33, Form 7.

Form 8

Apprenticeship and Tradesmen's Qualification Act

PROVISIONAL CERTIFICATE OF QUALIFICATION

..... Surname	..... Given Names	..... Trade Name	..... Trade Name
..... Street Address		..... Issue Date	..... Expiry Date
..... City or Town		..... Township	..... P.C. No.
..... Date of Birth		..... Telephone No.	..... Social Insurance No.

This is to certify that the above has submitted satisfactory proof of experience, and is hereby permitted to work in the trade indicated until the expiry date shown, at which time he will be required to write an examination for a regular certificate of qualification pursuant to subsection 9 (2) of the *Apprenticeship and Tradesmen's Qualification Act*.

ONTARIO DEPARTMENT OF LABOUR.....
(Director, Industrial Training Branch)

This form must be presented when reporting for examination and will not be valid after the expiry date indicated above.

If unable to attend, please notify this office prior to expiry date. Failure to attend or notify will result in the forfeiture of fee.

FOR DEPARTMENTAL USE ONLY

Employer or School—Name and Address

Request for Application

Telephone

Mail

Other

Requested

.....
Mailed

Received

Certificate Issued

.....
Certificate No.

R.R.O. 1970, Reg. 33, Form 8.

Form 9

Apprenticeship and Tradesmen's Qualification Act

REGISTRATION OF EMPLOYERS AND SELF-EMPLOYED PERSONS IN THE TRADE OF

TO THE DIRECTOR:

Under the *Apprenticeship and Tradesmen's Qualification Act* and the regulations, I register as an employer or self-employed person in the certified trade of and furnish the following information:

1. Name (if not a corporation).....
(surname) (first and middle names)

Name (if a corporation).....

2. Address
(street and No. or R.R.) (city, town or post office)

3. Certificate of Qualification, if not a corporation:

- (a) I am the holder of Certificate of Qualification Number in the certified trade of issued on; or

- (b) I am not the holder of a Certificate of Qualification in the certified trade of
but have been continuously engaged in such trade for years.

4. Particulars of persons in my employ in the certified trade of.....

Name	Address	Total Length of Experience at the trade		Branch if any	Date of Birth	Certificate No.
		Years	Months			

Dated at....., this.....day of....., 19.....

.....
(signature)

R.R.O. 1970, Reg. 33, Form 9.

REGULATION 37

under the Apprenticeship and Tradesmen's Qualification Act

GENERAL CARPENTER

1. In this Regulation,

- (a) "certified trade" means the trade of general carpenter;
- (b) "general carpenter" means a person who is experienced in all of the units as defined in columns 1 and 2 of Schedules 1 and 2;
- (c) "unit" means a subject in Column 1 of Schedule 1 consisting of the instruction set opposite the subject in Column 2 of Schedule 1 and a subject in Column 1 of Schedule 2 consisting of the instruction set opposite the subject in Column 2 of Schedule 2.

2. The trade of general carpenter is designated as a certified trade for the purposes of the Act. O. Reg. 570/76, s. 2.

3. An apprentice training program in the trade is established and shall consist of a minimum of 3,844 hours of related training and work experience training or such greater number of hours as the Director may determine of related training and work experience training to a maximum of 7,200 hours. O. Reg. 570/76, s. 3.

4. The apprentice training program for the certified trade shall consist of:

- (a) training at full-time educational day classes provided at a College of Applied Arts and Technology or in courses that, in the opinion of the Director, are equivalent thereto in each of the units contained in Schedule 1; and
- (b) work experience training provided by the employer of the apprentice in each of the units contained in Schedule 2 for at least the training hours set out opposite the subject in Column 3 to and including the training hours set out opposite the subject in Column 4 of Schedule 2 as may be determined by the Director under section 3. O. Reg. 570/76, s. 4.

5. Notwithstanding section 3 of Regulation 36 of Revised Regulations of Ontario, 1980, a person who has,

- (a) graduated in a course for the trade of general carpenter offered in the occupational program of a junior or special vocational school; and
- (b) been recommended to the Director by the Principal of the school where he completed the course for enrolment as an apprentice in the certified trade,

may be registered as an apprentice in the certified trade. O. Reg. 570/76, s. 5.

6. The Director shall issue an achievement record book to each apprentice in the certified trade for the purpose of recording his achievements during his apprenticeship. O. Reg. 570/76, s. 6.

7.—(1) Notwithstanding subsection 14 (1) of Regulation 36 of Revised Regulations of Ontario, 1980, the Director shall issue a certificate of apprenticeship to an apprentice in the certified trade where the apprentice,

- (a) completes the number of hours of related training and work experience training required under section 4; and
- (b) passes the examinations for each unit contained in Schedules 1 and 2.

(2) Sections 18 and 19 of Regulation 36 of Revised Regulations of Ontario, 1980, do not apply to an applicant for a certificate of apprenticeship in the certified trade. O. Reg. 570/76, s. 7.

8. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for each five journeymen employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus an additional apprentice for each additional five journeymen employed by that employer in the trade and with whom the apprentice is working. O. Reg. 570/76, s. 8.

9. Notwithstanding section 8, on the recommendation of the provincial advisory committee or a local apprenticeship committee approved under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 570/76, s. 9.

10. The rate of wages for an apprentice in the certified trade whether for his regular daily hours of work or for hours of work in excess of his regular daily hours of work, shall not be less than,

- (a) 40 per cent until the apprentice successfully completes five units or 1,800 hours of training and work experience contained in Schedules 1 and 2;
- (b) 50 per cent until the apprentice successfully completes ten units or 3,600 hours of training and work experience contained in Schedules 1 and 2;
- (c) 60 per cent until the apprentice successfully completes fifteen units or 5,400 hours of training and work experience contained in Schedules 1 and 2;
- (d) 80 per cent until the apprentice successfully completes the twenty units of training and work experience contained in Schedules 1 and 2,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 570/76, s. 10.

11.—(1) An applicant, other than an apprentice, for a certificate of qualification in the certified trade who provides satisfactory evidence that he has completed the number of hours of training and work

experience required under section 4 or the equivalent thereto as determined by the Director for one or more of the units in Schedules 1 and 2, is entitled to be a candidate for the examinations in such unit or units.

(2) An applicant who passes the examinations in all the units contained in Schedules 1 and 2 shall be issued a certificate of qualification in the certified trade.

(3) An applicant who passes the examinations in one or more of the units in Schedules 1 and 2 shall be,

- (a) issued an achievement record book by the Director;
- (b) accredited in the achievement record book for each unit in which he has passed the examinations; and
- (c) may be re-examined in each of the units that he has failed to pass at such time and place as may be fixed by the Director.

(4) Sections 18 and 19 of Regulation 36 of Revised Regulations of Ontario, 1980, do not apply to an applicant for a certificate of qualification in the certified trade. O. Reg. 570/76, s. 11.

12.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 570/76, s. 12.

13. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 570/76, s. 13.

Schedule 1

GENERAL CARPENTER

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Unit	Instruction to be given	Training Hours
1	Power Tools	Selecting and using portable power tools. Selecting and using stationary power tools.	40
2	Woodwork General 1	Common types of soft wood and hardwood lumbers. Rough and finish hardware. Common joints. Strength of lumber beams. Preservation of lumber. Stairs.	50
3	Mathematics 1	Whole numbers. Fractions. Decimals. Square roots. Areas. Volumes. Metric System.	20
4	Blueprints 1	Types of drawings. Arrangement of views. Alphabet of lines. Dimensioning and symbols. Section views. Notes and title block.	30
5	Hand Tools	Selecting and maintaining layout and measuring tools. Selecting and using cutting tools. Selecting and using pounding tools. Selecting and using impelling tools. Selecting and using tools for holding and supporting work. Selecting and using tools for fastening.	85
6	Construction Layout 1	Line problems. Angles and triangles. Quadrilaterals and parallelograms. The circle. Polygons. The ellipse. Solving ratio and proportion. Stair layout.	20
7	Welding 1 Oxy-acetylene	Safety. Handling and using oxy-acetylene cylinders. Handling and use of oxy-acetylene regulators, torches and auxiliary equipment. Weld faults. Practical application.	30
8	Safety	Housekeeping. Machinery. Tools. Tanks, manholes. Fire protection. Dermatitis. Injuries.	10
9	Woodwork General II	Doors. Window frames and sashes. Framed partitions for house construction. Floors. Sound and heat insulation. Roofs. Centres for arches. Formwork. Framing for wall panelling.	105
10	Mathematics II	Angles and triangles. Elementary algebra. Ratio. Proportion. Trigonometry. Introduction to mechanics of materials.	40
11	Blueprints II (Architecture)	Introduction to architectural drawings. Mechanical and Electrical drawings. Contracts, codes and specifications.	30
12	Construction Layout II	Working with the enlargement and reduction. Roof problems. Surface shapes. Working with auxiliary views. Arches, vaults and tunnels.	20
13	Rigging	Manual handling and lifting. Hazards. Hanging hoists. Selecting slings. Use of ladders and planking. Erecting unit type scaffolds.	30

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Unit	Instruction to be given	Training Hours
14	Acoustic Ceilings	Tools. Exposed grid ceilings. Furring bar system. Special applications.	25
15	Welding II Electric-arc	Safety. Basic arc welding techniques. Weld faults. Arc blow. Power sources. Shielded arc electrodes and metal transfer. Practical application.	30

O. Reg. 570/76, Sched. 1.

Schedule 2

GENERAL CARPENTER

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
	Unit	Work Experience Training	Minimum Training Hours	Maximum Training Hours
1	Finishing (Exterior)	Cornices. Roof coverings. Window and door frames. Corner boards and belt courses. Wall coverings. Verandah or open porch finishes. Boarding or sheathing. Patented wallboard. Scaffolding.	375	750
2	Framing	Window and door sills. Beams and girders. Columns and posts. Joists. Bridging and flooring. Platform framing. Balloon framing. Non-bearing partitions. Pre-fab walls and panels. Scaffolding. Floor framing and laying. Heavy wall framing. Heavy roof framing. Ramps and other heavy framing. Scaffolding. Gable roofs. Hip and valley roofs. Gambrel roofs. Mansard roofs. Flat roofs. Unequal pitch roofs. Dormers. Special roofs. Truss and roof construction. Scaffolding.	1075	2182

ITEM	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
	Unit	Work Experience Training	Minimum Training Hours	Maximum Training Hours
3	Formwork and Foundations	<p>Footing forms. Main wall forms. Stair forms. Column, pier, girder and slab forms. Continuous and special forms. Placing concrete. Stripping concrete forms. Scaffolding. Ramps and other heavy framing.</p> <p>Soil conditions. Building layout. Shoring and underpinning. Drainage.</p>	754	1538
4	Finishing (Walls and ceilings)	<p>Insulation. Walls and ceilings. Acoustic treatment. Scaffolding.</p>	415	833
5	Finishing (Interior)	<p>Doors. Windows. Horizontal trims. Finished floors. Built-in fixtures. Dado and wainscot treatments. Special hardware.</p> <p>Straight stairs. Platform stairs. Winders (stairs). Spiral and geometric stairs.</p>	660	1332

O. Reg. 570/76, Sched. 2.

REGULATION 38

under the Apprenticeship and Tradesmen's Qualification Act

GENERAL MACHINIST

INTERPRETATION

1. In this Regulation,

(a) "certified trade" means the trade of general machinist;

(b) "general machinist" means a person who,

(i) sets up and operates to prescribed tolerances engine lathes and milling, grinding, drilling, sawing and boring machines,

(ii) reads and interprets blueprints, operation and product-related reference charts and tables and selects mechanical measuring and checking and layout tools and devices, and

(iii) performs measuring, checking and layout operations and selects work piece materials and the required cutting tools and abrasives for metal removal operations,

but does not include a person or class of persons in a limited purpose occupation that, in the opinion of the Director, does not equate with the definition of general machinist. O. Reg. 866/80, s. 1.

2. The trade of general machinist is designated as a certified trade for the purpose of the Act. O. Reg. 866/80, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of a minimum of 6,000 hours of related training and work experience training or such greater number of hours as the Director may determine of related training and work experience training to a maximum of 8,000 hours. O. Reg. 866/80, s. 3.

4. The apprentice training program for the certified trade shall consist of,

(a) training at full-time educational day classes provided at a location approved by the Director or in courses that in the opinion of the Director are equivalent thereto in each of the units of study contained in Schedule 1; and

(b) work experience training provided by the employer of the apprentice in the units of study contained in Schedule 2 as may be

determined by the Director under section 3. O. Reg. 866/80, s. 4.

5. The subjects of examination for an apprentice in the certified trade are the units of study contained in Schedules 1 and 2. O. Reg. 866/80, s. 5.

6. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours of work or for hours of work in excess of his regular daily hours of work, shall be not less than,

(a) 50 per cent during the first 1,000 hours of related training and work experience training;

(b) 55 per cent during the second 1,000 hours of related training and work experience;

(c) 60 per cent during the third 1,000 hours of related training and work experience;

(d) 65 per cent during the fourth 1,000 hours of related training and work experience;

(e) 70 per cent during the fifth 1,000 hours of related training and work experience;

(f) 75 per cent during the sixth 1,000 hours of related training and work experience;

(g) 80 per cent during the seventh 1,000 hours of related training and work experience; and

(h) 85 per cent during the eighth 1,000 hours of related training and work experience,

of the average hourly rate of wages or its equivalent for journeyman employed by the employer in that trade and with whom the apprentice is working. O. Reg. 866/80, s. 6.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

(a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for each additional journeyman employed by that employer in the trade and with whom the apprentice is working; and

(b) where the employer is not a journeyman in the trade, one apprentice for each journeyman employed by that employer in the trade and with whom the apprentice is working. O. Reg. 866/80, s. 7.

8. Notwithstanding section 7, on the recommendation of the provincial advisory committee or a local

apprenticeship committee appointed under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 866/80, s. 8.

9. The Director shall issue a progress record book to an apprentice for the purpose of recording his related training and work experience training time and the apprentice shall be responsible for keeping his progress record book up to date and for its safekeeping. O. Reg. 866/80, s. 9.

10. An applicant for a certificate of qualification in the certified trade who is required to satisfy the Director under clause 11 (4) (b) or (c) of the Act shall submit to the Director proof of experience within the trade that, in the opinion of the Director, is equivalent to work

experience training described in the units of study contained in Schedule 2. O. Reg. 866/80, s. 10.

11.—(1) Subsection 11 (2) of the Act does not apply to a person who works or is employed in the certified trade.

(2) Subsection 11 (3) of the Act does not apply to an employer in the certified trade. O. Reg. 866/80, s. 11.

12. Section 5 of Regulation 36 of Revised Regulations of Ontario, 1980 does not apply to the certified trade. O. Reg. 866/80, s. 12.

13. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 866/80, s. 13.

Schedule 1

GENERAL MACHINIST

In-School Training

ITEM	COLUMN 1	COLUMN 2
	Unit of Study	Instruction to be given
1	Safety	Safe work habits. Protective clothing and equipment.
2	Blueprint Reading Reference Charts and Sketching	Interpretation of blueprints, reference charts and sketching.
3	Hand Tools and Benchwork	Care and use of hand tools. Fasteners and their application.
4	Measuring Tools	Care and use of precision measuring devices.
5	Trade Calculations	Calculation of geometrical values, ratios and formulae.
6	Layout	Care and use of layout tools. Surface preparation and layout techniques.
7	Metallurgy	Heat treatment of ferrous metals including furnace and torch hardening, cyaniding and hardness testing. Chemical and physical properties and identification of ferrous, non-ferrous and plastic materials.
8	Power Tools	Drilling, reaming, tapping, knurling, lapping, boring procedures. Set up and operate power hack-saws. Vertical band saws, radial drill presses, engine lathes, horizontal boring mills, horizontal cylindrical universal and tool and cutter grinders.

Schedule 2

GENERAL MACHINIST

Work Experience Training

ITEM	COLUMN 1	COLUMN 2
	Unit of Study	Instruction to be given
1	Safety	Knowledge and application of safe work practices; recognition of hazards and precautionary measures.
2	Shop Techniques/ Practices	Care and use of hand, bench and portable power tools, jigs and fixtures, precision measuring equipment. Application of tool geometry, twist drills, tool bits, cutters and abrasives, edges, clearances and angles. Shop Procedures.
3	Power Saws	Machine nomenclature, care and use of reciprocating, circular band, vertical cut-off saws. Speeds and feeds. Coolants. Blade replacement.
4	Radial and Drill Presses	Set up and operation, speed, feed and coolant. Function and purpose; i.e., drilling, countersinking, spot facing, reaming, boring, counter-boring, lapping, polishing, tapping, grooving, flycutting.
5	Lathes	Set up and operation, use of accessories, speed, feed, coolants, centering, drilling, turning, boring, counter-boring, reaming, threading, tapping, knurling tapers, lapping.
6	Milling Machines	Horizontal, Vertical, Universal, Ram and Turret type. Horizontal Boring Mill and accessories. Set up and operation, speed, feed, coolants, work piece holding, mounting milling operations, keyways, angles, splines, slots, gears, cams, contour spirals.
7	Grinders and Grinding Accessories	Horizontal Surface, Cylindrical, Universal, Tool and Cutter. Set up and operation, speed, feed, coolants, wheel and form dressing, machine grinding.

REGULATION 39

under the Apprenticeship and Tradesmen's Qualification Act

GLAZIER AND METAL MECHANIC

1. In this Regulation,

- (a) "certified trade" means the trade of glazier and metal mechanic;
- (b) "glazier and metal mechanic" means a person who,

- (i) performs layout, fabrication, assembly and installation of extruded frames, hardware, store fronts, wall facings, manual sliding doors, window sashes, manual door closers, automatic door operators and curtain walls,
- (ii) performs layout, fabrication, assembly and installation of suspended glass fronts, stuck glass fronts, auto glass, art glass, aquariums and similar special products,
- (iii) cuts, fits and installs glass in wood and metal frames for windows, skylights, store fronts and display cases, or on building fronts, interior walls, ceilings, tables and similar surfaces by means of mastic, screws or decorative moldings, and
- (iv) reads and understands design drawings, manufacturers' literature and installation diagrams. R.R.O. 1970, Reg. 34, s. 1.

2. The trade of glazier and metal mechanic is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 34, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of four periods of related training and work experience training of 2000 hours for each period,

- (a) at full-time educational day classes provided at a College of Applied Arts and Technology or in courses that, in the opinion of the Director, are equivalent thereto, in the subjects contained in Schedule 1; and
- (b) in work experience training provided by the employer of the apprentice in the subjects contained in Schedule 2. O. Reg. 408/73, s. 1.

4. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedules 1 and 2. R.R.O. 1970, Reg. 34, s. 5.

5. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

- (a) 60 per cent during the first 1000 hours of training and instruction;
- (b) 65 per cent during the second 1000 hours of training and instruction;
- (c) 70 per cent during the third 1000 hours of training and instruction;
- (d) 75 per cent during the fourth 1000 hours of training and instruction;
- (e) 80 per cent during the fifth 1000 hours of training and instruction;
- (f) 85 per cent during the sixth 1000 hours of training and instruction;
- (g) 90 per cent during the seventh 1000 hours of training and instruction; and
- (h) 95 per cent during the eighth 1000 hours of training and instruction,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. R.R.O. 1970, Reg. 34, s. 6.

6. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for every four journeymen employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus an additional apprentice for each additional four journeymen employed by that employer in the trade and with whom the apprentice is working. R.R.O. 1970, Reg. 34, s. 7.

7.—(1) Section 9 and subsections 11 (2) and (4) of the Act do not apply to a person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 408/73, s. 2.

8. A certificate of qualification in the certified trade is not required to be renewed. R.R.O. 1970, Reg. 34, s. 9.

Schedule 1

GLAZIER AND METAL MECHANIC

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics (Trade Related)	Mathematics Geometry	Addition, subtraction, multiplication and division of whole numbers, fractions and decimals, ratio and proportion, areas. Radian measure, right angle triangle, square root, simple formulae and equations. Lines, planes and angles: application to layout.
2	Science	Physics	Basic laws and principles, properties of matter, formulae. (Given as required in shop instruction).
3	English	Usage and Business Communication	Trade terminology and usage. Sentence and paragraph structure. Letter and report writing. Work and parts orders. Interpretation and use of manufacturers' manuals, job specifications.
4	Drafting	Basic Drafting and Interpretation	Drafting techniques: scales, symbols, projections. Preparation of elementary trade related working drawings and dimensioned sketches. Reading and interpretation of floor plans and elevations: sectional and cross sectional details.
5	General Trade Practice	Safety Hand Tools	Safety rules and safe operating procedures. Protective clothing and equipment. First aid. Fire prevention; use and maintenance of fire fighting equipment. Handling and storage of flammable and toxic solvents and materials. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . Correct lifting methods and use of lifting and hoisting equipment. Handling crated, loose and broken glass. Safe use of electrical tools and equipment and powder actuated tools. Truck and vehicle condition and loading. Good housekeeping. Selection, care and use of: hammers, screwdrivers, wrenches, files, allen keys, punches, rivetting tools,

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
			nail sets, scrapers, taps, pliers, clamps, snips, cold chisels and wood chisels, hacksaws, glass cutters: — diamond, fixed and interchangeable wheel; hackout knives, handstones, crow-bars, paint brushes and soldering equipment. Putty knives, caulking guns and dry glazing tools and point setters.
		Power Tools and Equipment	Care and use of portable air/electric drills, power tap guns and screwdrivers. Power circular and jig saws, routers. Powder actuated tools. Grinders: bench and portable, belt sanders; wheel and belt abrasive grades. Types and characteristics of drill bits and hole saws; drill gauge use. Grinding and sharpening procedures. Hand-brake and shears. Scaffolds, swing stages (manual and electric). Ladders and steps. Heating boxes.
		Glass Handling Devices and Equipment	Types, care and correct usage: suction cups, slings and webs, gloves and hand rubbers. Power suction gear use. Loose and crated glass dollies. Stationary and moveable racks.
		Measuring and Marking Tools	Care and use of rules, straight edges, protractors, squares and scribes. Centre-punches, angle dividers. Spirit levels, transits and plumb-bobs, chalk and mason's lines. Measuring: use of grid and base lines and benchmarks. Layout of right angles by measurement.
		Benchwork	Metal, wood, plastics and masonry; sawing, filing, chipping, shearing, braking, drilling and chiselling.
		Cutting-Table Operations	Glass cutting principles and methods for: sheet, polished plate, patterned and shaped glass. Cutter type selection, use, cooling and lubrication requirements. Free-hand cutting. Use of templates, straight edges, wood squares, circle cutters. Cutting inner and outer circles. Faulty cut causes and detection. Glass cut breaking methods. Hand finishing glass edges: hand stone types and usage. Purpose of wetting stone. Procedures for arrissing and grinding: angles and purpose.
		Fastening Devices	Types and sizes of woodscrews, sheet metal screws, self-tapping screws, expansion shields, toggle bolts, powder actuated fasteners, nuts and bolts, washers, rivets, nails, specially designed masonry fasteners. Factors governing selection. Screw thread terminology and systems. Thread purpose and fit classification. Installation and removal procedures. Torque setting. Locking methods. Drilling and tapping procedures. Power tapping. Removal of broken taps, studs and screws.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
6	Glass	<p>Glass Facts</p> <p>Glass Manufacturing Processes</p> <p>Glass Function and Recognition</p> <p>Miscellaneous Glasses</p>	<p>History. Composition. Properties: viscosity, devitrification, specific gravity. Thermal expansion and conductivity. Tensile, compressive and impact strengths. Light reflection loss. Sound transmission. Maximum glass sizes.</p> <p>Manufacture: mixing (frit), melting, drawing, annealing. Sheet glass: crown process, bulls-eyes or bullions, cylinder and flat drawn. Rolled glass: rolled and rough cast, cathedral and figured rolled, wired glasses. Polished plate glass. Float glass.</p> <p>Purpose, thickness and qualities.</p> <p>— Transparent glass: sheet, polished plate and float glass: thickness specifications and quality selection.</p> <p>— Translucent glass: cathedral, figured, rolled, antique, sand-blasted and acid-etched glasses; thickness specifications and tints.</p> <p>— Opal glasses; flashed opal and pot opal sheet, rolled and polished opal sheet; thickness specifications and colours.</p> <p>— Special purpose glasses; wired-cast or polished (georgian, hexagonal, diamond, single-strand). Toughened glass: fully tempered and heat-treated types; thickness and size limitations, edge conditions and configurations, warpage.</p> <p>— Laminated glass: dual and multiple.</p> <p>— Heat absorbing sheet, plate and rough glass; thickness, colour, tint, transmission factors, edge condition.</p> <p>— Heat reflecting glass: sheet and plate; thickness, colour, tint density, heat reflection and light transmission factors, edge condition.</p> <p>— Lead-plate glass (x-ray): thickness, cutting methods and problems.</p> <p>— Prismatic glass: light refraction properties.</p> <p>— Cladding (Spandrel) glasses: plate, sheet, textured, standard and special colours; heat strengthening, warpage, size limitations.</p> <p>Factory sealed units of plate, sheet, wired, textured or patterned, heat-absorbing or heat-reflecting and toughened glass; size limitations, air seal, air space, edge protection. Insulation factors, effective condensation control. Methods of avoiding thermal breaks in units.</p> <p>— Veneer and structural glasses: glass veneers, fire-finished, mechanical polished and float finished surfaces: annealed, toughened and laminated types; size limitations, colour range and matching, thickness. Edge and hole preparation, integral lettering or design.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Mirrors	<p>— Structural glass blocks and channels, surface textured, corrugated and wired glasses; size limitations.</p> <p>Plate, sheet, tinted and antique glass; glass quality, toughening, decorative cut, bevelled, sand-blasted, etched. Framed mirrors. Single mirror exposed edge installation: use of clips and rosettes. Multiple mirrors; ground and polished to butt. Mirror-flex and mirror-pane.</p> <p>— Transparent mirrors: annealed, toughened, tinted; size limitations, surface protection. Light intensity differential, effective light ratios.</p>
		Glass Preparation	<p>Cutting tolerances. Chipping and nipping, notching. Edgework procedures: grinding, polishing, mitring, levelling. Drilling techniques: use of carbobol, triangular or spade, tubular (regular or diamond impregnated) type drills; speeds and feeds, abrasives, coolants. Surface finishes: sand blasting and acid etching techniques. Bending and forming procedures.</p>
		Plastics	<p>Types and characteristics: Transparent, translucent, decorative, flat, corrugated, moulded, extruded, rigid or flexible — colour. Working, handling and cleaning techniques.</p>
7	Metals	Metal Types, Properties	<p>Composition and properties: aluminum, mild steel, stainless steel, bronze and copper, alloys, malleability. Expansion and contraction factors. Availability. Selection factors: strength, cost, durability, compatibility, workability; architectural features, engineering requirements.</p>
		Metal Shapes and Sections	<p>Sheet manufacturing processes: hot and cold rolled, smooth and textured surface. Standard sizes and size limitations. Thicknesses and gauges.</p> <p>— Formed sheet (brake-shape): hand and power braking procedures; size, design and thickness limitations. Brake-line surface distortion.</p> <p>— Rolled sections: rolling procedures. Design limitations. Economics vs. braking.</p> <p>— Extrusions: extruding process. Simple and port-hole extrusions. Permissible tolerances, relative strength and appearance.</p>
		Surface Finishes and Protective Coatings	<p>— Mechanical finishes: millfinish, belt finish (grit types) and polished.</p> <p>— Electrolytic and chemical finishes: acid etching. Anodizing; clear and coloured finishes, skin thickness. Colour matching, surface hardeners.</p> <p>— Paint finishes: lacquer, baked enamel. Degrees of gloss.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
			<p>— Ceramic and porcelain-enamel glaze finishes. Touch-up procedures.</p> <p>— Temporary surface protectors and removal techniques: lacquers (brush or spray), strippable plastic coatings (brush or spray), petroleum jelly, self-adhesive paper and tapes.</p>
8	Glazing Materials	<p>Properties of Sealants and Glazing Materials</p> <p>Conventional Glazing Materials (Knife grade and tapes)</p> <p>Sealant Types (Gun grade, 1-part and 2-part)</p> <p>Dry Glazing Materials</p> <p>Glazing Accessories</p> <p>Material Selection</p> <p>Joint Preparation</p> <p>Material and Applicator Preparation and Usage</p>	<p>Adhesion. Cohesion. Elongation. Modulus of elasticity. Hardness. Ultimate life. Tensile and compression strength, curing. Safety precautions: fumes, toxic action, fire hazards.</p> <p>— Oleo-resin compounds: wood and metal sash putty. Synthetic resin compounds: wood and metal mastics.</p> <p>— Butyl-rubber compounds, pre-formed tape (including reinforced types). Polybutene mastics and polyisobutylene tapes.</p> <p>Oleo-resin compounds. Synthetic resin, polybutene, liquid polymer acrylic-base, butyl rubber and urethane compounds. Polysulphide, silicone rubber and acrylic types. Primers and surface conditioners. Back-up materials: styrofoam and foam rubber. Shelf life, pot life and curing time.</p> <p>Neoprene and vinyl roll-in splines and U-channel gaskets. Neoprene structural gaskets: spline or compression types. Felt, cork or rubber stripping.</p> <p>Types of setting blocks: lead, treated hardwood, neoprene and vinyl. Spacers: cork, neoprene and vinyl, treated hardwood. Glazing clips: spring wire, wedge, points. Special clips designed by manufacturers.</p> <p>Governing factors: joint purpose and size; type of materials to be joined; installation sequence and working conditions; exposure to air, moisture temperature and light rays; economical factors; expected joint movement; architect's specifications.</p> <p>Architect's and manufacturer's instructions. Surface preparation methods: dry cleaning (wiping, wire brushing, scraping) Wet cleaning: cleaning solvents. Priming. Surface conditioning. Joint back-up.</p> <p>Job quantities. Manufacturer's packaging types. Mixing, stirring. Heating as required. Selection and preparation of applicators. Material application by appropriate procedures and techniques. Material compatibility. Procedures for cleaning applicators and material surfaces. Cleaning solvent types and usage. Site clean-up.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
9	Adhesives	Adhesive selection and Usage	Types and characteristics; glass veneer mastics, mirror mastics; epoxy, contact and plastic cements. Selection factors: material nature; air, moisture and temperature exposure; required holding power and resiliency. Application methods.
10	Glass Cements	Cement Selection	Types and characteristics: one-part and two-part glass cements. Pointing compounds. Selection factors: required holding power, resiliency to accommodate movement, required waterproofing degree, clamping requirements and colour. Handling and preparation: storage, shelf life, temperature and moisture damage. Mixing procedures — importance of manufacturer's instructions. Pot life. Safety precautions: fire and physical hazards. Procedures and techniques for installation of show cases, all-glass entrances and stuck-glass fronts.
11	Hardware and Operating Equipment	Door Hinges and Pivots	Types and characteristics: butt, gravity, double-acting, spring loaded, piano. Burglar proof types. Centre-hung, offset, intermediate pivots.
		Locks and Operating Hardware	Dead-locks, latch-locks. Flush-bolts. Electric strikes, panic devices (concealed or surface mounted), push and pull hardware: single and double acting.
		Thresholds and Guards	Centre-hung, offset and interlocking. Integral or surface mounted kick-plates. Buggy-bumpers and guard rails. Finger guards.
		Door Stops	Friction stays, drop arms, floor or wall mounted door stops; wind arrestors, chains, door co-ordinators.
		Weathering	Mohair pile, door or frame mounted, fixed or adjustable neoprene or rubber sweeps. Inter-locking types. Astragals.
		Door Closers (Manual Types)	Overhead exposed (pot or stream-lined types) and overhead concealed (frame or door mounted), floor concealed (single or double-acting, centre-hung, offset), balanced, revolving (manual or electric assist).
		(Automatic Types)	Pneumatic, hydraulic, electric: swing, sliding, overhead or in-floor mounted, single or multiple door operation; power or spring closing action; high or low pressure systems.
		Door Controls	Carpet and hardware controls: Photo-electric cells; radio-wave controls; pull-cord switches; control boxes.
		Sliding Door Hardware	Patio door locks and pulls. Roller assemblies and nylon guides. Door bumpers. Fly-screen hardware.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Showcase Hardware	Sliding door track and guides (roller, ball bearing, plastic). Locks: ratchet, friction and pin types. Finger pulls. Standards and shelf brackets. Counter posts.
		Window and Sash Hardware	Friction stays and hinges. Sash locks and balances. Manual remote controls.
		Miscellaneous Hardware	Mirror clips. Rosettes, glass mitre clamps. Three-way clamps.
12	Installation Procedures Glazing	Face Glazing	Wood and metal sash: squaring and plumb checks. Cleaning. Priming. Bedding: face and edge clearance. Setting-blocks and spacers. Glass holding: use of clips, wedges and points. Facing and stroking off. Filling voids. Excess compound removal.
		Stop Glazing	Wood and metal sash (fixed and opening): squared, plumbed, cleaned, primed. Snap-on or screw-on stops. Bedding; use of compound, preformed tapes. Setting blocks and spacers. Edge clearance and bite on glass. Use of sealants for heel and needle bead neoprene or vinyl glazing strips.
		Dry Glazing	Glazing-in rolled store front sections (glass to metal). Glazing-in extruded sections (neoprene or vinyl strip). Preparation of opening. Setting blocks at quarter points. Edge clearance and bite on glass. Application of stops (screw-on or snap-on). Application of neoprene or vinyl glazing strips.
		Gasket Glazing	Checking of openings and sashes: importance of size and squareness tolerances. — Gasket types and application. Setting glass (arrrissing, spatula and lubricant use). Placing of locking strips; use of locking tools and lubricants.
		Glass Veneers	— Wall preparation: checks for firmness, flatness and plumb. Surface conditioning (dry wall). Layout. — Placing of supporting clips and retaining molding. Cutting, nipping, arrissing and back-chipping glass. Mastic application, backspacing and coverage. Setting glass veneer, pointing joints and cleaning.
		Mirrors	— Wood or metal framed. Tamper-proof types. — Unframed: use of clips, rosettes, mirror-mastics, fasteners, mirror molding. Alignment procedures. Installation of mirror sliding doors, one-way mirrors and mirrorflex.
		Showcases	Measuring. Types of joints. Use of clamps or moldings, adhesive and sealants.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Sliding Glass Doors (Unframed)	Types of glass and size limitations. Measuring procedures. Installation of tracks, finger pulls and locks.
		Shelves	Types of glass and size limitations. Use of brackets and standards.
		Counter Partitions	Types of glass and size limitations. Use of counter posts. Speak-holes and covers, pay-holes and covers.
		Table Tops	Preparation of table top patterns.
		Curtain Walls	Planning and layout. Hoisting and placing glass on floors. Preparation of openings. Setting of vision and spandrel glass; use of swing stage. Condensation drainage and venting considerations. Application of pressure plates and stops. Finishing trims. Special hazards and safety precautions.
13	Installation Procedures Metal	Store Fronts (Rolled sections and Brake-Shapes)	On-site layout procedures and techniques for: sill sections, head and side jambs, sash (full and half), division, corner and muntin bars, stops, caps, awning boxes and hoods, canopies. Installation and setting procedures. Protection methods.
		Extruded Frames (Including Swing Doors)	Job-site checks and measuring. Frame layout and fabrication: use of jigs and templates. On-site assembly and frame installation. Hanging and glazing doors. Adjusting doors.
		Non-operating Hardware	Procedures for installation of: hinges, pivots, push and pull door hardware, locks, cylinders, flush-bolts and keepers. Panic hardware. Door hold-open devices, bumpers and wind-arrestors. Thresholds and kickplates. Door stops, astragals and finger-guards. Buggy bumpers and guardrails. Friction stays, sash locking devices and weathering devices. Layout procedures and techniques: use of jigs and templates. Adjustment procedures.
		Operating Hardware (Manual)	Procedures for installation of floor concealed (offset, centre-hung, single and double acting) closers. Overhead, (surface mounted or concealed, door or transom mounted) closers. Balanced and revolving door types. Adjustment and maintenance procedures. Layout procedures and techniques: Use of jigs and templates.
		(Automatic)	Layout procedures and techniques for installation of electric, pneumatic and hydraulic types. Controls: carpet, photo-electric, radio wave, pull cord switches and control boxes. Adjustment and maintenance procedures; use of test equipment.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		<p>Wall Facings</p> <p>Sliding Doors (Manual)</p> <p>Window Frames</p> <p>Curtain Wall</p>	<p>Installation procedures for wall facings formed from: flat aluminum sheet, metal brake shapes, extruded or rolled sections. Solid or hollow panels. Plastic window walls and sky-lights. Protection methods.</p> <p>Installation procedures for residential patio and commercial store front doors. Tub and shower enclosures. Mirror sliding doors. Protection methods.</p> <p>Punched, strip (horizontal or vertical) (fixed or opening) (top, bottom or side hung), (inward or outward opening) or sliding (horizontal or vertical), insulated or non-insulated, inside or outside glazed (single or double). Layout, assembly and installation procedures for: sills, drip deflectors, expansion joint covers, anchors, blocking, base frames, fasteners, expansion mullions, opening sashes and related hardware. Sealant application.</p> <p>Interpretation of plans and specifications; checking wall components with drawings and parts lists. Establishing lines, levels and grade marks; layout and presetting anchors. Preassembly of wall components. Installation and alignment of sections on lowest floor level. Installation and alignment of remaining wall grid. "Freezing" anchors (welding, etc.). Installing adaptors and flashings. Sealant application. Installation of insulation. Installation of partition closer panels. Final check of completed installation.</p>
14	<p>Installation procedures</p> <p>Special Products</p>	<p>Suspended Glass Fronts</p> <p>Stuck Glass Fronts</p> <p>Auto Glass</p> <p>Art Glass</p>	<p>Layout procedures: installation of suspension brackets and perimeter framing. Hanging of glass. Patch fittings. Special door hardware and mounting procedures. Supporting glass fins. Installation of weathering. Sealing procedures. Protection methods. Replacement procedures.</p> <p>Layout procedures. Installation of concealed or exposed perimeter framing. Glass stiffeners (one side or both sides). Finishing glass joints. Protection methods. Replacement procedures.</p> <p>Use of National Auto Glass Specifications Parts Book. Identification and selection of bent glass parts (toughened or laminated). Cutting and edge-work procedures for laminated flatstock to N.A.G. specifications. Damaged light removal procedures. Installation and sealing of new parts. Use of specialized tools, lubricants and sealants.</p> <p>Designing; use of cartoons (patterns). Cutting, waxing-up, etching, painting, firing, procedures</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Aquariums	<p>and techniques. Additional waxing-up and painting. Staining. Leading-up and soldering. Cementing and fitting into base frame. Handling and installation procedures.</p> <p>Producers for construction of framed and all-glass types. Glass selection, cutting and edgework. Selection of non-toxic cements and sealants. Water pressure and weight considerations. Mechanical blocking of glass in frames.</p>
15	Planning Procedures	<p>Job Specifications and changes</p> <p>Job Planning</p> <p>Production Principles</p>	<p>Reading and interpretation; work included, work excluded. Type and quality of materials, Finishes and workmanship called for. Responsibility for protection, cleaning, guarantees. Specific installation instructions. General conditions. Modifications to job specifications by bulletins and addendas, change notices and change orders.</p> <p>Manpower, tool and equipment requirements. Material and equipment deliveries and storage. On-site distribution of materials. Electric power requirements. Job allocation. Co-ordination with other trades through General Contractor.</p> <p>Job break-down into separate operations for specialization. Elimination of unproductive motion.</p>

R.R.O. 1970, Reg. 34, Sched. 1.

Schedule 2

GLAZIER AND METAL MECHANIC

Work Instruction and Experience

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	General Trade Practice	General	Safety rules and removal of all safety hazards. Use of hand and power tools and equipment, glass handling devices and equipment, measuring and marking tools, fastening devices. Benchwork and cutting-table operations. (As detailed in Schedule 1).

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
2	Glass	Glass Facts	Familiarization with glass composition and properties. Maximum glass sizes. Manufacturing processes.
		Glass Function and Recognition	— Transparent, translucent and opal glasses. Special purpose types: wired, laminated, heat absorbing, heat reflecting, and lead-plate glasses. Prismatic glass. Cladding (Spandrel) glasses. Miscellaneous glasses; factory sealed units, veneer and structural glasses, blocks and channels, corrugated glass. Mirrors: plate, sheet and transparent one-way types.
		Glass Preparation	Familiarization with cutting tolerances. Chipping and nipping, notching. Edgework: grinding, polishing, mitring, levelling. Glass drilling, sand blasting and etching. Bending and forming techniques.
		Plastics	Familiarization with types, characteristics and applications. Working, handling and cleaning operations.
3	Metals	Metal Types, Properties	Familiarization with characteristics and properties: aluminum, mild steel, stainless steels, bronze and copper, alloys. Selection factors.
		Metal Shapes and Sections	Familiarization with: sheet metal manufacturing processes: standard sizes and size limitations. Thicknesses and gauges. — Formed sheet (brake-shape): size, design and thickness limitations. Economics vs. braking. — Extrusions: permissible tolerances, relative strength and appearance.
		Surface Finishes and Protective Coatings	Familiarization with: mechanical finishes, — Electrolytic and chemical finishes: Colour matching, surface hardeners. — Paint finishes: lacquer and baked enamel. — Ceramic and porcelain-enamel glaze finishes. Touch-up procedures. — Temporary surface protectors and removal techniques.
4	Glazing Materials	Sealants and Glazing Materials	Properties. Safety precautions: fumes, toxic action, fire hazards.
		Conventional Glazing Materials (Knife grade and tapes)	— Oleo-resin compounds: wood and metal sash putty. Synthetic resin compounds: wood and metal mastics. — Butyl-rubber compounds: preformed tape (including reinforced types). Polybutene mastics and polyisobutylene tapes.
		Sealant Types (Gun grade, 1-part and 2-part)	Oleo-resin compounds. Synthetic resin, polybutene, liquid polymer acrylic-base, butyl rubber and urethane compounds. Polysulphide, silicone rubber and

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		<p>Glazing Accessories</p> <p>Joint Preparation</p> <p>Material Selection Preparation and Application</p>	<p>acrylic types. Primers and surface conditioners. Back-up materials. Shelf life, pot life and curing time. Dry-glazing materials: roll-in splines and U-channel gaskets. Structural gaskets. Stripping.</p> <p>Setting blocks. Spacers. Glazing clips. Special purpose clips.</p> <p>Surface preparation: dry cleaning, or wet cleaning. Priming. Surface conditioning. Joint back-up.</p> <p>Selection factors: mixing, stirring. Heating as required. Selection and preparation of applicators. Material application. Cleaning applicators and material surfaces. Site clean-up.</p>
5	Adhesives	Adhesive Selection and Usage	Characteristics; glass veneer mastics, mirror mastics; epoxy, contact and plastic cements. Selection factors; application methods.
6	Glass Cements	Cement Selection	Familiarization with: one-part and two-part glass cements. Pointing compounds. Selection factors. Handling and mixing procedures. Pot life. Safety precautions: fire and physical hazards. Installation of showcases, all-glass entrances and stuck-glass fronts.
7	Hardware and Operating Equipment	<p>Door Hardware</p> <p>Showcase Hardware</p> <p>Window and Sash Hardware</p> <p>Miscellaneous Hardware</p>	<p>Familiarization with types and characteristics: door hinges and pivots. Locks and operating hardware. Thresholds and guards. Kick-plates. Buggy-bumpers and guard rails. Finger guards. Door stops. Wind arrestors, chains, door co-ordinators. Weathering. Astragals. Door closers: (manual types) including balanced, revolving (manual or electric assist); automatic types: pneumatic, hydraulic, electric, power or spring closing action; high or low pressure systems. Door controls: carpet and hardware controls: Photo-electric cells; radiowave controls; pull-cord switches; control boxes. Sliding door hardware. Door locks and bumpers. Fly-screen hardware.</p> <p>Sliding door track and guides. Locks. Finger pulls. Standards and shelf brackets. Counter posts.</p> <p>Friction stays and hinges. Sash locks and balances. Manual remote controls.</p> <p>Mirror clips. Rosettes, glass mitre clamps. Three-way clamps.</p>
8	Installation Procedures Glazing	Face Glazing	Wood and metal sash: squaring and plumb checks. Cleaning. Priming. Bedding: face and edge clearance. Setting-blocks and spacers. Glass holding: use of

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		Stop Glazing	clips, wedges and points. Facing and stroking off. Filling voids. Excess compound removal. Wood and metal sash (fixed and opening): squaring and plumb checks. Cleaning. Priming. Application of snap-on or screw-on stops. Bedding; use of compound, preformed tapes. Setting blocks and spacers. Sealing heel and needle bead neoprene or vinyl glazing strips.
		Dry Glazing	Glazing-in rolled store front sections (glass to metal). Glazing-in extruded sections (neoprene or vinyl strip). Preparation of opening. Setting blocks. Application of stops (screw-on or snap-on). Application of glazing strips.
		Gasket Glazing	Checking openings and sashes. —Gasket selection. Setting glass. Placing locking strips.
		Glass Veneers	—Wall preparation and checking. Surface conditioning (dry wall). Layout. —Placing supporting clips and retaining moldings. Cutting, nipping, arissing and back-chipping glass. Mastic application, backspacing and coverage. Setting glass veneer, pointing joints and cleaning.
8	Installation Procedures Glazing	Mirrors	Alignment and installation of wood or metal framed, tamper-proof or unframed types: mirror sliding doors, one-way mirrors and mirrorflex.
		Showcases	Measuring and installation. Use of clamps or moldings, adhesives and sealants.
		Sliding Glass Doors (Unframed)	Measuring and installation of tracks, finger pulls and locks.
		Shelves	Use of brackets and standards. Size limitations.
		Counter Partitions	Use of counter posts. Provision of speak-holes and covers, pay-holes and covers.
		Table Tops	Measuring and pattern making.
		Curtain Walls	Planning and layout. Hoisting and placing glass on floors. Preparation of openings. Setting vision and spandrel glass: use of swing-stage. Condensation drainage and venting. Application of pressure plates, stops, and finishing trims.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
9	Installation Procedures Metal	Store Fronts (Rolled sections and Brake Shapes)	On-site layout of sill sections, head and side jambs, sash (full and half), division, corner and muntin bars. Stops, caps, awning boxes and hoods, canopies. Installation, setting and protection.
		Extruded Frames (Including Swinging Doors)	Job-site checks and measuring. Frame layout and fabrication: jig and template use. On-site assembly and frame installation. Hanging, glazing and adjusting doors.
		Non-operating Hardware	Installation of hinges, pivots, push and pull door hardware, locks, cylinders, flush-bolts and keepers. Panic hardware. Door hold-open devices, bumpers and wind-arrestors. Thresholds and kick-plates. Door stops, astragals and finger guards. Buggy-bumpers and guardrails. Friction stays, sash locking devices and weathering devices. Layout: use of jigs and templates. Final adjustment.
		Operating Hardware (Manual)	Layout and installation of floor concealed (offset, centre-hung, single and double acting closers), overhead (surface mounted or concealed, door or transom mounted) closers. Balanced and revolving door types. Use of jigs and templates. Final adjustments.
		(Automatic)	Layout and installation of electric pneumatic and hydraulic types. Controls: carpet, photo-electric, radio wave, pull-cord switches and control boxes. Final adjustments: use of test equipment.
		Wall Facings	Installation and protection of wall facings formed from flat aluminum sheet, metal brake shapes, extruded or rolled sections. Solid or hollow panels. Plastic window walls and sky-lights.
		Sliding Doors (Manual)	Installation and protection of residential patio and commercial store front doors. Tub and shower enclosures. Mirror sliding doors.
		Window Frames	Punched, strip (horizontal or vertical) (fixed or opening) (top, bottom or side hung), (inward or outward opening) or sliding (horizontal or vertical), insulated or non-insulated, inside or outside glazed (single or double). Layout, assembly and installation of sills, drip deflectors, expansion joint covers, anchors, blocking, base frames, fasteners, expansion mullions, opening sashes and related hardware. Sealant application.
		Curtain Wall	Checking wall components. Establishing lines, levels and grade marks: layout and presetting anchors. Preassembly of wall components. Installation and

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
			alignment of wall grid. "Freezing" anchors (welding, etc.). Installing adaptors and flashings. Sealant application. Installation of insulation and partition closer panels. Completed installation check.
10	Installation Procedures —Special Products	Suspended Glass Fronts	Layout and installation of suspension brackets and perimeter framing. Hanging glass. Patch fittings. Special door hardware mounting. Supporting glass fins. Installation of weathering. Sealing operations. Replacement operations.
		Stuck Glass Fronts	Layout and installation of concealed or exposed perimeter framing. Glass stiffeners (one side or both sides). Finishing glass joints. Protection. Replacement operations.
		Auto Glass	Identification and selection of glass parts (toughened or laminated). Cutting and edgework of laminated flat-stock to National Auto Glass specifications. Damaged light removal. Installation and sealing of new parts.
		Art Glass	Designing. Cutting, waxing-up etching, painting, firing operations. Additional waxing-up and painting. Staining. Leading-up and soldering. Cementing and fitting into base frame. Handling and installation.
		Aquariums	Construction of framed and all-glass types. Glass selection, cutting and edgework. Use of non-toxic cements and sealants. Blocking glass in frames.

R.R.O. 1970, Reg. 34, Sched. 2.

REGULATION 40

under the Apprenticeship and Tradesmen's Qualification Act

HAIRSTYLING SCHOOLS

INTERPRETATION

1. In this Regulation,

- (a) "certified trade" means the trade of hairstylist; and
- (b) "hairstyling school" means any school or place at which instruction is offered in any branch of the certified trade of hairstylist but does not include,
 - (i) a hairdressing, barber or hairstylist shop in which apprentices are employed,
 - (ii) a college of applied arts and technology established under the *Ministry of Colleges and Universities Act*, or
 - (iii) a school or college under the jurisdiction of the Ministry of Education. O. Reg. 42/79, s. 1.

2. No person shall establish, operate or maintain a hairstyling school unless he is the holder of a licence issued under this Regulation. O. Reg. 42/79, s. 2.

3.—(1) An application for a licence to operate a hairstyling school shall be made to the Director in a form prescribed by the Director.

(2) A licence to operate a hairstyling school shall be in a form prescribed by the Director and the fee for a licence or a renewal thereof is \$100 per year.

(3) A licence to operate a hairstyling school expires on the 31st day of December in the year in which it is issued.

(4) An application for renewal of a licence to operate a hairstyling school shall be made to the Director not later than the 1st day of December in each year. O. Reg. 42/79, s. 3.

4.—(1) No holder of a licence to operate a hairstyling school shall enter into a contract to provide training and instruction with a candidate for enrolment unless the candidate,

- (a) is at least sixteen years of age;

- (b) has completed Grade 9 in Ontario or has such other academic qualification that, in the opinion of the Director, is equivalent thereto; and

- (c) has been approved for enrolment by the Director.

(2) A copy of the contract referred to in subsection (1) shall be filed by the licensee with the Director and a fee of \$10 shall be paid by the licensee to the Director for registration of the enrolment of the candidate.

(3) No holder of a licence to operate a hairstyling school shall give training or instruction to a student unless subsections (1) and (2) have been complied with. O. Reg. 42/79, s. 4.

5.—(1) Unless otherwise specified in writing by the Director the period of training and instruction in a hairstyling school shall be at least 1,200 hours for Branch 1 and Branch 2 of the certified trade and at least 1,500 hours for Branch 3 of the certified trade.

(2) The training and instruction in a hairstyling school shall be in accordance with the training profile for the certified trade approved by the Director.

(3) No student in a hairstyling school shall accept any remuneration for work performed in the hairstyling school. O. Reg. 42/79, s. 5.

6. A hairstyling school shall employ at least one instructor for each fifteen students in attendance at the hairstyling school, at any one time. O. Reg. 42/79, s. 6.

7.—(1) Every instructor shall,

- (a) be a holder of a certificate of qualification in Branch 1, 2 or 3 of the certified trade and have at least three years of work experience in the branch of the certified trade in which instruction is to be given by such instructor; and
- (b) within one year of commencing employment as an instructor, be a graduate of a teacher-training course that is approved by the Director,

and no instructor shall perform any barbering, hairdressing or hairstyling services for a customer of the hairstyling school except while he is actually demonstrating to a student or accept any remunera-

tion or gratuity from a customer for work performed in the hairstyling school.

(2) Notwithstanding subsection (1), the Director may approve the employment of any instructor at a hairstyling school who in the opinion of the Director is proficient in the branch of the certified trade for which instruction is to be given by such instructor. O. Reg. 42/79, s. 7.

8. Where the Director so requires, an instructor or student shall furnish, within a reasonable time, a certificate of a legally qualified medical practitioner that the instructor or student is not suffering from any communicable disease. O. Reg. 42/79, s. 8.

9.—(1) The premises of a hairstyling school shall be identified by a sign visible from the street and where a hairstyling school is conducted or operated on the same premises as a barber, hair-dressing or hairstylist shop, there shall be a solid partition reaching from the floor to the ceiling separating the hairstyling school from the rest of the premises and the hairstyling school shall have a separate entrance. O. Reg. 42/79, s. 9 (1).

(2) The holder of a licence to operate a hairstyling school shall ensure that the hairstyling school,

- (a) is equipped for teaching trade theory and practice;
- (b) provides a minimum of twenty square feet of floor space for each student in a lecture room; and
- (c) provides a minimum of forty square feet for each student in the work practice area. O. Reg. 684/79, s. 1.

10. No sign, placard or other advertising matter shall be used in connection with a hairstyling school unless in the opinion of the Director it,

- (a) properly designates the business as a hairstyling school;
- (b) is not misleading to the public; and
- (c) makes no reference to the prices charged for work performed at the school by its students. O. Reg. 898/80, s. 1.

11. The premises of a hairstyling school shall be,

- (a) painted or papered;
- (b) lighted and ventilated;
- (c) supplied with hot and cold running water;
- (d) supplied with drinking water; and
- (e) kept in a clean and sanitary condition,

and the licensee shall ensure that,

- (f) any repairs required to keep the premises in a safe and habitable condition are made; and
- (g) the cause of any effluvia arising from any defective drain or plumbing is removed and the defect is corrected. O. Reg. 42/79, s. 10.

12. The holder of a licence to operate a hairstyling school shall ensure that separate washrooms and toilet rooms for male and female persons are provided. O. Reg. 42/79, s. 1.

13. Every student in a hairstyling school shall be given a minimum of one-half hour for lunch. O. Reg. 42/79, s. 12.

14.—(1) No training or instruction shall be given in a hairstyling school,

- (a) on a holiday; and
- (b) before 8.00 a.m. or after 10.00 p.m.

(2) No weekly period of training and instruction shall exceed a total of forty-four hours for any student. O. Reg. 42/79, s. 13.

15. Every student and every instructor in a hairstyling school shall wear a clean light-coloured coat, smock or uniform of washable material. O. Reg. 42/79, s. 14.

16.—(1) All implements used in the certified trade of hairstylist in a hairstyling school shall be thoroughly sterilized or sanitized, immediately before each use and instruments that cannot be so treated shall not be used.

(2) All hair brushes shall be immersed in a strong antiseptic solution, rinsed in clear water and dried with a clean towel or by heat, before being used on a customer. O. Reg. 42/79, s. 15.

17. A room shall be provided in every hairstyling school to be used for eating purposes and no food shall be consumed in the hairstyling school in a place other than that room. O. Reg. 42/79, s. 16.

18. No hairstyling school shall be used for residential purposes. O. Reg. 42/79, s. 17.

REGULATION 41

under the Apprenticeship and Tradesmen's Qualification Act

HAIRSTYLIST

INTERPRETATION

1. In this Regulation,

- (a) "barber" means a person who performs any of the activities for which instruction is given in the units of study contained in Schedules 1 and 2 and who holds himself out to the public as a barber;
- (b) "certified trade" means the trade of hairstylist;
- (c) "hairdresser" means a person who performs any of the activities for which instruction is given in the units of study contained in Schedules 1 and 2 and who holds himself out to the public as a hairdresser; and
- (d) "hairstylist" means a person who performs any of the activities for which instruction is given in the units of study contained in Schedules 1 and 2 and who holds himself out to the public as a hairstylist. O. Reg. 949/78, s. 1.

2. The trade of hairstylist is designated as a certified trade for the purposes of the Act. O. Reg. 949/78, s. 2.

3. The certified trade is composed of three branches:

- 1. Branch 1, barber.
- 2. Branch 2, hairdresser.
- 3. Branch 3, hairstylist.

O. Reg. 949/78, s. 3.

4. An apprentice training program for the certified trade is established and shall consist of,

- (a) training and instruction at full-time educational day classes provided at a college of applied arts and technology in the units of study contained in Schedule 1 for a barber, hairdresser or hairstylist, as the case may be, or any programs of study that in the opinion of the Director, are equivalent thereto; and
- (b) in work experience training provided by the employer of the apprentice in the units of study contained in Schedule 2 for a barber,

hairdresser or hairstylist, as the case may be. O. Reg. 949/78, s. 4.

5. An apprentice in the certified trade shall,

- (a) for Branch 1, complete three periods of related training and work experience of 1,500 hours per period as set out in Column 5 of Schedules 1 and 2;
- (b) for Branch 2, complete three periods of related training and work experience training of 1,500 hours per period as set out in Column 4 of Schedules 1 and 2; and
- (c) for Branch 3, complete three periods of related training and work experience training of 1,580 hours as set out in Column 3 of Schedules 1 and 2. O. Reg. 949/78, s. 5.

6. The subjects of examination for an apprentice in the certified trade shall be based on the units of study contained in Schedules 1 and 2. O. Reg. 949/78, s. 6.

7. A person who is the holder of,

- (a) a certificate of apprenticeship or a certificate of qualification in the trade of barber or hairdresser issued under a predecessor of this Regulation; or
- (b) a certificate of apprenticeship or a certificate of qualification in Branch 1 or Branch 2 of the certified trade,

shall be credited with 4,500 hourly credits by the Director towards a certificate of apprenticeship or a certificate of qualification in Branch 3 of the certified trade. O. Reg. 949/78, s. 7.

8. A person who is the holder of,

- (a) a certificate of apprenticeship or a certificate of qualification in the trade of barber issued under a predecessor of this Regulation together with a certificate of apprenticeship or a certificate of qualification in the trade of hairdresser issued under a predecessor of this Regulation; or
- (b) a certificate of apprenticeship or a certificate of qualification in Branch 1 of the certified trade together with a certificate of apprenticeship or a certificate of qualification in Branch 2 of the certified trade,

shall upon payment of the prescribed fee be issued without examination a certificate of qualification in Branch 3 of the certified trade. O. Reg. 949/78, s. 8.

9. The holder of a certificate of apprenticeship or a certificate of qualification in Branch 3 of the certified trade is entitled to work or be employed as a barber, hairdresser or hairstylist. O. Reg. 949/78, s. 9.

10. The holder of a valid certificate of qualification shall post such certificate in a conspicuous place on the premises where he is engaged in the certified trade. O. Reg. 949/78, s. 10.

11. No person shall become an apprentice in the certified trade unless the person has successfully completed Grade 9 in Ontario or has such other academic qualification that in the opinion of the Director is equivalent thereto. O. Reg. 949/78, s. 11.

12. The rate of wages for an apprentice in the certified trade whether for regular daily hours or for hours in excess of daily hours shall not be less than,

- (a) 50 per cent during the first period of training and instruction;
- (b) 70 per cent during the second period of training and instruction;
- (c) 90 per cent during the third period of training and instruction,

of the average rate of wages or its equivalent for journeymen employed by the employer in the certified trade or where the employer is the only journeyman employed, of the average rate of wages or its equivalent for journeymen in the area. O. Reg. 949/78, s. 12.

13. The number of apprentices who may be employed in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the certified trade, one apprentice plus an additional apprentice for every three journeymen employed by that employer in the certified trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the certified trade, one apprentice for the first journeyman employed by the employer plus one additional apprentice for each additional three journeymen employed by that employer in the certified trade and with whom the apprentice is working. O. Reg. 949/78, s. 13.

14. Notwithstanding section 13, on the recommendation of the provincial advisory committee or a local apprenticeship committee approved under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 949/78, s. 14.

15.—(1) The holder of a certificate of apprenticeship or a certificate of qualification in the certified trade of barber or the certified trade of hairdresser issued under a predecessor of this Regulation shall be deemed to be the holder of a certificate of apprenticeship or a certificate of qualification in Branch 1 or Branch 2 of the certified trade, as the case may be.

(2) A person who is employed under an existing contract of apprenticeship in the certified trade of barber or the certified trade of hairdresser before this Regulation came into force shall be deemed to be employed under a contract of apprenticeship in Branch 1 or Branch 2 of the certified trade, as the case may be, and shall upon completion of the required apprentice training program established under this Regulation and upon passing such final examinations as are prescribed by the Director be entitled to be issued a certificate of apprenticeship or a certificate of qualification for Branch 1 or Branch 2 of the certified trade, as the case may be. O. Reg. 949/78, s. 15.

Schedule 1

HAIRSTYLIST

In School Training

ITEM	COLUMN 1	COLUMN 2	HAIRSTYLIST COLUMN 3	HAIRDRESSER COLUMN 4	BARBER COLUMN 5
	Unit	Instruction to be Given	Training Hours	Training Hours	Training Hours
1	Safety Health Sanitation	Federal Regulations. Local by-laws. Hygiene. Cleaning. Maintenance. Sanitation of shop and salon implements. Fire precaution	10	10	10
2	Facility Design and Equipment	Lighting. Ventilation. C.S.A. approved equipment. Tool & equipment maintenance.	10	10	10
3	Shop Management	Ethics. Professionalism. Types of ownership. Accounting, purchasing, renting, advertising, stock control.	10	10	10
4	Anatomy and Basic Physiology	Body systems. Disorders. Skin and hair composition.	10	10	10
5	Shampoo	Types. Materials. Methodology. Rinsing. Lotions. Tonics. Hairpieces and Wigs.	5	5	5
6	Corrective Hair Treatment	Purpose. Diagnose. Cause. Allergies. Recondition. Set. Dry. Comb. Style hair.	5	5	5
7	Scalp Treatment	Diagnose. Check for allergies. Materials. Equipment. Preparation. Application. Shampoo. Vibrator. Dry and style hair.	5	5	5
8	Scalp Massage	Preparation of patron. Purpose. Basic technique.	5	5	5
9	Cold Waving	Analyses. Prepare. Shampoo. Blot lotion. Solution. Oxidise. Clean-up. Sanitize. Patrons records.	50	50	50
10	Acid Waving	Preparation. Analyses. Shampoo. Dry. Lotion. Wind. Wave. Solution. Oxide. Clean-up. Sanitize. Maintain patrons' records.	20	20	20
11	Thermal Waving	Analyse hair. Types. Shampoo. Lotion. Preparation. Thermal wave. Comb-out. Sanitize. Patrons' records.	20	20	20
12	Hair Straightening	Theory. Product and implement selection. Basescalp. Relaxer. Neutralizer. Conditioner. Set. Dry and style hair. Clean-up. Sanitize. Records.	10	10	10

ITEM	COLUMN 1	COLUMN 2	HAIRSTYLIST COLUMN 3	HAIRDRESSER COLUMN 4	BARBER COLUMN 5
	Unit	Instruction to be given	Training Hours	Training Hours	Training Hours
13	Tinting	Salon colouring. Detrimental conditions. Select type of colouring. Equipment selection. Protective clothing. Tint. Shampoo. Set. Dry. Style. Records.	35	35	35
14	Bleach and Tone	Select lightener. Preparation. Application. Rinse & shampoo. Apply toner. Patrons' records.	60	45	15
15A and 17A	Basic Haircutting	Implement and tool selection. Cutting. Styling. Thinning. Combing. Taper. Brushing. Back combing. Comb-out. Spraying.	45	45	45
15	Hair Cutting Shaping and Designing	Facial features. Styles. Implements. Shampoo. Untangle hair. Recondition hair. Thinning. Cutting. Tapering. Curl. Brushing. Back-comb. Comb-out. Clean-up.	185	185	
16	Facials Make-up and Manicures	Benefits. Skin analysis. Equipment. Manipulation. Make-up materials. Eyebrow arching. Manicure equipment. Cosmetics. Nail shapes. Complete manicure.	10	10	
17	Hair Cutting Shaping and Designing	Preparation. Styles. Equipment. Shampoo. Recondition hair. Untangle hair. Cut hair. Finish hair. Records. Sanitize. Clean-up.	155		155
18	Shaving Moustaches and Beards	Precautions. Preparation. Shaving methodology. Post shaving treatment. Trimming and cutting.	55		55
19	Facial Massage	Benefits. Types. Facial preparation. Facial massage.	15		15

O. Reg. 949/78, Sched. 1.

Schedule 2
HAIRSTYLIST

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	HAIRSTYLIST COLUMN 3	HAIRDRESSER COLUMN 4	BARBER COLUMN 5
	Unit	Work Experience Training	Training Hours	Training Hours	Training Hours
20	Corrective Hair Treatment	Purpose. Diagnose. Cause. Allergies. Shampoo. Blot. Recondition. Set hair. Dry hair. Comb-out. Style hair. Sanitize equipment. Records. Clean-up.	25	25	25
21	Scalp Treatment	Diagnose. Check for allergies. Material and equipment. Application. Shampoo. Vibrator. Manipulate. Dry hair. Style hair. Sterilize and Sanitize. Clean-up.	10	10	10
22	Scalp Massage	Prepare patron. Clothing. Purpose of massage. Basic technique.	10	10	10
23	Cold Waving	Select material. Analysis. Preparation. Shampoo. Blot. Lotion. Waving solution. Oxidize. Clean-up. Sanitize. Patrons' records.			
24	Acid Waving	Select material. Analysis. Shampoo. Dry. Lotion. Wind. Waving solution. Oxide. Clean-up. Sanitize.			
25	Thermal Waving	Analyse hair. Material selection. Types. Shampoo. Lotion. Preparation. Thermal wave. Comb-out. Sanitize. Patrons' records.	500	500	500
26	Hair Straightening	Theory. Selection of products and implements. Base scalp. Application of relaxer. Neutralizer. Conditioner. Set. Dry and style hair. Clean-up.	50	50	50
27	Tinting	Salon colouring. Detrimental conditions. Types of colouring. Selection. Tint application. Shampoo Set. Dry and style hair. Sanitize. Clean-up. Records.			
28	Bleach and Tone	Select lightener. Preparation. Application. Rinse and shampoo. Apply toner. Records. Sanitize.	750	750	750
29	Haircutting Shaping and Designing	Facial features. Styles. Shampoo. Untangle hair. Recondition hair. Thin. Cut. Taper. Part and curl hair. Brush-out. Pin curl. Roller curl. Finger wave. Back comb. Back brush. comb-out. Finish. Clean-up.	2255	2175	

ITEM	COLUMN 1	COLUMN 2	HAIRSTYLIST COLUMN 3	HAIRDRESSER COLUMN 4	BARBER COLUMN 5
	Unit	Work Experience Training	Training Hours	Training Hours	Training Hours
30	Facials Make-ups Manicure	Benefits. Analyse skin. Select treatment and equipment. Conditions. Manipulation. Make-up materials. Eye brow arching. Eye brow make-up. Manicure equipment. Manicure cosmetics. Nail shapes. Massage and manicure.	200	500	
31	Haircutting Shaping and Designing	Hair styles. Shampoo. Recondition hair. Untangle hair. Cut hair. Finish hair. Clean-up. Sanitize equipment.			1675
32	Shaving Moustaches and Beards	Preparation and selection of equipment. Towel effect. Precautions. Shaving methodology. Post shaving treatment. Trim beard and moustache.	100		700
33	Facial Massage	Massage benefits. Types. Face preparation. Facial massage.	100		300

O. Reg. 949/78, Sched. 2.

REGULATION 42

under the Apprenticeship and Tradesmen's Qualification Act

HEAVY DUTY EQUIPMENT MECHANIC

1. In this Regulation,

- (a) "certified trade" means the trade of heavy duty equipment mechanic;
- (b) "heavy duty equipment" means any mobile equipment and attachments thereto, used for building construction, engineering construction, logging, mining and farming operations;
- (c) "heavy duty equipment mechanic" means a person who services, repairs and maintains heavy duty equipment. O. Reg. 419/80, s. 1.

2. The trade of heavy duty equipment mechanic is designated as a certified trade for the purposes of the Act. O. Reg. 419/80, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of five periods of related training and work experience training of 1800 hours per period,

- (a) in courses provided at a location approved by the Director in the units of study contained in Schedule 1; and
- (b) in work experience training provided by the employer of the apprentice in the units of study contained in Schedule 2. O. Reg. 419/80, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the units of study contained in Schedules 1 and 2. O. Reg. 419/80, s. 4.

5. Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of his regular hours of work shall be included in computing the hours spent by him in work experience training. O. Reg. 419/80, s. 5.

6. The rate of wages for an apprentice in the certified trade whether for his regular daily hours of work or for hours of work in excess of his regular daily hours of work shall not be less than,

- (a) 50 per cent during the first period;
- (b) 60 per cent during the second period;
- (c) 70 per cent during the third period;
- (d) 80 per cent during the fourth period;
- (e) 90 per cent during the fifth period;

of the average hourly rate of wages or its equivalent for journeymen employed by an employer in the certified trade and with whom the apprentice is working. O. Reg. 419/80, s. 6.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for each additional journeyman employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, an apprentice for each journeyman employed by that employer in the trade and with whom the apprentice is working.

O. Reg. 419/80, s. 7.

8. Notwithstanding section 7, on the recommendation of the Provincial Advisory Committee or a local apprenticeship committee approved under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 419/80, s. 8.

9. The Director shall issue a progress record book to an apprentice who shall record his related training and work experience training time and the apprentice shall be responsible for the safekeeping of his progress record book. O. Reg. 419/80, s. 9.

10. An applicant for a certificate of qualification in the certified trade who is required to satisfy the Director under clause 11 (4) (b) or (c) of the Act shall submit to the Director proof of experience within the trade that, in the opinion of the Director, is equivalent to work experience training described in the units of study contained in Schedule 2. O. Reg. 419/80, s. 10.

11. Sections 9 and 10 and subsections 11 (2) and (3) of the Act do not apply to a person who works or is employed to work on heavy duty equipment for which a permit has not been issued for use on a highway under the *Highway Traffic Act*. O. Reg. 419/80, s. 11.

12. Notwithstanding section 23 of Regulation 36 of Revised Regulations of Ontario, 1980, a certificate of qualification in the certified trade is not required to be renewed where the holder works or is employed to work solely on heavy duty equipment for which a permit has not been issued for use on a highway under the *Highway Traffic Act*. O. Reg. 419/80, s. 12.

Schedule 1

HEAVY DUTY EQUIPMENT MECHANIC

In-School Training

	COLUMN 1	COLUMN 2
Item	Unit of Study	Instruction to be Given
1	Safe Practices	Identify safety and health hazards. Use of appropriate fire extinguishers. Demonstrate good housekeeping
2	Hand and Power Tools	Identify, use, and maintain hand and power tools
3	Measuring Devices	Identify, use and maintain measuring devices
4	Machine Shop	Perform cutting, drilling, reaming, grinding, honing, knurling, and threading operations
5	Shop Equipment	Identify, use and maintain shop equipment
6	Trade Calculations	Trade related Mathematics, Sciences and schematics
7	Trade Communications	Effective communication, trade related reports, forms and technical publications
8	Welding	Fundamental principles of joining, welding, fusing and cutting metals using oxyacetylene, electric arc and soldering equipment
9	Engines	Operating principles, service, repair and overhaul of engines and engine components
10	Fuel Systems	Operating principles, service, repair and overhaul of gasoline and diesel fuel systems
11	Electrical Systems	Operating principles, service repair and overhaul of vehicle electrical systems
12	Power Trains	Operating principles, service, repair and overhaul of power trains
13	Suspension Steering and Brakes	Operating principles, service, repair and overhaul of suspensions, steering and brakes

O. Reg. 419/80, Sched. 1.

Schedule 2

HEAVY DUTY EQUIPMENT MECHANIC

Work Experience Training

	COLUMN 1	COLUMN 2
Item	Unit of Study	Instruction to be Given
1	Safe Practices	Be aware of shop and road hazards and safety rules
2	Hand and Power Tools	Practice the use and maintenance of hand and power tools
3	Measuring Devices	Practice the use and maintenance of measuring devices
4	Shop Equipment	Practice the use and care of machine shop or shop equipment
5	Welding	Practice welding, cutting, brazing and soldering automotive parts using oxyacetylene and electric arc and soldering equipment
6	Engines	Practice in diagnosing faults and service, repair and overhaul of engines and components
7	Fuel System	Practice in diagnosing faults and service, repair and overhaul of fuel systems
8	Electrical Systems	Practice in diagnosing faults and service, repair and overhaul of electrical systems
9	Power Trains	Practice in diagnosing faults and service, repair and overhaul of power trains
10	Suspension Steering and Brakes	Practice in diagnosing faults and service, repair and overhaul of suspension, steering and brakes
11	Major Components	Removing and replacing of major components

O. Reg. 419/80, Sched. 2.

REGULATION 43

under the Apprenticeship and Tradesmen's Qualification Act

INDUSTRIAL MECHANIC (MILLWRIGHT)

INTERPRETATION

1. In this Regulation "certified trade" means the trade of industrial mechanic (millwright). O. Reg. 685/79, s. 1.

2. The trade of industrial mechanic (millwright) is designated as a certified trade for the purposes of the Act. O. Reg. 685/79, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of four periods of related training and work experience training of 2,000 hours per period,

- (a) at full-time education day classes provided at a college of applied arts and technology in the units of study contained in Schedule 1 or in courses that, in the opinion of the Director, are equivalent thereto; and
- (b) in work experience training provided by the employer of the apprentice in the units of study contained in Schedule 2. O. Reg. 685/79, s. 3.

4. The subjects of examination for an apprentice in the certified trade shall be based on the units of study contained in Schedules 1 and 2. O. Reg. 685/79, s. 4.

5. Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of his regular hours of work experience training shall be included in computing the hours spent by him in work experience training. O. Reg. 685/79, s. 5.

6. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours of work or for hours of work in excess of his regular daily hours of work shall not be less than,

- (a) 60 per cent during the first period;
- (b) 70 per cent during the second period;
- (c) 80 per cent during the third period; and
- (d) 90 per cent during the fourth period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 685/79, s. 6.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for every four journeymen employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus an additional apprentice for each additional four journeymen employed by that employer in the trade and with whom the apprentice is working. O. Reg. 685/79, s. 7.

8. Notwithstanding section 7, on the recommendation of the provincial advisory committee or a local apprenticeship committee approved under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 685/79, s. 8.

9. The Director shall issue a progress record book to an apprentice who shall record his related training and work experience training time and the apprentice shall be responsible for the safekeeping of his progress record book. O. Reg. 685/79, s. 9.

10. An applicant for a certificate of qualification in the certified trade who is required to satisfy the Director under clause 11 (4) (b) or (c) of the Act shall submit to the Director proof of experience within the trade that, in the opinion of the Director, is equivalent to work experience training described in the units of study contained in Schedule 2. O. Reg. 685/79, s. 10.

11.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 685/79, s. 11.

12. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 685/79, s. 12.

Schedule 1

INDUSTRIAL MECHANIC (MILLWRIGHT)

In-School Training

Item	COLUMN 1	COLUMN 2
	Unit	Instruction to be given
1	Safety	Safe work habits. Personal protective clothing. Precautionary measures against accidents. Fire and electrical hazards. Basic first aid.
2	Measuring Devices	Care and use of measuring tools. Measurement and alignment.
3	Layout	Care and use of layout tools. Surface preparation and layout techniques.
4	Hand Tools	Care and use of hand and portable tools.
5	Power Tools	Set up and operation of power machinery.
6	Fastening Techniques	Use of fastening devices and anchors. Procedure and techniques, materials, stress and strain.
7	Lubrication	Purpose and use of lubricants. Inspection and Maintenance.
8	Metallurgy	Structure, physical properties of ferrous and non-ferrous metals. Heat treatment.
9	Fabrication and Erection	Material preparation. Forming, bending. Alignment and erection procedure.
10	Rigging and Machine Moving	Principle and practices of safe rigging and hoisting. Proper use of lifting and moving devices, load weight and balance. Hand signals. Tools and equipment for machine moving.

Item	COLUMN 1	COLUMN 2
	Unit	Instruction to be given
11	Welding Oxy- Acetylene and Arc	Identification and use of welding equipment and accessories cutting, welding and brazing techniques.
12	Trade Calculations	Trade related mathematical calculations. Principle of mechanics. Strength of materials. Application of formulae.
13	Trade Communications	Effective communication. Trade related. Reports, forms and technical publications.
14	Drawing and Blueprint	Interpretation of drawings, blueprints and schematics. Dimensioning, sketching and use of drawing instruments.
15	Bearings	Types, application, installation, care and maintenance.
16	Seals	Types, characteristics, application and installation. Procedures.
17	Shafting and Couplings	Types, application and installation procedures.
18	Clutches	Types, purpose and installation.
19	Drives	Types, purpose and installation.
20	Mechanisms	Types, purpose, routine inspection and maintenance.
21	Electricity	Theory. Wiring diagrams. Test instruments. Hazardous conditions. Types of Motors. Conductors and sheating. Transformer and solenoid operation. Purpose of lockout and grounding.
22	Machine Installation and Levelling	Interpretation of instructions machine component assembly and installation. Alignment and levelling.

Item	COLUMN 1	COLUMN 2
	Unit	Instruction to be given
23	Hydraulics	Theory. Assembly. Hydraulic Circuits. Remedial Procedure.
24	Pneumatics	Theory. Types. Circuits. Remedial Action.
25	Pumps and Valves	Types. Components parts. Operation and Maintenance.
26	Conveyors	Basic Types. Function. Assembly installation and maintenance procedures.
27	Start-up Run-In and Analysis	Pre-Start inspection. Start-up procedure. Adjustment and testing.

O. Reg. 685/79, Sched. 1.

Schedule 2

INDUSTRIAL MECHANIC (MILLWRIGHT)

Work Experience Training

Item	COLUMN 1	COLUMN 2
	Unit	Work Experience Training
1	Trade Practice	Safety Rules, removal of hazards. The <i>Occupational Health and Safety Act</i> . The <i>Building Code Act</i> . Care and use of hand and portable power tools and equipment, measuring devices. Layout techniques. Set-up and operation of power saws and shears, drills, lathes, grinders, milling machines, shapers and slotters. Fabrication techniques; forming and bending sheetmetal; barstock, plate and structural shapes; tubing and hollow sections. Heat treatment, hardness and non-destructive testing. Work erection, handling and positioning. Welding, brazing and soldering. Use of fastenings and adhesives.
2	Lubrication	Lubricants and systems. Familiarization with oil and grease types, classification and applications. Installation of oiling devices and systems. Centralized greasing systems and fittings. Routine checks of lubrication systems. machine operation. Servicing and preventive maintenance.

Item	COLUMN 1	COLUMN 2
	Unit	Work Experience Training
3	Rigging	Equipment hoisting, drifting, balancing. Lifting, rolling, skidding. Blocking and loading operations. Hand signal use. Safe use of hand, electric and pneumatic hoists. Winches and snatch blocks. Slings, ropes, cables, chains and attachments. Mechanical and hydraulic jacks. Rollers and skids. Scaffolding. Rigging equipment inspection, testing, maintenance and storage.
4	Bearings	Plain bearings; selection, installation, locating, oil grooving. Fitting and adjusting. Bearing removal. Anti-friction bearings; selection and installation. Pre-loading and adjustment. Removing, cleaning repacking.
5	Seals	Familiarization with types, applications. Installation of static, dynamic and rotary seals. Seal removal and replacement.
6	Shafting and Couplings	Checking shaft straightness. Installation and alignment. Maintenance and repairs, surface cleaning, building-up worn shafts, straightening. Installation of solid, flexible, universal, friction, compression, magnetic and fluid couplings. Removal and repair. Fitting splines and installation of straight, taper, woodruff, gib, sliding and tangential keys. Key removal.
7	Clutches	Installation of friction, mechanical fluid magnetic and over-running clutches, mountings and operating devices. Balancing, adjustment and maintenance.
8	Drives	Installation and alignment of V, flat and special belt drives. Roller, silent and conveyor chain drives, friction and gear drives, speed reducers. Maintenance and repairs.
9	Mechanisms	Installation of levers, cams and followers, power screws, mechanical springs. Adjustments and maintenance.
10	Location and Levelling	Alignment, levelling and installation of machine sections, components and drives to drawings and specifications. Grouting. Fastener installation, torquing, locking.

Item	COLUMN 1	COLUMN 2
	Unit	Work Experience Training
11	Hydraulics Pumps and Valves	Familiarization with principles. Making up piping, tubing, hoses and fittings. Installation of pumps, accumulators, reservoirs, filters, heat exchangers, cylinders, rotary actuators, motors, boosters. Valves and controls, actuators, pilots limit controls, pressure switches, recorders and controllers, control devices. Starting up, priming, testing and adjustments. Periodic servicing. Maintenance and repairs.
12	Pneumatics	Familiarization with principles. Installation of compressors, fans, blowers and drives. Air receivers and intake filters, valves and controls, pressure switches and limit controls, gauges, recorders and controllers. Piping. Cylinders and motors, rotary actuators, air line controls. Starting-up, testing and adjustment. Periodic servicing, maintenance and repairs, including portable pneumatic tools and paint spraying equipment.
13	Run-In and Analysis	Pre-start inspection of equipment installation, components, systems, service hook-ups, safety devices and controls, to drawings and specifications. Clean up and trades co-ordination. Start up operations; precautions. Tests and adjustments. Diagnosing and correcting abnormal operating conditions.
14	Conveyors	Installation, levelling and alignment of belt, roll, screw and bucket conveyors, miscellaneous conveyors; en masse, drag chain, flight, pallet, trolley, vertical lift, pusher bar, cable, monorail. Drive systems and controls. Servicing and maintenance.

O. Reg. 685/79, Sched. 2.

REGULATION 44

under the Apprenticeship and Tradesmen's Qualification Act

IRONWORKERS

1. In this Regulation,

(a) "certified trade" means the trade of ironworker;

(b) "ironworker" means a person who,

(i) in the field, fabricates, assembles, installs, hoists, erects, dismantles, reconditions, adjusts, alters, repairs or services all structural ironwork, precast and prestressed concrete, concrete reinforcing materials, ferrous and non-ferrous materials in curtain wall, ornamental and miscellaneous metal work and all other materials used in lieu thereof and applies sealants where applicable thereto, and moves and places machinery and heavy equipment, and

(ii) reads and understands all shop and field drawings, including those taken from original architectural and engineering drawings, that are related to the work operations contained in subclause (i),

but does not include a person employed as a shop-man on the fabrication and assembly of materials in an industrial manufacturing plant. O. Reg. 171/73, s. 1.

2. The trade of ironworker is designated as a certified trade for purposes of the Act. O. Reg. 171/73, s. 2.

3.—(1) An apprentice training program is established for the certified trade and shall consist of three periods of related training and work experience training of 2,000 hours for each period,

(a) at full-time educational day classes provided at a college of applied arts and technology in the subjects contained in Schedule 1; and

(b) in work experience training provided by the employer of the apprentice in the subjects contained in Schedule 2.

(2) The total hours of related training and work experience training shall be assigned as shown in Schedules 1 and 2. O. Reg. 171/73, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedules 1 and 2. O. Reg. 171/73, s. 4.

5. Every apprentice in the certified trade shall be at least seventeen years of age. O. Reg. 171/73, s. 5.

6. Every apprentice in the certified trade shall be in good physical health and shall provide medical proof thereof. O. Reg. 171/73, s. 6.

7. No apprentice shall be permitted to engage in the certified trade unless he is capable of climbing to and manoeuvring at heights commonly experienced in the certified trade. O. Reg. 171/73, s. 7.

8.—(1) Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of his regular daily hours of practical work experience training shall be included in computing the hours spent in related training and work experience training.

(2) The Director shall issue a progress record book to an apprentice in the certified trade for the purpose of recording the time spent by the apprentice in respect of related training and work experience training and the apprentice shall be responsible for its safekeeping. O. Reg. 171/73, s. 8.

9. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours or hours in excess of his regular daily hours, shall be not less than,

(a) 60 per cent during the first 1,000 hours of related training and work experience training;

(b) 70 per cent during the second 1,000 hours of related training and work experience training;

(c) 75 per cent during the third 1,000 hours of related training and work experience training;

(d) 80 per cent during the fourth 1,000 hours of related training and work experience training;

(e) 85 per cent during the fifth 1,000 hours of related training and work experience training;

(f) 90 per cent during the sixth 1,000 hours of related training and work experience training,

of the average hourly rate of wages or its equivalent for a journeyman employed by the employer in the certified trade and with whom the apprentice is working. O. Reg. 171/73, s. 9.

10. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

(a) one apprentice for the first journeyman employed by the employer plus one additional apprentice for each additional seven journeymen employed by the employer in the certified trade; and

(b) one apprentice for the first journeyman employed by the employer plus one additional apprentice for each additional five journeymen employed by the employer in the trade where the employer is engaged solely in the occupational skills

described in item 3 or item 4 of Schedule 2. O. Reg. 171/73, s. 10.

11. A contract of apprenticeship shall be entered into by every apprentice with the local apprenticeship committee for the certified trade, established under the Act in the area in which his apprenticeship originates and the apprentice shall be responsible for preparing the reports of his work experience and instruction as prescribed in his progress report book for submission to such local apprenticeship committee. O. Reg. 171/73, s. 11.

12. The local apprenticeship committee shall be responsible for periodic review of the progress of each apprentice and for ensuring that the apprentice obtains the prescribed range of work experience and related training as prescribed in the appendix of the progress record book. O. Reg. 171/73, s. 12.

13.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 171/73, s. 13.

14. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 171/73, s. 14.

Schedule 1

IRONWORKER

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
			Total Hours 636
1	Mathematics (Trade Related)		Addition, subtraction, multiplication, and division of whole numbers, fractions, mixed numbers, decimal fractions. Conversion of common fractions to decimals. Averages and percentages, linear measurement, simple equations. Ratio and proportion. Angle measurement. Areas of squares, rectangles, parallelograms, trapezoids, triangles. Volumes of cubes and cylindrical objects. Measurement of regular and irregular shaped forms.
2	Blueprint Reading	Architectural Structural, Shop Drawings	Types, methods of making, care and handling of prints. Lines and sections. Material symbols. Construction drawing elements, principles, symbols and dimensions. Auxiliary views. Notes and specifications. Steel frame construction members, framing for ore bridges, power houses, highway bridges, factory and office buildings and conveyors. Design and detail drawings. Column, purlin, strut, brace and beam symbols. Concrete reinforcing drawings for reinforcing bars and concrete reinforced steel accessories. Engineering and placing drawings. Wire mesh drawings. Reinforced concrete design drawings. Welding drawings and symbols, curtain wall, sash and other non-ferrous building trim drawings. Pre-cast concrete drawings. Ornamental drawings for doors, frames, stairs, gratings and grilles.
3	Structural Ironwork	Layout and Fabrication Erection and Assembly of Structural Steel Shapes Connecting Hoisting and Installing Care and use of Tools	Methods and procedures for drilling, reaming, burning, cutting, assembling and marking steel members. Methods and procedures for performing the functions of hooking-on, tagging, signalling, connecting, fitting, bolting, rivetting, guying, plumbing, aligning and shimming. Knowledge of bolting, rivetting, pinning, and welding techniques. Knowledge of the care and use of mobile land rigs, cranes, guy derricks, stiff-leg derricks, gin poles, high lines and tuggers. Erecting falsework and scaffolding and a knowledge of the breaking strains and working strengths of cables. Knowledge of chokers, spreaders, chain blocks, rope falls, shackles, rivetting guns, bolting machines, air compressors, burning equipment, welding equipment and jacks. Power activated tools and insert setting tools.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Precast Concrete and Laminated Timbers	Methods of handling precast and prestressed members. Hoisting and placing precast columns, beams, roof and floor slabs, architectural precast units, fascia panels and wall panels.
		Safety Regulations	Safety regulations and procedures for the performance of structural ironwork.
4	Rigging	Care and use of Tools	Splicing tools.
		Tying Knots and making Hitches	Tying knots and making bowline hitches, clovehitch, timber hitch, scaffold hitch, barrel hitch, becket hitch, half hitch and rolling hitch.
		Splicing	Splicing fibre and wire rope by short splicing, long splicing, crown and back splicing methods.
		Handling Ropes	Handling fibre and wire rope, including coiling and uncoiling, cutting, fitting clips and clamps, reeving drums and sheaves.
		Care and use of Slings	Proper use and positioning of chokers, spreaders, hooks, guy lines and anchorage. Knowledge of the breaking strains and working strengths of hoisting cables.
		Care and use of Hoisting Equipment	Knowledge of hoisting equipment including block and tackle, reeving or lacing equipment, chain blocks and come-alongs, skids, rollers, jacks, blocking equipment, cribbing gin poles, stiff-leg derricks, mobile cranes, bull-mooses, and tower cranes.
		Care and use of Scaffolding	Knowledge of scaffolding and tower hoists equipment including planking, swinging scaffolds, suspended scaffolds, needle beams, boatswain chairs and safe-way scaffolding.
		Safety	Safety requirements and procedures for the performance of rigging operations.
5	Reinforcing Ironwork	Knowledge of Materials	Knowledge of the specifications for bar size designations and size marks, bar tags and colours, wire mesh, stirrups, slab spacers, slab and beam bolsters, chairs and lapping.
		Placing Steel	Knowledge of the methods of placing steel in floor slabs, beams, columns, walls, piers, footings and stairways.
		Tying	Knowledge of the method of making snap ties, wrap and snap ties, column ties, wrap and figure eight ties and nail head ties.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Cutting and Bending	Knowledge of the method of cutting, bending, and fabricating steel bars for columns, beams, floor slabs, and stirrup and a detailed knowledge of bend allowances.
		Tools and Associate Equipment	Knowledge of the care and use of pliers, safety belts and reels, twistfers, hickey bars, bolt cutters, bending tables and jigs, power shears and burning equipment.
		Laying of Pans	Methods of installation.
		Post Tensioning of Concrete	Methods of post tensioning.
		Layout Procedures	Knowledge of blueprint reading and bar lists for placing of bars.
		Welding	Knowledge of welding techniques.
		Safety Requirements	Knowledge of the safety regulations and procedures for the performance of reinforcing operations.
6	Ornamental Ironwork and Curtain Wall Installations	Layout	Knowledge of the layout methods for doors, frames, gratings and grilles, hand-rails, stairways, platforms, railings, and miscellaneous ironwork.
		Erecting and Fitting	Knowledge of welding, drilling, burning, bending, fabricating, plumbing and alignment.
		Curtain Wall, Window Wall and Sash	Knowledge of the care and handling and fabrication of aluminum, brass, bronze, stainless steel and other ferrous and non-ferrous building trim. Methods for the installation of automatic door mechanisms.
		Installation of Metal Products	Knowledge of the methods for installing extruded aluminum frames, side jambs, head jambs, sash, division and corner bars. Familiarization with plans and specifications establishing lines and levels, setting anchors, assembling and installing curtain wall components, levelling, aligning, securing, and installing adapters, flashing and sealants.
		Care and use of Tools	Knowledge of ordinary hand tools.
		Sealing	Knowledge of the care and use of resin base, silicon base, polysulphide base, mastic base and polybutane base sealants.
		Safety Procedures	Knowledge of the safety regulations and procedures for the performance of ornamental iron and curtain wall work.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
7	Welding and Burning Equipment	Electric Arc Welding	Knowledge of the care and use of electrodes, AC & DC welding machines, cables and allied equipment. Fundamentals of manual welding of carbon and alloy steels, including proper fit-up, distortion control and cause and control of weld defects. Purpose and techniques for preheating, post heating and stress relieving.
		Cutting and Burning	Knowledge and use of oxy-acetylene equipment, both hand and machine, for flame cutting steel, and piercing. Knowledge and use of carbon-arc equipment for removing steel, making weld grooves and cutting steel.
		Safety	Knowledge of first aid treatment for arc burns to eyes and body, and electric shock. Importance of protective equipment and clothing. Hazards of working on or in vessels or tanks or confined areas.

O. Reg. 171/73, Sched. 1.

Schedule 2**IRONWORKER****Work Experience Training**

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	Structural Ironwork and Rigging		Total Hours 2652
		Layout and Lines	Transferring lines and grades to structure. Laying out structural steel.
		Selection and use of Hand Tools (Non-Cutting Tools)	Wrenches, hammers, pins, clamps, leverage tools, air hose clamps, punches.
		(Cutting Tools)	Cold chisels, handsaws, files, snips, axes, adze, wood boring, wood chisels, flame cutting, carbon arc cutting.
		(Portable Air Tools)	Impact wrenches, drills and reamers, hammers, grinders and brushes, timber saws, rivet passers.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
		(Portable Electric Tools)	Drills, grinders, impact wrenches, ventilating equipment, lumber saws.
		(Miscellaneous)	High mechanical advantage machines, forges, heating torches.
		Rope and Tackle	Selecting rope, installing rope, selecting sheave blocks, installing sheave blocks, installing high line.
		Scaffolds and Falsework	Selecting a hanging scaffold. Hanging a scaffold. Maintaining hanging scaffolds. Selecting a rigid scaffold or walkway, installing and maintaining rigid scaffold or walkway.
		Ladders and Stairways	Selection, erecting, maintaining.
		Barricades and Security	The <i>Occupational Health and Safety Act</i> . Maintaining security. Personal safety equipment.
		Falsework	Erection. Releasing.
		Timberwork	Slinging and handling timber structures.
		Erection Equipment (Cranes)	Types of and usage. Loading, moving and receiving. Setting up. Lifting with cranes. Maintenance.
		(Derricks)	Types of and usage. Loading. Erecting. Lifting and maintenance.
		(Hoists and Winches)	Types and usage. Installation. Operation.
		(Jacks)	Types and usage. Setting up. Operating. Maintenance.
		(Heavy Moving Equipment)	Types, characteristics and purpose. Using.
		(Other Erection Equipment)	Types and usage.
		Erection Techniques (Evaluating Structures)	Types and characteristics.
		(Shipping and Handling)	Loading and unloading structural steel and plate, and precast concrete.
		(Slinging and Hooking-on)	Methods and procedures.
		(Connecting)	Methods and procedures.
		(Field Fabrication)	Methods and procedures.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
		(Plumbing and Alignment) Fastening Techniques (Welding) (Bolting) (Rivetting) (Heavy Structural Pins) Inspection and Testing (Weldments) (Bolts) (Rivets) Safety Procedures	Methods and procedures for columns, spandrels, girts and elevator shafts. Types of electrodes. Equipment. Methods and procedures. Types of bolts. Usage of bolting equipment. Methods and procedures. Types of rivets. Usage of rivetting equipment. Methods and procedures. Installation. Inspection methods and procedures. Methods and procedures. Methods and procedures. Knowledge of the <i>Occupational Health and Safety Act</i> , and all safe practices of the trade.
2	Concrete Reinforcing	Drawings and Codes Types of Reinforced Concrete Construction Application of Steel to Individual Members Reinforcing Bar Fabrication Application of Welded Wire Fabric	Total Hours 872 Types of plans, placing plans, sections, schedules, Concrete Reinforcing Steel Institute recommended practices and Canadian Standards Association A23-1960 standards, trade terminology, applicable reference tables and coding. What is reinforced concrete—buildings, arches, shells, domes, bridges, bins and tanks—prestressed concrete, distinctive structure—reinforced concrete theory. Slip forming for continuous pour. Slabs, beams, joists, spandrel beams, columns, piers, footings, foundation mats, grade beams, sheet piling, bearing piles, caissons, retaining walls, cantilever slabs, cantilever beams, precast plank, slabs with hollow cores, double tees, stringers, abutments, wing wall single tees, tilt up slabs and fascia panels. Grades of steel, deformed or plain bars, standard and special sizes, bar lengths and bending; power and hand shears and benders, oxyacetylene equipment, bundling and tagging, bar markings and tolerances. Common style, laps and placing temperature reinforcement, main reinforcement of solid slabs, slabs on ground.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
		Placing Bars in Structures Care and use of Tools and equipment Inspection Safety Requirements Welding	Receiving, checking, sorting preassembled units, handling by hand or power, placing according to approved shop drawings, bar supports and spacers, lappings, and splicing, tying and welding, repairs, permissible variations, mill scale removal, placement in individual members and structures, laying of pans and post tensioning of concrete. Chokers, slings, hoist signals, scales, and tapes, pliers, wire reel, bolt cutter, power shears, bar benders, hickey, oxyacetylene burning and welding equipment, arc welding equipment. General, check lists. Knowledge of the <i>Occupational Health and Safety Act</i> , and all safe practices of the trade. Arc and processes other than arc welding for making joints in reinforcing steel.
3	Curtain Wall	Layout and Lines Handling Materials Hoisting Materials Assembling on the Site Loose connection of Curtain Wall Sections or Components Line-up and Weld	Total Hours 1070 Measuring job prior to starting work; establishing centres, checking masonry opening, use of plumb lines, dumpy level and transit level. Importance of special care of finished products such as fabricated aluminum and stainless steel. Methods of onsite storage of curtain wall materials and selection of storage areas. Hoists and tuggers, use of slings, chokers. spreaders, hoisting materials, palletized materials, pre-assembled frames. Planning the work, methods to be used, tool and equipment requirements, use of simple electric tools, drills, screw guns and application of sealants to joinery, working from shop drawings and auxiliary part lists or bills of materials, recognition of commonly used screws by size and type, recognition of fabrication errors or omitted operations by reference to shop drawings, corrective re-fabrication, knowledge of sizes of drill bits, taps and use of rivetting tools knowledge of application of neoprene and poly-vinyl chloride glazing and thermal separator strips. Distribution of assembled sections ready for erection. Erection by "stick" system, vertical mullions, horizontals spigotted in place. Erection of frame or panel system. Aligning and plumbing wall to previously established lines and centres. Bolting and shimming to suit. Freezing of anchors by welding. Use of level and transit.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
		Alternate Anchoring Systems	Inserts in concrete, masonry drilling, use of power-actuated tools.
		Application of Insulations	Perimeter, floor slab, spandrel pan and insulation, types of insulations and adhesives used.
		Application of Interior Forms	Formed shapes, gutters, use of painted or porcelain enamel trims.
		Installation of Sash into Curtain Wall	Hopper type centre pivotted, double hung.
		Swing Stage Work (Manual and Electric)	How to erect and safety requirements for handling materials when working on a stage, application of spandrel panels, exterior mullions or trims. Rigging power tools for stage work. Moving swing stages. Exterior caulking from a swing stage.
		Use of Caulking and Sealants	Knowledge of application method and limitations, use of hand caulking tools and air tools.
		Installation of Formed Materials	Field fitting of copings and soffits.
		Application of Protective Coatings and Paper	When is protection necessary? Precautions to be taken, removal procedures.
		Installation of Doors, Entrances and Louvres	Methods of frame erection, butt, centre pivotted and off-set pivot doors, overhead closers, floor closers, automatic closers, glazing procedures for doors.
		Installation of Punched Opening Frames and Sash	Checking opening, levelling and plumbing to ensure optimum operation of sash.
		Installation of Operating Sash	Single and double hung sash. Side hinged, bottom hinged and top projected out casements. Centre pivotted sash.
		Paperwork	Practical reading of architectural and shop drawings, understanding of architectural specifications, co-ordination of shop drawings, making reports in writing from out of town locations.
		Built-up Stages	Erection Methods.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
		Safety Procedures	Knowledge of the <i>Occupational Health and Safety Act</i> , and all safe practices of the trade.
		Auxiliary Knowledge	Care and cleaning of aluminum and stainless steel; anodizing, extruding of aluminum; first aid.
4	Ornamental and Miscellaneous Ironwork	<p>Drawings</p> <p>Layout and Lines</p> <p>Hoisting Materials</p> <p>Assembly and Installation</p> <p>Care and Clean-up of Stainless Steel and Non-Ferrous Materials</p> <p>Safety Requirements</p>	<p>Total Hours 770</p> <p>Reading and understanding of shop drawings. Ability to co-ordinate product placement from shop and architectural drawings.</p> <p>Checking masonry and concrete openings, establishing column centres, wall relations, and floor heights, use of plumb lines and levels.</p> <p>Use of hoists and tuggers, use of rope and tackle, slings.</p> <p>Assembling and installing by bolting and welding; standard stairs and fire escapes, spiral stairs, steel handrails, stainless steel, bronze and aluminum handrails, ladders and cages, catwalk framing, plate and grating flooring, collapsible gates, wire screens and grilles, wire partitions, fences and gates, flagpoles, mail chutes, ferrous and non-ferrous building fascias and panelling, canopies, doors, entrances and louvres related products,</p> <p>Use of abrasive and buffing equipment and materials.</p> <p>Knowledge of the <i>Occupational Health and Safety Act</i>, and all safe practices of the trade.</p>

REGULATION 45

under the Apprenticeship and Tradesmen's Qualification Act

LATHER

1. In this Regulation,

(a) "certified trade" means the trade of a lather;

(b) "lather" means a person who,

(i) plans proposed installations from blueprints, sketches, specifications, building standards and codes,

(ii) installs by tying, nailing, clipping, screwing or welding wire, metal or wood lath, drywall gypsum board or other materials in the construction or repair of walls, partitions, ceilings and arches in any structure,

(iii) erects light metal studs, metal furring components, acoustical ceiling systems and accessories to receive drywall gypsum board, wire and metal lath,

(iv) reads and understands design drawings, manufacturers' literature and installation diagrams,

but does not include a person engaged in the manufacture of equipment or the assembly of a unit, prior to delivery to a building structure or site. O. Reg. 16/76, s. 1.

2. The trade of lather is designated as a certified trade for the purposes of the Act. O. Reg. 16/76, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of three periods of related training and work experience training of 1,800 hours per period,

(a) at full-time educational day classes provided at a college of applied arts and technology or in courses that, in the opinion of the Director, are equivalent thereto in the subjects contained in Schedule 1; and

(b) in practical work experience training provided by the employer of the apprentice

in the subjects contained in Schedule 2. O. Reg. 16/76, s. 3.

4. Notwithstanding section 3 of Regulation 36 of Revised Regulations of Ontario, 1980, a person who has,

(a) graduated in a course for the trade of lather offered in the occupational program of a junior or special vocational school; and

(b) been recommended to the Director by the principal of the school where he completed the course for enrolment as an apprentice in the certified trade,

may be registered as an apprentice in the certified trade. O. Reg. 16/76, s. 4.

5. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedule 1 and Schedule 2. O. Reg. 16/76, s. 5.

6. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

(a) 40 per cent during the first period;

(b) 60 per cent during the second period; and

(c) 80 per cent during the third period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 16/76, s. 6.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

(a) where the employer is a journeyman in the trade, one apprentice plus one additional apprentice for every five journeymen employed by that employer in the trade and with whom the apprentice is working; or

(b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus one additional apprentice for each

additional five journeymen employed by that employer in the trade and with whom the apprentice is working. O. Reg. 16/76, s. 7.

8. Notwithstanding section 7, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 16/76, s. 8.

9. The Director shall issue a progress record book to each apprentice and the apprentice shall record therein the time that he spends in related training and work experience and the apprentice

shall be responsible for the safekeeping of his progress record book. O. Reg. 16/76, s. 9.

10.—(1) Section 9 and subsection 11 (2) of the Act do not apply to a person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 16/76, s. 10.

11. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 16/76, s. 11.

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics (Trade Related)		Addition, subtraction, multiplication, division of whole numbers, fractions, decimals. Metric system: conversion methods. Weights and measures. Ratio and proportion. Percentage, discounts, simple interest. Areas, volumes, linear, angular mensuration. Square root. Scale conversion. Geometry: terms, degrees, curves, angles. Lines, parts of circle; developing arches, stars, pentagons.
2	Business Communications (Trade Related)		Reading comprehension. Trade terminology and usage. Sentence and paragraph structure. Letter and report writing, work and materials orders. Interpretation and use of manufacturers' manuals. Interpretation and use of job specifications, schedules. Oral communication and on-site co-ordination with other trades.
3	Blueprint Reading		Three—view drawing. Instrument use. Sections and material symbols. Dimensioning. Freehand sketching. Plan study of frame, brick veneer, solid masonry, concrete and steel construction; materials, construction members, dimensioning methods, sections and details, schedules, architectural standard symbols. Fire ratings: metal and gypsum lath systems, acoustical ceiling systems, gypsum dry-wall, interior and exterior ceilings and walls. Introduction to isometric drawing. Representation of structural materials used in metal lathing, gypsum drywall systems, acoustical ceilings and insulation. Large scale details of various walls and partitions, column and beam furring, suspended ceilings, light troughs, reflected ceiling plans. Job specifications and quantity estimating.
4	Trade Practice General	Safety Hand Tools	Safety rules and safe operating procedures. Protective clothing and equipment. First aid. Fire prevention; location, use and maintenance of fire fighting equipment. <i>The Workmen's Compensation Act. The Building Code Act. The Occupational Health and Safety Act.</i> Safe use of lifting and hoisting equipment, scaffolds and planking, swing-stages and bosuns chair, pneumatic and electric tools, welding equipment, powder actuated tools. Hazardous area entry precautions. Warning and tagging procedures. Dermatitis protection. Good housekeeping. Selection, care and use of nippers; crescent, todd wire nippers. Screwdrivers, knives (utility), claw hammers. Ball peen hammers; use for driving concrete nails, chisels, driving the magnet, setting small concrete nails. Defective tool and mushroomed head

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
4		Measuring, Layout and Levelling Tools	hazards. Hatchets. Snips; heavy duty, aviation snips. Magnetic nail holders. Cold chisels; flat, round nose, diamond point, cape. Prick and drift punches, hand punch (Whitney), bench punch. Files. Hacksaws.
		Power Tools and Equipment	Selection, care and use of flexible steel tapes. Push-pull tapes. Rulers (straightedge). Steel squares. Marking tools; lead pencils, grease marking pencils. String lines, chalk lines and chalk boxes. Spirit levels, plumb bobs, water levels, laser beam levelling systems. Types, care and use of hand benders, bench benders. Bench cutters, bolt cutters. Bench punches (Whitney). Electric hammers, screw guns, electric drills, air driven nailer. Welding equipment. Staple guns, hammer staplers, bead clinches. Calking tools. Power saws; band saws, radial arm saws, hack saws. Powder actuated tool systems, purpose and care; the tool, powder charge, fastening device. Holding power of fasteners. Manufacturers operating instructions, interpretation, correct application for types of studs and power of charges, operating features and procedures. Safety precautions, use of safety goggles and face masks, compliance with the <i>Occupational Health and Safety Act</i> . Cleaning and maintenance. Selection of correct fastener for job. Testing for correct powder charge. Procedures to minimize spall. Types and characteristics of tubular frame sectional scaffolding, planking, swing-stages and bosuns chairs. Safe erection, securing and dismantling procedures. Types and use of hoisting equipment. Lifting materials, working and removing materials from elevated platforms.
5	Materials	Lath	Types and characteristics of metal lath; expanded, sheet lath. Wire fabric lath; woven, welded. Paper-backed metal lath and wire fabric. Purpose of waterproofing and vapour-proof backing papers. Gypsum lath; plain, perforated, insulating, rock lath, dry wall, veneer plaster board.
		Channels	Types and characteristics: carrying, furring, resilient furring channel. Channel use: in fireproof construction, support for laths in construction of walls and partitions, encasement of columns and beams. Runners, carriers and screw channels. Furring of ceilings. Constructing hollow partitions. Special coatings and purpose: galvanized, painted (rust resistant). Determining sizes and weights of channels.
		Prefabricated Steel Studs	Types and characteristics: truss steel studs, nailable studs, dry wall studs, $\frac{3}{4}$ " furring channel, heavy gauge steel (formed, cut to shape). Use of steel studs; hollow or double partitions, wall furring, column and pilaster construction. Holes and openings to facilitate work of mechanical trades.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
5		Rods, Special Channels and Inserts	Types, characteristics and purpose: pencil rods, carrier channels, furring channels, band iron.
		Hangers and Tie Wires	Types of hangers, characteristics and use: heavy wire, mild steel rods, band iron. Tie wires: monel, galvanized. Inserts: turtle back, drive in, beam flange clamps.
		Metal Lathing Accessories	Types, characteristics and use: clips, cornerite, base screeds. Corner beads, expansion and screed beads, casing beads. Cap molding, shadow molding, picture mold. Corner guards, plaster stops, chair rail, metal base. Ceiling runners or tracks, expanded wing bead or pedex, bull nose bead.
		Manufactured Acoustical Ceiling Systems	Types and characteristics: grid, H and T, Z-bar, soundlock, san-a-coustic, para-line, integrated ceiling systems.
		Door Frames (Metal)	Types and characteristics: one piece for various types of solid plaster and hollow stud partitions. Sectional types for dry-wall partition assemblies.
6	Ceiling Systems	Contact and Furred Ceilings	Interpretation of blueprints, specifications, reflected ceiling plans. Characteristics and purpose of contact ceilings. Characteristics and purpose of furred ceilings: extensive centre to centre spacing, to facilitate installation by mechanical trades. Fire protection. Air return plenums.
		(Erection Procedures)	Preparatory work in conjunction with other trades. Adherence to established trade practices. The <i>Occupational Health and Safety Act</i> local building codes. Safety practices in erection and use of scaffolds, planks, tools and equipment.
		Suspended Ceilings	Interpretation of blueprints, specifications, reflected ceiling plans. Types and characteristics of suspended ceilings: flat, arched, vaulted, groined, flat beamed, coffered. Concealing of electrical conduit, heating and air conditioning ducts, water pipes. Sound isolation suspension. Concealing and fire protection for structural members: beams, girders, trusses. Type, size and spacing of hangers.
		(Erection Procedures)	Preparatory work in conjunction with other trades. Adherence to established trade practices. The <i>Occupational Health and Safety Act</i> local building codes.
		Mechanical Suspended Ceilings, Acoustical	Interpretation of blueprints, specifications and reflected ceiling plan details. Recognition and characteristics of manufacturers design qualities, sound absorption and fire ratings.
		(Erection Procedures)	Layout and installation in accordance with blueprints, reflected ceiling plans and co-ordinating with manufacturers modular specifications. Consideration of sub-structure variations in determining practical method for hanger attachment.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
6		Special Systems	Interpretation of blueprints, specifications, reflected ceiling plans. Layout and construction of templates. Special systems, types and characteristics: arched groined, domed, Gothic, acoustical.
		(Erection Procedures)	Preparatory work in conjunction with other trades. Adherence to established trade practices, Occupational Health and Safety Act standards, local building codes. Use of benders or jigs for bending runners or furring. Application of hangers, furring, channel, metal lath.
7	Partitions, Walls and Vertical Furring	Wood Stud Construction	Interpretation of blueprints and specifications. Types of lath and purpose: metal, gypsum, K lath, radiant heat board, veneer plaster board, dry-wall gypsum board, exterior insulation board. Special characteristics: sound proofing, fire proofing. Fastening devices and procedures.
		(Erection Procedures)	Preparatory work in conjunction with other trades. Importance of firm bond or keying between lath and plaster, plaster to metal lath, gypsum plaster to gypsum lath. Use of backing materials for lath with large openings. Furring out of lath or wire fabric over solid surfaces. Determining type and weights of metal lath by spacing of supports (studs, joists or furring). Metal lath: adherence to established trade practices. The <i>Occupational Health and Safety Act</i> local building codes. Selection, spacing and application of nails, clips, staples, other fastening devices. Wire tying. Overlapping metal lath. Attaching cornerite to internal angles. Gypsum lath: adherence to established trade practices. The <i>Occupational Health and Safety Act</i> local building codes. Staggered pattern application. Attaching cornerite to internal angles. Selection, spacing and application of nails, standard and resilient clips, staples, other fastening devices. Special lath; K lath, radiant heat board.
		Hollow Partitions Construction	Interpretation of blueprints and specifications. Types of hollow partitions and characteristics: prefabricated steel studs, channel studs, sound isolating partitions, sound insulating partitions. X-ray shielding partitions. Fastening devices and procedures: wire tying, nailing or stapling, standard clips, resilient clips, spot welding.
		(Erection Procedures)	Preparatory work in conjunction with other trades. Importance of firm bond or keying between lath and plaster, plaster to metal lath gypsum plaster to gypsum lath. Use of backing materials for lath with large openings. Determining type and weight of metal lath by spacing of supports (studs, joists or furring). Metal lath: adherence to established trade practices. The <i>Occupational Health and Safety Act</i> local building codes. Selection, spacing and application of nails, clips, staples, other fastening devices. Wire tying. Overlapping metal lath. Attaching cornerite to internal angles. Gypsum lath: adherence to established trade practices.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
7		<p>Solid Plaster Partitions</p> <p>(Erection Procedures)</p> <p>Vertical Furring (Curtain Wall)</p> <p>(Erection Procedures)</p>	<p>The <i>Occupational Health and Safety Act</i> local building codes. Staggered pattern application. Attaching cornerite to internal angles. Selection, spacing and application of nails, standard and resilient clips, staples, other fastening devices. Special lath; K lath, radiant heat board.</p> <p>Interpretation of blueprints and specifications. Types of solid plaster partitions and characteristics: with channel studs, without channel studs (with temporary bracing). Fastening devices and procedures: wire tying diamond mesh to one side of studs, use of metal lath centre, or gypsum lath core in studless partitions.</p> <p>Preparatory work in conjunction with other trades. Importance of firm bond or keying between lath and plaster, plaster to metal lath, gypsum plaster to gypsum lath. Use of backing materials for lath with large openings. Determining type and weight of metal lath by spacing of supports (studs, joists or furring). Metal lath: adherence to established trade practices. The <i>Occupational Health and Safety Act</i> local building codes. Selection, spacing and application of nails, clips, staples, other fastening devices. Wire tying. Overlapping metal lath. Attaching cornerite to internal angles. Gypsum lath: adherence to established trade practices. The <i>Occupational Health and Safety Act</i> local building codes. Staggered pattern application. Attaching cornerite to internal angles. Selection, spacing and application of nails, standard and resilient clips, staples, other fastening devices.</p> <p>Interpretation of blueprints and specifications. Vertical furring purpose: fire protection for columns and interior wall framing. Concealing pipes, ducts or columns. Covering irregularities and offsets in walls. Insulating against condensation on inner wall surfaces. Characteristics of vertical furring: free-standing, braced furring. Use of anchoring devices. Self-furring metal and core board. Rib metal lath.</p> <p>Preparatory work in conjunction with other trades. Importance of firm bond or keying between lath and plaster, plaster to metal lath, gypsum plaster to gypsum lath. Use of backing materials for lath with large openings. Determining type and weight of metal lath by spacing of supports (studs, joists or furring). Metal lath: adherence to established trade practices, Occupational Health and Safety Act standards, local building codes. Selection, spacing and application of nails, clips, staples, other fastening devices. Wire tying. Overlapping metal lath. Attaching cornerite to internal angles. Gypsum lath: adherence to established trade practices. The <i>Occupational Health and Safety Act</i> local building codes. Staggered pattern application. Attaching cornerite to internal angles. Selection, spacing and application of nails, standard and resilient clips, staples, other fastening devices. Special lath; K lath, radiant heat board.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
7		Veneer Plaster Base	Interpretation of blueprints and specifications. Veneer plaster base and characteristics. Materials application: large size lath, supporting framework. High density gypsum plaster. Special veneer plaster stops, beads and expansion joints. Fibre-glass tape.
		(Erection Procedures)	Preparatory work in conjunction with other trades. Importance of firm bond or keying between lath and plaster. Use of backing materials for lath with large openings. Gypsum lath: adherence to established trade practices. The <i>Occupational Health and Safety Act</i> local building codes. Staggered pattern application. Attaching cornerite to internal angles. Selection, spacing and application of nails, standard and resilient clips, staples, other fastening devices. Special lath: K lath, radiant heat board.
		Demountable Partitions	Interpretation of blueprints and specifications. Vinyl-faced gypsum board types and characteristics. Insulation, sound reduction qualities. Manufacturers installation instructions. Finishing materials, uses and characteristics: steel stud and feature strip finish. Base molding, aluminium or vinyl. Aluminium feature strips (screwed on). Vinyl feature strips (glued on). Clip-ons. Horizontal or vertical feature strip. Rail height cornice, glazed partitions and all other accessory components.
		(Erection Procedures)	Preparatory work in conjunction with other trades. Adherence to established trade practices. The <i>Occupational Health and Safety Act</i> local building codes. Safety practices in erection and use of scaffolds, planks, tools and equipment.
		Shaft Wall Systems	Interpretation of blueprints and specifications. Characteristics and function of cavity enclosures: air supply and return, bathroom exhaust; elevator, stairwell and plumbing shaft enclosures; smoke shafts. Identification of manufactured gypsum board systems and fire rating qualities.
		(Erection Procedures)	Preparatory work, including layout. Installation of floor and ceiling tracks, including calking of critical seals. Erection of gypsum boards and metal components. Attachment methods.
		Exterior Curtain Walls Non Loadbearing	Interpretation of blueprints and specifications. Identification of metal furring components, floor and ceiling tracks, studs. Metal gauges. Calking of critical seals. Fenestration applications. Types and characteristics of enclosing materials, metal lath, K-lath, cement asbestos board, gypsum sheathing. Fire ratings and fastening methods. Insulations: identification, thermal transmission qualities, installation procedures. Finishes: textured plaster, identification and qualities; metal fascia panels.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
7		(Erection Procedures)	Layout and design in accordance with blueprints. Erection of components in safe, practical and economic procedures. Introduction to swing-stage. Erection of scaffolding. Prefabrication of modular units. Hoisting, placing and fastening units by welding or bolting.
8	Welding	Electric Arc Welding	Interpretation of blueprints, specifications, symbols. Welding principles and terminology. Equipment and operation; Direct Current type (motor-generator). Alternating Current type (transformer). Auxiliary equipment: cables (heavy duty), electrode holders, electrodes. Safety practices; adherence to established trade practices. The <i>Occupational Health and Safety Act</i> . Importance of proper ventilation. Use of welding helmet and approved wearing apparel. Techniques used in arc welding of light gauge mild steel lathing components. Importance of proper arc length: speed of travel, angle of electrode, current setting. Physical characteristics of good welds; strength, ductility, penetration, uniformity.
		Resistance Spot-welding	Types of equipment. Principles of operation. Safety precautions. Time and amperage settings for gauge of metal. Trade related welding operations. Clamping of lathing components. Dressing electrode tips.

O. Reg. 16/76, Sched. 1.

Schedule 2**LATHER****Work Experience Training**

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	Trade Practices (As detailed in Schedule 1)	General	Safety rules and removal of all hazards. The <i>Building Code Act</i> . The <i>Workmen's Compensation Act</i> . The <i>Occupational Health and Safety Act</i> . Care and use of hand tools, measuring, layout and levelling tools, power tools and equipment. Safe use of lifting and hoisting equipment, scaffolds and planking, swing-stages, bosuns chair, pneumatic and electric tools. Welding equipment. Powder actuated tools.
2	Blueprint Reading (As detailed in Schedule 1)	General	Familiarization, interpretation and use of architectural and structural drawings of frame, brick veneer, solid masonry, concrete and steel construction; materials, construction members, dimensioning methods, sections and details, schedules, architectural standard symbols. Building codes. Fire ratings of metal and gypsum lath systems, acoustic ceiling

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
2			systems, gypsum dry-wall, interior and exterior ceiling and walls. Representation of structural materials used in metal lathing, gypsum dry-wall systems, acoustical ceilings, insulation. Large scale details of walls and partitions, column and beam furring, suspended ceilings, light troughs, reflected ceiling plans. Job specifications. Quantity estimating, on-site co-ordination with other trades.
3	Materials (As detailed in Schedule 1)	General	<p>Familiarization with types, characteristics and usage. Metal lath; expanded, sheet lath. Wire fabric lath. Paper-backed metal lath and wire fabric. Gypsum lath; plain, perforated, insulating, rock lath, dry wall, veneer plaster board. Channels: carrying, furring, resilient furring channel. Runners, carriers and screw channels. Prefabricated steel studs: truss steel, nailable, dry wall studs, $\frac{3}{4}$" furring channel, heavy gauge steel (formed, cut to shape).</p> <p>Rods, special channels and inserts: pencil rods, carrier channels, furring channels, band iron. Hangers and tie wires: heavy wire, mild steel rods, band iron. Tie wires: monel, galvanized. Inserts: turtle back, drive in, beam flange clamps. Metal lathing accessories: clips, cornerite, base screeds. Corner, expansion, screed and casing beads. Cap and shadow molding, picture mold. Corner guards, plaster stops, chair rail, metal base. Ceiling runners or tracks, expanded wing bead or pedex, bull nose bead.</p> <p>Manufactured acoustical ceiling systems: grid, H and T, Z-bar, soundlock, san-a-coustic, para-line, integrated ceiling systems. Door frames (Metal): one piece for solid plaster and hollow stud partitions. Sectional types for dry-wall partition assemblies.</p>
4	Ceiling Systems (As detailed in Schedule 1)	<p>Contact and Furred Ceilings</p> <p>Suspended Ceilings</p> <p>Mechanical Suspended Ceilings, Acoustical</p> <p>Special Systems</p>	<p>Use of blueprints, specifications, reflected ceiling plans. Layout, preparation and installation of contact ceilings and furred ceilings. Erection and use of scaffolds, planks, tools and equipment.</p> <p>Use of blueprints, specifications, reflected ceiling plans. Preparation, layout and installation of suspended ceilings: flat, arched, vaulted, groined, flat beamed, coffered types. Sound isolation suspension. Fire protection of structural members: beams, girders, trusses.</p> <p>Use of blueprints, specifications, reflected ceiling plans. Manufacturers design qualities, sound absorption, fire ratings. Layout and installation in accordance with manufacturers modular specifications and sub-structure variations.</p> <p>Use of blueprints, specifications, reflected ceiling plans. Layout and construction of templates, arched, groined, domed, Gothic and acoustical systems.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
5	Partitions, Walls and Vertical Furring (As detailed in Schedule 1)	Wood Stud Construction	Use of blueprints and specifications. Preparation and installation of metal lath. Application of fastening devices. Wire tying. Overlapping metal lath. Attaching cornerite. Preparation and installation of gypsum lath. Staggered application. Attaching cornerite. Application of fastening devices. Use of special lath; K lath, radiant heat board, veneer plaster board, dry-wall gypsum board, exterior insulation board.
		Hollow Partitions	Use of blueprints and specifications. Use of pre-fabricated steel studs, channel studs. Construction of sound isolating and sound insulating partitions. X-ray shielding partitions. Use of backing materials. Spacing supports. Preparation and installation of metal lath. Application of fastening devices. Wire tying. Overlapping metal lath. Attaching cornerite. Preparation and installation of gypsum lath: Staggered application. Attaching cornerite. Application of fastening devices. Use of special lath; K lath, radiant heat board.
		Solid Plaster Partitions	Use of blueprints and specifications. Construction of solid plaster partitions with or without channel studs. Wire tying diamond mesh to one side of studs, use of metal lath centre, or gypsum lath core in studless partitions. Use of backing materials. Spacing supports. Preparation and installation of metal lath. Application of fastening devices. Wire tying. Overlapping metal lath. Attaching cornerite. Preparation and installation of gypsum lath. Staggered application. Attaching cornerite. Application of fastening devices.
		Vertical Furring (Curtain Wall)	Use of blueprints and specifications. Installation of vertical furring: free-standing, braced furring. Use of anchoring devices, self-furring metal and core board, rib metal lath. Use of backing materials. Spacing supports. Preparation and installation of metal lath. Application of fastening devices. Wire tying. Overlapping metal lath. Attaching cornerite. Preparation and installation of gypsum lath. Staggered application. Attaching cornerite. Application of fastening devices. Use of special lath; K lath, radiant heat board.
		Veneer Plaster Base	Use of blueprints and specifications. Application of large size lath, supporting framework. High density gypsum plaster. Special veneer plaster stops, beads, expansion joints. Fibre-glass tape. Use of backing materials. Preparation and installation of gypsum lath. Staggered application. Attaching cornerite. Application of fastening devices. Use of special lath; K lath, radiant heat board.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
5		Demountable Partitions	Use of blueprints, specifications, and manufacturers installation instructions. Installation of vinyl-faced gypsum board and finishing materials: steel stud and feature strip finish. Base molding, aluminium or vinyl. Aluminium and vinyl feature strips. Clip-ons. Horizontal or vertical feature strip. Rail height cornice, glazed partitions and all other accessory components.
		Shaft Wall Systems	Use of blueprints and specifications. Manufactured board systems and fire ratings. Preparation and layout of cavity enclosures; air supply and return, bathroom exhaust; elevator, stairwell and plumbing shaft enclosures; smoke shafts. Installation of floor and ceiling tracks, calking critical seals. Erection and attachment of gypsum boards and metal components.
		Exterior Curtain Walls Non Load-bearing	Use of blueprints and specifications. Layout, design and installation of metal furring components, floor and ceiling tracks, studs, enclosing materials, insulation, finishing materials. Calking critical seals. Erecting, operating and working on swing-stages and scaffolding. Prefabrication of modular units in accordance with blueprints and specifications. Hoisting, placing and fastening units by welding or bolting.
6	Welding (As detailed in Schedule 1)	General	Positioning, clamping and arc welding, resistance spot-welding of steel lathing components.

O. Reg. 16/76, Sched. 2.

REGULATION 46

under the Apprenticeship and Tradesmen's Qualification Act

LINEMAN

INTERPRETATION

1. In this Regulation,

- (a) "certified trade" means the trade of lineman;
- (b) "lineman" means a person who,
 - (i) operates, maintains and services power lines used to conduct electricity from generating plants to consumers, and
 - (ii) constructs or assembles a system of power lines used to conduct electricity from generating plants to consumers. O. Reg. 686/79, s. 1.

2.—(1) The certified trade is composed of two branches.

(2) Branch 1 is power lineman as defined in subclauses 1 (b) (i) and (ii).

(3) Branch 2 is construction lineman as defined in subclause 1 (b) (ii). O. Reg. 686/79, s. 2.

3. The trade of lineman is designated as a certified trade for the purposes of the Act. O. Reg. 686/79, s. 3.

4. An apprentice training program is established for the certified trade and shall consist of four periods of related training and work experience training of 2000 hours for each period for Branch 1; and three periods of related training and work experience training consisting of one period of 2500 hours and two periods of 2000 hours for Branch 2,

- (a) at full-time educational day classes provided at a location approved by the Director, in the units of study contained in Schedule 1 for Branch 1 of the certified trade or in the units of study contained in Schedule 3 for Branch 2 of the certified trade or in the subjects that in the opinion of the Director are equivalent thereto; and
- (b) in practical training and instruction provided by the employer of the apprentice in the units of study contained in Schedule 2 for Branch 1 of the certified trade or in the units of study contained in Schedule 4 for Branch 2 of the certified trade. O. Reg. 686/79, s. 4.

5. The subjects of examination for an apprentice in Branch 1 of the certified trade shall be based on the units of study contained in Schedules 1 and 2 and the subjects of examinations for an apprentice in Branch 2 of the certified trade shall be based on the units of study contained in Schedules 3 and 4. O. Reg. 686/79, s. 5.

6. The holder of a certificate of apprenticeship or certificate of qualification in Branch 2 of the certified trade is entitled to a certificate of apprenticeship or certificate of qualification in Branch 1 of the certified trade upon completion of a further three periods of training and instruction of 1500 hours for each period that shall include a course of study approved by the Director. O. Reg. 686/79, s. 6.

7. Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of his regular hours of work experience training shall be included in computing the hours spent by him in work experience training. O. Reg. 686/79, s. 7.

8. The rate of wages for an apprentice in the certified trade whether for his regular daily hours of work or for hours of work in excess of regular daily hours of work shall not be less than,

- (a) for Branch 1,
 - (i) 40 per cent during the first period,
 - (ii) 50 per cent during the second period,
 - (iii) 60 per cent during the third period,
 - (iv) 70 per cent during the fourth period; and
- (b) for Branch 2,
 - (i) 40 per cent during the first period,
 - (ii) 55 per cent during the second period,
 - (iii) 70 per cent during the third period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in the certified trade and with whom the apprentice is working. O. Reg. 686/79, s. 8.

9. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

(a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for each additional journeyman employed by that employer in the trade and with whom the apprentice is working; and

(b) where the employer is not a journeyman in the trade, one apprentice for each journeyman employed by that employer in the trade and with whom the apprentice is working. O. Reg. 686/79, s. 9.

10. Notwithstanding section 9, on the recommendation of the Provincial Advisory Committee or a Local Apprenticeship Committee approved under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 686/79, s. 10.

11. The Director shall issue a progress record book to an apprentice who shall record his related training and work experience training time and the

apprentice shall be responsible for the safekeeping of his progress record book. O. Reg. 686/79, s. 11.

12. An applicant for a certificate of qualification in Branch 1 or Branch 2 of the certified trade who is required to satisfy the Director under clause 11 (4) (b) or (c) of the Act shall submit to the Director proof of experience within the trade that, in the opinion of the Director, is equivalent to work experience training described in the units of study contained in Schedule 2 or Schedule 4, as the case may be. O. Reg. 686/79, s. 12.

13.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 686/79, s. 13.

14. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 686/79, s. 14.

Schedule 1

BRANCH 1 — POWER LINEMAN

In-School Training

Item	COLUMN 1	COLUMN 2
	Unit	Instruction to be given
1	Field Vestibule	Select and use personal protective equipment. Climb poles/structures. Work on de-energized lines. Select and use small line work tools. Knowledge of trade safety practices, first aid kit and fire extinguisher use.
2	Safety	Pole top rescue. Artificial respiration. Work protection code. Temporary grounds. Good work area housekeeping. Protective equipment. Potential electrical and mechanical hazard recognition. Develop safe work habits.
3	Theory	Live line work. Series and parallel circuits. Electrical measurement. Co-ordinated systems. Distribution transformer. Anchors. Temporary grounds. Ground resistance. Aerial devices. Voltages. Voltage regulator. Mobile transformer. Tree trimming.
4	Installation Practices	Work order interpretation. Live line tool techniques. Splice, string, sag, dead-end clamp-in, tape, tap, cable and conductor terminal connection. Aerial device operation. Voltage regulators.
5	Tools & Equipment	Use and maintain trade related hand and power tools. Ampac tool. Rope and snatch blocks. Chain and cable hoists. Boom equipped vehicle.
6	Trade Calculations	Rigging principles. Weights and tension, additional loading. Rope and block, slings and two-part line, work load limits.

Schedule 2

BRANCH 1 — POWER LINEMAN

Work Experience Training

Item	COLUMN 1	COLUMN 2
	Unit	Work Experience Training
1	Core Skills/ Protective Practices	Knowledge of all trade related safety practices. Recognition and removal of all hazards. Pole climbing, use of safety belt and hand-line. Working on energized lines. Pole-top rescue, first aid and resuscitation methods. Safe rigging procedures.
2	Tools and Equipment	Care and use of trade related hand and power tools and equipment. Insulated aerial devices. Boom equipment. Mobile hydraulic, electric, pneumatic and power equipment.
3	Pole Structures	Preparation, installation and removal of Pole Structures and related workpieces.
4	Conductors/ Cables	Handling, installation and removing secondary overhead services and bus, primary conductors. Installing secondary underground services and bus. Installing primary underground cable.
5	Isolating and Protective Devices	Installing, removing and operating isolating and protective devices overhead and underground.
6	Transformers	Installing and removing overhead transformers. Installing and removing transformer underground.
7	Capacitors & Regulators	Installing and removing capacitor bank complete. Installing and removing voltage regulators.
8	Street Lighting	Installing and removing street lighting system.

Schedule 3

BRANCH 2 — CONSTRUCTION LINEMAN

In-School Training

Item	COLUMN 1	COLUMN 2
	Unit	Instruction to be given
1	Field Vestibule	Select and use personal protective equipment. Climb poles and structures. Work on de-energized lines. Select and use small line work tools. Knowledge of safe work habits, related safety practices, first aid kit and fire extinguisher use.
2	Safety	Pole top rescue. Artificial respiration. Work protection code. Temporary ground. Good work area housekeeping. Protective equipment. Potential electrical and mechanical hazards. Safe work habits.
3	Theory	Energized electrical circuits. Trade hazards, crane signals. Load connection. Tower section identification. Electrical theory and measurement. Rope and line use.
4	Installation	Interpret work orders. Temporary ground. Splices. Rider poles and arms. Insulators and travellers. Knots and hitches. Clamp-in. Re-fuse. Oil circuit reclosers. Dead-end. Sag. Cover up. Crane work. Rigging.
5	Tools & Equipment	Trade related tools. Ampac tool. Rope, snatch blocks. Chain and cable hoists. Temporary grounds.
6	Trade Calculation	Rigging principles. Conductor. Weight, tension, additional loading. Slings and line use. Rope and block work load limit.

Schedule 4

BRANCH 2 — CONSTRUCTION LINEMAN

Work Experience Training

Item	COLUMN 1	COLUMN 2
	Unit	Work Experience Training
1	Core Skills/ Protective Devices	Knowledge of all trade related safety practices. Recognition and removal of hazards. Pole and structure climbing. Use of personal safety tools, safety belts, handline and equipment. Use of small hand tools.
2	Tools & Equipment	Care and use of trade related tools, accessories and equipment. Grip-all clamp stick. Chain hoists. Presses. Amp-tool. Temporary grounds. Rope. Torque wrench.
3	Pole Structures	Preparation, installation and removal of structure and related workpiece/component. Voltages, identification of circuits and sections. Rigid cover-up equipment.
4	Conductors	Handling. Installing and removing conductors.
5	Isolating and Protective Devices	Installing, removing and operating isolating and protective devices. Reclosures and sectionalizers. Air break switches. Permanent grounding.

O. Reg. 862/79, s. 1, *part.*

REGULATION 47

under the Apprenticeship and Tradesmen's Qualification Act

MOTOR VEHICLE MECHANIC

INTERPRETATION

1. In this Regulation,

- (a) "certified trade" means the trade of motor vehicle mechanic;
- (b) "motor vehicle" means a motor vehicle or trailer as defined under the *Highway Traffic Act* and for which a permit has been issued for use on a highway under the *Highway Traffic Act* but does not include a motorcycle or a motor assisted bicycle;
- (c) "motor vehicle mechanic" means a person engaged in the servicing, repairing, overhauling, diagnosing or inspecting of motor vehicles who,
 - (i) disassembles, adjusts, repairs and reassembles engines, transmissions, clutches, rear ends, differentials, brakes, drive shafts, axles and other assemblies,
 - (ii) tests, diagnoses and corrects faulty alignment of wheels and steering mechanisms, manual or power,
 - (iii) diagnoses faults, repairs or replaces suspension systems, including shock absorbers and spring assemblies,
 - (iv) diagnoses faults, installs, repairs and removes ignition systems, generators, alternators, starters, coils, panel instruments, wiring and other electrical systems and equipment,
 - (v) diagnoses faults, repairs and adjusts fuel systems,
 - (vi) performs complete engine tune-ups, and
 - (vii) diagnoses faults, installs, inspects, maintains and removes motor vehicle air-conditioning and refrigeration systems,

but does not include a person who is permanently employed for the limited purpose of,

- (viii) removing and replacing auto glass,
- (ix) removing and replacing exhaust systems,

(x) removing and replacing radiators, or

(xi) removing and replacing shock absorbers or springs that do not require the realignment of the front or rear suspension. O. Reg. 43/80, s. 1.

2. The trade of motor vehicle mechanic is designated as a certified trade for the purposes of the Act. O. Reg. 43/80, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of five periods of related training and work experience training of 1800 hours per period,

- (a) in courses provided at a location approved by the Director in the units of study contained in Schedule 1; and
- (b) in work experience training provided by the employer of the apprentice in the units of study contained in Schedule 2. O. Reg. 43/80, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the units of study contained in Schedules 1 and 2. O. Reg. 43/80, s. 4.

5. Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of his regular hours of work shall be included in computing the hours spent by him in work experience training. O. Reg. 43/80, s. 5.

6. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours of work or for hours of work in excess of his regular daily hours of work shall not be less than,

- (a) 50 per cent during the first period;
- (b) 60 per cent during the second period;
- (c) 70 per cent during the third period;
- (d) 80 per cent during the fourth period;
- (e) 90 per cent during the fifth period,

of the average hourly rate of wages or its equivalent for journeymen employed by an employer in the certified trade and with whom the apprentice is working. O. Reg. 43/80, s. 6.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

(a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for each additional journeyman employed by that employer in the trade and with whom the apprentice is working; and

(b) where the employer is not a journeyman in the trade, an apprentice for each journeyman employed by that employer in the trade and with whom the apprentice is working. O. Reg. 43/80, s. 7.

8. Notwithstanding section 7, on the recommendation of the provincial advisory committee or a local apprenticeship committee approved under the Act for the certified trade, the Director may determine the ratio

of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 43/80, s. 8.

9. The Director shall issue a progress record book to an apprentice who shall record his related training and work experience training time and the apprentice shall be responsible for the safe-keeping of his progress record book. O. Reg. 43/80, s. 9.

10. An applicant for a certificate of qualification in the certified trade who is required to satisfy the Director under clause 11 (4) (b) or (c) of the Act shall submit to the Director proof of experience within the trade that, in the opinion of the Director, is equivalent to work experience training described in the units of study contained in Schedule 2. O. Reg. 43/80, s. 10.

Schedule 1

MOTOR VEHICLE MECHANICS

In-School Training

	COLUMN 1	COLUMN 2
Item	Unit of Study	Instruction to be Given
1	Safe Practices	Identify safety and health hazards. Use of appropriate fire extinguishers. Demonstrate good housekeeping.
2	Hand and Power Tools	Identify use, and maintain hand and power tools.
3	Measuring Devices	Identify, use and maintain measuring devices.
4	Machine Shop	Perform cutting, drilling, re-surfacing, reaming, grinding, boring, honing, knurling, and threading operations.
5	Shop Equipment	Identify, use and maintain shop equipment.
6	Trade Calculations	Trade related Mathematics, Sciences, and schematics.
7	Trade Communications	Effective communication, trade related reports, forms and technical publications.
8	Welding	Fundamental principles of joining, welding, fusing and cutting metals using oxyacetylene, electric arc and soldering equipment.
9	Engines	Operating principles, service, repair and overhaul of engines and engine components.
10	Fuel Systems	Operating principles, service, repair and overhaul of gasoline and diesel fuel systems.
11	Electrical Systems	Operating principles, service, repair and overhaul of vehicle electrical systems.
12	Air Conditioning	Safety practices, removal and replacement of air-conditioning units.
13	Power Trains	Operating principles, service, repair and overhaul of power trains.
14	Suspension, Steering	Operating principles, service, repair and overhaul of suspension, steering and brakes.

Schedule 2

MOTOR VEHICLE MECHANICS

Work Experience Training

	COLUMN 1	COLUMN 2
Item	Unit of Study	Instruction to be Given
1	Safe Practices	Be aware of shop and road hazards and safety rules.
2	Hand and Power Tools	Practice the use and maintenance of hand and power tools.
3	Measuring Devices	Practice the use and maintenance of measuring devices.
4	Shop Equipment	Practice the use and care of machine shop or shop equipment.
5	Welding	Practice welding, cutting, brazing and soldering parts using oxyacetylene and electric arc and soldering equipment.
6	Engines	Practice in diagnosing faults and service, repair and overhaul of engines and components.
7	Fuel System	Practice in diagnosing faults and service, repair and overhaul of fuel systems.
8	Electrical Systems	Practice in diagnosing faults and service, repair and overhaul of electrical systems.
9	Power Trains	Practice in diagnosing faults and service, repair and overhaul of power trains.
10	Suspension, Steering and Brakes	Practice in diagnosing faults and service, repair and overhaul of suspension, steering and brakes.
11	Major Components	Removing and replacing major components.

O. Reg. 464/80, s. 1, *part.*

REGULATION 48

under the Apprenticeship and Tradesmen's Qualification Act

MOTORCYCLE MECHANIC

INTERPRETATION

1. In this Regulation,

(a) "certified trade" means the trade of motorcycle mechanic;

(b) "motorcycle" means a self-propelled vehicle,

(i) having a seat or saddle for the use of the driver and designed to travel on not more than three wheels in contact with the ground and includes a motor scooter but does not include a motor assisted bicycle, and

(ii) for which a permit has been issued under the *Highway Traffic Act*;

(c) "motorcycle mechanic" means a person who services, repairs, overhauls and inspects motorcycles and tests them for faults or road-worthiness. O. Reg. 865/80, s. 1.

2. The trade of motorcycle mechanic is designated as a certified trade for the purposes of the Act. O. Reg. 865/80, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of three periods of related training and work experience training of 1,800 hours per period,

(a) in courses provided at a location approved by the Director in the units of study contained in Schedule 1; and

(b) in work experience training provided by the employer of the apprentice in the units of study contained in Schedule 2. O. Reg. 865/80, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the units of study contained in Schedules 1 and 2. O. Reg. 865/80, s. 4.

5. Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of the apprentice's regular hours shall be included in computing the hours

spent by the apprentice in work experience training. O. Reg. 865/80, s. 5.

6. The rate of wages for an apprentice in the certified trade whether for the apprentice's regular daily hours of work or for hours of work in excess of the apprentice's regular daily hours of work shall not be less than,

(a) 50 per cent during the first period;

(b) 70 per cent during the second period; and

(c) 90 per cent during the third period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in the certified trade and with whom the apprentice is working. O. Reg. 865/80, s. 6.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

(a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for each additional journeyman employed by that employer and with whom the apprentice is working; and

(b) where the employer is not a journeyman in the trade, an apprentice for each journeyman employed by that employer in the trade and with whom the apprentice is working. O. Reg. 865/80, s. 7.

8. Notwithstanding section 7, on the recommendation of the provincial advisory committee or a local apprenticeship committee approved under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 865/80, s. 8.

9. The Director shall issue a progress record book to an apprentice who shall record the related training and work experience training time and the apprentice shall be responsible for the safe-keeping of the progress record book. O. Reg. 865/80, s. 9.

10. An applicant for a certificate of qualification in the certified trade who is required to satisfy the Director under clause 11 (4) (b) or (c) of the Act shall submit to the Director proof of experience within the trade that, in the opinion of the Director, is equivalent to work experience training described in the units of study contained in Schedule 2. O. Reg. 865/80, s. 10.

Schedule 1

MOTORCYCLE MECHANIC

In-School Training

ITEM	COLUMN 1	COLUMN 2
	Unit of Study	Instruction to be given
1	Safe Practices	Identify safety and health hazards. Use of appropriate fire extinguishers.
2	Hand and Power Tools	Identify, use and maintain hand and power tools.
3	Measuring Devices	Identify, use and maintain measuring devices.
4	Shop Equipment	Identify, use and maintain shop equipment.
5	Machine Shop	Perform cutting, drilling, grinding, knurling and threading operations.
6	Engines	Operating principles, service, repair and overhaul and the diagnosing of faults.
7	Transmission Mechanisms	Operating principles, service, repair and overhaul of, and diagnose faults in, transmission mechanisms.
8	Electrical Systems	Operating principles, service, repair and diagnose faults of electrical systems.
9	Fuel Systems	Operating principles, service and repair of, and diagnose faults in, fuel systems.
10	Frames, Wheels and Brakes	Operating principles, service, repair and overhaul of, and diagnose faults in, frames, wheels and brakes.
11	Welding	Fundamental principles of joining, welding, fusing and cutting metals using oxyacetylene electric arc and soldering equipment.
12	Trade Calculations	Trade related mathematics, english and sciences.
13	Trade Communications	Effective communications trade related reports, forms and technical publications.

O. Reg. 865/80, Sched. 1.

Schedule 2

MOTORCYCLE MECHANIC

Work Experience Training

ITEM	COLUMN 1	COLUMN 2
	Unit of Study	Instruction to be given
1	Safe Practices	Be aware of shop hazards and safety rules.
2	Hand and Power Tools	Practise the use and maintenance of hand and power tools.
3	Measuring Devices	Practise the use and maintenance of measuring devices.
4	Shop Equipment	Practise the use and care of shop equipment.
5	Engines	Practise the servicing, repairing and overhauling of, and diagnosing faults in, engines and components.
6	Transmission Mechanisms	Practise the servicing, repairing and overhauling of, and diagnosing faults in, transmission mechanisms.
7	Electrical Systems	Practice in the servicing and repairing of, and diagnosing faults in, electrical systems.
8	Fuel Systems	Practice in the servicing and repairing of, and diagnosing faults in fuel systems.
9	Frames, Wheels and Brakes	Practice in the servicing, repair and overhauling of, and diagnosing faults in, frames, wheels and brakes.
10	Welding	Practice in joining, welding, fusing and cutting metals using oxyacetylene, electric arc and soldering equipment.

O. Reg. 865/80, Sched. 2.

REGULATION 49

under the Apprenticeship and Tradesmen's Qualification Act

MOULD MAKER

INTERPRETATION

1. In this Regulation,

- (a) "certified trade" means the trade of mould maker;
- (b) "mould maker" means a person who,
 - (i) sets up and operates to prescribed tolerances engine lathes and milling, grinding, drilling, sawing and boring machines,
 - (ii) reads and interprets blueprints, operation or product related reference charts and tables and selects mechanical measuring and checking and layout tools and devices,
 - (iii) performs measuring, checking and layout operations and selects work piece materials and the required cutting tools and abrasives for metal removal operations,
 - (iv) performs metal removal operations using hand and power tools and selects work piece clamping and holding devices and product-related components,
 - (v) performs hand finishing and polishing operations on moulds, and
 - (vi) assembles and tests moulds for application purposes,

but does not include a person or class of persons in a limited purpose occupation that, in the opinion of the Director, does not equate with the definition of mould maker. O. Reg. 867/80, s. 1.

2. The trade of mould maker is designated as a certified trade for the purposes of the Act. O. Reg. 867/80, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of four periods of related training and work experience training of 2,000 hours per period,

- (a) at full-time educational day classes provided at a location approved by the Director or in

courses that in the opinion of the Director are equivalent thereto in each of the units of study contained in Schedule 1; and

- (b) work experience training provided by the employer of the apprentice in the units of study contained in Schedule 2. O. Reg. 867/80, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the units of study contained in Schedules 1 and 2. O. Reg. 867/80, s. 4.

5. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours of work or for hours of work in excess of his regular daily hours of work, shall be not less than,

- (a) 50 per cent during the first 1,000 hours of related training and work experience training;
- (b) 55 per cent during the second 1,000 hours of related training and work experience;
- (c) 60 per cent during the third 1,000 hours of related training and work experience;
- (d) 65 per cent during the fourth 1,000 hours of related training and work experience;
- (e) 70 per cent during the fifth 1,000 hours of related training and work experience;
- (f) 75 per cent during the sixth 1,000 hours of related training and work experience;
- (g) 80 per cent during the seventh 1,000 hours of related training and work experience; and
- (h) 85 per cent during the eighth 1,000 hours of related training and work experience,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 867/80, s. 5.

6. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for each additional journeyman employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for each journeyman

employed by that employer in the trade and with whom the apprentice is working. O. Reg. 867/80, s. 6.

7. Notwithstanding section 6, on the recommendation of the provincial advisory committee or a local apprenticeship committee appointed under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 867/80, s. 7.

8. The Director shall issue a progress record book to an apprentice for the purpose of recording his related training and work experience training time and the apprentice shall be responsible for keeping his progress record book up-to-date and for its safekeeping. O. Reg. 867/80, s. 8.

9. An applicant for a certificate of qualification in the certified trade who is required to satisfy the Direc-

tor under clause 11 (4) (b) or (c) of the Act shall submit to the Director proof of experience within the trade that, in the opinion of the Director, is equivalent to work experience training described in the units of study contained in Schedule 2. O. Reg. 867/80, s. 9.

10.—(1) Subsection 11 (2) of the Act does not apply to a person who works or is employed in the certified trade.

(2) Subsection 11 (3) of the Act does not apply to an employer in the certified trade. O. Reg. 867/80, s. 10.

11. Section 5 of Regulation 36 of Revised Regulations of Ontario, 1980 does not apply to the certified trade. O. Reg. 867/80, s. 11.

12. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 867/80, s. 12.

Schedule 1

MOULD MAKER

In-School Training

ITEM	COLUMN 1	COLUMN 2
	Unit of Study	Instruction to be given
1	Safety	Safe work habits. Protective clothing and equipment.
2	Blueprint Reading Reference Charts and Sketching	Interpretation of blueprints, reference charts, charts and sketching.
3	Hand Tools and Benchwork	Care and use of hand tools. Fasteners and their application.
4	Measuring Tools	Care and use of precision measuring devices.
5	Trade Calculations	Calculation of geometrical values, ratios and formulae.
6	Layout	Care and use of layout tools. Surface preparation and layout techniques.
7	Metallurgy	Heat treatment of ferrous metals including furnace and torch hardening, cyaniding and hardness testing. Chemical and physical properties and identification of ferrous, non-ferrous and plastic materials.
8	Power Tools	Drilling, reaming, tapping, knurling, lapping, boring procedures. Set up and operate power hack-saws. Vertical band saws, radial drill presses, engine lathes, horizontal boring mills, horizontal cylindrical universal and tool and cutter grinders.
9	Mould-Making	Mould-making operations, special hand/power tools and assembly procedures

Schedule 2

MOULD MAKER

Work Experience Training

ITEM	COLUMN 1	COLUMN 2
	Unit of Study	Instruction to be given
1	Safety	Knowledge and application of safe work practices; recognition of hazards and precautionary measures.
2	Shop Techniques/ Practices	Care and use of hand, bench and portable power tools, jigs and fixtures, precision measuring equipment. Application of tool geometry, twist drills, tool bits, cutters and abrasives, edges, clearances and angles.
3	Machine/Equipment/ Accessories	Power saws: machine nomenclature, care and use of reciprocating, circular band, vertical cut-off saws. Speeds and feeds. Coolants. Blade replacement.
4	Radial and Drill Presses	Set up and operation, speed, feed and coolant. Function and purpose; i.e., drilling, counter-boring, lapping, polishing, tapping, grooving, flycutting.
5	Lathes	Set up and operation, use of accessories, speed, feed, coolants, centering, drilling, turning, boring, counter-boring, reaming, threading, tapping, knurling tapers, lapping.
6	Milling Machines	Horizontal, Vertical Universal, Ram and Turret type. Horizontal Boring Mill and accessories. Set up and operation, speed, feed, coolants, work piece holding, mounting, milling operations, keyways, angles, splines, slots, gears, cams, contour spirals.
7	Grinders and Grinding Accessories	Horizontal Surface, Cylindrical, Universal, Tool and Cutter. Set up and operation, speed, feed, coolants, wheel and form dressing, machine grinding.

REGULATION 50

under the Apprenticeship and Tradesmen's Qualification Act

PAINTER

INTERPRETATION

1. In this Regulation,

- (a) "certified trade" means the trade of painter;
- (b) "painter" means a person who,
 - (i) prepares and performs interior and exterior work to plaster, wallboard, wood, metal, concrete masonry, stucco and allied materials,
 - (ii) erects scaffolding including swing stage,
 - (iii) prepares and performs work by steam wallpaper stripping machines and applies wall coverings, wallpaper, grass cloth, wood veneer, vinyl fabrics and allied materials,
 - (iv) prepares and performs work by mechanical processes, blow torches, spray guns and sandblasting. O. Reg. 960/76, s. 1.

2. The trade of painter is designated as a certified trade for the purposes of the Act. O. Reg. 960/76, s. 2.

3.—(1) The certified trade is composed of two branches.

(2) Branch 1 is a commercial and residential painter as set out in subclauses 1 (b) (i), (ii) and (iii).

(3) Branch 2 is an industrial painter as set out in subclauses 1 (b) (i), (ii) and (iv). O. Reg. 960/76, s. 3.

4. Notwithstanding section 3 of Regulation 36 of Revised Regulations of Ontario, 1980, a person who has,

- (a) graduated in a course for the trade of painter offered in the occupational program of a junior or special vocational school; and
- (b) been recommended to the Director by the principal of the school where he completed the course for enrollment as an apprentice in the certified trade,

may be registered as an apprentice in the certified trade. O. Reg. 960/76, s. 4.

5. An apprentice training program is established for the certified trade and shall consist of four periods of related training and work experience training of 1,800 hours per period for Branch 1 and three periods of related training and work experience of 1,800 hours per period for Branch 2,

- (a) at full-time educational day classes provided at a college of applied arts and technology or in courses that, in the opinion of the Director, are equivalent thereto in the subjects contained in Schedule 1; and
- (b) in practical training and instruction provided by the employer of the apprentice in the subjects contained in Schedule 2. O. Reg. 960/76, s. 5.

6. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedules 1 and 2. O. Reg. 960/76, s. 6.

7. The holder of a certificate of apprenticeship or certificate of qualification in Branch 2 of the certified trade is entitled to a certificate of apprenticeship and certificate of qualification in Branch 1 of the certified trade upon completion of a further period of training and instruction of 1,800 hours that shall include a course of study approved by the Director. O. Reg. 960/76, s. 7.

8. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours, shall not be less than,

- (a) 50 per cent during the first period;
- (b) 60 per cent during the second period;
- (c) 70 per cent during the third period; and
- (d) 80 per cent during the fourth period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 960/76, s. 8.

9. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus one additional apprentice for every three journeymen employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus one additional apprentice for each additional three journeymen employed by that employer in that trade and with whom the apprentice is working. O. Reg. 960/76, s. 9.

10. Notwithstanding section 9, on the recommendation of the provincial advisory committee or a local apprenticeship committee approved under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen

who may be employed by an employer in the certified trade. O. Reg. 960/76, s. 10.

11. The Director shall issue a progress record to each apprentice and the apprentice shall record therein the time that he spends in related training and work experience and the apprentice shall be responsible for the safekeeping of his progress record. O. Reg. 960/76, s. 11.

12.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 960/76, s. 12.

13. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 960/76, s. 13.

Schedule 1

PART I

PAINTER

COMMERCIAL AND RESIDENTIAL

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
1	Mathematics (Trade Related)		Addition, subtraction, multiplication and division of whole numbers, fractions, decimals. Weights and measures. Ratio and proportion. Percentage, discounts and simple interest. Areas, volumes, linear and angular mensuration. Simple equations and formulae calculations. Metric system; conversion methods.
2	Communications	General	Reading comprehension. Trade terminology, usage. Sentence and paragraph structure. Letter, report writing. Work, material and parts orders. Interpretation, use of manufacturers' manuals and instructions, job specifications. Oral communication.
3	Drafting	Basic Drafting and Interpretation	Architectural drafting techniques; scales, symbols, projections. Preparation of elementary trade related working drawings and dimensioned sketches. Reading and interpretation of construction plans, elevations; specifications for frame, masonry, concrete construction. Details, work schedules. Wall and ceiling surface areas for decorating estimates. Bills of material preparation.
4	Trade Tools and Procedures	Safety	Safety rules and safe operating procedures. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . Protective clothing and equipment. First Aid. Fire prevention; use and maintenance of fire fighting equipment. Handling and storage of flammable and toxic materials and solvents. Ventilation. Dangers of spontaneous combustion. Lead poisoning, dermatitis and silica dust hazards. Correct use of lifting and hoisting equipment, electric power tools and equipment. Good housekeeping.
		Hand Tools	Care and use of paint brushes (bristle, nylon), fitches. Paint rollers. Graining, marbling, blending, mottling, texturing, stippling tools and rollers. Stencil knives. Putty knives, scrapers, wire brushes. Paperhanging brushes, rollers, cutters, shears, chalklines.
		Power Tools and Equipment	Types, use and maintenance of portable air and electric sanders, grinders, brushes. Abrasive materials; types, grits, grades. Paint burning torches, steam wallpaper stripping machines, air compressors, sandblasting equipment. Taping machines. Scaffolding, ladders, steps, trestles. Swingstages (manual and electric), bosun's chairs and related equipment.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		Layout and Measuring Devices	Care and use of rules, tapes, squares, straightedges, compasses and dividers, plumb bobs, chalk lines. Patterns, templates, stencils. Viscosity cups. Paint film gauges.
5	Trade Practices Coating Materials	Properties and Characteristics Formulation Mixing	Chemical properties, uses, drying characteristics of organic and synthetic coating materials. Temperature and humidity effects. Paints, enamels (alkyds, phenolics), varnishes, lacquers, shellacs, calcimine primers, sealers, epoxy resins, silicones, vinyls, emulsion coatings, oils, waxes; wood stains, bleaches, preservatives. Adhesives. Types and purpose of pigments, vehicles or binders, extenders, driers, accelerators and retarders, thinners, solvents, catalysts. Material mixing, reduction, viscosity, straining for brush, roller or spray application. Material, thinner or solvent compatibility and intermixing. Tinting colours. Colour harmony; theory, styling, recognition. Colour cards. Matching and tinting to samples. Material covering and hiding properties. Paint and coating film failure; recognition, terminology and causes. Corrective procedures. Paint systems and specifications. Film thickness and adhesion tests.
6	Trade Practices Brush Work	Brush and Roller Techniques	Brush types, sizes, purpose. Cleaning methods and materials. Brush manipulation for specific materials; flowing on, brushing out, cutting in, laying off. Avoiding runs and sags. Lining and striping procedures. Roller application techniques.
7	Trade Practices Spray Painting	Spray Guns and Equipment Spraying Techniques	Conventional and airless (hydraulic) gun types. Operating principles, component parts. Syphon cups and pressure pots. Cleaning, adjustment and maintenance procedures. Types and construction of air and fluid hoses, couplings and adaptors. Pressure drop. Air transformer types, purpose and installation. Minimum pipe sizes. Moisture and oil problems and correction. Adjustment and maintenance. Use and servicing of organic vapor and dust type respirators and masks. Masking procedures after surface preparation. Use of masking tape and taping machine. Importance of correct gun type, fluid tip and air cap combination, fluid and spreader adjustment, regulated air and fluid pressures, viscosity for material used. Spray patterns and corrective adjustments. Gun position, distance, stroking, triggering, speed and overlap. Practice spraying of vertical and horizontal panels, inside and outside corners.
8	Painting Interior Work	Preparation	Protection of floors, trim, furniture. Use of drop sheets, building paper, masking tape. New plaster; drying time, use of moisture meter. Surface neutralizing requirements and materials.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
	(Plaster and Wallboard)		<p>Hotspot treatment. Use of litmus paper. Stain causes, killing methods and materials.</p> <p>Repairing cracks and holes; preparation and cutting out. Filling materials; mixing and application. Types of wallboards and joint cements. Joint taping and sanding methods.</p> <p>Preparation of previously painted and papered plaster. Gas fume discolouration. Washing methods and materials. Old calcimine removal and stripping off wallpaper.</p> <p>Surface sanding requirements. Sand paper types and grades. Hand and power sanding techniques.</p>
		Priming and Sealing	Surface porosity. Types and use of oil based, poly-vinyl acetate, acrylic primers and sealers. Thinners, viscosity. Tinting methods. Brush and roller application.
		Second Coat	Drying times between coats. Between coat sanding. Material types, tinting and thinning. Application.
		Finish Coat	Finishing material types, hiding and covering qualities; enamels, flats. Tinting methods. Mixing, consistency. Application and laying off. Stippling techniques.
		Latex Paints	No neutralizing required. Effects of zinc sulphate and sizing materials under latex paints. Tinting materials and methods. Mixing; overthinning effects. Application methods.
9	Painting Interior Work (New, Painted or Varnished Wood)	Preparation	<p>Trade and architects' specifications for finish and number of coats. Wood absorption qualities. Peeling, scaling and blistering causes.</p> <p>Use of spatchling materials. Treatment of knots, sap and bleeding stains. Paint removal techniques; burning, use of paint removers. Safety precautions. Neutralizing.</p> <p>Preparation of varnished wood for enamel. Wax and polish removal, washing methods and materials. Special undercoats for varnished woodwork.</p>
		Priming Coat	Types and choice of primers, thinners and driers. Consistency. Brush and roller application and laying off.
		Undercoats	Drying time before recoating. Types of undercoats. Sanding and dusting between coats. Consistency. Tinting colours. Use of putties and stopping. Undercoat application and laying off. Material quantities.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		Finish Coats	Finishing materials; flats, semi-gloss, enamels. Number of coats. Matching colours. Brush, roller and spray application techniques. Temperature requirements. Enamel rubbing methods.
10	Painting Interior Work (Metal)	Preparation	Trade finish specifications. Old and new surface preparation techniques. Mill scale, rust and corrosion treatment; types and use of corrosion inhibiting materials. Paint receiving qualities of metals. Pre-paint treatment of galvanized metal. Old paint removal methods.
		Priming Coat	Metal primer types and correct usage. Heat resisting paints, heat effects on light colours, conductivity. Brush, roller and spray application.
		Second and Finishing Coats	Paint and enamel types for metal finishing. Industrial colour code and piping code. Colour harmony; room finishes. Material costing. Brush, roller and spray application.
11	Painting Interior Work (Concrete and Masonry)	Preparation	Trade finish specifications. Absorptive qualities of concrete, brick, stone, concrete blocks. Moisture content, use of moisture meter. Use of acids and cleaning solutions. Neutralizing with zinc sulphate; litmus paper tests. Efflorescence treatment. Pointing and stopping materials and methods.
		Priming Coat	Characteristics of polyvinyl acetate (P.V.A.), acrylic, oil and varnish sealers. Thinner types. Thinning and tinting primer coat. Application methods.
		Second and Finish Coats	Determination of material quantities. Colour harmony. Concrete floor paints, thinner types and uses. P.V.A. and acrylic finishes. Multi-coloured paints and undercoats. Cement finishes. Correct brush, roller or spray application method for material used. Techniques for laying out and stripping concrete floors.
12	Painting Exterior Work (Wood)	Preparation	Woods to paint or stain; weathering effects, causes of peeling, scaling, blistering. Interior dampness or condensation effects; correction methods, testing with litmus paper and moisture meter. Architects' specifications for finish and number of coats. Old paint removal methods. Wire brushing, sanding, dusting. Spotting-in burned off areas. Knot and sap treatment. Caulking compound application.
		Priming Coat	Exterior primers, purchased or painter prepared; function and consistency. Types of oil, thinners, driers and usage. Absorption qualities of various woods. Reasons for brush application, not spray. Controlled penetration theory. 2-Coat system (Heavy priming coat). Back priming.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		Second Coat	Puttying, sanding and caulking requirements. Exterior paints; brands, grades, fade resistant colours and usage. Thinning and application methods.
		Finish Coat	Use of ready mixed coloured paints. Self cleaning whites. White tinting bases. Pigment volume. Thinner types and usage. Avoiding oil use in finish coats. Application methods. Material quantities.
13	Painting Exterior Work (Shingled Roofs)	Preparation	Cleaning off old roofs. Fastening loose shingles. Good roof paint and stain grades. Materials and mixing methods. Harmonizing colour combination with trim. Number of coats.
		First and Finish Coats	Paint and stain application methods. Brush types. Covering butts. Material mixing for finish coat. Material quantities.
14	Painting Exterior Work (Concrete and Stucco)	Preparation	Specifications for finish type and number of coats. Cleaning and neutralizing. Efflorescence treatment. Crack repairs, pointing and stopping. Litmus paper and moisture meter tests.
		Priming Coat	Use of P.V.A., acrylic, oil and varnish sealers, thinners. Consistency. Tinting colours. Brush, roller or spray application.
		Finish Coat	Colour harmony. Application of P.V.A., acrylic, oil finishes, multi-coloured paints and their under-coats. Application methods and equipment for cement and stucco finishes. Material quantities.
15	Painting Exterior Work (Metal)	Preparation	Hand and power metal cleaning tools and techniques. Sandblasting methods. Rust and corrosion causes; chemical treatments, rust inhibiting materials. Galvanized metal treatment. Paint removal; use of alkaline and emulsion cleaners, passivating treatment, pH testing. Steam cleaning.
		Priming Coat	Material specifications for exposure and environment. Antifouling paints. Red lead (and additives) primers; advantages, usage. Primers for aluminum, bright metals. Wash primers. Wetting ability. Drying time. Heat resisting paints for smoke stacks. Epoxies. Thinners, solvents, catalysts. Mixing and thinning procedures. Brush, roller and spray application.
		Second or Finish Coat	Recoating requirements. Water and salt water effects on metals and paints. Suitable types of paints, enamels, lacquers, epoxies. Graphite paints. Metallic dust mixtures. Material application methods. Metal roof painting techniques. Field touch-up painting.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
16	Wood Finishing	Old Finish Removal	Liquid remover types and usage. Block removers. Purpose of neutralizing. Cleaning methods. Fire hazards.
	Interior Work		
	(Natural, Satin, Bleach, Varnish and Lacquer Finishes)	Preparation	Specifications for job requirements. Sanding methods and materials. Wood types; characteristics, imperfections and corrective treatments. Prepared coloured fillers. Filler colouring methods. Thinning solvents. Satin and filler application, excess removal techniques. Specially prepared stains. Wood texture variations; equalizing suction, appropriate finishes. Between coat drying time. Bleaching procedures; materials and brush types. Types of shellacs and solvents. Consistency and cuts. Temperature and humidity effects. Application methods. Between coat treatment. Putty types, uses, mixing and colouring. Application and excess removal methods.
		First and Second (Finish) Varnish Coats	Varnish types and grades. Reducing solvents. Application techniques; preventing runs, sags, imperfections. Between coat sanding. Rubbing down, cleaning and polishing materials and techniques. Material quantities.
		Lacquer Coats	Lacquer sealers. Clear brushing and spraying lacquers. Lacquer thinners, use for reducing. Temperature and humidity effects, use of retarders. Brush and spray application techniques, preventing runs and sags. Sanding between coats. Cleaning and polishing materials and techniques.
17	Wood Finishing	Preparation	Finish specifications. Old varnish removal; hand and power wire brushing, sanding, dusting methods. Correct abrasive use.
	Exterior Work		
	(Natural, Stain, Varnish Finish)		Stain mixing, filler colouring and application techniques. Drying time and excess removal. Use of prepared stains and tinted sealers. Equalizing suction. Putty types; mixing, colouring, application and excess removal. Use of correct varnish, reducing solvent, brush types. Application techniques; preventing runs, sags, imperfections. Temperature and humidity effects. Between coat treatment.
		First and Second Varnish Coats	

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
18	Interior Decorating Wall Coverings (Paperhanging)	Preparation	Repairing ceiling, wall cracks and imperfections. Treatment of old and new plaster and wallboard, calcimine and water base paints. Stripping and readying papered surfaces. Neutralizing methods. Size types, purpose; preparation and application methods.
		Cutting and Pasting	Checking pattern, run and lot number. Starting procedure. Measuring, cutting lengths and removing curl. Pasting and folding short and long ends. Matching, plumbing and trimming. Starting and finishing conditions. Filling in. Butting seams and rolling. Hand tool types and usage. Turning corners and cutting around lights.
		Hanging Paper and Border	Finishing and joining conditions. Hanging level. Matching sloping ceilings. First strip application. Butting joints.
		Hanging Panels	Laying out panels and block pattern. Panel to stile ratio. Chalk line use. Centering pattern. Hanging field, stiles and border.
		Papering Stair Wells and Halls	Starting procedure. Correct top. Cutting paper to fit stair well rake.
19	Interior Decorating Wall Coverings (Fabrics)	Preparation	Surface repairs and treatment.
		Grass Cloth, Wood Veneers	Special primer and adhesive types and application methods. Material soaking, wet or dry trimming and application techniques. Eliminating springing and bubbles. Adherence to manufacturers instructions.
		Vinyl Wall Covering	Tests for minimum allowable wall moisture content. Applying special colour matched primers and adhesives for vinyl fabric. Hanging procedures. Overlapping and cutting edges. Joints 4" minimum from inside and outside corners. Removing excess adhesive from fabric. Adherence to manufacturers' instructions for lot number and shading.
20	Interior Decorating Special Finishes	Graining	Surface preparation. Filling and sanding. Ground coats; correct colour, mixing and straining. Application of prepared coats and mixed coats. Mixing glaze with colours. Distemper colours and usage. Thinner types. Ground coat application, rubbing in, softening. Action of oils, turpentine, driers. Megilp types and usage. Wood grain characteristics. Graining processes and tools. Varnish types and application.
		Blending	Colour harmony. Mixing colours. Retarding methods. Use of softener and cheese cloth pad.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		Mottling	Application and starting techniques. Retarding and setting. Varnish types and usage. Causes of creeping, sissing and sagging.
		Stippling	Surface preparation as required. First coat; material types, colour mixing and application methods. Sanding. Second and finish coats; material types, tinting and application methods. Use of stippling tools and decorative rollers.
		Glazing and Antiquing	Surface preparation as required. Undercoats; material and thinner types. Colour preparation. Brushing techniques. Types of glazes. Mixing glazing colours. Application tools and methods. Finishing.
		Texturing	Surface preparation as required. Sealer types, purpose. Application over old and new surfaces. Texture types available. Correct consistency. Application methods, tools and equipment.
		Marbling	Surface preparation as required. Mixing of base colours. Marble types and characteristics. Mixing and applying ground colour coat. Marking off techniques, drying time. Mixing and applying glaze. Veining colours. Veining and softening tools and techniques.

PART II

PAINTER

INDUSTRIAL

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
1	Mathematics (Trade Related)	Mathematics	Addition, subtraction, multiplication and division of whole numbers, fractions, decimals. Weights and measures. Ratio and proportion. Percentage, discounts and simple interest. Areas, volumes, linear and angular mensuration. Simple equations and formulae calculations. Metric system; conversion methods.
2	Communications (Trade Related)	General	Reading comprehension. Trade terminology, usage. Sentence and paragraph structure. Letter, report writing. Work, material and parts orders. Interpretation, use of manufacturers' manuals and instructions, job specifications. Oral communication.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
3	Blueprint Reading	General	Architectural drafting techniques; scales, symbols, projections. Reading and interpretation of construction plans, elevations, specifications for frame, masonry, concrete and structural steel construction. Details, work schedules. Surface areas for estimates. Bills of material preparation.
4	Trade Tools and Procedures	Safety	Safety rules and safe operating procedures. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . Protective clothing and equipment. First aid. Fire prevention; use and maintenance of fire fighting equipment. Handling and storage of flammable and toxic materials and solvents. Ventilation. Dangers of spontaneous combustion. Lead poisoning, dermatitis and silica dust hazards.
		Hand Tools	Correct use of lifting and hoisting equipment, scaffolds, ladders, swing-stages; electric power tools and equipment, sandblasting equipment; conventional, air-less and electro-static spraying equipment. Working inside vessels; mandatory use of air-fed hoods, spark-proof tools and equipment, explosion-proof electrical devices. Good housekeeping.
		Power Tools and Equipment	Care and use of paint brushes (bristle, nylon). Paint rollers. Scrapers, chipping hammer, wire brushes.
		Spray Guns and Equipment	Types, use and maintenance of portable air and electric sanders, grinders, chipping hammers, brushes. Abrasive materials; types, grits, grades. Air compressors, sandblasting equipment. Taping machines. Scaffolding, ladders, steps, trestles. Swing-stages (manual and electric), bosun's-chairs and related equipment. Correct use of ropes and cables. Knot types, usage, tying.
		Layout and Measuring Devices	Conventional and airless (hydraulic) gun types. Operating principles, component parts. Syphon cups and pressure pots. Cleaning, adjustment and maintenance procedures. Types and construction of air and fluid hoses, couplings and adaptors. Pressure drop. Air transformer types, purpose and installation. Minimum pipe sizes. Moisture and oil problems and correction. Adjustment and maintenance.
5	Coating Materials	Properties and Characteristics	Care and use of rules, tapes, squares, straightedges, compasses and dividers, plumb bobs, chalk lines. Patterns, templates, stencils. Viscosity cups. Paint film gauges. Moisture meters.
			Chemical properties, uses, drying characteristics of organic and synthetic coating materials. Temperature and humidity effects. Paints, enamels (alkyds, phenolics), varnishes, lacquers, shellacs, sealers, silicones, vinyls, emulsion coatings, oils, waxes; wood stains, bleaches, preservatives. Adhesives. Protective coatings: vinyls, chlorinated rubber based, neoprene, epoxies, epoxy resins. Mastics and cements.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		Formulation	Selection factors for environmental conditions: sun-light and water, stress, impact, abrasion, heat, water, salts, solvents, alkalis, acids, oxidation. Manufacturers technical data.
		Mixing	Types and purpose of pigments, vehicles or binders, extenders, driers, accelerators and retarders, thinners, solvents, catalysts.
			Material mixing, reduction, viscosity, straining for brush, roller or spray application. Material, thinner or solvent compatibility and intermixing. Material covering and hiding properties. Paint and coating film failure; recognition, terminology and causes. Corrective procedures. Paint systems and mil thickness specifications. Film thickness and adhesion tests.
6	Surface Preparation	Cleaning (Hand Tools)	Job specifications for coatings to be applied, correct surface preparation method. Correct use of wire brush, paint scraper, chipping hammer.
		(Power Tools)	Correct use of rotary brush, sanders, chipping hammers (electric or pneumatic).
		(Sandblasting)	Cost advantages over other methods. Selection factors: silica sand grain size, type; dust or "fines". Hose type, size, lengths, "deadman" shut-off controls. Nozzle size and type to ensure sufficient air pressure. Air supply: adequate pressure and volume for nozzle type. Moisture or contaminant separation (including air supply to airfed hoods). Continuous, intermittent and double outlet sandblast systems. Brush-off, commercial and white metal blast finishes.
		(Solvent Use)	Use on old surfaces in good condition, not requiring mechanical preparation. Use on new but contaminated surfaces. Use between coats to prevent inter-coat contamination. Selection of suitable solvents.
		(Other Methods)	Water-wash pressure cleaning. Acid etches. De-greasing solutions. Flame cleaning.
7	Paint Application	Brush Techniques	Brush types, sizes, purpose. Cleaning methods and materials. Brush manipulation for specific materials; flowing on, brushing out, cutting in, laying off. Avoiding runs and sags. Lining and striping procedures.
		Roller Techniques	Types of rollers: dip, fountain and pressure; roller application methods; cleaning.
		Spraying Techniques (Conventional)	Use and servicing of organic vapor and dust type respirators and masks. Masking procedures after surface preparation. Use of masking tape and taping machine. Importance of correct gun type, fluid tip and air cap combination, fluid and spreader adjustment, regulated air and fluid pressures, viscosity for material used. Spray patterns and corrective adjustments.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		(Airless Spray)	Principles of airless spraying: equipment required and procedures for use; pressures, head types for materials used. Precautions.
		(Electrostatic)	Principles of electrostatic spraying: equipment and procedures; precautions.
8	Painting Interior Work (Metal)	Preparation	Trade finish specifications. Old and new surface preparation. Mill scale, rust and corrosion treatment; types and use of corrosion inhibiting materials. Paint receiving qualities of metals. Pre-paint treatment of galvanized metal. Old paint removal methods.
		Priming Coat	Metal primer types and correct usage. Heat resisting paints, heat effects on light colours, conductivity. Brush, roller and spray application.
		Second and Finish Coats	Paint and enamel types for metal finishing. Industrial colour code and piping code. Colour harmony; room finishes. Material costing. Brush, roller and spray application.
9	Painting Interior Work (Concrete and Masonry)	Preparation	Trade finish specifications. Absorptive qualities of concrete, brick, stone, concrete blocks. Moisture content, use of moisture meter. Use of acids and cleaning solutions. Neutralizing with zinc sulphate; litmus paper tests. Efflorescence treatment. Pointing and stopping materials and methods.
		Priming Coat	Characteristics of polyvinyl acetate (P.V.A.), acrylic, oil and varnish sealers. Thinner types. Thinning and tinting primer coat. Application methods.
		Second and Finish Coats	Determination of material quantities. Colour harmony. Concrete floor paints, thinner types and uses. P.V.A. and acrylic finishes. Multi-coloured paints and undercoats. Cement finishes. Correct brush, roller or spray application method for material used. Techniques for laying out and stripping concrete floors.
	(Wood)	Preparation and Finishing	Wood and paint defects and condition, corrective action, surface preparation. Trade finish specifications and materials. Brush, roller or spray application procedures as required.
10	Painting Exterior Work (Concrete and Stucco)	Preparation	Specifications for finish type and number of coats. Cleaning and neutralizing. Efflorescence treatment. Crack repairs, pointing and stopping. Litmus paper and moisture meter tests.
		Priming Coat	Use of P.V.A., acrylic, oil and varnish sealers, thinners. Consistency. Tinting colours. Brush, roller or spray application.
		Finish Coat	Colour harmony. Application of P.V.A., acrylic, oil finishes, multi-coloured paints and their undercoats. Application methods and equipment for cement and stucco finishes. Material quantities.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
	(Wood)	Preparation and Finishing	Woods to paint or stain; weathering effects, causes of peeling, scaling, blistering. Testing and correction methods. Wood and surface preparation. Trade finish specifications and materials. Brush, roller and spray application procedures as required.
11	Painting Exterior Work (Metal)	Preparation Priming Coat Second or Finish Coat	Hand and power metal cleaning. Sandblasting. Critical priming of bare metal. Rust and corrosion causes; chemical treatments, rust inhibiting materials. Galvanized metal treatment. Paint removal; use of alkaline and emulsion cleaners, passivating treatment, pH testing. Steam cleaning. Material specifications for exposure and environment. Antifouling paints. Red lead (and additives) primers; advantages, usage. Primers for aluminum, bright metals. Wash primers. Wetting ability. Drying time. Heat resisting paints for smoke stacks. Epoxies. Thinners, solvents, catalysts. Mixing and thinning procedures. Brush, roller and spray application. Recoating requirements. Water and salt water effects on metals and paints. Suitable types of paints, enamels, lacquers, epoxies. Graphite paints. Metallic dust mixtures. Material application methods. Metal roof painting techniques. Field touch-up painting.
12	Special Coatings and Techniques	Epoxy and Urethane Compounds, Powdered Coatings (Inorganic Zinc)	Properties and characteristics of epoxyesters and "two-package" catalyzed epoxy finishes; urethane oils, moisture cured urethanes, "two-package" catalyzed urethanes; powdered coatings, special thinners required; various drying rates, pot-life. Mixing and application precautions.

O. Reg. 960/76, Sched. 1.

Schedule 2

PART I

PAINTER

COMMERCIAL AND RESIDENTIAL

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	Trade Tools and Procedures (As detailed in Schedule 1)	General	Safety rules and removal of all hazards. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . Care and use of hand and power tools and equipment, including erection and use of ladders, scaffolds, swing stages, bosun's chairs and related equipment, layout and measuring devices.
2	Trade Practices (As detailed in Schedule 1)	Coating Materials	Familiarization with chemical properties, uses, drying characteristics of organic and synthetic coating materials. Paint failure causes and corrective action. Material formulation; mixing, colouring, reduction, straining and application techniques. Colour harmony; theory, styling and recognition. Matching and tinting. Paint systems.
		Brush and Roller Work	Familiarization with brush types and purpose. Care and cleaning methods. Brushing techniques. Lining and striping. Roller application methods.
		Spray Painting	Familiarization with conventional and airless (hydraulic) spray equipment; principles, components, uses, cleaning and maintenance. Spraying techniques; gun selection, pressures, material viscosity, spray patterns and adjustments. Mask use and servicing.
3	Interior Decorating Painting, Varnishing, Lacquering	Preparation	Protection of floors, trim and furnishings. Trade finish specification. Repairing cracks and holes in wood, plaster, wallboard and concrete. Taping and filling wallboard joints. Neutralizing plaster, concrete and galvanized metal surfaces. Killing stains in wood and plaster. Knot treatment. Treating previously painted, papered or varnished surfaces. Use of paint and varnish removers; neutralizing operations. Sanding, scraping, stripping and sandblasting operations.
		Sealing, Priming, Filling	Sizing new plaster. Sealer application. Priming wood, plaster, wallboard, concrete and metal. Use of oil, spirit and water stains and fillers. Bleaching agents. Application of concrete block fillers. Between coat sanding.
		Undercoating and Finishing	Mixing, tinting, reduction and application of oil paints, enamels, varnishes, shellacs, lacquers, P.V.A. and acrylic finishes, multi-coloured paints, concrete floor paints, catalyzed finishes and cement finishes by brush, roller and spray methods.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
4	Interior Decorating Wall Coverings	Preparation and Application	Ceiling and wall preparation as required. Neutralizing and sizing. Cutting, fitting, pasting and hanging wallpaper. Fitting and finishing borders. Hanging panels, field, stiles and border. Hanging decorator's cotton, lining paper, fabrics, grass cloth, wood veneers and vinyls.
5	Interior Decorating Special Finishes	Preparation and Application	Surface preparation as required. Wood graining operations. Blending, mottling, stippling, glazing and antiquing and texturing operations. Marbling, veining and softening operations.
6	Exterior Work Painting, Varnishing, Lacquering	Preparation Sealing, Priming, Filling Undercoating and Finishing	Trade finish specifications. Repairing cracks and holes in wood, stucco and concrete. Pointing and stopping. Treating previously painted or varnished surfaces; old finish removal by burning and chemical strippers. Neutralizing and passivating treatments for wood, concrete and metal surfaces. Rust and corrosion treatment. Wire brushing, sanding, scraping and sandblasting operations. Wood preservative application. Knot treatment. Caulking. Fastening loose shingles. Priming wood, concrete, stucco and metal surfaces. Use of oil, spirit and water stains and fillers. Use of sealers and bleaching agents. Concrete block fillers. Between coat sanding. Mixing, tinting, reduction and application of oil paints, enamels, varnishes, lacquers, P.V.A. and acrylic finishes, heat resisting finishes, catalyzed materials, metallic dust mixtures, multi-coloured paints, cement finishes, by brush, roller and spray methods. Field touch-up painting.
7	Special Coatings and Techniques	Epoxy and Urethane Compounds	Mixing, use and application of epoxyesters and "two-package" catalyzed epoxy finishes; urethane oils, moisture cured urethanes, on other than steel surfaces.

PART II

PAINTER

INDUSTRIAL

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	Trade Tools and Procedures (As detailed in Schedule 1)	General	Safety rules and removal of all hazards. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . Care and use of hand and power tools and equipment, including erection and use of ladders, scaffolds, swing stages, bosun's chairs and related equipment, sandblasting and spraying equipment, lay-out and measuring devices.
2	Trade Practices (As detailed in Schedule 1)	Coating Materials	Familiarization with chemical properties, uses, drying characteristics of organic and synthetic coating materials. Protective coatings and selection factors. Paint failure causes and corrective action. Material formulation; mixing, colouring, reduction, straining and application techniques. Colour harmony; theory, styling and recognition. Matching and tinting. Paint systems.
		Brush and Roller Work	Familiarization with brush types and purpose. Care and cleaning methods. Brushing techniques. Lining and striping. Roller application methods.
		Spray Painting	Familiarization with conventional, airless (hydraulic), and electrostatic spray equipment; principles, components, uses, cleaning and maintenance. Spraying techniques; gun selection, pressures, material viscosity, spray patterns and adjustments. Mask use and servicing. Masking tape use.
3	Painting Interior Work (Metal)	Preparation	Trade finish specifications. Old and new surface preparation. Mill scale, rust and corrosion treatment. Pre-paint treatment of galvanized metal. Old paint removal.
		Priming Coat	Use of metal primers and heat resisting paints. Brush, roller and spray application.
		Second and Finish Coats	Use of paint and enamels for metal finishing. Industrial colour code and piping code. Material costing. Brush, roller and spray application.
4	Painting Interior Work (Concrete and Masonry)	Preparation	Trade finish specifications. Use of moisture meter. Use of acids and cleaning solutions. Neutralizing with zinc sulphate; litmus paper tests. Efflorescence treatment. Pointing and stopping.
		Priming Coat	Use of polyvinyl acetate (P.V.A.), acrylic, oil and varnish sealers. Thinning and tinting primer coat. Application.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
	(Wood)	Second and Finish Coats	Determination of material quantities. Use of concrete floor paints, P.V.A. and acrylic finishes, multi-coloured paints and undercoats, cement finishes. Brush, roller or spray application. Laying out and stripping concrete floors.
		Preparation and Finishing	Trade finish specifications. Recognition and correction of wood and paint condition defects. Surface preparation. Determination of material quantities. Brush, roller and spray application and finishing as required.
5	Painting Exterior Work (Concrete and Stucco)	Preparation	Specifications for finish and coats. Cleaning and neutralizing. Efflorescence treatment. Crack repairs, pointing and stopping. Litmus paper and moisture meter tests.
		Priming Coat	Use of P.V.A., acrylic, oil and varnish sealers, thinners. Tinting colours. Brush, roller or spray application.
		Finish Coat	Application of P.V.A., acrylic, oil finishes, multi-coloured paints and their undercoats, cement and stucco finishes. Estimating material quantities.
	(Wood)	Preparation and Finishing	Trade finish specifications. Recognition, testing and correction of wood and paint condition defects. Surface preparation. Determination of material quantities. Brush, roller and spray application and finishing as required.
6	Painting Exterior Work (Metal)	Preparation	Hand and power metal cleaning. Sandblasting: critical priming requirements. Use of chemical treatments, rust inhibiting materials. Galvanized metal treatment. Paint removal; use of alkaline and emulsion strippers, passivating treatment, pH testing. Steam cleaning.
		Priming Coat	Material specifications. Use of antifouling paints, red lead (and additives) primers; primers for aluminum, bright metals; wash primers. Heat resisting paints for smoke stacks. Epoxies. Mixing and thinning. Brush, roller and spray application.
		Second or Finish Coat	Suitable types of paints, enamels, lacquers, epoxies. Graphite paints. Metallic dust mixtures. Material application. Metal roof painting. Field touch-up painting.
7	Special Coatings and Techniques	Epoxy and Urethane Compounds, Powdered Coatings (Inorganic Zinc)	Mixing, use and application of epoxyesters and "two-package" catalyzed epoxy finishes; urethane oils, moisture cured urethanes, "two-package" catalyzed urethanes; powdered coatings.

REGULATION 51

under the Apprenticeship and Tradesmen's Qualification Act

PLASTERERS

1. In this Regulation,

- (a) "certified trade" means the trade of plasterer;
 - (b) "plasterer" means a person who,
 - (i) applies plaster and stucco to the walls and ceilings, whether interior or exterior, of a structure,
 - (ii) applies plaster and stucco on lath, masonry and rigid insulation, and
 - (iii) tapes gyproc and wallboard.
- R.R.O. 1970, Reg. 43, s. 1.

2. The trade of plasterer is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 43, s. 2.

3.—(1) No person shall become an apprentice in the certified trade unless he has completed Grade 8 or has such other academic qualification that, in the opinion of the Director, is equivalent thereto.

(2) Notwithstanding subsection (1), a person who has,

- (a) graduated in a course for the trade of plasterer offered in the occupational program of a Junior or Special Vocational School; and
- (b) been recommended to the Director by the principal of the school where he completed the course for enrollment as an apprentice in the certified trade,

may be registered as an apprentice in that trade. R.R.O. 1970, Reg. 43, s. 3.

4. An apprentice training program for the certified trade is established and shall consist of,

- (a) training and instruction at full-time educational day classes provided at a College of Applied Arts and Technology or in courses that, in the opinion of the Director, are

equivalent thereto, in the subjects contained in Schedule 1; and

- (b) practical training and instruction provided by the employer of the apprentice in the subjects contained in Schedule 2. R.R.O. 1970, Reg. 43, s. 4.

5. An apprentice shall complete four periods of training and instruction of 1600 hours per period. R.R.O. 1970, Reg. 43, s. 5.

6. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedules 1 and 2. R.R.O. 1970, Reg. 43, s. 6.

7. Notwithstanding subsection 8 (2) of Regulation 36 of Revised Regulations of Ontario, 1980, every hour worked by an apprentice in excess of his regular daily hours of practical training and instruction shall be included in computing the hours spent in training and instruction. R.R.O. 1970, Reg. 43, s. 7.

8. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for every five journeymen employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus an additional apprentice for each additional five journeymen employed by that employer in the trade and with whom the apprentice is working. R.R.O. 1970, Reg. 43, s. 8.

9. Sections 9 and 10 and subsections 11 (2), (3) and (4) of the Act do not apply to any person who works or is employed in the certified trade. R.R.O. 1970, Reg. 43, s. 9.

10. A certificate of qualification in the certified trade is not required to be renewed. R.R.O. 1970, Reg. 43, s. 10.

Schedule 1

PLASTERER

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Academic Subjects	General	Blueprint reading, arithmetic, geometry, English, inter-relationships with supervisors and fellow workers.
		Trade Terminology	Vocabulary of plastering terms and inter-relationship with other building trades.
2	General Trade Practice	Safety	Safety practices in the erection and use of scaffolds, ladders, hoisting and other such equipment. The <i>Occupational Health and Safety Act</i> . Housekeeping: protection of finished work, removal of waste materials, clean up of job site.
		Tools	Identification, care and use of hand and power tools and equipment as related to the trade and safety practices pertaining to same.
		Bases	Types and uses: Masonry such as brick, clay and tile, gypsum block, cement block, metal lath, gypsum board, insulating fiber boards, insulating polystyrene.
		Base Coats	Neat hardwall, fibered and unfibered. Light weight base coats as perlite and vermiculite. Portland cement plaster; waterproofing. Concrete, bond stone and plaster weld.
		Aggregates	Identification, selection and use of sand, perlite and vermiculite.
		Smooth Finishes	Lime, keenes, non-alkaline.
		Irregular Finishes	Sponge, dash, float, stipple, acoustic, spray, stucco.
3	Molds	Types and Uses	Fabrication, run in place, run on bench.
4	Mitering	Mitering Techniques	Use of joint rod, cut and planted returns.
5	Layout	Identification and Planning	General geometric layout for all plastering conditions in shop and site.
6	Quantity Take-off	Calculations	Method of calculating areas and volumes and determining the related requirements of plastering materials.

Schedule 2

PLASTERER

Work Instruction and Experience

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	General Trade Practice	<p>Safety</p> <p>Tools</p> <p>Bases</p> <p>Materials</p> <p>Application</p>	<p>Safety practices in the erection and use of scaffolds, ladders, hoisting and other such equipment. The <i>Occupational Health and Safety Act</i>.</p> <p>Housekeeping: Protection of finished work, removal of waste materials, clean up of job site.</p> <p>Trade Terminology: Vocabulary of plastering terms and inter-relationship with other building trades.</p> <p>Identification, care and use of hand and power tools and equipment as related to the trade and safety practices pertaining to same.</p> <p>Types and uses: Masonry such as brick, clay and tile. Gypsum block, cement block. Metal lath. Gypsum board. Insulating fiber boards. Insulating polystyrene.</p> <p>Identification and use of plastering materials for both base and finishing coats.</p> <p>Techniques of application, by hand and by machine.</p>
2	Molds	Construction and Use	Fabrication, run in place, run on bench.
3	Mitering	Application	Use of joint rods, cut and planted returns.
4	Layout	Practical Planning	General geometric layout for all plastering conditions in shop and site.
5	Quantity Take-off	Practical Calculations	Calculating areas and volumes and determining the related requirements of plastering materials.
6	Leadership	Indoctrination	Functions of a superintendent. Reading and interpretation of specifications. Room scheduling.

REGULATION 52

under the Apprenticeship and Tradesmen's Qualification Act

PLUMBERS

1. In this Regulation,

(a) "certified trade" means the trade of plumber;

(b) "plumber" means a person who,

(i) lays out, assembles, installs, maintains or repairs in any structure, building or site, piping, fixtures and appurtenances for the supply of water for any domestic or industrial purpose or for the disposal of water that has been used for any domestic or industrial purpose,

(ii) connects to piping any appliance that uses water supplied to it or disposes of waste,

(iii) installs the piping for any process, including the conveyance of gas, or any tubing for a pneumatic or air-handling system,

(iv) makes joints in piping, or

(v) reads and understands design drawings, manufacturers' literature and installation diagrams for piping and appliances connected thereto,

but does not include a person engaged in,

(vi) the manufacture of equipment or the assembly of a unit prior to delivery to a building, structure or site,

(vii) the laying of metallic or non-metallic pipe into trenches to form sanitary or storm sewers, drains or water mains, or

(viii) the repair and maintenance of the installations in an operating industrial plant. R.R.O. 1970, Reg. 44, s. 1.

2. The trade of plumber is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 44, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of five

periods of related training and work experience training 1800 hours for each period,

(a) at full-time educational day classes provided at a College of Applied Arts and Technology or in courses that, in the opinion of the Director, are equivalent thereto, in the subjects contained in Schedule 1; and

(b) in work experience training provided by the employer of the apprentice in the subjects contained in Schedule 2. O. Reg. 410/73, s. 1, *part*.

4. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedules 1 and 2. O. Reg. 410/73, s. 1, *part*.

5. Any person who,

(a) applies in the prescribed form for apprenticeship in the certified trade; and

(b) works in that trade for three months or less,

is exempt from subsection 11 (2) of the Act. O. Reg. 410/73, s. 1, *part*.

6. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

(a) 40 per cent during the first period of training and instruction;

(b) 50 per cent during the second period of training and instruction;

(c) 60 per cent during the third period of training and instruction;

(d) 70 per cent during the fourth period of training and instruction; and

(e) 80 per cent during the fifth period of training and instruction,

of the hourly rate of wages or its equivalent for a journeyman employed by the same employer in the certified trade and with whom the apprentice is working. R.R.O. 1970, Reg. 44, s. 5.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for every three journeymen employed by the employer in the trade and with whom the apprentice is working; and

- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus an additional apprentice for each additional three journeymen employed by the employer in the trade and with whom the apprentice is working. R.R.O. 1970, Reg. 44, s. 6.

Schedule 1

PLUMBER

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
1	Mathematics (Trade Related)	Mathematics	Addition, subtraction, multiplication, division of whole numbers, fractions, decimals. Weights and measures. Ratio and proportion. Percentage, discounts, simple interest. Areas, volumes, linear and angular mensuration. Square root. Scale conversion. Simple equations and formulae calculations (tanks, pipes; capacities, rate of flow).
2	Science	Physics	Hydrostatics, hydraulics; pressure and head differences. Pascal's Law. Pump capacities (H.P. rating and flow). Pressure pump principles; venturi, fluid flow, water hammer. Heat; temperature measurement, heat transfer. Heat units, evaporation, condensation, humidity, heat effect on metals. Heat calculations, expansion problems (solids, liquids, gases). Air and water properties, atmospheric pressure, syphonage, effect on plumbing materials. Electrolysis and corrosion. Water treatment, pollution, pH factor. Plumbing materials; relative strengths, electrolytic, chemical, bacteriological resistance, uses.
3	English	Usage and Business Communication	Reading comprehension. Trade terminology, usage. Sentence, paragraph structure. Letter, report writing. Work and parts orders. Interpretation, use of manufacturer's manuals, job specifications. Oral communication.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
4	Drafting	Basic Drafting and Interpretation	Drafting techniques; scales, symbols, projections. Preparation of elementary trade, related working drawings, dimensioned sketches. Reading, interpretation of floor plans elevations, plumbing and heating installations, specifications, material estimates.
5	Trade Tools and Procedures	Safety	Safety rules and safe operating procedures. Protective clothing, equipment. First aid. Fire prevention: use and maintenance of fire fighting equipment. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . The <i>Building Code Act</i> . The <i>Ontario Water Resources Act</i> (Regulation 736 of Revised Regulations of Ontario, 1980). Correct lifting methods and use of lifting and hoisting equipment. Safe use of electrical tools, equipment and powder actuated tools. Good housekeeping.
		Hand Tools	Selection, care and use of hammers, screwdrivers, wrenches, wood saws, hacksaws, chisels (metal, wood, masonry), files, hand shears, hand drills, pipe cutting, threading, reaming and bending tools.
		Power Tools and Equipment	Care and use of portable air and electric drills, grinders, circular and sabre saws. Powder actuated tools. Mechanical and hydraulic tube bending equipment. Pipe cutting, reaming and threading equipment. Pedestal and bench grinders, abrasive cut-off tools. Grinding drill bits, cutting tools. Materials handling devices, scaffolds, ladders, ropes, slings, hoists.
		Measuring Devices	Care and use of rules, tapes, builders levels, calipers, micrometers, squares, straightedges, hand levels, plumb bobs.
6	Trade Tools and Procedures	Soldering	Soft soldering techniques; uses, solder alloys, fluxes. Heating torches and soldering irons. Preparation, sweating, jiggling, tacking.
	Pipe, Tubing and Fittings		Tinning dips. Hard soldering; alloys, fluxes, techniques and uses. Cleaning and testing joints.
	(Joining Techniques)	Welding and Brazing	Welding and brazing rods, electrodes, fluxes. Set up, operation and use of oxyacetylene, propane, arc welding equipment for heating, welding, brazing and cutting operations. Protection of flammable materials. Explosion hazards; ventilation, cleaning or purging methods, testing equipment.
		Caulking	Caulk joint characteristics. Relevant codes. Joining with hot sulphur, asbestos cement, lead wool. Use of packing irons, oakum. Measuring, cutting, supporting or hanging cast iron pipe. Lead pouring and caulking vertical, horizontal, inverted and submerged joints. Test methods.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		Cutting and Reaming	Holding devices. Hand and power pipe cutting and reaming. Lubricants. Length and fitting allowances, cleaning.
		Threading Pipe	Thread identification, usage; standard pipe threads. Die setting. Hand and power threading procedures. Pipe vises, collets, chucks. Cutting fluids. Cutting standard, loose, tight, crooked threads. Recutting damaged threads. Burr removal.
		Flanged Fittings	Threaded, welded, lap jointed types. Relevant codes. Gasket materials, cutting methods. Expansion loops and joints, swing joints. Temporary pipe slinging, aligning; tightening bolts. Marking and drilling blank flanges. Breaking old joints.
		Compression Type Fittings	Flared joint, flared joint and ring, ferrule types. Relevant codes. Gaskets, packings. Flaring ferrous and nonferrous tube. Joint assembly.
		Lead Burning	Good joint design. Relevant codes. Lead burning and supporting techniques in all positions. Adequate ventilation.
		Wiping Joints	Lead to lead, lead to brass, and lead to copper wiped joints. Relevant codes. Wiping alloys, cloths, tools; smudge, paste and flux. Preparing and wiping flange, butt, underhand, vertical, rolled joints. Handling, supporting, protecting lead pipes.
		Cementing Joints	Pipe or materials used. Relevant codes. Cement mixtures. Raking joints, aligning and supporting. Installing new pipe in existing lines. Test methods.
		Nonmetallic Joints (Plastic)	Cutting and joining techniques; materials, cleaning and solvent welding compounds, aligning and supporting methods.
7	Trade Tools and Procedures	Pipe and Tubing	Bending procedures; tubing specifications, allowable radii. Hand and power benders. Filling with sand, lead, resin. Use of spring and stationary mandrels. Bend centers.
	Pipe, Tubing and Fittings		Wire templates.
	(Bending and Forming Techniques)		
		Bar Stock	Hot and cold bending techniques. Hardening, tempering, annealing, stress relieving.
		Forming Lead	Forming tools. Layout, bossing or dressing techniques. Joint preparation.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
8	Trade Tools and Procedures Pipe, Tubing and Fittings (Installation)	Pipe and Tubing Selection	Size, lengths, classification; wrought iron, steel, cast iron, copper, lead, brass, vitrified tile, concrete, bituminized fibre, cement asbestos (transite), plastic, stainless steel, glass, dur iron. Relevant codes. Working and bursting pressures; safety and usage factors.
		Threaded Pipe	Standard, extra-heavy, double extra-heavy weight pipe. Butt weld, lapweld, seamless types. Relevant codes. A.S.M.E. standard thread tables. Standard pipe and fitting terminology. Thread compounds. Making up fittings, installation, aligning.
		Pipe Hangers and Fasteners	Suspending pipes by; drilling and tapping, expansion shields, toggle bolts, welding, clamps, powder actuated tool and fastener use. Types, use of wood, machine, coach or lag screws. Relevant codes. Hanging or supporting pipe by pipe hooks, extension bar, solid ring hangers; pipe rings, rolls and saddles; U bolts, hanger rods, masonry piers, brackets and clamps. Positioning, aligning, levelling. Insulation allowances.
		Tubing and Fittings	Types and classification; underground limitations. Relevant codes. Installing, joining by soldering, brazing, swaging, compression fittings. Fitting allowances. Expansion loops. Vibration reduction.
		Valves	Terminology, types, construction, purpose, locating; gate, O.S. and Y valves, sliding stem, globe, check, pressure reducing and relief. Stuffing boxes, gland packing. Relevant codes. Installation procedures; tagging and charting. Valve defects and wear.
		Supports	Above or underground installations. Relevant codes. Support layout, spacing, grade. Installation of reinforced concrete, steel, masonry, wood types, on filled ground, virgin soil, chair carriers, suspended from buildings.
9	Roughing In (Drainwork)	Sewers and Drains	Elevation of inverts. Location of stacks, connections. Drain sizes. Relevant codes. Locating, setting, levelling; using dumpy levels and batter boards, bench marks or datum points.
		(Excavating and Trenching)	Relevant codes and regulations. Safety, inspection procedures. Shoring methods; hazards. Ventilation. Dewatering. Piling excavated material. Back-filling.
		(Building Sewers)	Location, layout, size, elevation of inverts. Relevant codes. Drainage terminology, materials, jointing compounds. Storm, sanitary, combination drainage systems. Grading, supporting. Location of cleanouts. Testing drains. Repair and servicing; locating, clearing blockages, use of drain plans, rods, power equipment, chemicals. Cutting, inserting fittings.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		(Building Traps)	Types, requirements, location, size. Relevant codes. Setting trap level for seal, installing, supporting. Air inlet and cleanouts. Repair and servicing.
		(Floor Drains)	Application, location of simple and fixture floor drains. Relevant codes. Strainers; levelling. Grading floors, sealing strainer inlets. Supporting grating. Venting floor drain traps. Connecting floor drains to building drains. Locating cleanouts. Repair and servicing.
		(Rain-water Leaders, Area Drains and Subsoil Drainage Tile)	Location. Relevant codes. Sizing storm drains; rainfall charts, sizing tables, drainage areas. Installing subdrainage tile (inside and outside), area drains, rain-water leaders to combination and storm drains. Sediment catchment.
		(Oil and Gasoline Interceptors)	Manufactured and concrete (single and multiple chamber) types. Specifications. Relevant codes. Installing oil collecting tanks, vents, flow control fittings. Concrete interceptor construction. Connecting inlet and outlet pipes to interceptors and building drains. Prohibited discharges through interceptor. Repair and servicing; cleaning, sediment removal. Open flame hazards.
		(Sewage Pumps)	Sump location, ejector type, elevation, subbasements, subdrains. Relevant codes. Sewage, drainage sumps. Venting. Sewage and drainage pumps, ejectors. Operating intervals. Sizing, installation of sewage sumps, pumps, discharge lines. Controls and safety devices; single and duplex pumps, high water alarms, alternator controls. Electrical connections. Discharge connection to building drains, with or without main traps. Connecting subdrains to sewage tanks; testing methods. Repairing, servicing pumps, screens, impellers, valves, air compressors, motors, controls.
		(Backwater Valves)	Purpose and installation of flat and float backwater valves. Locating factors. Combination and separate drainage systems. Relevant codes. Sewage and drainage sumps for backflood protection. Repairing and servicing backwater valves.
		(Blow-off Tanks)	Tank size, location. Discharge temperature. Venting. Blowdown, quick opening and closing valves. Connecting water supply to tanks, discharge line to building drains. Cross-connection prevention. Repair and servicing.
		Municipal Sewage Systems	Public sewers; intercepting or trunk line, tributary or contributing. Grading. Construction materials and design. Sewage treatment, disposal; activated sludge process, artificial drying, lagoon systems. Final effluent treatment.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		(Connecting Building Sewers to Public Sewers) Rural Sewage Systems (Septic Tanks) (Disposal Fields)	<p>Location, size of public sewers, depth of inverts. Relevant codes. Sewer connecting procedures; explosion hazards, safety practices. Maintenance responsibility of municipality.</p> <p>Septic systems; single and multiple chamber trickle type, 2 compartment tank with automatic syphon, Imhoff tanks, cesspools.</p> <p>Grease interception, removal. Freezing protection.</p> <p>System type; location. Relevant codes. Poured concrete, steel, pre-cast concrete, other tank types. Sizing. Installation of tanks, fittings, cleanouts, venting, elevation. Repair and servicing; cleaning by manual removal, vacuum tanks, sludge pumps. Sludge disposal. Septic action starters, conditioners.</p> <p>Disposal bed systems, location. Relevant codes. Percolation tests. Boring test holes. Chart use for required absorption area. Leaching systems; standard trench, seepage pits. Bed layout; trench depth and width, grades, spacing. Installation of weeping tile, aggregate, connections, venting, backfilling. Distribution box construction. Repair and servicing.</p>
10	Roughing in (Stacks, Wastes and Vents)	Soil and Waste Stacks (Sleeves and Inserts) (Stack Footings) (Flashings) (Horizontal Branches and Fixture Waste Pipes)	<p>Types, characteristics. Locating. Sizing. Prohibited practices. Relevant codes. Joining pipe materials, fittings. Cutting stack holes, notching structural members. Connecting fixtures at stack bases; pressure effects, hazards. Cleanouts. Relief venting stacks in multistorey buildings. Prefabrication, installation of stacks, offsets; plumbing, aligning. Stack testing. Repair and servicing; cutting fittings into stacks. Freezing protection. Thawing stacks, wastes.</p> <p>Sleeve filling materials. Fixed, adjustable, continuous inserts. Lining up sleeves, inserts, with chalk line, plumb bob.</p> <p>Locations, sizes. Relevant codes. Pipe, fitting selection. Connecting stack footings to drain. Grading, installation tools, supporting footings.</p> <p>Hub, sleeve, manufactured types; lead, copper, neoprene. Relevant codes. Flashing flat, pitched, shingled, slate, other roofs. Flashing tools. Use of ladders and scaffolds, hand line, ropes and slings.</p> <p>Conventional and Dunham plumbing systems. Relevant codes. Roughing in, fixture dimensions. Sizing horizontal and vertical waste pipes, fixture drains. Grading. Connecting and supporting pipes. Rigging methods.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		(Fixture Traps)	Purpose of P traps, drum traps, special designs. Relevant codes. Trap components and seals. Seal loss; causes, effects. Measuring seal.
			Trap location. Cleanouts. Connecting and supporting traps to fixtures and waste pipes. Repair and servicing. Hazards of chemical use, use of drain rods.
		(Grease Traps)	Trap types. Flow control fittings. Relevant codes. Sizing. Locating, installing and venting, traps and flow control fittings, installed as fixture traps or as interceptors.
		(Chair Carriers)	Roughing in (concrete and frame); closet, urinal, lavatory and sink, hospital fixture, wall type carriers, vandal proof fittings. Alignment. Thread protection.
		(Venting)	System type, vent stack locations, sizes, supports. Relevant codes. Sizing, installing back vents, continuous waste and vents; dual, stack, wet, loop and circuit, relief and yoke type vents. Terminating stacks through walls and roofs. Draining dead end vents.
		Rainwater Leaders	Purpose, size, material, location of leaders, hoppers, gutters. Expansion joints. Flashings. Connecting leaders to storm and sanitary drains. Rainwater traps. Cleanouts.
11	Roughing In (Water Supply Systems)	Main Supply (Service Connection to Municipal Water Main)	Service connection materials. Relevant codes. Threaded, caulked, capillary solder, flared, wiped solder and mechanical type joints. Supporting service pipes on virgin soil, filled ground, through walls. Installing anchors.
			Location of main control valves. Drilling, tapping mains under pressure. Installation of curb valve, main supply valves. Meter chamber construction. Protecting plastic service pipes from hot water back-up. Testing main supply pipes.
		(Water Meters)	Meter Types. Selection and installation. Anti-tampering devices. Electrical grounding. Bypass. Use of test dial. Shop testing with calibrated tubes and tanks. Field testing large meters with portable test meters, orifice plates. Meter protection.
		(Cold Water Supply Piping)	Locating, sizing supply system; flow factors, storage tanks, other connections, draining. Relevant codes. Installation procedures. Use of booster pumps. Backflow prevention. Damage and freezing protection. System testing. Noise elimination. Thawing procedures. Repair and maintenance.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		(Hot Water Supply Piping)	<p>Heater and storage tank location, heat generation method, size of mains, branches, risers, outlets to fixtures, circulation method, pipe expansion, valve locations. Insulation. Relevant codes. Direct, indirect, instantaneous heaters. Sizing. Boiler connections to converters, circulating pumps. Tank manifolds. Location of main control valves, drain valves, temperature/pressure relief valves, temperature control valves, thermometers, pressure gauges. Tempering valves, expansion loops and fittings. Preventing reverse flow. Installation of noncirculating, gravity, forced circulation systems. Flexible hanger use. Wall and floor sleeves; pipe clearances. Preventing cross connections between potable and nonpotable hot water pipes. Protecting and testing system. Noise elimination. Repair and maintenance.</p>
		Rural Water Supply Systems	<p>Supply source. Well types; construction codes, potability tests. Pump characteristics, sizing factors; centrifugal jet (shallow and deep), reciprocal (shallow and deep), submersible, gear, hydraulic ram. Power sources. Gravity and hydro-pneumatic storage tanks. Locating, installing tanks and pumps. Suction line. Pressure and float switches, air volume controls. Pressure gauges, gauge glass, level indicator. Relief valve, overflow pipe, pulsation chamber, drain cocks, sand trap, strainers, filters. Main control, foot and check valves. Power connections. Priming pump. Preventing cross connections, back-siphonage, well contamination. System purging. Repair and servicing shallow well, deep well pumps and systems.</p>
		Fire Line Systems	<p>Connections to supply source, hose stations. Type, sizes of pipe and fittings. Size, locations of mains, standpipes, check valves, siamese connection. Relevant codes and underwriters specifications. Standard outlets. Hazards of intervening valves in fire line. Outside booster connection.</p>
		(Fire Protection Lines)	<p>Locating, installing, supporting, fire lines, standpipes and outlets, hose storage cabinets, control valves. Hose, valve, nozzle selection. Use of booster pump. Preventing backflow to domestic system. System protection and testing.</p>
		(Ring Mains For Exterior Fire Protection)	<p>System type, supply source (single and dual); location of main control valves, check valves, hydrants; valves in hydrant branches, valve chambers, storage tank, reservoir, booster pump. Relevant codes, underwriters specifications. Underground installation factors. Installing branches to hydrants. Use of thrust blocks, saddles or anchors. Frost protection; inside hydrants, frost heave, draining facilities. Indicator valves. Protection against backflow into municipal system. Strategic valve</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
			locations. Fire department pumper connections. System testing. Backfilling. Erosion prevention. Purging pipes. Leak detection on buried lines by earphone diaphragm, geophone, valve box locator. Replacing defective section, installing bell joint clamps. Inserting extra branch. Repair and maintenance.
12	Roughing In (Process Supply Systems)	Special Water Systems (Chilled Water Systems) (Distilled Water Systems) (Nonpotable Water Supply Systems) (Lawn Irrigation Systems) Liquid Dispensing Systems Special Fluid Process Piping Systems	Systems for dairies, laboratories, hospitals, industries. Cooling units, components. Heat exchangers. Insulation. Installation of upfeed and downfeed systems, components. Relevant codes. Colour coding system. Test methods. Reclaiming water from cooling towers, spray ponds, condenser coils. Systems for battery manufacture, drinking fountains, hospitals, drug, beverage manufacturers. Installation of distillation units, components, pipes, fittings. Nonpotable supply source, location of mains, risers, branches, connection to supply. Usage factors. Relevant codes. Installation; isolation from potable systems. Coding. Backflow preventers. Supply source, system type, pipe, fittings. Relevant codes. Control and zoning. Installation. Backflow preventers. Fertilizer injection. Pressure and gravity type systems. Installation. Installation and relevant codes for fluid transfer in bakeries, dairies, distilleries, food processing plants, breweries, laboratories, refineries, hospitals, industrial plants.
13	Fixture and Equipment Installation and Servicing (Basic Fittings)	Supply Fittings Automatic Flush Valves	Separate faucets, combination supply and waste, combination swing spout, single lever control, sink and shampoo faucets with spray attachments, automatic tempering devices. Relevant codes. C.S.A. and manufacturers standards. Installing exposed and concealed faucets; deck, wall mounted. Roughing in; finished wall clearance, valve bonnet access, air gap. Vacuum breakers. Testing. Preventing damage to finished fittings. Control valves; compression, needle types. Relevant codes. C.S.A., manufacturers standards. Component assembly. Test methods. Diaphragm and plunger types. Hand, seat, foot or push button operated flushing mechanisms; domestic use. Installing, testing, adjusting. Backsiphonage preventers.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		Repair and Replacement of Supply Fittings, Valves and Piping	Washer replacement procedures. Removing broken and corroded valve, faucet washer screws. Seat regrinding tools, techniques. Replacing valve gland, faucet bonnet packings, "O" rings, spindle sleeves. Use of lubricants. Basin wrench use. Replacement faucets; adapter wall plates, crows foot washers. Diverter valves; repair, adjusting. Cleaning screens, aerator outlets. Adapting supply to replacement fittings.
		Waste Fittings	Installation of mechanical and plug outlets. Strainers. Tail pieces. Stoppage causes; clearing methods. Repair and replacement.
14	Fixture and Equipment Installation and Servicing (Fixtures)	Bathtubs	Porcelain ware, enamelled cast iron, enamelled press-formed steel bath tubs. Built-in, freestanding, other types. Built-in enclosures. Location, roughing in dimensions, handling. Installation. Protection. Installation of supply fittings, wastes and overflows. Repair and maintenance.
		Washbasins	Wall hung, combined wall and floor type, pedestal, slab (vanity) types. Handling precautions. Installation and mounting; Installation of supply and waste fittings. Testing, cleaning. Repair and replacement.
		Water-Closets	Floor, wall hung, other types. Construction materials. Syphon jet, reverse trap, washdown, reverse trap without jet, blowout types. Relevant codes. Installation procedures. Gaskets. Tank refill devices; float, flush, control valves, lever mechanisms; testing, adjusting for storage level, flushing action. Pressure noise control. Freezing protection. Temporary trap seals. Seat types, installation. Closet servicing, repair, replacement.
		Bidets	Characteristics. Installation procedures: relevant codes. Roughing in dimensions. Connecting to supply. Backflow preventers. Adjusting control valves. Repair and maintenance.
		Showers	Shower compartments; built-up, prefabricated, multiple types. Relevant codes. Installing prefabricated compartments. Forming, installing pans for built-up types. Shower drains, strainers. Sizing and locating traps. Supply fittings; combination, single, remote control. Roughing in dimensions. Sizing. Installation of exposed and concealed systems. Automatic tempering devices. Therapeutic uses. Test spouts. Adjustable heads; hard water effects. Shower repair and maintenance.
		Sinks	Single and multiple compartment, combined sink and drainboard. Relevant codes. Materials, finishes.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		<p>Laundry Tubs</p> <p>Urinals</p> <p>Drinking Fountains</p>	<p>Installation of counter top, wall hung, freestanding, cabinet types. Tail pieces, strainers, traps, faucets (single loose flange, combination, single handle control, preset temperature control). Supply fittings, spray hose, aerator, control valves. Repair and maintenance.</p> <p>Single outlet, two and three compartment types. Construction materials; handling. Roughing in dimensions. Relevant codes. Installing tubs, supply, strainers, traps, waste and vent.</p> <p>Wall hung, stall, pedestal, trough, integral trap types. Syphon storage tanks, flush valves, self closing stops. Roughing in dimensions. Relevant codes. Locating, installing, adjusting urinals, flushing devices, strainers. Connecting to wall outlet (exposed and integral traps), floor outlet, waste and supply. Provisions of cleanouts. Repair and maintenance.</p> <p>Wall hung, built-in recess, pedestal, basin attachment, electrically cooled, other types. Roughing in dimensions. Relevant codes. Mounting, connecting to supply and waste (integral and exposed traps). Adjusting flow control valves. Fountain repair and maintenance.</p>
15	<p>Fixture and Equipment Installation and Servicing</p> <p>(Water Conditioning Equipment)</p>	<p>Water Conditioners (Softeners)</p> <p>(Filters — Private Systems)</p> <p>(Chlorinators — Private Systems)</p>	<p>Capacity factors. Conditioning agents. Hardness tests. Installing, connecting to supply, fixtures. Bypass loop and valves (internal, supply line); manual and automatic. Alarm meter. Regenerating by; direct salting, brine tank system.</p> <p>Types, characteristics: filtration principles. Water tests. Locating, installing. Preventing filter bed channelling. Servicing procedures.</p> <p>Individual, combined filter chlorinators. Water tests. Chlorination principles. Installation methods. Adjusting chlorinating solution feed rate.</p>
16	<p>Fixture and Equipment Installation and Servicing</p> <p>(Equipment and Appliances)</p>	<p>Dishwashers and Laundry Washing Machines</p> <p>Domestic Garbage Disposal Units</p> <p>Hot Water Storage Tanks</p>	<p>Domestic, commercial, institutional dishwashers; electric, hydraulic types. Gyrator, drum laundry washing machines. Relevant plumbing, electrical codes. Installation, levelling; use of vibration shock absorbers.</p> <p>Types, characteristics. Relevant plumbing, electrical codes. Effect of raw wastes on sewage systems. Installation; connecting to waste, sink outlet, power source. Servicing and repair.</p> <p>Direct, indirect heater; electric, gas, oil integral heating units. Relevant electrical, plumbing, gas or oil burner codes. Cathode rod, tank linings, insulation. Locating, installing tanks, drain valve, pressure and</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
		Swimming Pools	temperature relief valves. Preventing syphonage, air-locks. Installing check valve on hot water supply. Dip tubes. Avoiding overheating tanks. Vent flue for self-contained oil and gas heated tanks. Inspection, maintenance.
		(Filters)	Deck level gutter types. Recirculating systems. Relevant codes. Installation of vacuum fittings, cleaning equipment, skimmer fittings, baffles, inlet fittings, main drain, deck drains, sight glass, recirculating and filtered lines, balancing tank.
		(Recirculating Pumps)	Back wash, cartridge, combined filter chlorinator types. Location, capacities. Relevant codes. Installing and servicing filters.
		(Heating Units)	Characteristics, location: calculating size, capacity. Available voltage. Strainer types. Installing, leveling pumps.
		Ornamental Pools and Aquariums	Oil, gas, electric, other pool heaters. Relevant plumbing, electrical, oil, gas burner codes. Sizing, installation, controls.
		Commercial and Institutional Equipment	Characteristics of installations. Relevant codes.
			Characteristics of kitchen equipment; potato peelers, coffee urns, refrigerators, water dispensers and coolers, steam kettles and tables, bain maries. Hospital, laboratory equipment; service sinks, flushing rim sinks, laboratory tables, elongated toilet bowls (bed pan hose, spray attachments), sterilizing equipment, anaesthetic gas lines, oxygen lines and equipment, suction lines, water, compressed air lines, physiotherapy equipment. Size, location, installation. Control valves, supply piping, waste and traps for primary and secondary waste traps, waste cleanouts, grease interceptors. Equipment and fixture maintenance.

Schedule 2**PLUMBER****Work Instruction and Experience**

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	Trade Tools and Procedures (As detailed in Schedule 1)	General	Safety rules and removal of all hazards. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . The <i>Building Code Act</i> . The <i>Ontario Water Resources Act</i> (Regulation 736 of Revised Regulations of Ontario, 1980). Care and use of hand and power tools and equipment, measuring devices. Joining pipe, tubing, fittings by; soft and hard soldering, brazing, welding, caulking; pipe cutting, reaming, threading; flanged fittings, compression fittings, lead burning, wiping joints, cementing joints, nonmetallic plastic joints. Bending and forming pipe and tubing, bar stock, lead sheet.
2	Trade Tools and Procedures Pipe, Tubing and Fittings (Installation)	Selection and Installation	Familiarization with relevant codes, regulations and specifications. Selection and installation of pipe, tubing, threaded pipe, valves, pipe hangers and fasteners. Support layout, spacing, grade for above or underground installations according to pipe, soil and building requirements.
3	Roughing in (Drainwork)	Sewers and Drains	Familiarization with relevant codes, regulations, specifications. Establishing invert elevations, locating, setting, levelling. Installing building sewers, traps, floor drains. Connecting rain-water leaders, area drains, subsoil drainage tile to building drains. Installing oil and gasoline interceptors, sewage pumps, backwater valves. Connecting blow-off tanks to building drains. Municipal sewage systems; familiarization with types and characteristics, grading, construction, design, pipe materials, sewage treatment and disposal methods. Connecting building sewers to public sewers. Rural sewage systems; familiarization with types and characteristics, septic process, disposal bed systems, components. Leaching systems. Construction and installation of septic tanks, disposal beds. Testing, repair and maintenance of sewers, drains, sewage systems.
4	Roughing in (Stacks, Wastes and Vents)	Stacks, Wastes and Vents	Familiarization with relevant codes, regulations, specifications. Laying out, installing sleeves and inserts, stack footings, soil and waste stacks, terminal flashings. Installing horizontal branches, fixture wastes and traps, grease traps, chair carriers. Installing venting systems. Installing rain water leaders. Testing, repair and maintenance of stacks, wastes, vents.
5	Roughing in	General	Familiarization with relevant codes, regulations, specifications. Making service connections to municipi-

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
	(Water Supply Systems)		pal water mains. Installing and testing water meters. Installing cold water supply piping and domestic hot water supply piping systems. Rural supply systems; familiarization with supply sources, well types, pump types, storage tanks, power sources. Installing rural supply systems. Fire line systems; installing fire protection lines. Installing ring mains for exterior fire protection. Testing, repair and maintenance of water supply systems.
6	Roughing in (Process Supply Systems)	Special Water Systems	Familiarization with relevant codes, regulations, specifications. Installing chilled water and distilled water systems, nonpotable water systems, lawn irrigation systems. Installing special fluid process piping systems. Testing, repair and maintenance of special water systems.
7	Fixture and Equipment Installation and Servicing (Basic Fittings)	Supply, Fittings, Valves, Piping, Wastes and Traps	Familiarization with relevant codes, regulations and specifications. Installing supply fittings, control valves, automatic flush valves. Repairing or replacing water supply fittings, valves, supply piping. Installing waste fittings, strainers, plug outlets, fixture and equipment traps. Clearing stoppage, replacing wastes and traps.
8	Fixture and Equipment Installation and Servicing (Fixtures)	Fixtures and Equipment	Familiarization with relevant codes, regulations, specifications. Installing bathtubs, washbasins, water-closet combinations, bidets, showers, sinks, laundry tubs, urinals. Installing drinking fountains. Maintenance, repair and replacement of fixtures and equipment.
9	Fixture and Equipment Installation and Servicing (Water Conditioning Equipment)	Water Conditioners	Familiarization with relevant codes, regulations, specifications. Installing water softeners. Installing filters and chlorinators in private water systems. Testing, repair and maintenance of water conditioning systems.
10	Fixture and Equipment Installation and Servicing (Equipment and Appliances)	Domestic, Commercial, Institutional, Hospital and Laboratory Equipment	Familiarization with relevant codes, regulations, specifications. Installing dishwashers, laundry washing machines, domestic garbage disposal units, hot water storage tanks. Installing piping systems, filters, recirculating pumps, heating units for swimming pools. Installing supply, recirculating, waste systems for ornamental pools, aquariums. Installing and servicing commercial and institutional kitchen equipment; potato peelers, coffee urns, refrigerators, water dispensers and coolers, steam kettles and tables, bain maries. Installing and servicing hospital, laboratory equipment; service sinks, flushing rim sinks, laboratory tables, elongated toilet bowls (bed pan hose, spray attachments), sterilizing equipment, anaesthetic gas lines, oxygen lines and equipment, suction lines, water, compressed air lines, physiotherapy equipment.

REGULATION 53

under the Apprenticeship and Tradesmen's Qualification Act

PRINTER

INTERPRETATION

1. In this Regulation,

- (a) "certified trade" means the trade of printer;
- (b) "training profile" means the training curriculum approved by the Director for the various branches of the certified trade, including the units of study required for in-school and work experience training. O. Reg. 814/80, s. 1.

2. The trade of printer is designated as a certified trade for the purposes of the Act. O. Reg. 814/80, s. 2.

3. The certified trade is composed of eight branches as follows:

- 1. Branch 1, letter press (job shop).
- 2. Branch 2, lithography (job shop).
- 3. Branch 3, offset pressman (plant).
- 4. Branch 4, linotype operator.
- 5. Branch 5, compositor.
- 6. Branch 6, pressman, letter press.
- 7. Branch 7, compositor, phototypesetting.
- 8. Branch 8, compositor and camera technician. O. Reg. 814/80, s. 3.

4. An apprentice training program is established for the various branches of the certified trade and shall consist of the number of periods of related training and work experience referred to in section 5,

- (a) in the units of study contained in the training profile or in a program that in the opinion of the Director is equivalent thereto at a location approved by the Director; and
 - (b) in work experience training provided by the employer of the apprentice in the units of study contained in the training profile.
- O. Reg. 814/80, s. 4.

5. An apprentice in the certified trade shall,

- (a) for Branch 1, 2, 3, 4, 5, 6 or 7 complete four periods of 2,000 hours per period of related training and work experience in the subjects contained in the training profile for such branch, as the case may be; and
 - (b) for Branch 8, complete five periods of 2,200 hours per period of related training and work experience in the subjects contained in the training profile for such branch.
- O. Reg. 814/80, s. 5.

6. Notwithstanding clause 3 (a) of Regulation 36 of Revised Regulations of Ontario, 1980, the Director may permit a person to become an apprentice in the certified trade where he has less than Grade 10 standing. O. Reg. 814/80, s. 6.

7. The rate of wages for an apprentice in the certified trade when not attending a training program at a location approved by the Director, shall not be less than the minimum rate of wages prescribed by the regulations under the *Employment Standards Act* for employees in the particular branch of the certified trade, as the case may be, plus a minimum of 20 per cent for each period of related training and work experience completed by the apprentice. O. Reg. 814/80, s. 7.

8. The Director may from time to time determine the ratio of apprentices to journeymen who may be employed by an employer in the branch of the certified trade. O. Reg. 814/80, s. 8.

9.—(1) Section 9 and subsection 11 (2) of the Act do not apply to a person who works in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 814/80, s. 9.

10. A certificate of qualification in a branch of the certified trade is not required to be renewed. O. Reg. 814/80, s. 10.

REGULATION 54

under the Apprenticeship and Tradesmen's Qualification Act

RADIO AND TELEVISION SERVICE TECHNICIAN

1. In this Regulation,

- (a) "certified trade" means the trade of radio and television service technician;
- (b) "radio and television service technician" means a person who,
 - (i) installs, adjusts and repairs radio and television receivers and other domestic electronic equipment,
 - (ii) makes adjustments to obtain desired density, linearity, focus, colour and size of television pictures,
 - (iii) isolates and detects defects by the use of schematic diagrams, voltmeters, generators, oscilloscopes and other electronic testing instruments,
 - (iv) tests and changes tubes and other components,
 - (v) repairs loose connections and repairs or replaces defective parts by the use of hand tools and soldering irons, and understands electronic theory and shop techniques,

but does not include a person who is,

- (vi) engaged in the manufacture of radio, television, amplifier or other related electronic equipment,
- (vii) employed in the repair and maintenance of radio, television, amplifier or other related electronic equipment in an industrial plant, or
- (viii) engaged in the wiring of radio, television, amplifier or other related electronic equipment to an external power source. O. Reg. 221/74, s. 1.

2. The trade of radio and television service technician is designated as a certified trade for the purposes of the Act. O. Reg. 221/74, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of four periods of related training and work experience training of 2,000 hours for each period,

- (a) at full time educational day classes provided at a college of applied arts and technology in the subjects contained in Schedule 1; and
- (b) in work experience training provided by the employer of the apprentice in the subjects contained in Schedule 2. O. Reg. 221/74, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedules 1 and 2. O. Reg. 221/74, s. 4.

5. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

- (a) 40 per cent during the first period;
- (b) 50 per cent during the second period;
- (c) 60 per cent during the third period; and
- (d) 80 per cent during the fourth period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 221/74, s. 5.

6. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus one additional apprentice for every two journeymen employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus one additional apprentice for each additional two journeymen employed by that employer in the trade and with whom the apprentice is working. O. Reg. 221/74, s. 6.

7. The Director shall issue a progress record book to each apprentice and the apprentice shall record therein the time that he spends in related training

and work experience and the apprentice shall be responsible for the safekeeping of his progress record book. O. Reg. 221/74, s. 7.

8.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 221/74, s. 8.

9. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 221/74, s. 9.

Schedule 1

RADIO AND TELEVISION SERVICE TECHNICIAN

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics (Trade Related)	Mathematics	Fractions, decimals, square root. Graphs, co-ordinates. Powers, indices. Equations; types, applications. Trigonometry; right angles and vector relationships. Slide rule types and usage. Decibel calculations.
2	Science	Physics	Electricity; static and dynamic. Electron Theory; electromotive force, ionization. Electricity in motion. Ohm's Law. Electro-chemical energy. Conductors, semi-conductors and insulators. Electrical measurement units. Light; principles, wave motion. Sound; units of measurement. Magnetism; principles and application. Electro-magnetic induction. Hysteresis electro-magnets.
3	English	Usage and Business Communication	Trade terminology and usage. Sentence and paragraph structure. Letter and report writing. Work and parts orders. Interpretation and use of manufacturers' manuals, exploded drawings and parts lists.
4	Electronic Drafting	Interpretation	International and Mil-Spec. symbols; circuits, cable-forms, wire harnesses, fastening and locking devices Chassis and panel layout. Printed circuits; materials and finishes. Schematics and circuit tracing, color codes.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
5	General Shop Practice	Safety	Safety rules and safe operating procedures. First Aid. Fire prevention; use and maintenance of Fire Fighting Equipment. High Voltage Hazards; bleeding-off procedures, use of non-conductive matting, isolation transformers. X-ray emission. Picture tube handling; implosion hazards. Cleaning solvent use; toxic fume hazard. Correct lifting methods. Good housekeeping.
		Hand Tools	Care and use of: screwdrivers, pliers, sockets, files. Electric soldering irons and guns. Wire forming and connections, soldering and de-soldering components. Use of heat sinks, resin cored solders. Insulating.
		Power Tools	Care and use of: portable electric drills, bench grinders. Drilling. Grinding screwdrivers and drill bits.
		Test Equipment	Types, care and use of: voltmeters, ammeters, ohmmeters, bridges, field strength meters, volume unit-meters, distortion meters. Signal generators; calibration requirements. Oscilloscopes; operation, uses and servicing.
6	Basic Electricity	Direct Current	Series circuits; total resistance, current flow, voltage drops. Parallel circuits; total resistance, branch currents, total current. Series-parallel circuits; total resistance, simplification of series-parallel combinations, voltage drops, current. Short circuits or open circuits; effects on total resistance, currents, voltage drops, fuses, locating defects. Multiple and sub-multiple of electrical units; conversion. Miscellaneous components; switches, pilot lamps, hardware.
		(a) Resistors	Types and construction; NTC, PTC and VDR. Power and energy in resistors; total in circuit, internal resistance of voltage sources. Voltage divider networks; Kirchhoff's Laws, design of dividers.
		(b) DC Measuring Instruments	Moving coil meter; characteristics, sensitivity, ammeter shunts, voltmeters and multipliers, ohmmeters, meggers.
		(c) DC Motors	Characteristics; armature, field magnets, commutator, brushes. DC generators.
		Alternating Current	AC Principles; induced voltage and current, motor action, generation of AC Sine waves. AC Voltage oscilloscope patterns; amplitude, frequency, period, wavelength, RMS, average and peak to peak values. Non-sinusoidal waves.
		(a) Inductance	Definitions; Lenz's Law, series and parallel inductance, coefficient of coupling, mutual inductance.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
6		(b) Inductive Reactance	Phase angles, series LR Circuits, Parallel circuits, vector analysis, impedance, formulae, LR time constant.
		(c) Transformers	Ratios, efficiency, Z matching, isolation, cores, wire, windings.
		(d) Capacitance Electro-Statics	Capacitor types, characteristics and construction; voltage ratings, colour codes, series and parallel capacitors, AC voltage dividers. Capacitor testing procedures.
		(e) Capacitive Reactance	Phase angles, series CR Circuits, parallel CR circuits, vector analysis, impedance, formulae, CR time constant.
		(f) Resonance	Series LCR circuits, cancellation of reactances, voltage magnification, parallel LCR Circuits; cancellation of currents, impedance magnification, formula for resonance, RF tuning, Q, Band width, response curves, harmonics.
		(g) Filters	Low pass, High pass, Bandpass, Bandstop, magnetic shielding, RF component losses.
		(h) AC Power	Real power, apparent power, power factor.
7	Basic Electronics	Vacuum Tube Fundamentals	Vacuum tube structure. Tube numbering, Basing, ratings. Types of emission, space charge. Diodes; rectification and detection. Triode characteristics. Plate resistance. Transconductance. Amplification factor. Triode amplifier, stage gain. DC and AC amplifiers. Interelectrode capacitance. Characteristics of Tetrode, Beam Power Tube and Pentode. Power Pentode. Variable-mu Pentode. Multi-unit tubes; Compactrons. Tube defects and testing procedures. Use of Tube Manuals.
		Vacuum Tube Amplification & Amplifiers	Audio amplification. Coupling methods. Classes of operation. Bias methods. Load lines. Voltage and Power Amplification. Phase relationships. Single-ended and push-pull amplifier circuits. Phase inverters. Distortion types and causes. Frequency response; methods of improving high and low frequency response in voltage amplifiers. Feedback networks. Undistorted power output; power sensitivity, decibels. Cathode follower. Resistance and voltage analysis of audio amplifiers.
		Power Supplies	Vacuum tube power supplies. Power supply requirements. Transformer type half-wave and full-wave. Transformer-less half-wave. Voltage doublers. Bridge rectifiers. Filter circuits and decoupling networks. Selenium and Silicon Rectifiers. Transients and PIV. Bleeders, Voltage Dividers. Gas-type voltage regulators. Circuit breakers. Power supply servicing procedures.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
7		Vacuum Tube Oscillators	Oscillation requirements. Regenerative Feedback Principle of Operation. Sine-wave types; Armstrong, Hartley, Colpitts, RC phase shift, crystal controlled, electron-coupled, tuned-plate-tuned-grid. Non-sine-wave types; plate-coupled multi-vibrator, cathode-coupled multi-vibrator, blocking oscillator. Operation and frequency checking procedures. Servicing tests.
8	Semi-Conductors	Atomic Structure	Valence. P-type, N-type. Holes. Diffusion and drift. Silicon and Germanium types.
		PN Diodes	Diode junction. Potential hill or barrier. Majority and minority charge carriers. Junction biasing. Leakage current. Front-to-back resistance ratio. Characteristic diode curve. Avalanche or Zener breakdown. Zener diodes; theory and practical applications. Diode capacitance; applications and disadvantages. Tunnel diodes.
		Junction Transistors	PNP and NPN types; construction, transistor action. Majority and minority carriers. Transistor bases and basing diagrams. Tube and transistor comparison. Current gain, Alpha, Beta. Alpha and Beta cut-off frequency.
		Field Effect Transistors	Channel source, gate, drain. Input impedance. Direction of current flow. Pinch effect. Frequency response. IGFET (MOSFET). Special handling precautions.
		Transistor Amplifiers	Configurations; common emitter, common base, common collector. Amplifier operation and characteristics. Transistor biasing methods and stabilization. Transistor characteristic curves. Plotting load lines to predict amplifier performance.
		Coupling Methods	Cascade amplifiers. Impedance matching considerations. Transformer-coupling. RC coupling. Impedance-coupling. Direct-coupling. Volume control considerations. De-coupling circuits—RC filters. Frequency response of amplifiers.
		Power Amplifiers	Single-ended and push-pull audio output stages. Complementary symmetry. Drivers and phase inverters. Class A, AB and B operation. Negative feedback. Transformerless output circuits.
		Power Supply	Comparison of vacuum tube and transistorized types. Zener diodes.
		Transistor Oscillators	Feedback and impedance matching considerations. Types of oscillators.
		Specialized Semi-conductors	Unijunction transistor. Silicon controlled rectifier. Surge and transient suppressors. Switching transistor circuits.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
8		Semi-conductor Data	Interpretation of manufacturers' specification sheets and tabulated data. Rating of typical low-signal and power transistors. Derating at high temperatures. Clarification of parameters. Transistor defects and testing.
		Integrated Circuits	Construction. IC amplifiers. External connections. Testing procedures.
9	Radio, High-fidelity and Sound Systems	AM Radio Transmission and Reception Principles	Closed oscillatory circuit. Open oscillatory circuit. Simple antennas, radio waves. RF carriers. Amplitude modulation. Simple Transmitters. Simple receivers. Demodulation. Crystal receiver. Regenerative receiver. TRF receiver. Sensitivity and selectivity.
		Heterodyning	Disadvantage of TRF receivers. Non-linear characteristics of the amplifier. Frequency conversion, intermediate frequency.
		Frequency Converters	Simple converter stage, using separate local oscillator. Pentagrid converters. Conversion Transconductance. Harmonic mixers. Superheterodyne receiver block diagram.
		Intermediate Frequency	IF stages, bandpass filter, double-tuned IF stages. Selectivity, gain vs. bandwidth, loose coupling, over coupling. Frequency response curves, AM sideband theory. Disadvantages of superheterodyne; spurious responses. Choice of IF frequencies.
			Pentode IF amp. stage, application of AVC remote cut-off Pentode. IF transformer types, construction and shielding.
		Detectors	Operation and characteristics of the tube diode. Triode detector; plate, grid leak, regenerative types. Crystal detector characteristics. Detector load and output polarity. Detector servicing techniques.
		Automatic Volume Control	Simple, delayed and filtering types. Application to tubes. AVC circuit, DAVC tuning indicators.
		Audio Frequency Stages	Volume control, tone control. AF driver stage. Power output stage. Speakers.
		Practical Tube Receiver Circuits	AC radios. AC-battery portables. Automobile. Short Wave.
		Practical Transistor Receiver Circuits	RF and IF coupling methods. RF amplifier circuits. Converter circuits; separate oscillator and mixer, autodyne converter. IF amplifiers and AGC. AGC modes. Detectors. Reflex amplifiers, audio circuitry. Schematics of complete receivers. Transistor radio troubleshooting procedures; test instruments, techniques, precautions. AM/FM receivers. Automobile receivers. Techniques for replacing components and repairing printed circuit boards.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
9		Alignment of Tube and Transistor Receivers	Purpose of IF alignment; "Miller" effect. Alignment procedures; equipment used and connection methods. Tracking, trimming, padding, rocking the gang capacitor. Mixer and RF stage alignment; permeability tuned receivers. Alignment techniques. Sweep alignment of broad band stages.
		Propagation	Radio wave, wave energy, wave polarization. Modes of propagation; ionosphere, ground wave, sky wave.
		FM Transmission and Reception Principles	Modulation in general. FM modulation by capacitive microphone. Side bands in FM modulation index. Deviation ratio. Center Frequency, frequency deviation. Frequency swing, percentage modulation. Effect of loudness, effect of AF frequency. Reactance tube modulator. Frequency multipliers.
		Antennas	Long wire or Marconi antenna, resonant or Hertzian type. Half-wave dipole antenna, standing waves, loop, node. Electrical length, directivity, gain, front-to-back ratio. Folded dipole antenna, director, reflector types.
		Transmission Lines	Characteristic impedances; open wire, 300 OHM lead, co-axial cable, line termination. Source, load, impedance matching, energy transfer. Standing wave ratio, reflections. Propagation velocity factor. Attenuation, losses. Matching stubs. BALUN.
		FM Receivers	FM Detectors. Slope detection. Discriminator. Ratio detector. Gated beam detectors. AM limiting. Pre-emphasis; de-emphasis. Front ends and intermediate frequency. FM stereo principles and AFC.
		High Fidelity Sound Systems and Record Changers	Aural response; high-fidelity system requirements. Transducers, microphones, speakers, pick-up cartridges, changer mechanisms. Loudness, bass, treble, stereophonic effect, speaker enclosures. High-fidelity amplifier circuitry.
		Public Address Sound Systems	Intercoms, 25 and 70 volt lines. Acoustics and audio power. P.A. speakers.
		Tape Recorders	Drive mechanisms. Magnetic tape and tape heads; reel-to-reel, cassette and cartridge types. Bias oscillators. Switching; schematic interpretation.
		Trouble Shooting	Procedures, techniques and test equipment for radio, high-fidelity and sound systems.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
10	Black and White Television	The Television System	Picture elements. Transmitting and receiving the picture. Scanning. Motion pictures. Frame and field frequencies. Vertical and horizontal scanning frequencies. Synchronization. Picture qualities. Television channels. The Associated FM Sound Signal. Standards of transmission. Television channel frequencies. DOT frequency allocations. Principal world television systems. Television broadcasting development.
		Camera Tubes	Photo-emission principles. Flying spot camera. Camera tube types. Image orthicon. Vidicon. Plumbicon. Closed-circuit television.
		Scanning and Synchronizing	Sawtooth waveform for linear scanning. Standard scanning pattern. Flicker. Raster distortions. Synchronizing pulses.
		Composite Video Signal	Construction. Picture information and video signal. Video frequencies and picture information. Maximum number of picture elements. Test patterns. DC components of the video signal.
		Picture Carrier Signal	Negative transmission. Vestigial-side-band transmission. The television channel. Line-of-sight transmission (UHF and VHF). Television broadcasting.
		Television Receivers	Receiver circuits. Sound take-off circuits. Receiver circuits and functions; operating controls. Vacuum tubes. Semi-conductors. Printed circuits. Block diagram. Localizing troubles to a receiver section. Multiple troubles.
		Antennas and Transmission Lines	Resonant length of antenna. Definition of antenna terminology. Ghosts. Straight, folded and broadband dipoles. Long-wire antennas, parasitic arrays. Multiband antennas. Rotators. Closed circuit wiring. Multi-set coupling. UHF/VHF coupling.
		Power Supplies	Full-wave rectifiers. DC voltage polarities. Heater circuits. Voltage doublers. Transformerless low-voltage power supply. Stacked B+ circuits. Rectifier ratings. High voltage power supplies and safety precautions. High voltage troubles. Low voltage supply troubles. Hum.
		The RF Tuner	Operation. The RF amplifier stage and circuits. Mixer stage. Local oscillator. AFT vari-cap diode. RF alignment. Conversion methods for UHF channels. RF tuner circuit types. UHF tuner circuit. Vari-cap tuners. Receiver noise. Cleaning.
		Picture IF Amplifier	Picture IF response. IF amplification. Double and single-tuned IF amplifiers. Stagger-tuned stages. Wave traps. Picture IF alignment. Picture IF amplifier circuits; related malfunctions.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
10		Video Detector	Detection. Detector polarity. Video detector load resistance and filter. Detector diodes. Peaking circuits. Composite video signal functions. Detecting the 4.5 Mc intercarrier beat. Detector output voltage measurement.
		Video Amplification	Video signal and picture reproduction. Video signal polarity and amplification. Manual contrast control. Video frequencies; frequency and phase distortion. Video amplifier frequency response. Video amplifier circuit. Video signal hum.
		Picture Tubes, Brightness Control and DC Restoration	Deflection, focusing and centering. The luminescent screen. Picture tube types. The electron beam; focusing technique. Electro-static and magnetic deflection. Picture tube precautions and troubles. Brightness control. Video signal DC component and average value. DC insertion. Grid-leak bias clamping action. Diode clamping circuit.
		Automatic Gain Control	AGC circuit requirements and bias controls gain. AGC circuits for picture signal; advantages. Keyed AGC circuit. AGC level adjustment and troubles. AGC bias for transistor amplifiers.
		Sync. Separation	Picture vertical and horizontal synchronization. Separation of Sync. from video signal. Vertical sync. integration. Sync. noise. Sync. separator circuits. Sync. and blanking bars on kinescope screen. Sync. troubles.
		Deflection Oscillators	Sawtooth deflection wave form. Producing sawtooth voltage. Blocking oscillator and discharge tube. Blocking oscillator circuit analysis. Deflection generators with blocking oscillator and discharge tube. Deflection oscillator control. Blocking oscillator synchronization. Multivibrators: plate-coupled and cathode-coupled types, sawtooth generator, synchronization. Trapezoidal voltage waveshape. Incorrect oscillator frequency.
		Horizontal AFC Circuits	AFC requirements. Push-pull Sync. discriminator. Multivibrator circuit controlled by sync. discriminator. Single-ended sync. discriminator. DC-control tube (synchro-guide). Sine-wave oscillator with reactance tube (synchro-lock). Hold-in and pull-in ranges. Filtering the DC control voltage. Phasing between horizontal blanking and flyback. Anti-hunt network.
		Vertical Deflection Circuits	Triode vertical output stage, transformers and vertical linearity. Internal vertical blanking. Vertical deflection circuit with blocking oscillator. Combined vertical oscillator and output circuit. Vertical deflection troubles.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
10		Horizontal Deflection Circuits	Circuit function. Horizontal amplifier circuit. Horizontal output circuit damping. Horizontal scanning and damping. Boosted B+ voltage and high voltage. Horizontal deflection controls and yokes. Horizontal output transformers. Horizontal output circuit analysis. Typical horizontal deflection circuit and troubles. VDR.
		FM Sound Signal	FM signal frequency changes and audio modulation. FM terminology. Reactance tube modulator. FM advantages and disadvantages. Pre-emphasis and de-emphasis. FM signal receiver requirements and slope detection. Triple-tuned and center-tuned discriminators. Limiter. Ratio detector. Quadrature-grid FM detector. Complete sound IF circuit and alignment. Intercarrier sound and buzz.
		Remote Control Systems	Types, operation and adjustments.
		Receiver Servicing	Adjustments and cleaning procedures. Types of ghosts. RF interference. Picture external noise interference and sound; localizing hum troubles. Testing Scanning Linearity with Bar Patterns. Signal injection. Localizing receiver troubles and intermittent faults. DC voltage and oscilloscope measurements. Alignment procedures.
11	Color Television	Colorimetry	Color, visible spectrum, wave length. Separation of colors by prism; white light. Primary colors, complementary colors. Separation of colors by reflection and by projection method. Additive and subtractive filters. Combining colors, recombination by additive method. Luminance, chrominance, hue and saturation. Deficiencies of human color vision.
		Color Transmission	Compatability. Characteristics of the NTSC (National Television System Committee) signal. Transmitter and receiver block diagrams. Matrixing. Y, I and Q signals. Delay lines. Multiplexing—balanced modulator. Color sub-carrier and sidebands. Color burst synchronization. Video frequency interleaving. Cancellation interlace. Phase relations in color transmission. Vectors and vector diagrams.
		Antenna Systems	Antenna band width, gain, linearity, response and impedance match of system.
		Color Picture Tubes	Tri-Gun and In-Line types. Gun assembly construction. Phosphor dot face plate. Shadow mask. Beam positioning magnets. Purity coil or magnet. Lateral blue magnet. Deflection yoke. Convergence coils. De-gaussing.
		(Adjustments)	Purity. Static and dynamic convergence. Gray scale tracking.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
11		Y Channel Circuitry	Delay line. Separate sound and video detectors. Sound traps.
		Color Processing Stages	Bandpass amplifier circuit. ACC circuits. Color Killer, burst keyer and burst amplifier circuits. Horizontal blanking amplifier stage. Sub-carrier local oscillator and AFPC circuits. Reactance tube stage. Color demodulators; axis of demodulation. Color difference amplifiers.
		Retrace Blanking	Vertical and horizontal circuits.
		Horizontal Output and High Voltage System	High voltage. High voltage regulation and horizontal output adjustment. Boosted B++ . Focus. Horizontal efficiency coil. High voltage.
		Color Receiver Servicing	Trouble-shooting procedures and techniques and test equipment. N.T.S.C. and keyed rainbow color bar generators. Operation, calibration, use of the bar-dot generator. Adjustment procedures for sweep regulation systems. X-Ray emission problems. Demodulator, chroma, chroma sync. and VIF alignment techniques. Diagnosing and correcting faults in the cathode ray tube, convergence and color circuitry.
12	Shop Management	Costing	Elementary bookkeeping: average operation times, labour, parts and overhead costs. Use of pricing lists and manuals. Billing typical repair work.
		Public Relations	Proper conduct and business dealings in relation to employer, customers and co-workers. Punctuality.

O. Reg. 221/74, Sched. 1.

Schedule 2**RADIO AND TELEVISION SERVICE TECHNICIAN****Work Experience Training**

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	General Shop Practice	General	Safety rules and removal of all safety hazards. Care and use of trade related hand and power tools and test equipment, (as detailed in Schedule 1).
2	Basic Electricity	Fundamentals	Familiarization with series circuits, parallel circuits and series-parallel circuits. Kirchhoff's Laws. AC and DC characteristics. Inductance, capacitance, resistance. Transformers—fundamentals. Components—color coding—resistors, capacitors. Schematic diagrams—symbols.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
3	Basic Electronics	Vacuum Tubes	Familiarization with purpose, construction and types of vacuum tubes:—Diodes, Triodes, Tetrodes, Pentodes, multi-unit tubes. Thermionic emission—space charge. Plate resistance and load. Bias methods. Stage gain.
		Semi-conductors	Familiarization with types, advantages, characteristics and uses of semi-conductors. Bias. Circuit arrangement.
4	Radio, High-fidelity and Sound Systems	AM Receivers	Familiarization with principles and characteristics. Percentage of modulation. Band width and side bands. Superheterodyne operation. RF pre-selectors. Mixers and converters. Tuner circuits. IF amplifiers. Automatic volume control. Tone controls. Testing, servicing and alignment of vacuum tube and transistorized receivers.
		FM Receivers	Familiarization with principles and characteristics. Terms and definitions. Methods of producing FM. Frequency swing. Bandwidth and sidebands. Modulation index. Vacuum tube and transistorized monaural FM. Tuner circuits. Automatic frequency control. IF circuits. Limiter stage FM detectors. Tuning indicators. Stereo. Multiplex transmission. RF signal characteristics. Vacuum tube and transistorized multiplex converter or adaptor circuits. Testing, servicing and alignment of vacuum tube and transistorized FM receivers.
		Record Players	Familiarization with monaural and stereo types. Turntables and changers. Pick-up cartridges. Load impedances. Equalization. Sizes and characteristics of styli. Stereo, preamplifiers and audio frequency amplifiers. Testing, servicing and alignment. Use of manuals.
		Tape Recorders	Familiarization with monaural and stereo reel-to-reel, cassette and cartridge types. Vacuum tube and transistorized types. 1, 2 and 4 track. Characteristics and speeds. Mechanical and electronic operation. Bias system. Testing, servicing and alignment. Use of manuals.
		P.A. Sound Systems	Familiarization with types and operation. Microphone types—characteristics. Audio frequency pre-amplifiers and amplifiers. Negative feed back. Speakers and multiple speaker systems. Crossover networks and impedance matching. Baffles and enclosures. Testing and servicing P.A. sound systems.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
5	Black and White Television	Principles	Familiarization with image formation. Picture elements. Aspect ratio. Video signal structure. Scanning and synchronization. Raster formation. Line frame and field frequencies. Transmission—channel allocation—bandwidth. Carrier frequencies and sideband.
		Circuits and Components	Familiarization with characteristics of vacuum tube and transistorized receivers. Cathode ray tubes. Sync. separator circuits. Deflection generators. Automatic frequency control circuits. High voltage section. Video IF stages. Video detectors. Automatic gain control circuits. Video amplifiers. Audio take-off circuits. Audio IF amplifiers and limiters. FM detectors. Audio frequency output stages. Tuner circuits. Remote control systems. Transmission lines—characteristics. Matching networks. Signal boosters and amplifiers. Antenna systems and rotators. Low voltage power supplies. Testing, servicing and alignment of vacuum tube and transistorized Black and White television receivers and systems.
6	Color Television	Colorimetry	Familiarization with characteristics of color, hue, saturation and brightness. Additive color system characteristics. Deficiencies of human color vision.
		Color Transmission	Familiarization with characteristics of the NTSC (National Television System Committee) signal. Bandwidth. Basic color signal analysis (transmitter block diagram).
		Color Reception and Processing Stages	Familiarization with vector analysis of chroma signal for hue and saturation. Basic color signal analysis (receiver block diagram). Video intermediate frequency amplifiers and video amplifiers, including tube and solid state color TV delay. Automatic fine tuning and indicating circuits. Chroma amplifiers. Chroma bandpass. Burst amplifiers. Burst automatic frequency control and reactance tubes. Crystal oscillators. Variations in chroma sync. chains. Color killer. Horizontal output and high voltage system.
		Color Receiver Servicing	Trouble-shooting and use of test equipment; including NTSC and keyed rainbow color bar generators, bar-dot generators. Adjustment of sweep regulation systems and high voltage regulation; X-ray emission precautions. Servicing demodulator, chroma, chroma sync. circuits. VIF and chroma alignment. Diagnosing and correcting faults in the cathode ray tube circuitry.
		Picture Tube Adjustments	Purity, convergence, de-gaussing and gray-scale tracking adjustments.

REGULATION 55

under the Apprenticeship and Tradesmen's Qualification Act

REFRIGERATION AND AIR-CONDITIONING MECHANIC

INTERPRETATION

1. In this Regulation,

- (a) "certified trade" means the trade of refrigeration and air-conditioning mechanic;
- (b) "refrigeration and air conditioning mechanic" means a person who,
 - (i) lays out, assembles, installs, maintains in the field any cooling or heating-cooling combination system for residential, commercial or industrial purposes within the limitation of the *Energy Act*,
 - (ii) installs or connects piping for the purpose of conveying refrigerant of all types for either primary or secondary cooling,
 - (iii) overhauls or repairs any equipment used in a refrigeration or air-conditioning system, and
 - (iv) tests, adjusts, maintains all controls on refrigeration or air-conditioning systems including air-balancing,

but does not include a person who is engaged in the repair or installation of single-phase hermetically sealed domestic self-contained units with factory mass produced systems precharged with refrigerant, or a person employed in production commonly known as mass production.
O. Reg. 612/73, s. 1; O. Reg. 17/76, s. 1.

2. The trade of refrigeration and air-conditioning mechanic is designated as a certified trade for the purposes of the Act. O. Reg. 612/73, s. 2.

3. An apprentice training program is established for the certified trade and consists of five periods of related training and work experience training of 1800 hours for each period,

- (a) at full time educational day classes provided at a college of applied arts and technology or in courses that in the opinion of the

Director are equivalent thereto in the subjects contained in Schedule 1; and

- (b) in practical training and instruction provided by the employer of the apprentice in the subjects contained in Schedule 2.
O. Reg. 612/73, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the subjects contained in schedules 1 and 2. O. Reg. 612/73, s. 4.

5. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours of work or for hours of work in excess of his regular daily hours of work shall not be less than,

- (a) 40 per cent during the first period;
- (b) 50 per cent during the second period;
- (c) 60 per cent during the third period;
- (d) 70 per cent during the fourth period; and
- (e) 80 per cent during the fifth period,

of the average hourly rate of wages or its equivalent for journeymen in that trade employed by the employer with whom the apprentice is working.
O. Reg. 612/73, s. 5.

6. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for each three journeymen in the trade employed by that employer;
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman in the trade employed by the employer plus an additional apprentice for each additional three journeymen in the trade employed by that employer.
O. Reg. 612/73, s. 6.

7. Any person who,

- (a) applies in the prescribed form for apprenticeship in the certified trade; and
- (b) works in that trade for three months or less,

is exempt from subsection 11 (2) of the Act. O. Reg. 612/73, s. 7.

8. The Director shall issue a progress record book to each apprentice and the apprentice shall record therein the time that the apprentice spends in related training and work experience and the apprentice shall be responsible for the safekeeping of his progress record book. O. Reg. 612/73, s. 8.

9. An applicant for a certificate of qualification in the certified trade shall submit to the Director evidence satisfactory to the Director of,

- (a) his successful completion of the apprenticeship training program described in section 3; or
- (b) his engagement in the certified trade as a journeyman for a period at least equivalent to the total number of hours of which the apprenticeship training program consists. O. Reg. 612/73, s. 9.

Schedule 1

REFRIGERATION AND AIR-CONDITIONING MECHANIC

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction to be Given
1	Mathematics (Trade Related)	Mathematics	Whole numbers, fractions, mixed numbers, decimals. Linear, square and cubic measure. Area and volume calculations. Angles and degrees. Ratio and proportion. Weights and measures. Percentage and simple interest. Metric system and conversion methods. Algebra; fundamentals, linear equations, formulae, shop calculations. Slide rule use. Pipe capacities; cross sectional areas, ratio, fluid flow calculations. Estimating; units, trade unit, quantity calculations, costing principles. Inventory. Business operations; practices, payroll and wages calculations; insurance, taxes, Workmen's Compensation, wage earner's lien.
2	English Communications	Printed, Written, and Oral Communication	Vocabulary of the trade. Reading comprehension; use of trade publications, dictionary, library. Sentence structure, grammar, punctuation, composition. Trade related letter, memoranda writing, completion of forms, reports, job descriptions, estimates, orders. Oral communication. Good listening principles.
3	Blueprint Reading	Introduction and Interpretation	Working drawings. Title block. Section views. Orthographic, isometric and multi-view projections. Auxiliary views. Aligned, revolved and auxiliary sections. Threads, fasteners. Dimensioning. Fits and tolerances. Surface finish. Standard architectural symbols. Schematics. Job specifications, addendums.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
3		Elementary Drafting	Tolerances. Reproduction process. Three—view drawing. Instrument use. Sections and material symbols. Dimensioning. Freehand sketching, schematics. Plan study of construction; materials, construction members, dimensioning methods, sections and details, schedules. Electrical drawings for commercial and industrial projects, electrical symbols. Schematic diagram for electric defrost system, single and multiple coil hook-up. Piping drawings; single line, double line, isometric. Pipe fabrication, piping and welding symbols. Preparation of elementary trade related working drawings, dimensioned sketches, piping systems, circuits, schematics, layouts, estimates.
4	Safety	General	Safety rules and safe operating procedures. Protective clothing and equipment. First aid; refrigerant and electrical accidents, burns, artificial respiration. Ventilation. Fire prevention; types and use of extinguishers. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . The <i>Building Code Act</i> . <i>Electrical Safety Code</i> —Regulation 794 under the <i>Power Corporation Act</i> . Handling and storage of refrigerants and oils. Safe use of lifting and hoisting equipment, electrical tools and equipment, welding equipment. Powder actuated tools. Good housekeeping.
5	Trade tools and test instruments	Hand Tools	Care and use of hammers and chisels, pliers, cutters and shears, drifts and punches. Files and reamers. Taps and dies, metal and wood saws, wrenches, drill bits (wood, metal, masonry) stud extractors, clamps and vises, pipe cutting, flaring and bending tools.
		Power Tools and Equipment	Use, care and storage of portable electric drills and hammers. Pipe cutting and threading machines. Grinders. Powder actuated stud guns. Jacks and hoists, cranes, slings, pulleys.
		Test Instruments	Use, care and storage of hydrometers, salometers, pressure and vacuum gauges, dry and wet bulb thermometers, electrical meters, stroboscope, stop watch. Fluid and gaseous flow meters. Leak detection devices; use of halide leak detectors, electronic leak detectors, soap test, litmus paper, sulphur stick.
		Measuring Tools	Care and use of rules, squares and protractors. Calipers and feeler gauges. Levels. Micrometers. Plumb bobs. Chalk lines.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
6	Elements of Refrigeration	<p>Refrigeration</p> <p>Applied Physics</p> <p>Basic Refrigeration Cycle</p> <p>Basic Automatic Cycle Controls</p> <p>Multiple Systems</p> <p>Codes and Regulations</p>	<p>Evolution. Definition and description. Applications for cooling, preserving. Trade terminology.</p> <p>Heat (cold); kinds of heat, sensible, latent, fusion, vaporization, sublimation, specific, super heat. Kinetic theory of heat; heat effects of bodies, change of state, volume. Vaporization, condensation, fusion, solidification, sublimation. Saturated and superheated vapour. Temperature and pressure relationship. Temperature; indicating instruments, scales, scale conversion, thermometer types and installation. Heat transfer; flow laws, conduction, convection, radiation. Units of measurement; British Thermal Unit, ton of refrigeration, specific heat. Pressure; atmospheric and absolute, indicating instruments, pressure and vacuum gauges. Fluid flow; friction, velocity, cause of flow, total pressure, units of measure. Properties of matter; gravity, density, saturation. Chemical and physical properties of air and water. Elements of energy; kinds, work and horsepower, heat, molecular energy. Gas laws; Dalton's Law, Boyle's Law, Charle's Law. General Gas Law. Thermodynamic properties; pressure, temperature, volume, density, enthalpy, entropy.</p> <p>Open cycle; water canteen, refrigerant drum. Closed cycle; basic essentials—compressor, evaporator, condenser, metering device. Compression cycle; operation and schematics, system components, refrigerant cycle.</p> <p>Control by thermostat (temperature), pressurestat (pressure), humidistat (moisture, humidity). Expansion in liquids, solids, vapours. Pressure drop across expansion valves, accessories.</p> <p>Parallel evaporators. Control methods. Parallel compressors. Piping methods.</p> <p>Refrigeration systems and building occupancy classifications. Requirements for institutional, public, residential and commercial installations. Refrigerant piping and pressure vessels, pressure relief devices, valves, fittings, thread lubricants and sealers.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
9	Compression Cycle	Vapour Compression Cycle	Definition and description. Various systems. Dense air. Vapour compression. Absorption system. Control methods.
		Systems	Low side and high side float systems. Capillary control. Direct expansion system; constant pressure, constant super heat. Principles of operation. Construction. Control and adjustment methods. Advantages and disadvantages. Applications.
		Condensing Units	Types. Applications. General installation data. Cascade systems.
		Hermetically Sealed Units	Description. Construction differences. Installation requirements. Applications.
10	Compressors	Basics	Principles and general operation. Function in the system. Compressor seals. Capacity. Piston displacement, volumetric efficiency, compression ratio. Power sources. Lubrication.
		Compressor Types	Common types and selection for type of refrigeration system application. Reciprocating; open, semi-hermetic, welded hermetic, vertical, V and W, for halocarbon or halogenated hydrocarbon and ammonia, double acting. 2-stage compressors and booster. Rotary; accessible, open and hermetic, domestic, ammonia. Centrifugal (halocarbon or halogenated hydrocarbon and ammonia). Screw type.
		Capacity Control	Control methods. Cylinder unloading. Hot-gas bypass. Multiple compressors. Solenoid valve control (hot-gas and evaporator). Vane and speed controls.
		Installation	Checking compressor and equipment received. Erection methods. Piping connections. Driver alignment and control connections.
		Absorption Machines	Types of absorption systems, function of generators, absorbers, condensers, evaporators. Installation methods. Care in handling.
		Maintenance	Procedures for replacing hermetic compressor. Replacing motor compressor system, valve plates, seals. Dis-assembly, inspection, overhaul and re-assembly of reciprocating and rotary compressors. Clean-up procedures (burn-out).

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
7	Piping in Refrigeration Systems	Piping Principles	Identification and application of piping types; iron, plastic, copper, brass, steel and related fittings.
		Pipe Work	Copper; cutting, flaring, swaging and bending procedures. Iron; cutting, threading, making of proper joints (coupled, flanged, welded). Plastic; cutting, joining. Steel; cutting, reaming, threading, bending, hanging.
		Hangers and Supports	Installation of pipe hangers. Cutting and threading rod hangers. Installing hangers in concrete, steel and wood. Hanging pipe and tubing, riser supports. Common problems; causes, elimination. Making up piping and fittings for commercial hook-ups. Applicable codes and regulations.
		Insulations	Insulating materials; Types and methods of fitting. Insulating lines (liquid, suction).
		Piping Practices	Allowable velocities. Pressure drop. Oil return. Compressor protection. Sizing of suction lines, liquid lines, hot gas risers. Use of refrigerant piping charts. System design.
8	Refrigerants and Oils	Piping	Liquid, suction, hot gas discharge, condensate. Double risers, "P" traps. Multiple compressors, multiple evaporators, remote condensers. Primary and secondary systems. Refrigerant lines; high pressure, low pressure.
		Refrigerants	Requirements. Thermodynamic properties. Physical properties. Classification and types; primary, secondary. Operational procedures. Leak detection methods for different types. Testing for contamination of refrigerant. Refrigerant cylinder filling methods. Toxicity, flammability and explosive hazards. Number designation of refrigerants.
		Oils and Lubricants	Types. Characteristics. Properties and proper applications.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
11	Condensers and Receivers	Condenser Types	Description, purpose and function in system. Applications. Air cooled, water cooled, combination, evaporation. Auxiliary. Shell and tube condenser receivers. Construction materials. Controls and safety devices; pressure, temperature and humidity. Relevant codes. Freeze protection.
		Components and Operation	Heat transfer. Piping and pumps. Cooling towers.
		Installation and Servicing	Space requirements. Methods of mounting and installing condensers and cooling towers. Piping connections. Servicing procedures. Start-up. Close-down. Cleaning, water treatment, draining, flushing. Winter operation.
12	Evaporators	Principles	Purpose and function in system. Air coolers (coils). Liquid coolers. Defrost systems.
		Design and Operation	Circuiting. Direct expansion coils. Humidity. Defrost methods; electrical, thermo bank, reversing valves. Multiple coils. Capacities, coil temperature control. Air circulation effects on product, humidity, capacity. Applications for beer, soda, water coolers.
		Evaporation (temperature difference)	Definition. Proper coil selection factors. Capacity and temperature difference relationship.
		Installation	Evaporator selection and sizing factors. Valve selection. Space requirements. Mounting methods. Piping connections. Servicing procedures.
13	Metering Devices	Operating Principles and Types	Definition and theory, Importance to system. Hand operated, thermostatic and automatic expansion valves. Capillary tube. Low side float. High side float. Applications. Selection factors. Operation; pressures, control.
14	Evacuation	Principles	Reason for evacuation (air, moisture). Vacuum pump theory, inches of mercury, microns.
		Methods	Evacuation by air; single by vacuum pump, double by vacuum pump, heat. Evacuation of moisture; dehydration by vacuum pump and by desiccants.
15	Accessories	Types and Function	Characteristics and function in system. Dehydrators and desiccants. Liquid indicators. Suction line filters. Check, two-temperature and water regulating valves. Heat exchangers. Oil separators. Mufflers. Vibration eliminators. Accumulators. Head pressure control (low ambient conditions with roof-mounted aircooled condensers.)

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
16	Electrical Systems	Basic Theory	Current flow. Voltage. Resistance. Ohm's Law. Measurement and use of test equipment; voltmeter, ammeter, ohmmeter, wattmeter, test fuses. Magnetism and solenoids. E.M.F. AC and DC. Generators and motors (single and poly-phase). Transformer principle. Batteries. Electrical safety practices. Relevant codes and standards. Safe operating procedures.
		Controls and Components	Control circuitry; starter circuits, control circuits. Start and run capacitors, relays, magnetic starters, contactors. Circuit protective devices. Transformers. Low voltage control system. Control circuit testing. Motor types, testing and direction reversing procedures. Capacitor capacitance formula. Multiple capacitor connections.
		Wiring Diagrams	Interpretation of installation, label (or line) and schematic wiring diagrams and symbols.
		Installation	Procedures for installation, connecting and testing of electrical circuits, controls and components for commercial refrigeration systems. Trouble shooting electrical faults. Use of electrical and mechanical test instruments.
17	Controls and Control Circuitry	Fundamentals of Control	Purpose, function and types of control circuits and control devices in commercial refrigeration systems. Electric, pneumatic and electronic types. Primary and secondary categories. Control devices; controllers (thermostats, humidistats, pressure type switches). Controlled devices; automatic valves, valve operations, automatic dampers, damper operations, electrical heaters, meters, contactors, starters. Auxiliaries; transformers, relays, potentiometers, manual switches, clocks or timers. Components used in controls and circuits. Capacity and distribution control systems.
		Fundamentals of Measurement	Temperature; primary elements, heating, cooling. Relative humidity; humidistats or hygrostats, sensing elements, controlled devices.
18	Commercial Load Calculation	Heat Transmission (Sensible)	Conduction; walls, ceilings, floors. Time. Insulation type and thickness. External area. Temperature difference. Radiation; glass, other materials. Heat gains ("U" factor). Solar. Air change; inside volume, types of usage. Product. Miscellaneous factors; people, lights, motors, appliances (gas or electric).
		Load Estimation	Estimating methods and forms used. Selection and locating factors for; coolers, compressors, condensers and receivers, piping, controls and accessories. Chart use.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
19	Installations and Start-up	Main Components	Installation procedures for self contained units, compressors, condensers and receivers. Evaporators, tubing and piping, control devices and accessories. Fitting gauges and test instruments.
		Large Commercial Systems	Design considerations and major factors. Low temperature food warehouses (long term storage). High temperature, short term food storage. Chain store applications. Packaged equipment. Industrial applications for dairies, breweries, meat packing plants. Skating and curling rinks. Test facilities and special equipment. Pumping systems. Water chillers (reciprocating, centrifugal, absorption). Cooling towers. Defrost methods. Self-contained air conditioners. Heat pumps. Air handling units. Direct and indirect coolers.
		Initial Start-up	Evacuation, charging and purging procedures. Operational checks; leak test, charge, position valves, belts, oil, power source. Safe operating procedures, safety devices. Hazards and malfunctions.
20	Service Problems	Trouble Shooting	Principles, procedures and techniques. Common component malfunctions and symptoms; condensers and receivers, evaporators, compressors, basic cycle controls, accessories, metering devices. Electrical systems; load and control circuits. Use of wiring diagrams, and design conditions.
		Inspection and Servicing	Systematic detection of malfunctions, identification and corrective repairs or adjustments. Personal and equipment safety protection. Periodic preventive maintenance inspections.
21	Welding (Oxyacetylene)	General	Welding terminology. Oxyacetylene equipment and processes. Hazards and safety precautions. Protective clothing and equipment. Welding and brazing rods, fluxes. Basic weld joints. Material cleaning and preparation. Weld and torch cutting faults. Weld testing procedures.
		Welding, Cutting, Brazing	Equipment handling, set-up and operation; regulated pressures, tip sizes, flame types, purpose and adjustment. Flat and horizontal position fusion and braze welding. Manual torch cutting. Use of brazing, brazing alloys, silver solder, and soft solder for making joints.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
22	Air Conditioning	General Principles	Air and human comfort factors. Filters, fans, ducts, grilles, air balancing, types and layout of systems, noise levels. Effects of humidity, heating and cooling the air. Load analysis and calculation.
		Air Circulation	Return and outside air. Duct systems. Static pressure. Total pressure. Inches of water column. Ventilating systems; equipment required, location and applications.
		Air Cooling and Heating Systems	Description. Equipment required. Location. Means of cooling and heating. Types of air distribution. Controls required. Year-round systems; function, mechanical operation, psychrometric charts. Equipment. Controls. Trouble shooting and servicing.
		Air Cleaning Equipment	Filters; viscous and dry types. Filter bank installation, checking and cleaning procedures. Electrostatic air filters; component assembly, starting, operating, cleaning and maintenance procedures.
		Air Distribution	Checking duct system. Setting and adjustment of registers, grilles, venting dampers, supply air diffusers. Adjustment of direct discharge (package free-blow units), induction units and high velocity mixing boxes. Adjustment and balancing of air volume. Setting open and closed exhaust hoods. Room C.F.M. . Air movement F.P.M. . Humidifying and de-humidifying equipment; spray and wetted surface types, evaporators. Service requirements.
		Design Factors	Duct sizes for given total C.F.M. . Duct system layout including fresh air. Register sizes and number per room. Air flow measurement. Dry expansion chillers; operation, selection, C.F.M., condenser water G.P.M., heat rejection factors. Window installations. Packaged equipment. Remote self-contained and central station equipment.
		Automatic Control Systems	Pneumatic, electric, electronic, fluidic types. Installation procedures.
23	Psychrometrics	Properties of Air	Relationship to air conditioning systems design and operation. Ventilation requirements. Evaporative cooling. Air mixture. Return air and outdoor air. Winter and summer air treatment passing through plenum.
		Calculations	Air and humidity calculations. Use of psychrometric charts, sling and aspirating psychrometers.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
24	Air Handling and Distribution Equipment	Components	Fans and blowers. Filter devices. Humidification and de-humidification equipment. Diffusers, grilles, registers. Ductwork. Dampers. Fan coil units; types, features and limitations, controls.
		System Variations	Single and multi-zone units; all-air and air-water induction systems, central station apparatus, piping.
		Air System Balancing	Air flow balancing methods. Use of air measuring instruments. System adjustments and control.
		Maintenance	Maintenance cycles and procedures.
25	Air Conditioning Equipment	Selection Factors	Equipment types, domestic and commercial applications. Use of manufacturers charts. Packaged equipment. Heat pumps. Water chillers. Absorption equipment. Pumps; water, glycol, brines and ammonia types. O. Reg. 612/73, Sched. 1.

O. Reg. 612/73, Sched. 1.

Schedule 2**REFRIGERATION AND AIR-CONDITIONING MECHANIC****Work Experience Training**

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	Trade Practices (as detailed in Schedule 1)	General	Safety rules and removal of all hazards. The <i>Occupational Health and Safety Act</i> . The <i>Workmen's Compensation Act</i> . The <i>Building Code Act</i> . <i>Electrical Safety Code</i> —Regulation 794 under the <i>Power Corporation Act</i> . Care and use of hand and power tools and equipment, test instruments, measuring tools. Pipe work; cutting, reaming, threading, flaring, swaging and bending. Making and fitting joints. Welding, brazing, torch cutting and soldering.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
2	Refrigeration Systems	General	Familiarization with basic refrigeration cycle, automatic cycle controls, multiple systems. Requirements for institutional, public, residential and commercial installations. Applicable codes and regulations.
		Pipe Work	Familiarization with piping types, practice and applications. Use of refrigerant piping charts. Sizing and installing piping and fittings for liquid, suction, hot gas discharge, condensate lines. Primary and secondary systems, high and low pressure refrigerant lines. Making up and installing pipe hangers, hanging pipe and tubing, insulating lines.
		Refrigerants, Oils and Lubricants	Familiarization with properties, types, classification and usage. Leak detection. Refrigerant contamination tests. Filling refrigerant cylinders. Hazards and safety precautions.
		Compressors	Familiarization with principles, types, general operation. Selection and installation of reciprocating, rotary, centrifugal, screw type compressors, 2 stage compressors and booster. Erection operations. Piping connections. Driver alignment and control connections. Installation of absorption equipment.
		(Maintenance)	Replacing hermetic compressor. Clean-up after burn-out. Replacing motor compressor system, valve plates, seals. Dis-assembly, inspection, overhaul and re-assembly of reciprocating and rotary compressors. Lubrication.
		Condensers and Receivers	Familiarization with principles, types, function. Relevant codes. Mounting and installing condensers and cooling towers. Piping connections. Start-up and close-down operations. Servicing; cleaning, water treatment, draining, flushing. Winter operation.
		Evaporators	Familiarization with principles, types, and function; air coolers (coils), liquid coolers, defrost systems. Installation; evaporator selection and sizing, valve selection, mounting operations. Piping connections. Servicing.
		Metering Devices	Familiarization with operating principles and types. Selection and installation of hand operated, thermostatic and automatic expansion valves, capillary tubes, high and low side float.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
2		Accessories	Function and installation of de-hydrators and desiccants. Liquid indicators. Suction line filters. Check, two-temperature and water regulating valves. Mufflers. Heat exchangers, oil separators. Vibration eliminators. Accumulators.
		Electrical Systems	Familiarization with basic electrical theory. Safety practices and operating procedures. Relevant codes and standards. Installation, connecting and testing of electrical circuits, controls and components for commercial refrigeration systems. Use of wiring diagrams. Trouble shooting electrical faults.
		Controls and Circuitry	Familiarization with control fundamentals and measurement. Installation of control circuits, fluidic, electric, pneumatic and electronic, primary and secondary control and controlled devices. Capacity and distribution control systems. Trouble shooting controls and circuitry.
		Commercial Refrigeration Systems	Familiarization with heat transmission principles and factors. Commercial load calculations and estimates. Selection and location of coolers, compressors, condensers and receivers, piping, controls and accessories.
		(Installation)	Large commercial systems; low temperature food warehouses (long term storage), high temperature, short term food storage. Chain store applications. Packaged equipment. Industrial applications for dairies, breweries, meat packing plants. Skating and curling rinks. Pumping systems. Water chillers. Cooling towers. Defrost systems. Self contained air conditioners. Heat pumps. Air handling units. Direct and indirect coolers. Multiplex systems.
		(Initial Start-up)	Safe operating procedures and safety devices. Fitting gauges and test instruments. Evacuation, charging and purging. Operational checks.
		(Trouble Shooting and Maintenance)	Systematic detection of malfunctions, identification and corrective repairs or adjustments. Periodic maintenance inspections.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
3	Air Conditioning Systems	<p>General</p> <p>Equipment Selection</p> <p>Installation</p> <p>Servicing</p>	<p>Familiarization with principles. Load analysis and calculation. Design factors for duct sizes, duct system layout, registers. Air flow measurement. Psychrometrics. Air and humidity calculations.</p> <p>Equipment types for domestic and commercial applications. Use of manufacturers charts. Packaged equipment. Heat pumps. Water chillers. Absorption equipment. Pumps; water, glycol, brines and ammonia types. Free cooling.</p> <p>Single and multi-zone units; all-air and air-water induction systems, piping. Window installations. Packaged equipment. Remote self-contained and central station equipment. Fans and blowers. Filter devices. Humidification and de-humidification equipment. Diffusers, grilles, registers. Ductwork. Dampers. Fan coil units. Pneumatic, electric and electronic, fluidic and automatic control systems. Air flow balancing. Use of air measuring instruments. System adjustments and control.</p> <p>Trouble shooting. Servicing, repairs. Periodic maintenance inspections.</p>

REGULATION 56

under the Apprenticeship and Tradesmen's Qualification Act

SERVICE STATION ATTENDANT

1. In this Regulation,

- (a) "certified trade" means the trade of service station attendant;
- (b) "motor vehicle" means a vehicle propelled by an internal combustion engine, or a vehicle operated or controlled from a vehicle propelled by an internal combustion engine, that is registered for use on a highway under the *Highway Traffic Act* and is used primarily for the transport of persons, equipment or goods but does not include a vehicle,
 - (i) operated only on rails,
 - (ii) used for transportation solely within an employer's actual place of business, or
 - (iii) used for farming operations but not used for carrying a load;
- (c) "service station attendant" means a person engaged in the servicing and maintenance of motor vehicles who,
 - (i) repairs, changes and balances wheels and tires,
 - (ii) changes oil in motor vehicles or lubricates motor vehicles, including lubricating the front wheel bearings and drive shaft,
 - (iii) supplies motor vehicles with anti-freezing solutions,
 - (iv) replaces cooling-system hoses, engine-driven belts and thermostats,
 - (v) cleans or replaces spark plugs,
 - (vi) installs new or rental batteries or battery cables, or recharges batteries,
 - (vii) replaces sealed beam units, light bulbs, lenses, fuses and horns, and
 - (viii) checks and replenishes fluid levels in hydraulic systems. R.R.O. 1970, Reg. 46, s. 1.

2. The trade of service station attendant is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 46, s. 2.

3. No person shall become an apprentice in the certified trade unless he has successfully completed Grade 8 in Ontario or has such other academic qualification that, in the opinion of the Director, is equivalent thereto. R.R.O. 1970, Reg. 46, s. 3.

4. An apprentice training program for the certified trade is established and shall consist of,

- (a) training and instruction at full-time educational day classes provided at a College of Applied Arts and Technology or in classes that, in the opinion of the Director, are equivalent thereto; and
- (b) practical training and instruction provided by an employer of the apprentice,

in the subjects contained in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 46, s. 4.

5.—(1) Subject to subsections (2) and (3), an apprentice shall complete two periods of training and instruction of 1800 hours per period.

(2) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma or has Ontario Grade 12 standing in English, Mathematics and Science or has such other academic qualification that, in the opinion of the Director, is equivalent thereto, he shall complete two periods of training and instruction of 1600 hours per period.

(3) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma majoring in auto mechanics or has such other academic qualification that, in the opinion of the Director, is equivalent thereto, he shall complete two periods of training and instruction of 1200 hours per period. R.R.O. 1970, Reg. 46, s. 5.

6. Sections 9 and 10, subsections 11 (2) and (4) and clause 14 (a) of the Act do not apply to any person who works or is employed in the certified trade. R.R.O. 1970, Reg. 46, s. 6.

7. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

- (a) 60 per cent during the first period of training and instruction; and

- (b) 80 per cent during the second period of training and instruction,

of the average rate of wages for journeymen employed by the employer in that trade or, where the employer is the only journeyman employed, of the average rate of wages for journeymen in the area. R.R.O. 1970, Reg. 46, s. 7.

8. The subjects of examination for an apprentice are the subjects set out in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 46, s. 8.

9. A certificate of qualification in the certified trade remains in force until cancelled or suspended in accordance with the regulations. R.R.O. 1970, Reg. 46, s. 9.

Schedule

SERVICE STATION ATTENDANT

PART 1

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics	Arithmetic	Addition, subtraction and division of whole numbers and fractions, ratio and proportion, areas and volumes.
		Geometry	Lines, planes and angles.
2	Science	Physics Mechanics }	Basic laws and principles, formulae. (Given as required in shop instruction.)
3	English	Basic Usage and Business Communications	Trade terminology and usage. Letter and report writing. Work and parts orders. Interpretation and use of manufacturers' manuals.
4	General Shop Practice	Safety	Safety rules and safe operating procedures. First aid. Fire prevention. Use and maintenance of fire-fighting equipment. Handling of gasoline, oils and cleaning solvents. Danger of carbon monoxide fumes. Correct use of lifting and hoisting equipment. Good housekeeping.
		Hand Tools	Selection and use of hammers, punches, chisels, pliers, wrenches, sockets, screwdrivers, hacksaws, files, scrapers, snips, clamps, vises, drill bits, reamers, taps and dies, stud extractors.
		Power Tools	Use of portable air and electric drills and impact tools.
		Benchwork Operations	Cutting with hacksaw, filing, scraping, drilling, use of drill press and bench grinder. Grinding of drill bits, chisels, etc. Soldering, gasket making, oxy-acetylene welding and cutting. Brazing techniques. Care and maintenance of welding equipment. Use of rules, straight edges and squares.
		Fastening Devices	Types of bolts, nuts, studs, screws and tube fittings. Thread identification and classification. Tensile strengths. Installation procedures, tightening

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		General Shop Equipment	<p>torques, cutting internal and external threads, removing broken studs. Types of rivets, keys, springs, flat and lock washers, snap rings, circlips, cotter pins. Installation and removal. Thread lubricants and sealers.</p> <p>Capacities and correct usage of floor cranes, hoists, jacks, stands. Operation and maintenance of degreasing and steamcleaning equipment and air compressors. Characteristics, capacities and use of tow trucks and related vehicle recovery equipment. Care and use of lubrication equipment.</p>
5	Internal Combustion Engines	Basic Knowledge and Terminology	Operating principles. 2 and 4 stroke cycles. Engine designs: in-line, V-type, opposed piston, flat or pancake.
6	Lubrication	<p>Types and Classification of Lubricants</p> <p>Engine Lubricating Systems</p> <p>Open Drive Shafts</p> <p>Driving Axles and Differentials</p> <p>Standard Transmissions</p> <p>Automatic Transmissions</p> <p>Suspension Systems</p> <p>Steering Systems A (Manual) B (Power)</p>	<p>Identification, properties and characteristics of oils: Heavy duty (detergent), regular—(non-detergent). S.A.E. viscosity ratings. A.P.I. classifications. Other types of oils and greases. Additives. Frequency of change intervals.</p> <p>Function. Lubricant feeds; oil pumps, pressure control. Inspection procedures. Detection of leaks. By-pass and full-flow oil filters; maintenance and replacement. Flushing lubricating systems. Correct levels. Positive crankcase ventilation systems; inspection, testing and servicing.</p> <p>Characteristics; support bearings, universal joints, slip joints. Lubrication and sealing. Disassembly, relubing, reassembly and reinstallation. Torquing universal trunnions.</p> <p>Characteristics; gears and bearings. Oil sealing and venting. Lubricants. Filling and checking oil levels.</p> <p>Characteristics; gears, bearings, components. Lubricants. Draining and refilling. Correct levels.</p> <p>Characteristics of operation. Cleanliness. Transmission fluids. Oil seals and vents. Draining, refilling and checking fluid levels.</p> <p>Lubricating suspension components and friction proofing spring leafs. Sealed systems.</p> <p>Characteristics of steering box gearing. Lubricants. Filling and checking levels.</p> <p>Characteristics of power steering systems. Oil seals and vents. Types of fluid, capacities. Filling and checking system levels.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		C (Linkages)	Characteristics; bushings and joints. Methods of sealing and lubricating movable steering joints. Sealed systems.
		Front Wheel Bearings	Types and characteristics. Lubrication; adjusting or torquing. Replacing oil seals.
		Generators, Alternators, Starters	Types and characteristics of bearings used. Bushes, ball bearings; lubricated and prepacked lubricant type. Correct type and amount of lubricant where necessary.
		Miscellaneous Linkage and Cables	Throttle, clutch, gearshift, and emergency brake linkage. Lubricant and lubrication methods where necessary.
		Carburetor Air Cleaners	Types and characteristics of air cleaners and filters. Inspection, maintenance and replacement.
		Lubrication Certification	Certification of lubricant and filter changes and re-lubing of bearings and components. Extended warranties.
7	Cooling Systems	Components, Operation, Inspection and Maintenance	Air and liquid cooled systems and components. Types of circuits. Coolant, additives. Pressurized systems. Test methods and equipment. Hazards involved. Coolant levels. Testing of anti-freeze. Checking for leaks. Cooling system cleaning. Pressure and flow testing radiators. Automatic transmission and engine oil coolers.
		Hoses and Clamps	Characteristics. Inspecting, installing, sealing hoses. Stiffening springs. Sealing compounds.
		Thermostats	Types, and function. Inspecting, testing and replacement.
8	Electrical Systems	Batteries, Cables, Hold-downs	Characteristics and function of lead acid batteries. Electro-chemical action. Electrolyte. Ampere-hour ratings. Inspecting and testing. Use of voltmeters, ammeters, load resistances and hydrometers. Battery charging. Charging and handling hazards. Removal, servicing and installation of batteries and associated parts. Dry-charged batteries; activation procedures.
		Lights	Vehicle lighting regulations. Characteristics of lights. Bulbs and seal beam units. Candle power and wattage ratings. Lenses and holders. Head-light aiming equipment. Aiming, testing, installing and repairing lights. Circuit fuses. Grounding. Signal lights; flasher units.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Horns	Characteristics of automotive horns; electric, air-vacuum, etc. Blending notes. Controlling air-vacuum horns. Inspecting and adjusting horns. Circuit fuses.
		Electric Windshield Wipers	Characteristics of windshield wipers. Drives and linkage. Electric; single and multi-speed. Vacuum type. Operation. Speed controls. Washer cycling. Circuit fuses. Checking, replacing and adjusting wiper blades and arms.
		Windshield Washers	Characteristics; automatic and manual operation. Fluids and additives. Installing, repairing, or replacing windshield washers and controls. Aiming fluid nozzles.
		Miscellaneous Circuits	Characteristics of generator, alternator and power assist mechanism circuits. Circuit fuses.
9	Ignition Systems	Spark Plugs	Characteristics, and operation. Heat ranges. Radio suppression. Erosion of electrodes. Analyzing deposits. Cleaning, testing, filing, gapping and installing. Torquing.
10	Brake Systems	Hydraulic Brakes	Characteristics of brake operating systems and components. Checking for external leaks. Replenishing system. Approved fluids.
11	Belt Drives	"V" Belts	Characteristics; inspecting, installing and adjusting. Effects of tight or worn and loose belts on cooling, charging, power steering and air conditioning systems.
12	Exhaust Systems	Mufflers, Resonators, Exhaust and Tail Pipes	Types and features of exhaust systems. Single, dual and resonators with mufflers. Cross-over pipes. Heat riser passages. Back pressure. Emission controls. Exhaust system insulators, hangers, brackets and clamps. Replacing exhaust systems. Use of gas cutting and welding equipment for removal, stress relieving.
13	Accessories	Rear View Mirrors	Installation procedures. Care of car finish.
14	Wheels and Tires	Wheels and Rims	Types and characteristics: single and dual. Removal and installation. Wheel wrenches. Wheel to hub fastening and locating devices. Handling heavy wheels and tires. Inspecting and servicing. Run-out.
		Tires, Tubes and Valves	Types, sizes, characteristics and application. Demounting and mounting. Equipment and lubricants. Repairing tires, tubes and valves. Tire inflation precautions. Inspection for damage, wear and faults. Tire rotation. Retreads.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Balancing Wheels and Tires	Wheel balancing equipment. Balancing wheels and related parts. Static and dynamic balance. Weight installation.
15	Running Maintenance Inspections	<p>Inspection Procedure</p> <p>Starting Engines</p>	<p>Development of quick visual checking procedures for excessive wear and looseness in steering linkage, components and wheel bearings. Buckled wheels, broken springs or leafs, weak shock absorbers and worn mountings. Defective clutch, service or emergency brake operation. Defective engine and transmission mountings. Worn or loose universal joints. Worn or defective tires, tubes and valves. Misalignment. Faults in exhaust systems. Defective lights, batteries and hold-downs, wiring and cables. Coolant, oil and fluid leaks. Deteriorated hoses, loose clamps, damaged lines. Loose or worn "V" belts. Defective windshield wipers and washers. Overdue lubrication requirements, oil and air-filter changes. Reporting of defects or conditions.</p> <p>Starting engines under adverse conditions due to: condensation in ignition system, fuel flooded engines, fouled spark plugs, cold temperatures, discharged batteries. Use of batteries and jumper cables. Correct connections.</p>
16	Shop Management	<p>Parts Ordering</p> <p>Costing</p> <p>Quality Control</p> <p>Discipline and Public Relations</p>	<p>Parts replacement; identification of parts and vehicle by year, model and serial number. Availability of parts. Discounts.</p> <p>Average operation times. Time cards. Work orders. Elementary bookkeeping. Labour and material costs. Overhead. Stock records, preparation of typical bills for servicing vehicles.</p> <p>Quality of workmanship—acceptable standards.</p> <p>Employee attitude. Good customer relations. Courtesy, appearance, handling complaints. Protection of customers' vehicles and personal property.</p>

PART 2

Work Instruction and Experience

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	General Shop Practice	General	Safety rules and removal of all safety hazards. Use of hand and power tools, measuring and fastening devices and general shop equipment. Benchwork operations. (As detailed in Part 1.)
2	Internal Combustion Engines	Basic Knowledge and Terminology	Basic knowledge of operating principles. Familiarization with trade terminology and usage.
3	Lubrication	Lubricants Engine Lubricating Systems Drive Shafts Axles and Differentials Standard Transmissions Automatic Transmissions Suspension Systems Steering Systems (Manual) (Power) (Linkages) Front Wheel Bearings Generators, Alternators, Starters Miscellaneous Linkage and Cables	Familiarization with characteristics, classification and ratings; contamination and deterioration, frequency of change intervals. Detection of leaks. By-pass and full-flow oil filters; inspection, maintenance and replacement. Flushing lubricating systems. Checking levels. Testing and servicing P.C.V. systems. Open drive shafts; support bearings, universal joints, slip joints. Disassembly, relubing, reassembly and installation. Torquing. Lubricants. Draining, filling and checking fluid levels. Automatic transmission fluids. Draining, refilling and checking fluid levels. Lubricating suspension components; friction proofing spring leafs. Sealed systems. Lubricants. Filling and checking steering box lubricant levels. Fluid types; capacities. Filling and checking system levels. Lubricants. Relubing. Sealed systems. Relubricating, adjusting or torquing. Oil seal replacement. Correct type and amount of lubricant where necessary. Throttle, clutch, gearshift and emergency brake. Lubricants; and lubrication where necessary.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		Carburetor, Air Cleaners	Inspection, maintenance and replacement.
		Certification	Lubrication and filter change certification to comply with warranties.
4	Cooling Systems	Liquid Cooled Systems	Pressure testing. Testing anti-freeze solutions. Checking for leaks. Cleaning procedures. Radiator flow testing. Inspection and installation of hoses and clamps. Thermostats; testing and replacement.
5	Electrical Systems	Batteries, Cables, Hold-Downs	Removal, servicing and installation. Inspection and testing; use of voltmeters, ammeters, load resistances and hydrometers. Battery charging. Checking electrolyte levels. Activating dry-charged batteries.
		Lights	Replacement of bulbs, seal beam units and lenses. Aiming, testing and repairing lights. Fuse and flasher unit replacement.
		Horns	Inspecting and adjusting horns. Fuse replacement.
		Electric Windshield Wipers	Fuse replacement. Checking, replacing and adjusting wiper arms and blades.
		Windshield Washers	Installing, repairing, or replacing windshield washers and controls. Aiming fluid nozzles. Fluids and additives.
		Miscellaneous Circuits	Charging and power assist mechanism circuits. Fuse replacement.
6	Ignition Systems	Spark Plugs	Cleaning, testing, filing, gapping and installation. Analyzing deposits. Torquing.
7	Brake Systems	Hydraulic Brakes	Filling and checking reservoir levels. Approved fluids. Checking for external leaks.
8	Belt Drives	"V" Belts	Inspection, installation and adjustment.
9	Exhaust Systems	Mufflers, Resonators, Exhaust and Tail Pipes	Replacement of complete systems or parts. Use of gas cutting and welding equipment for removal and stress-relieving.
10	Accessories	Rear View Mirrors	Installation. Car finish care.
1	Wheels and Tires	Wheels and Rims	Removal and installation. Inspecting and servicing wheels and rims. Checking run-out.
		Tires, Tubes and Valves	Demounting and mounting. Inspection for damage, wear and faults. Repairing tires, tubes and valves. Inflation precautions. Tire rotation.
		Wheel and Tire Balancing	Use of on and off vehicle balancing equipment. Installation of weights.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
12	Running Maintenance Inspections	Inspection Procedures	Quick visual checking to ascertain excessive wear, damage, defective operation, deterioration, leaks, overdue lubrication requirements, filter changes and P.C.V. servicing. Reporting conditions.
		Starting Engines	Starting engines under adverse conditions caused by: ignition system condensation, carburetor flooding, fouled spark plugs, cold temperatures, discharged batteries. Use of booster batteries and jumper cables.
13	Shop	Parts Ordering Management	Ordering parts by vehicle year, model and serial number.
		Costing	Elementary bookkeeping. Preparing work orders. Maintaining stock records. Billing customers.
		Quality Control	Standard of workmanship acceptable.
		Public Relations	Good customer relations; courtesy, appearance, handling complaints. Protection of customers' vehicles and personal property.

R.R.O. 1970, Reg. 46, Sched.

REGULATION 57

under the Apprenticeship and Tradesmen's Qualification Act

SHEET METAL WORKER

1. In this Regulation,

- (a) "certified trade" means the trade of sheet metal worker;
- (b) "sheet metal worker" means a person who,
 - (i) manufactures, fabricates, assembles, handles, erects, installs, dismantles, reconditions, adjusts, alters, repairs or services all ferrous and non-ferrous sheet metal work of No. 10 U.S. Gauge or of any equivalent or lighter gauge and all other materials used in lieu thereof, and
 - (ii) reads and understands shop and field sketches used in fabrication and erection, including those taken from original architectural and engineering drawings or sketches,

but does not include a person employed in production commonly known as mass production. O. Reg. 298/73, s. 1.

2. The trade of sheet metal worker is designated as a certified trade for the purposes of the Act. O. Reg. 298/73, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of five periods of related training and work experience training of 1,800 hours for each period,

- (a) in full time educational day courses provided at a college of applied arts and technology, or in courses that in the opinion of the Director, are equivalent thereto in the subjects contained in Schedule 1; and
- (b) in practical training and instruction provided by the employer of the apprentice in the subjects contained in Schedule 2. O. Reg. 298/73, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedules 1 and 2. O. Reg. 298/73, s. 4.

5. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours of work or for hours of work in excess of his regular daily hours of work, shall be not less than,

- (a) 40 per cent during the first period;
- (b) 50 per cent during the second period;

(c) 60 per cent during the third period;

(d) 70 per cent during the fourth period; and

(e) 80 per cent during the fifth period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 298/73, s. 5.

6. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for every four journeymen employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus an additional apprentice for each additional four journeymen employed by that employer in the trade and with whom the apprentice is working. O. Reg. 298/73, s. 6.

7. Any person who,

- (a) applies in the prescribed form for apprenticeship in the certified trade; and
- (b) works in that trade for three months or less,

is exempt from subsection 11 (2) of the Act. O. Reg. 298/73, s. 7.

8. The Director shall issue a progress record book to each apprentice and the apprentice shall record therein the time that the apprentice spends in related training and work experience and shall be responsible for the safekeeping of his progress record book. O. Reg. 298/73, s. 8.

9. An applicant for a certificate of qualification in the certified trade shall submit to the Director evidence satisfactory to the Director of,

- (a) his successful completion of the apprenticeship training program described in section 3; or
- (b) his engagement in the certified trade as a journeyman in Ontario or elsewhere for a period at least equivalent to the total number of hours of which the apprenticeship training program consists. O. Reg. 298/73, s. 9.

Schedule 1

SHEET METAL WORKER

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics (Trade Related)	Mathematics	Addition, subtraction, multiplication, division of whole numbers, fractions, decimals. Metric system; conversion methods. Weights and measures. Ratio and proportion. Percentage, discounts, simple interest. Areas, volumes, linear, perimeter, angular mensuration. Square root. Scale conversion. Algebra fundamentals: simple equations, formulae, shop calculations. Trigonometry; right angled and oblique triangles, formulae, shop calculations.
2	Science (Trade Related)	Physics	Air; properties, pressure, vacuum, pressure measurement; duct pressures, pressure variation effects on equipment. Water; physical and chemical properties, density, specific gravity, pressure at depth, capillarity. Heat; temperature scale, transmission, effects, measurement, specific heat of metals and air, heat capacity, humidity, expansion. Sound; transmission, acoustic insulation, decibel ratings. Properties of materials; tensile and compressive stress. Basic metallurgy; ferrous and non-ferrous metals, corrosion, electrolysis, electropotential series. Principle of machines; mechanical advantage, efficiency, work, energy and power. Fan motor horse-power requirements.
3	English	Usage and Business Communication	Reading comprehension. Trade terminology, usage. Sentence, paragraph structure. Letter, report writing. Work and parts orders. Interpretation and use of manufacturer's manuals and job specifications. Oral communication.
4	Drafting and Blue Print Reading	Basic Drafting and Interpretation	Use of lines, views, projections, sections, developments, dimensions, lettering. Threads and fasteners. Material specifications. Reading and interpretation of frame, masonry and concrete construction plans; materials, construction members, dimensioning, sections, elevations, details, schedules, standard architectural symbols. Preparation of elementary trade-related working drawings, dimensioned sketches of duct work layouts, jigs and fixtures. Material estimates and labour costs.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
5	Trade Practice General	Safety	Safety rules and safe operating procedures. Protective clothing and equipment. First aid. Fire prevention; location, use and maintenance of fire fighting equipment. The <i>Workmen's Compensation Act</i> . The <i>Building Code Act</i> . The <i>Occupational Health and Safety Act</i> . Handling and storage of flammable liquids, gases, acids and sealants. Safe use of lifting and hoisting equipment, pneumatic and electrical tools and equipment, welding equipment. Good house-keeping.
		Hand Tools	Care and use of hammers, mallets, chisels, files, stakes, dies, rivetsets, dollies, bucking bars, punches, drifts, pliers, hand shears, drills, reamers, taps and dies, hacksaws, pop rivetters.
		Power Tools, Equipment and Rigging	Care and use of portable pneumatic and electric drills, grinders, circular and sabre saws, unishers or nibblers. Impact and powder actuated tools. Power shears, bench-masters, brakes, rolls. Edging, forming, locking, beading, swaging, wiring equipment. Bench grinder, drill press, punch press, rivetting tools. Spot, oxy-acetylene, arc and carbon arc welding equipment. Materials handling devices, scaffolds, ladders, ropes, slings, hoists.
		Measuring and Layout Devices	Care and use of rules, tapes, squares, straightedges, protractors, compasses, dividers, scribes and tram-mels. Sheet metal and wire gauges. Micrometers, levels, plumb bobs, chalk lines. Patterns and templates.
6	Trade Practice Pattern Development	Parallel Line Method	Developing patterns for profile, rectangular, round and elliptical forms. Blueprint use for size and profile. Stretchout pattern methods. Seam, fold and joint allowances. Determining miter line. Types of notches.
		Radial Line Method	Developing patterns for regular conical forms and pyramids. Blueprint use for size and profile. Conical form types. Plan and elevation relationship. Determining apex. Seam allowance. Types of notches and pyramid forms.
		Triangulation Method	Developing patterns for irregular tapered forms. Blueprint use for form and size. Tapered form types. Plan and elevation relationship to half-pattern. Determining solid and broken lines, hypotenuse for true lengths and stretchout relationship. Seam and lock allowances. Types of notches. Transition patterns; blueprint use for offset forms and sizes. Types of transitions. Plan and elevation relationship for full pattern.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
			Double angle form patterns; blueprint use for true angle of auxiliary forms. Types of twisted shapes. Plan, elevation, auxiliary and double auxiliary views.
7	Trade Practice Cutting Methods	Straight Shearing Curved Shearing	Use of regular and combination pattern hand shears. Slitting; use of hand, special slitting, lever slitting, hand and power rotary slitting shears, portable unishears and nibblers. Use of double cut pipe shears for split shearing. Square shearing; use of foot and power operated squaring, gap squaring shears and attachments. Inside cuts; starting methods, use of bench, slitting and scroll shears. Shearing bolts, rivets, etc. with cold chisels. Types and use of hand shears. Circle shearing; use of hand and power operated circle shears. Inside cuts; use of hand and power ring and circle shears. Use of power elbow shear for compound curves.
8	Trade Practice Forming Procedures	Edges (Bench Tools) Shapes (Hand and Bench Tools) Beading and Swaging Wired Edges Reinforcements Reinforced Fibreglass	Types, uses and methods of forming hemmed, open, burred, turned, flanged and crimped edges. Edge allowances. Use of brakes, bar folders, bending bars, hand and power burring, turning, flanging and crimping equipment. Rolling; rolled form types. Use of solid or slip rolls and funnel forming equipment. Forming on stakes; stake types, uses. Hand tool types and use with stakes. Profile bending; types of profiles and forms, use of hand and power cornice brake. Panning; methods and use of panning equipment. Raising, bumping and stretching; uses of bumping and stretching hammers and dies. Determining layout for bumping. Metal yield point. Annealing methods. Beading and swaging roll types; reinforcing with beads and swaging, swaging for stops. Use of hand and power beading and swaging equipment. Wiring straight edges; edge allowance, wire sizes and gauges, measurement. Use of hand and power wiring, wire and brace bending equipment. False wiring edges of round, rectangular and square containers; false wire allowance. Use of hand and power false wiring and turning equipment. Diagonal bending; methods and use for stiffening. Reinforcing methods; use of band, angle, tee and channel iron. Reinforcement fastening methods. Fibreglass cloth, resins and catalysts. Pot-life. Lay-up and finishing techniques for duct work, fittings and joints. Joint tool use.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Soldering	Copper heating methods, equipment. Correct temperature. Forging methods; copper types, shapes, weights. Use of hammer and anvil. Tinning; surface cleaning requirements, dip and tinning solutions. Fluxing; flux types, uses, applications. Defluxing after soldering. Acid use precautions. Solder application; solder types, uses, flow and penetration. Preheating requirements. Soldering types of positioned joints. Surface tinning methods. Testing for leaks. Cleaning soldered joints by hand and power filing, sanding, buffing methods and equipment.
		Cementing	Cleaning surfaces for caulking; cleaning material types, uses, application methods. Sealant types and use for high and low pressure duct systems; underground ducts of transite, vitreous clay, plastic; high temperatures. Sealant application methods.
10	Trade Practice Job-site Assembly and Erection Techniques	Metal Roofing and Copings	Styles of roofs, monitors, towers, minarets, dormers, copings, pediments and corrugated roofs. Metal and plastic roofing types, rubber, lead and canvas. Joints and cleats. Fastening types and methods. Waterproofing methods using grouting, plastic sealants, solder. Vapour barrier types and installation methods. Expansion allowance. Installation of curbs, saddles and roof sleeves. Use of special roofing tools. Safe roof work practices and erection of scaffolding.
		Flashings and Skylights	Flashing types, purpose and installation; soakers, step, cape, hip, valley, ridge, gravel stops and nosing. Joint and seam making methods. Caulking, grouting and sealing methods. Types and uses of fasteners and plugs. Skylight types and installation techniques.
		Gutters and Downspouts	Gutter types and materials; ogee, round, inlaid. Flat and rake miter making methods. End and outlet installation. Expansion allowance methods. Downspout types, shapes, sizes, materials. Assembly of conductor heads, elbows, shoes, splash pans and scuppers. Installation of gutters and downspouts; erection of scaffolding, types and uses of hangers, spikes, ferrules, straps. Use of plastic and solder sealants.
		Plenums and Ducts	Plenum and casing types, construction materials. Types of joints. Stiffening and reinforcing methods. Fastener types and uses. Assembly and installation techniques. Correct relationship to air-handling equipment. Provision of access doors and openings. Gaskets and sealants.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		(Square Ducts)	Material types, weights and gauges. Types of cleats. Jointing methods; lapping and fastening. Hanging device types and uses; masonry anchors, bolts, screws, rivets, nails. Use of powder actuated stud guns. Hanger positioning and installation methods. Duct assembly and installation techniques. Positioning and installation of fire dampers. Taping and sealant use.
		(Round Ducts)	Common and special material types, including plastics. Jointing methods and joining devices. Hanger and support types, uses and installation techniques. Sealant and taping use. Plastic welding methods. Installation techniques for collector systems, flues, stacks, chimneys and breechings.
		(Internal Insulation)	Types, uses and methods of applying duct insulation for acoustic lining, thermal resistance, condensation prevention. Use of sound baffles and manufactured silencers.
		(Air Flow Measurement and Balancing)	Normal velocities in low and high pressure duct systems. Average velocities at grilles, through air handling equipment. Material conveying velocities. Static and velocity pressures. Effects of poorly designed elbows, fan fittings, branch take-offs and transitions.
		Roof Ventilators	Types and uses; stationary, cowl, gravity, ventilators, louvred penthouse. Motorized roof vents and fan discharge heads. Installation techniques. Use of bird and fly screens.
		Exhaust Hoods	Types and uses; standard canopy, fume cabinets. Types and uses of spray booths, drying booths, machine exhaust hoods. Interior and exterior hood materials. Plastic hoods. Methods of jointing and finishing seams, butt and welded joints. Use of hood filters. Hood assembly and installation methods in accordance with applicable codes. Condensation control.
		Air Handling Equipment (Fans and Blowers)	Types, functions and characteristics. Installation and mounting methods. Component alignment. Use of manufacturers drawings and specifications for installations.
		(Direct Fired Heating Equipment)	Types and characteristics; gravity and forced air units. Heat measurement; quantity (B.T.U.), intensity (temperature). Characteristics of solar, waste products, coal, wood, oil, gas and electrical heating systems. Comfort factors. Boiler and furnace room ventilation. Installation of heating units, ducts and vents to applicable safety codes.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		(Components)	Types, characteristics and installation of air washers, humidifiers, de-humidifiers, spray eliminators and dust collectors. Filters; replaceable media, washable, absolute, electronic precipitators and activated carbon types. Types and installation of preheat coils, reheat coils, direct expansion coils for cooling and dehumidifying and electric duct heaters.
		(Dampers)	Types, uses and installation of hand and automatically controlled parallel and opposed blade, face, face and by-pass dampers, blast gates and switches.
		(Indicating Devices and Controls)	Types and characteristics. Installation methods. Care and use of filter gauge and manometers.
		(Louvres and Grilles)	Types and installation of fixed and adjustable louvres, shutters, bird and fly screens, grilles and ceiling outlets.

O. Reg. 298/73, Sched. 1.

Schedule 2**SHEET METAL WORKER****Work Experience Training**

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	Trade Practice General (As detailed in Schedule 1)	Safety	Safety rules and removal of all hazards. The <i>Workmen's Compensation Act</i> . The <i>Building Code Act</i> . The <i>Occupational Health and Safety Act</i> . Care and use of hand and power tools and equipment, measuring and layout devices.
2	Trade Practice	Methods and Applications	Parallel line method; developing patterns for profile, rectangular, round and elliptical forms. Stretchout patterns. Radial line method; developing patterns for regular conical forms and pyramids. Triangulation method; developing patterns for irregular tapered forms, transition patterns, double angle form patterns.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
3	Trade Practice	Straight Shearing	Use of regular and combination pattern hand shears. Slitting. Split shearing. Square shearing. Inside cuts. Use of bench, slitting and scroll shears, portable unishears and nibblers. Shearing bolts, rivets, etc. with cold chisels.
		Curved Shearing	Circle shearing; use of hand and power operated circle shears. Inside cuts; use of hand and power ring and circle shears. Use of power elbow shear for compound curves.
4	Trade Practice Forming Operations	Edges (Bench Tools)	Forming hemmed, open, burred, turned, flanged and crimped edges. Use of brakes, bar folders, bending bars, hand and power burring, turning, flanging and crimping equipment.
		Shapes (Hand and Bench Tools)	Rolling; use of solid or slip rolls and funnel forming equipment. Forming on stakes. Profile bending; use of hand and power cornice brake. Panning; use of panning equipment. Raising, bumping and stretching. Annealing.
		Beading and Swaging	Reinforcing with beads and swaging. swaging for stops. Use of hand and power beading and swaging equipment.
		Wired Edges	Wiring straight edges. Use of hand and power wiring, wire and brace bending equipment. False wiring edges of round, rectangular and square containers. Use of hand and power false wiring and turning equipment.
		Reinforcements	Diagonal bending. Reinforcing use of band, angle, tee and channel iron. Reinforcement fastening.
		Reinforced Fibreglass	Lay-up and finishing of fibreglass ductwork, fittings and joints.
5	Trade Practice Joining Operations	Lock Seams	Groove seaming; internal and external seams. Use of hand and machine groovers. Brake, mallet and stake grooved seams. Use of hand and power setting down equipment.
			Double seaming; allowance. Use of hand and power double seaming equipment, slide and snap locks.
			Box locking; forming methods. Pittsburgh locking; use of brake and Pittsburgh lock former. Elbow edging. Use of hand and power elbow edging machines. Elbow seam closing; rigid and adjustable elbows. Use of hand and machine closing equipment. Standing seams. Use of seam closing devices. Collar locking. Use of hand and power collar locking equipment.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		Rivetted Seams	Hole spacing, punching, drilling. Rivetting operations. Use of hand and power punches, drilling and rivetting equipment.
		Welding	Spot welding; material preparation, locating and spacing welds. Use of portable and stationary spot welding equipment. Oxy-acetylene; basic weld joints, material preparation allowances, positions. Welding, cutting and brazing operations. Arc welding. Flat and horizontal fillet welding. Carbon-arc cutting and brazing.
		Soldering	Copper heating. Forging. Tinning. Fluxing. De-fluxing after soldering. Acid use precautions. Solder application. Preheating. Soldering positioned joints. Surface tinning. Testing for leaks. Cleaning soldered joints by filing, sanding, buffing.
		Cementing	Cleaning surfaces. Sealant use for high and low pressure duct systems; underground ducts of transite, vitreous clay, plastic; high temperatures.
6	Trade Practice Job-site Assembly and Erection Operations	Metal Roofing and Copings	Installation of sheet metal for roofs, monitors, towers, minarets, dormers, copings, pediments and corrugated roofs. Plastic roofing, rubber, lead and canvas. Waterproofing with grouting, plastic sealants, solder. Vapour barrier installation. Expansion allowance. Installation of curbs, saddles and roof sleeves. Safe roof work practices.
		Flashings and Skylights	Installation of soakers, step, cape, hip, valley, ridge, gravel stops and nosing. Caulking, grouting and sealing. Skylight installation.
		Gutters and Downspouts	Assembly of conductor heads, elbows, shoes, splash pans and scuppers. Installation of gutters and downspouts; use of plastic and solder sealants.
		Plenums and Ducts	Assembly, installation and sealing. Provision of access doors and openings.
		(Square Ducts)	Hanger positioning and installation. Duct assembly and installation. Fire dampers. Taping and sealing.
		(Round Ducts)	Hanger and support installation. Sealing and taping. Plastic welding. Installation of collector systems, flues, stacks, chimneys and breechings.
		(Internal Insulation)	Installation of duct insulation for acoustic lining, thermal resistance, condensation prevention. Sound baffles and silencers.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		(Air Flow Measurement and Balancing)	Familiarization with normal velocities in low and high pressure duct systems. Average velocities at grilles, through air handling equipment. Material conveying velocities. Static and velocity pressures. Effects of poorly designed elbows, fan fittings, branch take-offs and transitions.
		Roof Ventilators	Installation of stationary and gravity types, cowls, ventilators, louvred penthouses. Motorized roof vents and fan discharge heads. Bird and fly screens.
		Exhaust Hoods	Assembly and installation of standard canopy, fume cabinets. Spray booths, drying booths, machine exhaust hoods. Interior and exterior hoods. Plastic hoods. Hood filters. Condensation control. Applicable codes.
		Air Handling Equipment (Fans and Blowers)	Installation and mounting. Component alignment. Use of manufacturers drawings and specifications.
		(Direct Fired Heating Equipment)	Familiarization with heat measurement; solar, waste products, coal, wood, oil, gas and electrical heating systems. Comfort factors. Boiler and furnace room ventilation. Installation of gravity and forced air heating units, ducts, vents and stacks to applicable safety codes.
		(Components)	Installation of air washers, humidifiers, de-humidifiers, spray eliminators and dust collectors. Filters, electronic precipitators and activated carbon types. Pre-heat coils, reheat coils, direct expansion coils and electric duct heaters.
		(Dampers)	Installation of hand and automatically controlled parallel and opposed blade, face, face and by-pass dampers, blast gates and switches.
		(Indicating Devices and Controls)	Installation and adjustment. Use of filter gauges and manometers.
		(Louvres and Grilles)	Installation of fixed and adjustable louvres, shutters, bird and fly screens, grilles and ceiling outlets.

REGULATION 58

under the Apprenticeship and Tradesmen's Qualification Act

SPRINKLER AND FIRE PROTECTION INSTALLER

1. In this Regulation,

- (a) "certified trade" means the trade of sprinkler and fire protection installer;
- (b) "sprinkler and fire protection installer" means a person who,
 - (i) plans proposed installations from blueprints, sketches, specifications, standards and codes,
 - (ii) lays out, assembles, installs, tests and maintains high and low pressure pipeline systems for supplying water, air, foam, carbon dioxide or other materials to or for fire protection purposes,
 - (iii) measures, cuts, reams, threads, solders, bolts, screws, welds or joins all types of piping, fittings or equipment for fire protection of a building or structure,
 - (iv) installs clamps, brackets and hangers to support piping, fittings and equipment used in fire protection systems,
 - (v) tests, adjusts and maintains pipe lines and all other equipment used in sprinkler and fire protection systems,
 - (vi) operates and utilizes necessary tools and equipment for the installation of sprinkler and fire protection systems,

but does not include a person engaged in,

- a. the manufacture of equipment or the assembly of a unit prior to delivery to a building or site, or
- b. the installation of electrical equipment, devices and wiring not integral or attached to fire protection systems. O. Reg. 420/80, s. 1.

2. The trade of sprinkler and fire protection installer is designated as a certified trade for the purposes of the Act. O. Reg. 420/80, s. 2.

3. An apprentice training program is established for the certified trade and consists of four periods of related training and work experience training of 1800 hours per period,

- (a) in courses provided at a location approved by the Director in the subjects contained in Schedule 1; and
- (b) in work experience training provided by the employer of the apprentice in the subjects contained in Schedule 2. O. Reg. 420/80, s. 3.

4. The subjects of examination in the certified trade are the subjects contained in Schedules 1 and 2. O. Reg. 420/80, s. 4.

5. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

- (a) 40 per cent during the first period;
- (b) 60 per cent during the second period;
- (c) 70 per cent during the third period;
- (d) 80 per cent during the fourth period,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in the certified trade and with whom the apprentice is working. O. Reg. 420/80, s. 5.

6. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus one additional apprentice for every two journeymen employed by that employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus one additional apprentice for each additional two journeymen employed by that employer in the trade and with whom the apprentice is working. O. Reg. 420/80, s. 6.

7. Notwithstanding section 6, on the recommendation of the Provincial Committee or a local apprenticeship committee appointed under the Act for the certified trade, the Director may determine the ratio of

apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 420/80, s. 7.

8. The Director shall issue a progress record book to an apprentice who shall record his related training and work experience training time and the apprentice shall be responsible for the safekeeping of his progress record book. O. Reg. 420/80, s. 8.

9.—(1) Section 9 and subsection 11 (2) of the Act do not apply to any person who works or is employed in the certified trade.

(2) Section 10 and subsection 11 (3) of the Act do not apply to an employer in the certified trade. O. Reg. 420/80, s. 9.

10. A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 420/80, s. 10.

Schedule 1

SPRINKLER AND FIRE PROTECTION INSTALLER

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics (Trade Related)	Mathematics	Whole numbers, fractions, mixed numbers, decimals. Linear, square and cubic measure. Area and volume calculations. Square root. Angles and degrees. Ratio and proportion. Weights and measures. Percentage Discounts. Metric system and conversion methods. Algebra; fundamentals, linear equations, formulae, shop calculations. Right angled and oblique triangles, shop calculations. Tank and pipe capacities; rate of flow calculations.
2	Business Communications	Technical Reports	Characteristics; clearness, accuracy, facts. Trade types, reasons for, preparation; time sheets, accident reports, weekly progress reports, day work reports, test reports. Foreman's final report. Contractor's certificate. Bills of lading.
		Related Basic Business Practices	Inventory. Business operations; practices, payroll and wages calculations; insurance, taxes, Workmen's Compensation, wage earner's lien.
3	Applied Physics (Trade Related)	General	Units of measurement, symbols, formulae, conversions, constants, abbreviations. Hydraulics; chemical and physical properties of water. Density and specific gravity. Capillary action. Fluids under pressure. Transmission of pressure. Pressure and pressure units, equations, resistance. Fluid flow and velocity. Static and residual pressures, friction and energy losses, fluid energy. Pascal's Law, Hazen and William's Formula, Bernoulli's Principle. Hydrostatics; atmospheric pressure, gauges and measurement. Pressure head and calculation of pressures. Siphon principle.
4	Drafting and Blueprint Reading	Blueprints	Introduction. Drafting tools and equipment. Working drawings. Section views. Orthographic, isometric and multi-view projections, applications. Size and location dimensioning. Piping and material symbols. Cylinders. Thread representation and dimensioning. Sketching, working sketch, pictorial drawing. Piping sections. Material estimating.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Drafting	<p>Reproduction process. Three-view drawing. Alphabet of lines, invisible edges. Sections and material symbols. Dimensioning. Freehand sketching. Isometric drawing. Plan study of construction; materials, construction members, dimensioning methods, sections and details, schedules, architectural standard symbols. Types of piping drawings; single, double line, isometric. Piping symbols, pipe hangers. Making sketches from blueprints. Design of sprinkler systems showing necessary sections. Drawing completely approved sprinkler systems for all types of construction and occupancies, including hydraulically calculated systems. Interpretation of architects and contractors specifications, checking general contractor conditions. Co-ordination with other mechanical trades.</p>
5	Safety	General	<p>Safety rules and safe operating procedures. Protective clothing and equipment. First aid, emergency treatment, artificial respiration. Fire Protection; location, types, use and maintenance of fire fighting equipment.</p> <p>Ventilation. <i>The Workmen's Compensation Act.</i> <i>The Occupational Health and Safety Act.</i></p> <p>Handling and storage of flammable materials. Static electricity hazards. Sparkproof tool use. Safe use of hand tools, lifting, hoisting and rigging equipment, portable pneumatic and electric tools, electrical equipment and explosive actuated tools, heating and welding equipment. Temporary heating equipment. Tank interior and manhole work precautions. Warning and tagging procedures. Good housekeeping.</p>
6	Sprinkler Systems	<p>General</p> <p>Sprinkler Head Selection</p> <p>Sprinkler Devices and Equipment</p>	<p>Interpretation of blueprints, specifications, symbols. Relevant codes and standards.</p> <p>Identification and installation of sprinkler heads. Selection of correct type, characteristics and operation; standard upright, standard pendent, dry pendent, on-off, flush type. Sidewall type, window, cornice, large orifice, open sprinklers. Special, corrosion resistant sprinklers, other types. Guards. Deflector types. Pressure and discharge pattern. Sprinkler layout and spacing. Classification of occupancies. Types of construction.</p> <p>Interpretation of blueprints, specifications and symbols. Identification and installation of; alarm valves, retarding chambers, excess pressure pumps, pressure gauges. Dry pipe valves, exhausters, accelerators, water flow alarm indicators. Pre-action valves, deluge valves, flow control and pressure reducing valves, water rotary gongs. Electric alarm switches, electric alarm gongs, local electric alarm systems. Annunciators, remote alarm systems, supervisory alarm systems. Air compressors, air supply from shop air system, relief valves, air pressure maintenance devices. Heat actuating devices, automatic releases, smoke detectors. Emergency cabinets, spare sprinklers, sprinkler head wrenches.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Wet-Pipe Systems	Interpretation of blueprints, specifications and symbols. Purpose, characteristics and use of wet-pipe system, water supply, size of system.
		(Installation Procedures)	Sprinkler head type. Control valve. Pipe, fittings, hangers. Anti-freeze systems. Back-flow preventers. Alarm test connections, other test connections. Drain connections.
		(Alarms and Alarm Devices)	Selection and installation procedures for; water rotary gong, electric alarm gongs, other alarms. Supervisory service. Devices and equipment; alarm valves. Excess pressure pump. Emergency cabinet and spare sprinklers. Water flow alarm indicator.
		(Testing Systems)	Procedures for hydrostatic test, water flow test. Inspection tests, drain tests. Anti-freeze solution tests. Filing of reports.
		Dry-Pipe Systems	Interpretation of blueprints, specifications and symbols. Purpose, characteristics and use of dry-pipe system. Water supply. Size of system. Operation time limitations. Sub-division of system.
		(Installation Procedures)	Type of sprinkler head. Dry-pipe valve, quick opening devices. Air compressor, air pressure maintenance device, connection to owners plant air supply. Emergency cabinet and spare sprinklers. Pipe, fittings, hangers. Valve enclosure. Alarm test connections, other test connections. Drain connections. Use in cold storage rooms. Drainage of piping, low point drains. Drum drips.
		(Alarms and Alarm Devices)	Selection and installation procedures for; water rotary gongs, electric alarm gongs. Other alarms. Supervisory service.
		(Testing System and Alarms)	Procedures for hydrostatic test, air pressure test, water flow test. Drain tests. Inspection tests, other tests. Filing of reports.
		Pre-Action and Deluge Systems	Interpretation of blueprints, specifications and symbols. Purpose, characteristics and use of this system. Water supply. Size of system.
		(Installation Procedures)	Type of sprinkler head. Control valves, pre-action valves, deluge valves. Heat responsive system, heat actuating devices. Manual operation equipment. Mercury checks. Supervisory air pressure, electric air pump panel. Monitor switch. Testing equipment. Pipe, fittings, hangers. Valve enclosures. Emergency cabinets and spare sprinklers. Drainage connections and test connections.
		(Alarms and Alarm Devices)	Selection and installation procedures for; trouble alarms, low air pressure trouble alarms. Water rotary gongs, electric alarm gong, other alarms.
		(Testing Pre-Action and Deluge System)	Procedures for hydrostatic test, air pressure test, water flow test. Drain tests. Inspection tests, other tests. Filing of reports.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Combined Dry-Pipe and Pre-Action Systems	Interpretation of blueprints, specifications and symbols. Purpose, characteristics, and use of this system. Sub-division of systems. Water supply. Size of system. Operation time limitations.
		(Installation Procedures)	Type of sprinkler head. Control valves, check valves, dry-pipe valves. Exhausters. Tripping devices. Supplemental chamber. Heat responsive system, heat actuating devices. Air compressor, connection from owners air line, air maintenance device. Pipe, fittings, hangers. Valve enclosure. Emergency cabinet, spare sprinklers and head wrench. Cross connection at dry-pipe valves and at quick opening device. Low point drains (heated location). Drum drips (heated location).
		(Alarms and Alarm Devices)	Selection and installation procedures for; automatic fire alarm systems. Water rotary gongs, electric alarm gongs. Other alarms.
		(Testing Combined System)	Procedures for hydrostatic test, air pressure test, water flow test. Drain tests. Inspection tests, other tests. Filling of reports.
		Outside, Window or Cornice Systems	Interpretation of blueprints, specifications and symbols. Purpose, characteristics, and use of this system. Water supply. Orifice size of sprinkler head.
		(Installation Procedures)	Type of sprinkler head. Control valves, check valves. Strainers. Gauge connections. Pipe, fittings, hangers. Test connections, drain connections.
		(Testing System)	Water pressure test methods.
7	Special Type Sprinkler Systems	Special System Applications	Selection for; transformers, outside storage, tanks and equipment. Hydraulically designed systems. Sprinklers in high rise buildings. Woodworking plants. Water curtains.
		Hydraulically, Calculated Sprinkler Systems	Interpretation of blueprints, specifications and symbols to determine; height of building, layout, type of structure. Steel column protection. Location of fire walls and draft curtains.
		(Job-Site Examination)	Ventilation and drainage facilities. Importance of adherence to relevant codes and specifications. Examination of storage or work areas to determine; types and value of materials in storage. General conditions. Height of stock piling, methods of stacking, unitizing, palletizing, pile stability. Aisle and exit locations. Water tests.
		(System Requirements)	Determining correct system: type and size, area of application, discharge density, sprinkler operating pressure, control of system. Coverage area per sprinkler head. Determining correct clearance below sprinkler heads, sprinkler orifice size. Designing the system.
		(Other Protection)	Selection of portable extinguishers; types, purpose and characteristics. First aid fire hose connections, purpose and use. Outside hydrant protection. Smoke detectors, characteristics and application. CO ₂ systems, foam and dry chemicals.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		(Water Supply Requirements)	Water supply location and application: city water, reservoirs, gravity tank, booster pump and fire pump secondary supplies. Fire department pumper connection, location, application.
		Carbon Dioxide and Halogenated Fire Extinguishing Systems	Interpretation of blueprints, specifications, relevant codes and underwriter's standards. Types and characteristics of CO ₂ and halogenated extinguisher systems for local application, total flooding. Purpose, scope and arrangement of system. Limitations. Carbon Dioxide and halogen characteristics, composition, hazards. Specifications, plans and approvals. Hazards to personnel, safety requirements, electrical clearances. CO ₂ supply: low pressure systems, high pressure systems. Quantities, quality, replenishment. Storage containers, high and low pressure. Use of manufacturers' manuals.
		(Installation Procedures)	Approval of appropriate authority. Distribution systems: pipes and fittings, systems arrangement. Valves. Discharge nozzles. Orifice requirements.
		(Operation and Control of System)	Methods of actuation. Detection of fires. Operating devices. Supervision. Alarms. Indicator troubles, defects. Annual inspection by qualified inspector. Procedures for semi-annual inspection. Maintaining, servicing and testing system. Regular periodic approved tests.
		Foam Extinguishing Systems	Interpretation of blueprints, specifications, relevant codes, underwriters' standards. Types and characteristics of foam extinguishing systems: fixed systems for indoor flammable liquid hazards. Fixed systems and portable tower systems for exterior storage tanks. Spray foam systems, monitor and hose nozzles for exterior protection. Purpose of system, methods of application. Scope, arrangement, and limitations of system. Foam material types, quantity to be stored, density required. Rate of application (discharge), period of discharge, hydraulic calculations. Specifications, plans and approvals. Systems design: automatic and auxiliary manual operation.
		(Installation Procedures)	Approval of appropriate authority. Distribution systems: pipes and fittings, systems arrangement. Detailed layout of piping and automatic detection equipment. Use of pump charts for delivery efficiency, horsepower curves. Generators. Pump for air foam concentrate, water. Pump controller types, location. Storage of foam producing materials: location, capacity. Methods of construction and erection, supports. Manholes, sediment pockets. Necessary outlets and connections for materials and water. Gauges. Drainage. Cleaning and inspection methods. Alarms: electrical, water flow type. Detection equipment and operation. Trouble alarms, supervisory alarms. Water supply to system: correct capacity and pressure for 60 minutes operation. Correct temperature. Strainers. Acceptance tests.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		(Operation and Control of System)	Instruction and training of other concerned personnel. Methods of actuation. Detection of fires. Operating devices. Supervision. Alarms. Indicator troubles, defects. Annual inspection by qualified inspector. Semi-annual inspection procedures. Maintaining, servicing and testing system. Regular periodic approved hydrostatic pressure tests.
		Dry Chemical Extinguishing Systems	Interpretation of blueprints, specifications, relevant codes, underwriters' standards. Type and characteristics of dry chemical extinguishing systems: total flooding, local application, hand hose line. Purpose, scope, arrangement and limitations of system. Dry chemical requirements and distribution. Hazard classifications. Specifications plans and approvals.
		(Installation Procedures)	Approval of appropriate authority. Distribution systems: pipe and fittings, systems arrangement.
		(Operation and Control of System)	Instruction and training of other concerned personnel. Methods of actuation. Detection of fires. Operating devices. Supervision. Alarms. Indicator troubles, defects. Annual inspection by qualified inspector. Semi-annual inspection procedures. Maintaining, servicing and testing system. Regular periodic approved tests.
8	Water Supply	Sources and Installation	Types of primary and secondary supplies. Public Utility water supplies. Elevated gravity tanks, pressure tanks, reservoirs. Wells, lagoons, penstocks or flumes, rivers or lakes. Fire pumps, booster pumps. Fire department connections.
		Fire Pumps	Blueprint reading for requirements of proposed installations. Selection of approved pumps for specific purposes. Determining size, capacity, location of unit, pump driven by electricity, diesel, gasoline, steam or other power. Determining pump type; horizontal, vertical shaft, centrifugal, or turbine. Suction water supply, source and quantity. Performance. Hose connections, pressure relief connection, circulation relief, test valves and manometers.
		(General)	Pump Room requirements, pump foundations, pump alignment, setting impellers, priming connections. Installation of pump drives; electric, gasoline, diesel, steam, other power. Water level indicators, gauges. Air release valves. Jockey pumps. Pump controllers; electric, manual, automatic, or any combination. Electric, diesel, gasoline and steam supply, including all equipment. Exhaust piping. Supply, suction and discharge piping, fittings, valves. Suction strainer. Testing of unit.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Gravity Tank Installation	Blueprint reading for approval requirements. Type of tank required, capacity, construction; wood, steel. Frost protection. Foundations. Pipe connections and fittings at base. Riser piping and connection, expansion joints. Check valves and control valves. Tank filling and overflow connections. Water level indicator and/or mercury gauge, water temperature gauge. Tank heater and connections. Corrosion prevention. Testing connections.
		Pressure Tanks	Blueprint reading for requirements of proposed installation. Tank size and approved design for specific installation. Construction and location of tank. Air locks. Pipe connections, fittings, accessories. Relief valves. Testing the complete unit. Painting unit. Water supply to tank, including pump. Air supply to tank, including compressors. Tank drainage. Supports.
		Installation of Fire Department Pumper Connections	Size, types and location of pumper connections required. Types of threads on inlets and outlets. Connections to interior sprinkler systems, other fire protection systems. Piping, fittings, check valves, ball drip or drain connections. Identification plate showing use of unit. Connections to wet-pipe and dry-pipe sprinkler systems, multiple systems.
9	Standpipe and Hose Systems	<p>Fire Line Systems</p> <p>Installation of Fire Protection Lines</p>	<p>Interpretation of drawings and specifications for: connection to source of supply, location of hose stations, type and sizes of pipe and fittings, size and location of mains and standpipes, siamese connections. Adherence to relevant codes and underwriters specifications. Function of check valves on fire line connection. Direct connection to source of supply. Hazards of intervening valves in fire line connection. Outside booster connection. Standard hose threads on all outlets. Siamese connection ball drip. Avoiding use of cast-iron fittings on fire protection lines.</p> <p>Methods of installing fire lines and standpipes. Supporting horizontal mains, vertical standpipes. Location of mains and stand-pipes in relation to building components, other trades, grades. Location of standpipe outlets in relation to accessibility, height from floor, physical characteristics of building, length of hose. Installation of hose cabinets, control valves, hose reels, hose racks. Selection factors for hose and nozzles; durability, type of materials, maximum length, frictional resistance to flow, available water pressure, type of spray. Placing hose on reel and rack, storing in closed cabinet. Conditions requiring booster pump. Connecting methods to prevent backflow in domestic system. Selection factors for hose valves. Testing system; type and duration of test. Type and use of test equipment. Evaluation of test to relevant codes. Safeguarding completed work.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
10	Hydrants	Fire Hydrant and Equipment Installation	Type and size of approved hydrants required: compression, gate valve, and wall type. Provision for drainage. Hose houses and characteristics: five-sided large type, wall hanging type, types for close proximity to building. Types and sizes of approved equipment: cotton rubber-lined fire hose, play pipes, gated "Y" fittings. Hydrant wrenches, spanners. Spare hose washers. Lanterns, axes, pry bars. Erection of hose houses and cabinets. Hose house foundations.
11	Supplementary Alarm Systems	Selection and Installation Procedures	Types and characteristics of central station protection signalling systems: emergency action signals, maintenance action signals (alarms from manual boxes, water-flow alarms). Signals to cover other emergencies. Supervisory signal on valves: need for supervisory action, maintenance action signals. Manual fire alarm devices: distribution of equipment, coded signals. Guards' tour supervisory service: correct number and location of stations, records and reports. Automatic fire detection and alarm service: supplementary manual system, locating detectors. Automatic smoke alarm service: locating detectors, connections to shut off blowers; fans, shutters.
		Testing and Maintenance	Procedure for testing, restoring and maintaining alarms and systems.
12	Portable Fire Extinguishers	Equipment Selection and Location	Extinguisher types and characteristics: chemical solution (soda acid), water, loaded stream. Foam, carbon dioxide, dry chemical, bromotrifluoromethane. Wheeled and pumper tank extinguisher. Fire pails, drums with pails, bucket tanks. Correct location: accessibility, conspicuousness, height from floor. Proper erection methods: on hangers or brackets, cabinets, shelves. Location of Operating Instructions.
		Classification of Fires and Extinguishers Used	"A"—ordinary combustible materials, "B"—flammable liquids, "C"—electrical equipment, "D"—combustible metals. Extinguisher colour coding and symbols. Distribution and size for Class "A" fires: light hazard, ordinary hazard, extra hazard occupancies. Class "B" fires: light hazard, ordinary hazard, extra hazard occupancies, dip tanks. Class "C" and "D" fires.
		Inspection, Testing and Maintenance	Regular monthly inspection. Annual inspection, thorough check-up. Inspection tags, purpose and use. Recharging extinguishers. Hydrostatic check.
13	Materials, Supports and Hangers	Hanging Pipe	Types of rings, characteristics and applications: clevis, swivel ring, solid ring, split ring, roller, post ring. Proper selection. Correct spacing. Determining load capabilities of supporting members and structures. Hanger selection for vertical runs of pipe: use of pipe clamps, "U" bolts. Hand and power cutting and threading rod for hangers.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Fastening Hangers to Concrete	Pre-set anchor boxes and application: protecting threads, correct locating of hangers. Expanding-type inserts: use of drills or impact tools, selection of drill bits and star drills, insertion of rawl plugs and expanding inserts. Selection and application of powder driven studs: correct charge, use of safety shields and protective devices.
		Fastening Hangers to Wood	Fastener types and application: coach screw rods, "U" hangers. Clips, one and two-hole. Wood screws, drive screws, lag bolts, machine bolts. Selection and use of electric drills, hand brace. Correct bit type and size.
		Fastening Hangers to Steel	Selection and application of clamps, hangers and other devices: "C" clamps, "I" clamps. Cantilever hangers, eye rod hangers. "J" hooks, top and bottom beam types. "L" brackets. Selection and use of cutting and drilling equipment: electric drills, drill bits, cutting torches, beam punches. Fastening hangers by electric arc welding. Selection and application of powder driven studs: correct charge, use of safety shields and protective devices. Use of epoxies.
		Bracket and Hangers Fabrication	Trapeze bracket types and purpose: pipe, angle iron, channel iron. Correct strength. Making angle or "L" brackets from channel or angle iron. Electric arc welded brackets. Saddles or stands. Multiple pipe hangers.
		Bracing and Vibration	Use of fabricated steel braces and supports of angle, channel or pipe against earth tremors. Stiffening rod with pipe. Riser supports. Support and hanger location to prevent oscillation. Compensating for sound and other vibration: use and selection of isolation springs.
		Piping (General)	Pipe types and selection factors: steel pipe (black and galvanized). Copper pipe and tubing. Other pipe. Characteristics and selection of fittings: cast iron (threaded, flanged or grooved types; standard pattern; extra heavy pattern). Malleable iron (threaded, flanged or grooved types; standard pattern; extra heavy pattern). Grooved type. Welding fittings. Copper (socket, soldered, brazed or screw type).
		Underground Piping	Selection of underground pipe and fitting types: mechanical joint, tyton joint, bell and spigot (lead joint). Ductile iron pipe, universal joint, asbestos cement pipe. Other types.
		(Installation Procedures)	Depth of cover (frost level). Depth under roadways, railroad tracks. Hazards of running pipe under buildings, heavy piles. Arching foundation walls, if running pipe beneath buildings. Sleeving and sealing piping with mastic sealers. Prevention of foreign matter in pipe. Tight (approved) joints. Use of proper clamps and braces, concrete thrust blocks. Grounding methods. Anchoring underground fire mains at change of direction points, tees, plugs, caps, bends, hydrants. Use of pipe clamps, tie rods, thrust blocks.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		(Flushing and Testing)	Flushing underground water mains before connection to interior piping. Adequate flushing capacity for system. Correct flow rate for pipe used. Time for proper cleansing. Testing before joints covered. Hydrostatic test, at prescribed pressure and duration. Procedures for testing: hydrants, control valves, fire pumps. Completing contractors' test certificate.
		Valves	Approved valve types, characteristics and selection factors: gate, butterfly, check, globe and hose valves. Screw and flange, O, S and Y, mechanical joint, angle, straight, vertical and hub end types. Miscellaneous valves: tapping sleeves and valves, floor stand valves. Pressure relief valves, pressure reducing valves, safety valves. Underwriter foot valves, foot valves and strainers. Quick opening valves. Pet cocks, stop cocks. Ball valves. Approved back-flow preventers, detector check valves.
		Miscellaneous Materials	Types and characteristics: valve boxes and covers, sprocket wheels and chains. Sight test connections. Wall and floor plates. Sleeves (steel pipe, galvanized steel, plastic or fibre types). Nipples, machine bolts and nuts. Pipe joint compound, cutting and threading oil, anti-freeze solution. Identification plates and tags. Instruction charts and manuals. Corrosion preventive materials. Gaskets.
14	Care and Maintenance	Responsibility of Owner	Delegation of responsibility. Weekly inspections and reports. Instructions to watchmen. Use of contractors' services. Maintenance of ample water supplies. Control valves must be open: when to shut off. Obstructions to sprinklers by partitions, stock: and effects. Protection against freezing. Examination and sealing of control valves. Sprinkler pressure gauges. Water flow and alarm line tests. Necessary alterations, additions to sprinkler system. Condition of sprinkler heads, exterior and interior piping, hangers. Excess pressure, wet system. Air pressure, dry system. Priming water in dry-pipe valve. Low points on dry system. Trip and reset dry-pipe valve once yearly. Maintain supply of replaceable parts and gaskets. Valve enclosure heating and lighting. Water rotary alarm gong. Electric alarm gong. Local supervisory alarms. Central supervisory alarm service.
		Specific Equipment Recommendations	Maintaining fire pumps: operation of fire pump once each week. Check for efficient operation to capacity. Check suction line, intakes for obstructions. Check foot valves and hose connections. Maintaining gravity tanks: checking level of water in tank, mercury gauge, water temperature gauge. Filling connection, drain connections, expansion joint. Heating equipment and piping. Frost proof casing. Tank supports. Valve chamber and equipment. Maintaining fire hydrants and equipment: check hydrant opening and drainage. Lubrication. Hose house and hose cabinets, fire hose and couplings, equipment in hydrant house. Flushing underground mains at regular intervals. Fire department connection: checking condition, checking hose

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
			valves, caps, ball drain. Open sprinkler systems: warm weather yearly test. Special sprinkler systems: check required by governing authority to contractors and manufacturers instructions. Periodic checks of fire extinguishers and interior hose stations.
15	Tools of the Trade	<p>Wrenches</p> <p>Cutting and Threading Tools</p> <p>Hand Tools</p> <p>Measuring and Plumbing Tools</p> <p>Portable Power Tools</p>	<p>Types and characteristics. Selection for specific applications; pipe wrenches, lever or super wrenches. Chain tongs. Strap, valve, adjustable, socket and ratchet, open end and box, pin and torque wrenches. Installation of sprinkler heads; use of manufacturers special wrenches. Proper adjustments. Care and maintenance of wrenches.</p> <p>Cutting steel pipe and tubing; use of single and three wheel cutters. Hand or power hacksaws. Cast iron pipe; use of three and four wheel cutters, chain cutters. Ductile iron; use of wheel cutters, electric or gasoline powered carborundum disc saw. Single wheel cutters for copper pipe and tubing. Threading pipe: use of ratchet type block and adjustable dies, stationary head adjustable and large ratchet or power drive pipe dies. Types, sizes and use of reamers. Reaming purpose and importance. Types, sizes and use of portable groovers. Threading rod: types and use of block, ratchet and adjustable bolt dies.</p> <p>Selection, care and use of wood saws; rip, crosscut, keyhole. Hacksaws. Wood chisels, cold chisels. Caulking irons. Grinding procedures. Awls, center, drift and beam punches. Braces and wood bits—expansion and extension types. Hammers; claw, ball peen, sledge, mash. Screwdrivers; regular, phillips, robertson, ratchet. Files. Allen Keys. Types and sizes of pipe and tube benders and flaring tools for installing tubing. Miscellaneous; pliers, metal snips, side cutters and bolt cutters.</p> <p>Types and use of tape measures, pocket rules, steel tapes. Steel square, adjustable pocket squares. Spirit levels, sight level and transits, plumb bobs, chalk line. Micrometers; inside and outside. Calipers. Block, wedge, feeler and dial gauges. Manometers. Pitot tube. Tachometers. Hydrometers. Vibration checking tool.</p> <p>Use of electric drills, steel and wood bits, bolt and pipe taps. Hole saws for wood and steel. Carbide concrete saws. Diamond core drills, star drills, stove pipe. Drilling concrete, chipping, setting anchors: use of electric hammers, rotating hammer bits. Self drilling anchors. Chipping chisels. Use of electric hand saws and electric or gasoline chain saws for cutting wood or concrete. Use of power hacksaws for cutting steel or cast iron pipe. Portable gasoline or electric saws and carborundum discs for cast iron, ductile iron and concrete pipe. Electric power vise: use for cutting and threading rod and pipe. Power drive to thread or groove larger pipe. Setting anchors: use of powder actuated tools for steel and concrete. Pneumatic tools, star drills. Safe handling of equipment. Pipe holding tools: type and use; bench vise, vanderman vise, chain vise. Tri-stand, four-legged and yoke vises.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Underground Piping Installation Tools	Lead joint type; use of caulking tools, cold chisels, yarning iron, running rope, melting pot and ladle for lead. Use of propane, acetylene or electric lead melting equipment. Cement asbestos pipe; use of pipe cutter, carborundum discs, pipe beveller and coupling tools. Mechanical joint, standard type (ductile and tyton pipe); use of ratchet and socket wrenches, adjustable wrenches. Wheel cutters, pressure cutters, carborundum discs. Grinders. Types and use of dewatering pumps; centrifugal, diaphragm, piston, gear. Crow-bars and pinch bars.
		Special Purpose Tools and Equipment	Storing; use of tool boxes and storage boxes. Equipment for testing pumps: gasoline, electric, hand operated. Gear, centrifugal, piston and turbine types.
16	Welding	General	Interpretation of blueprints, specifications and symbols. Relevant codes. Gas and arc welding principles. Safety procedures. Use of protective clothing and equipment. Ventilation. Fire precautions and prevention, posting fire guard. First aid for arc burns, artificial respiration. Hazards when welding in or near tanks that contain, or have contained combustible or volatile materials. Use of explosive meters. Welding types: oxyacetylene, electric arc; A.C. and D.C., TIG, MIG, Heliarc, semi-automatic. Arc welding power sources: gasoline, diesel. Electrical; DCW machine, AC-DC rectifiers, AC transformers.
		Welding Equipment use and Maintenance	Cold weather starting. Common arc-welding machine troubles and correction. Connection of grounds, grounding machines to power source. Electrode holders. Welding cable types and grounds: correct use, splicing, length, fastening to holder and machine. Use, care and maintenance of oxyacetylene torches and equipment. Fueling, operating and servicing gasoline and diesel powered welding machines.
		Arc Welding	Manual and semi-automatic arc welding of steel pipe, brackets, structural, vessels and tanks. Layout procedures. Electrode selection: checking drawings and specifications for electrodes required. Correct size electrode for weldment. Visual identification. Relevant codes and regulations. Types, purpose and characteristics of electrodes; carbon steel, alloy steel. Classification and identification of metals and steels. Effect of voltage, amperage, polarity, arc length. Types and characteristics of welds. Fusion and penetration. Wind, temperature and moisture effects during welding. Electrode storage. Use of electrode ovens: effects of moisture, prolonged heat. Selecting and estimating quantity of electrodes required at work site. Pre-heating, post-heating and stress relieving techniques. Controlling distortion during welding: by mechanical control, welding procedure. Size and strength of welds. Causes of porosity, undercuts, cracks, slag inclusions in weldments. Use of scaling and chipping hammers, power grinders. Carbon arc gouging. Surface preparation of weldments.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
17	Rigging and Scaffolding	Hoist Selection	Hoist types and characteristics, application. Care and use of electric, hand, pneumatic, hydraulic types. Chain and cable hoists, rope blocks. Winches, tuggers. Tripods, gin poles. Hooks. Determining a "safe load"; effects of size, weight and shape.
		Hanging Hoists	Use of proper anchoring or hanging methods and devices. Support member strengths. Isolated supporting methods: tripods, "A" frames and gimbets. Preventing unhooking.
		(Lifting and Pulling)	Load weight estimating. Load balance center. Moving techniques; drifting (2 or more hoists), balancing (auxiliary hoist), on inclined planes. Handling long equipment: upending, laying down. Use of winches and snatch blocks. Rollers, jacks and skids. Forklifts and scissor-type platform hoists. Hand signals. Regular hoist inspection and maintenance; effects of improper operation.
		Slings, Rope Attachments (Selection)	Correct selection methods. Types, care and use of: rope, cable, chain, strap webbing. Adherence to manufacturers' specifications. Types and strengths of splices, cable clamping. Knot tying.
		(Installation and Maintenance)	Standard installation procedures. Positioning slings and guide-lines. Results of sharp bends, kinks and frayed cable. Hazards of improper rope storage. Hand protection. Dragging rope into bar.
		Jacks	Types, care and use; ratchet, screw, hydraulic. Heavy equipment moving techniques; solid footing, jack positioning and support, blocking up, preventing equipment damage. Angle jacking, blocking and shimming. Correct jack bar length. Precautions.
		Rollers	Types, care and use; wood, steel (solid, hollow pipe), special roller units. Skids and skid plates; lubricants. Controlling loads on slopes. Changing direction. Floor and equipment protection; roller size and spacing, runner types. Safety precautions.
		Scaffolds	Types, care and use; ladders and planking. Platform scaffolds; single and multiple plank (wood, metal), rigid platform, ladder and plank, swing stages. Hanging scaffolds; multiple rope support, needle beams, rope blocks. Swing limiting methods. Types, sizes, care and use of standard unit scaffolds. Assembly of multiple units. Use of all safety devices; assembly and wheel locks, guard rails, rigid ladders, braces, plank positioning cleats. Types, characteristics and use of mobile power-operated hoists and scaffolding, cherry picker.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
18	Trenching and Shoring	Equipment and Safety Procedures	Trenching and excavating for underground sprinkler piping and equipment. <i>The Construction Safety Act, The Trench Excavators Protection Act</i> , local regulations. Heavy mechanical equipment used; back hoe, bull-dozer, trucks, front-end loader. Compressors and accessories. Pavement cutting equipment. Boring and tunnelling equipment. Hand tools: shovels, pick, pinch bars, sledge hammer. Ditch pumps. Tampers. Safety Precautions during digging with back hoe or other heavy equipment. Working in trenches. Shoring and bracing. Protection of public. Storing material near excavations. Backfilling. Compaction methods and equipment.

O. Reg. 420/80, Sched. 1.

Schedule 2

SPRINKLER AND FIRE PROTECTION INSTALLER

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	Trade Practices (As detailed in Schedule 1)	General	Safety rules and removal of all hazards. <i>The Workmen's Compensation Act. The Occupational Health and Safety Act.</i> Care and use of hand and portable power tools and equipment, measuring and plumbing tools, underground piping installation tools, special purpose tools and test equipment. Oxyacetylene and arc welding equipment. Powder actuated tools. Layout, cutting, drilling, reaming, threading, grooving, grinding. Fastening, soldering; cutting, welding and brazing. Rigging and scaffolding erection.
2	Blueprint Reading	General	Familiarization, interpretation and use of architectural, structural, mechanical and piping drawings. Standard architectural and piping symbols. Fire protection systems layout. Specifications. Material estimating. Relevant codes and underwriters standards. General contractor conditions. Coordination with other mechanical trades.
3	Materials, Supports and Hangers (As detailed in Schedule 1)	General	Piping: selection of pipe, tubing and fittings for specific applications. Hanging pipe: fastening hangers to concrete, wood and steel. Fabrication of hangers and brackets. Bracing and vibration isolation. Underground piping installation, sleeving and sealing, flushing and testing. Valve selection and installation. Miscellaneous materials.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
4	Sprinkler Systems (As detailed in Schedule 1)	General	Selection, layout, installation and testing of sprinkler heads, sprinkler devices and equipment. Wet-pipe systems, dry-pipe systems, pre-action and deluge systems, combined dry-pipe and pre-action systems, alarms and alarm devices. Outside, window and cornice systems. Special systems and applications. Maintenance and servicing.
5	Special Type Sprinkler Systems (As detailed in Schedule 1)	General	Layout, installation and testing of hydraulically calculated systems. Job-site examination. System requirements. Additional protection. Water supply. Layout, installation and testing of carbon dioxide and halogenated extinguishing systems (high and low pressure). For local application, total flooding. Operation and control of system. Maintenance and servicing. Layout, installation and testing of foam extinguishing systems: fixed systems for indoor flammable liquids, fixed systems and portable tower systems for exterior tanks; spray foam systems, monitor and hose nozzles for exterior protection. Automatic and auxiliary manual operation. Maintenance and servicing. Layout, installation and testing of dry chemical extinguishing systems for total flooding, local application, hand hose line. Operation and control of system. Maintenance and servicing.
6	Water Supply (As detailed in Schedule 1)	General	Familiarization with water supply sources and applications. Fire pumps; layout, installation, adjustment and testing of horizontal, vertical shaft, centrifugal and turbine pumps. Pump drives. Suction, supply, discharge and exhaust piping systems and fittings. Controllers. Maintenance and servicing. Layout, installation and testing of fire department pumper connections. Connecting to wet-pipe and dry-pipe sprinkler systems, multiple systems, other fire protection systems. Maintenance and servicing. Layout, installation and testing of gravity tanks, piping systems, fittings, indicators and gauges. Insulation. Tank heating systems. Corrosion prevention. Maintenance and servicing. Layout, installation and testing of pressure tanks, piping, connections, fittings and accessories. Maintenance and servicing.
7	Standpipe and Hose Systems (As detailed in Schedule 1)	General	Familiarization with fire line systems requirements. Layouts, installation and testing of fire lines and standpipes. Installation of hose cabinets, control valves, hose reels and racks. Safe-guarding completed work.
8	Hydrants (As detailed in Schedule 1)	General	Layout, installation and testing of approved compression, gate valve and wall type hydrants. Erection of hose houses and cabinets. Installation of approved equipment and accessories. Maintenance and servicing.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
9	Supplementary Alarm Systems (As detailed in Schedule 1)	General	Layout and installation of central station protection signalling systems. Manual fire alarm devices. Guards tour supervisory service. Automatic fire detection, alarm service and supplementary manual systems. Automatic smoke alarm service. Testing, restoring and maintaining alarms and systems.
10	Portable Fire Extinguishers (As detailed in Schedule 1)	General	Familiarization with classification of fires and extinguishers used. Colour coding and symbols. Equipment selection, location, distribution and size for occupancy hazards and dip tanks. Inspection, testing and maintenance.
11	Care and Maintenance (As detailed in Schedule 1)	General	Familiarization with owners responsibility for maintenance. Delegation of responsibility. Use of contractors services. Specific equipment maintenance; required periodic operation, testing and servicing to ensure readiness of all fire protection equipment.
12	Trenching and Shoring (As detailed in Schedule 1)	General	Familiarization with trenching and excavation procedures, equipment and safety precautions for installation of underground sprinkler piping and equipment.

O. Reg. 420/80, Sched. 2.

REGULATION 59

under the Apprenticeship and Tradesmen's Qualification Act

STEAMFITTERS

1. In this Regulation,

- (a) "certified trade" means the trade of steam-fitter;
- (b) "steamfitter" means a person who,

- (i) lays out, assembles, installs, maintains or repairs any heating system, cooling system, process system or industrial system,
- (ii) installs or connects piping in any building or structure,
- (iii) installs the piping for any process, including a process that conveys gas, or the tubing for any pneumatic or airhandling system, or
- (iv) reads and understands design drawings, manufacturer's literature and installation diagrams for any system referred to in subclause (i),

but does not include a person engaged in the manufacture of equipment or the assembly of a unit, prior to delivery to a building, structure or site. O. Reg. 124/73, s. 1.

2. The trade of steamfitter is designated as a certified trade for the purposes of the Act, O. Reg. 124/73, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of five periods of related training and work experience training of 1800 hours for each period,

- (a) at full-time education day classes provided at a College of Applied Arts and Technology or in courses that, in the opinion of the Director, are equivalent thereto in the subjects contained in Schedule 1; and
- (b) in work experience training provided by the employer of the apprentice in the subjects contained in Schedule 2. O. Reg. 124/73, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the subjects contained in Schedules 1 and 2. O. Reg. 124/73, s. 4.

5. Any person who,

- (a) applies in the prescribed form for apprenticeship in the certified trade; and
- (b) works in the certified trade for three months or less is exempt from subsection 11 (2) of the Act. O. Reg. 124/73, s. 5.

6. The rate of wages for an apprentice in the certified trade whether for his regular hours or for hours in excess of his regular daily hours shall not be less than,

- (a) 40 per cent during the first period of training and instruction;
- (b) 50 per cent during the second period of training and instruction;
- (c) 60 per cent during the third period of training and instruction;
- (d) 70 per cent during the fourth period of training and instruction; and
- (e) 80 per cent during the fifth period of training and instruction,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 124/73, s. 6.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for every three journeymen employed by the employer in the trade and with whom the apprentice is working; and
- (b) where the employer is not a journeyman in the trade, one apprentice for the first journeyman employed by the employer plus an additional apprentice for each additional three journeymen employed by the employer in the trade and with whom the apprentice is working. O. Reg. 124/73, s. 7.

Schedule 1

STEAMFITTER

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics (Trade Related)	Mathematics	Addition, subtraction, multiplication, division of whole numbers, fractions, decimals. Metric system; conversion methods. Weights and measures. Ratio and proportion. Percentage, discounts, simple interest. Areas, volumes, linear, angular mensuration. Square root. Right angle triangle. Scale conversion. Simple equations and formulae calculations (tanks, pipes; capacities, rate of flow).
2	Science (Trade Related)	Physics	Properties of matter; solids, liquids, gases. Hydrostatics; atmospheric pressure, manometer, mercury barometer, gauge and absolute pressure, syphon principle. Hydraulics; Pascals Law, fluids under pressure. Gas laws; expansion and compression, Boyles Law, vacuum pump, compression pump. Work, energy and power; units of energy, horse power calculations. Basic electricity; amperes, voltage, resistance, Ohm's Law. Electron flow. Electromagnetism. Series and parallel circuits. Voltage drop. Conductors and insulators. Heat; temperature scales, heat capacity. Specific heat of solids, liquids, gases. Coefficients of expansion, expansion of gases, Charles Law. Changes of state; evaporation, condensation, freezing. Pressure effects, sensible and latent heats, B.T.U. graph. Heat transmission; radiation, convection, conduction. Properties of steam; sensible and latent heats, saturated and super-heated steam, heat content, mechanical equivalent of heat, heating plant efficiency, heat loss and prevention. Properties of materials; tensile and compressive stress. Basic metallurgy; ferrous and non-ferrous metals, corrosion, electrolysis, electro-potential series, welding effects.
3	English	Usage and Business Communication	Reading comprehension. Trade terminology, usage. Sentence, paragraph structure. Letter, report writing. Work and parts orders. Interpretation and use of manufacturer's manuals and job specifications. Oral communication.

	COLUMN 1	COLUMN 2	COLUMN 3
ITEM	Course	Subject	Instruction To Be Given
4	Drafting and Blue Print Reading	Basic Drafting and Interpretation	Use of lines, views, projections, sections, developments, dimensions, lettering. Threads and fasteners. Material specifications. Reading and interpretation of frame, masonry and concrete construction plans; materials, construction members, dimensioning, sections, elevations, details, scales, schedules, standard architectural symbols. Piping drawings; single line, double line, isometric. Pipe fabrication, piping and welding symbols. Steam and hot water systems. Boiler room and diesel engine piping, pipe hangers. Preparation of elementary trade related working drawings, dimensioned sketches, piping systems and layouts, material estimates.
5	Trade Practice General	Safety	Safety rules and safe operating procedures. Protective clothing and equipment. First aid. Fire prevention, location, use and maintenance of fire fighting equipment. The <i>Workmen's Compensation Act</i> , the <i>Building Code Act</i> , the <i>Boilers and Pressure Vessels Act</i> , the <i>Occupational Health and Safety Act</i> , the <i>Energy Act</i> and the regulations thereunder. Handling and storage of flammable liquids, gases, acids and sealants. Safe use of lifting and hoisting equipment, pneumatic and electrical tools and equipment, welding equipment. Powder actuated tools. Good house-keeping.
		Hand Tools	Selection, care and use of hammers, screwdrivers, wrenches, wood saws, hacksaws, chisels and drill bits (metal, wood, masonry), files, hand shears, hand drills, pipe cutting, threading, reaming, flaring and bending tools.
		Power Tools, Equipment	Care and use of portable pneumatic and electric drills, grinders, circular and sabre saws. Powder actuated tools. Pipe bending equipment (mechanical, hydraulic). Pipe cutting, reaming, threading equipment. Pedestal and bench grinders, abrasive cut-off tools. Grinding drill bits, cutting tools. Materials handling devices, scaffolds, ladders, ropes, cables, slings, hoists.
		Measuring Devices	Care and use of rules, tapes, builders' levels, calipers, micrometers, squares, straightedges, hand levels, plumb bobs.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
6	Trade Practice	Erection Details	Heat source location. Direction and location of runs, risers, other features. Blueprint use, relevant codes, specifications.
	Pipe Work	Ferrous Pipe and Tubing	Types and uses; wrought iron, genuine wrought iron, galvanized, seamless, welded seam, steel, stainless steel. Weights; standard-schedule 40, extra strong-schedule 80, double extra strong-schedule 160. Nominal sizes and dimensions. Manufacturing methods, possible defects. Bending methods and allowances. Joining methods. Fitting types, sizes, uses. Threaded joints; pipe and fitting measurements, thread allowances, tolerances. Colour coding. Protection and storage.
		(Cutting, Reaming and Threading)	Pipe holding devices. Cutting oils. Hand and power cutting and reaming. Thread identification, usage, standard pipe threads. Hand and power threading procedures.
		(Fitting Joints)	Good piping practices. Assembly stresses, expansion and contraction. Thread lubricants. Making up pipe and fittings, installation and aligning.
		Non-ferrous Pipe and Tubing	Types and uses; brass, copper, aluminum, bronze, nickel, monel, other. Sizes and weights. Protection and storage. Bending methods and allowances. Types, sizes and uses of fittings. Joint types. Effects of condensate, electrolysis, expansion and contraction, capillary action, oxidation. Pipe cutting, reaming and threading procedures. Thread lubricants. Pipe and fitting measurements, thread allowances.
		(Making Joints)	Pipe and tubing practices. Brazing methods. Hard and soft soldering. Silver soldering. Cleaning methods, fluxes. Heat application, working temperatures. Tube flaring methods.
		Non-metallic Pipe	Types, properties, sizes, uses; polyethylene, bituminized fibre, glass. Protection and storage. Types of joints. Pipe and fitting measurements, allowances. Cutting, reaming and flaring methods. Making cemented and fused joints; capillary action, expansion and contraction. Pipe bending methods, allowances, stresses.
		Hangers and supports	Building structure details; pipe runs and hanging methods, hanger types and spacing. Hanger rods; standard rod sizes and bolt threads, hand and power cutting and threading methods.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		(Installation)	Concrete construction; inserts and setting methods. Cutting and drilling concrete. Anticipating locations. Use of stud guns and pin drivers. Co-operation with other trades. Steel structures; clamp types, standard bolts and nuts. Drilling steel joists. Use of stud guns and pin drivers. Wood construction; types and uses of bolts, lag and wood screws. Joist drilling and cutting methods. Construction methods for pipe, angle and channel iron supports. Fabricated and welded supports. Vibration and isolation springs. Flexible connections; applications, installation, short circuiting.
		Flanged Joints	Types and advantages; flanged fittings, valves, unions, companion flanges. Flange bolt types, material, sizes, threads. Threading pipe for flanges and joints. Cutting pipe for welded flanges. Preparing threaded flanges; use of pipe vise, drift pins. Gaskets and gasket materials; cutting methods. Flanged joint assembly; wrenches, lubricants, alignment, bolt tightening sequence. Misalignment effects.
		Expansion Accommodating Theory and Methods	Types, making up, locating, installation. Swing and scissors joints; piping direction changes, determining offsets. Expansion loops and bends; standard pipe bends, calculations and bending methods for circle, U, expansion U, double offset U bends. Mechanical expansion joints; bellows and sleeve types, manufacturers specifications. Expansion joint anchors; location, expansion direction. Anchoring methods; before and after concrete pouring, steel construction, underground. Guide types; installation, manufacturers recommendations.
		Pipe Welding and Fabrication	Terminology. Safety practices. Relevant Boilers and Pressure Vessels Regulations, qualification tests. Welding and brazing rods, fluxes. Electrode types, classification, sizes, colour coding. Basic weld joints and symbols, pipe template development and use, plate and edge preparation, distortion prevention, stress relieving. Weld faults.
		(Oxyacetylene)	Equipment and operation; regulated pressures, flame types, purpose, adjustments. All-position welding and braze welding techniques. Manual torch cutting.
		(Arc)	A.C. and D.C. equipment types, operation, running maintenance. Polarity. Current requirements. Electrode selection factors. All-position single and multi-pass welding techniques.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
7	Hot Water Systems	Roughing-in Procedures.	Unit layout and requirements, blue print use. Hot water heating theory; gravity and forced. System types; direct return, reverse return, monoflo, perimeter, radiant, heating and cooling, high temperature, snow melting, greenhouse heating. Advantages and disadvantages. Calculating quantities, pipe capacities, heat losses. Use of U factor and pipe sizing tables.
		Installing System	
		(Roughing-in Pipe)	Planning necessary cutting and sleeving. Co-operation with other trades. Piping methods for; one pipe, up feed and down feed systems, reverse return, perimeter, radiant and high temperature hot water heating. Grading supply and return. Typical take-off connections. By-passing obstacles. Providing for pipe expansion; guiding, anchoring. Standard piping practices.
		(Zoning of System)	Zoning theory and heat requirements. Length of circuits and balancing. Provision of circulators.
		(High Temperature Hot Water Systems)	On site fabrication of special fittings. Venting. Special installation requirements. Pump types; water cooled. Expansion provision; guiding and anchoring, advantages and disadvantages. Safety precautions and hazards.
		Boilers	Sectional and package unit types; manufacturers specifications and rated capacities. Determining type and location from plans and specifications. Receiving, handling and erecting procedures for damage prevention, ease of maintenance. Making connections; headers (supply and return). Water supply; back syphonage prevention, provision for draining.
		(Boiler Trim)	Flow control valve. Operation of aquastats; single and multiple zone control. Safety features; pressure and temperature relief, pressure reducing (water), thermometers and location. Pressure gauge. Low water cut-offs. Circulators; types, necessity for use, water velocity, by-pass.
		(Hot water Converters)	Types and operation; steam and water connections, pressure reduction (water and steam).
		Expansion Tanks	Locating considerations and purpose. Connections for venting, overflow, water level gauge, air inlet valve, open systems. Tank supports. Compression or cushion tanks; purpose, location, connections. Air charging. Water-logging effects. Closed systems. Air control; air charging valve, boilerrol and airtrol fittings. Venting of systems; purpose, methods, types of vents. Manual venting.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Radiation	Radiation theory, types, sizing. Heat transfer. Venting. E.D.R. and M.B.H. Use of U factor tables. Hanging wall type radiators. Types of hangers. Fastening to masonry, concrete, wood frame construction. Piping connections for supply and return. Proper placement. Controls. Installing radiators or convectors, unit heaters, baseboard heating, radiant panels, heating and cooling units.
		Miscellaneous Procedures	Installing controls; relief valve, temperature gauges, flow control valves, pressure regulating devices, pressure gauges, automatic valves; electric and pneumatic. Electric and pneumatic radiator valves, thermostats, aquastats. Venting of systems. Manufacturers specifications. Relevant codes and regulations.
		(Firing of boilers)	Combustion theory. Fuel types; coal, oil, gas. Firing controls. Draft regulation. Safety precautions, and applicable regulations.
		(Testing System)	Testing methods. Noise elimination. Balancing system. Responsibilities to contractor and owner. Good housekeeping. Precautions against using oxygen for testing.
8	Low Pressure Systems	Installation Procedures	Layout and requirements of systems; gravity and mechanical types. Advantages and disadvantages. Use of blueprints, specifications, piping and steam tables. Heat and friction losses. Use of manufacturers design data. Effect of air in system. Piping installation techniques; preparing for sleeving and inserts, co-operating with other trades. Grading and anchoring. Accommodating expansion. Hangers and supports. Necessity for drips and location.
		Steam Mains	
		(Return Mains)	Theory of returns; dry and wet returns, sub-atmospheric, gravity pump. Making return and boiler connections; standard practice. Proper grading. Scale and dirt elimination.
		(Risers)	Taking off connections, supporting. Expansion provision. Up feed and down feed connections.
		(Special Accessories)	Interpreting specifications and certified drawings. Air elimination devices. Design and function of return traps, equalizers and bleeders. Safety requirements, applicable codes.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Low Pressure Boilers	Blueprint use for building details, location of various units. Interpreting manufacturers specifications. Boiler types and construction; fire tube, water tube, cast iron. B.T.U. ratings. Boiler horse-power. Boiler rating calculations. Heat loss causes. E.D.R. ratings. Provision for sufficient unit space, ease of maintenance. Boiler assembly sequence; good trade practices. Effects of air in system, elimination methods.
		(Connections and Trim)	Connections required for various heating systems. Steam headers; construction and purpose. Piping practices. Theory of return lines. Return headers. Safety practices. Trim installation; boiler code requirements. Local regulations. Manufacturers specifications. Safety equipment. Water feed connections; water pressure required and temperature effects, location of control and check valves. Water feeder types.
		(Cleaning and Testing)	Boiler operating procedures. Possible adjustments. Conditions requiring water treatment. Water testing and cleaning methods.
		(Operating and Start-up)	Electrical and fuel controls. Design and function of flues, breeching, chimney and draft controls. Safety practices. Instructions to owner. Peak boiler loads. Initial start-up procedures.
		Radiation	Position of units, building details. Use of blueprints and specifications. Radiation types; convectors, unit heaters. Wall hung radiators. Circulation. Heat loss factors. E.D.R. and B.T.U. ratings. Heat transmission; U factor tables. Piping connections. Radiator valves; manual and automatic. Regulating fittings. Radiator traps; types, operation and maintenance, failure results. Venting radiation; manual and automatic air vents.
		(Piping Connections)	Ground floor and riser connections. Grading heating element. Length of branch run outs. 3-elbow swing joints. Grade on branches. Use of angle and vertical traps and valves, regulating fittings. Condensate eliminating methods. Riser expansion compensation. Down feed connections.
		(Steam Traps)	Theory of condensation return, steam traps. Location, types, operation and sizing. Testing methods; failure causes and effects. Water hammer. Trap connections for wall hung, floor mounted and recessed radiation.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
			Dripping of risers and steam mains. Connections for dry and wet returns. Boiler water level relationship. Thermostatic traps. Air elimination. Drip connections. Eccentric reducer use. Scale pockets; size and length. Connections for valve and strainer, float and thermostatic trap. Cooling legs. Expansion movement allowance.
		(Bucket Traps)	Theory and operation; installations requiring use. Piping and by-pass connections; necessary precautions.
		(Return Trap or alternate Receiver)	Operation of boiler return trap; piping connections. Piping connections to Hartfordloop and return main.
		Unit Heaters	Types and operation. Unit locations, building details, type of system and units. Hanging, supporting units, piping procedures. Conditions requiring recirculation ducts; sizing, E.D.R. ratings. Thermostat and starting switch operation, locating factors. Limit controls. Testing installation; adjusting controls, temperature fluctuation causes.
		(Cabinet Heaters and Window Units)	Types and operation. Blueprint, specification and shop drawing use. Piping connections. Controls and damper linkage adjustments. Combing and cleaning.
9	High Pressure Systems	Steam Supply Installation	Building and boiler room details. Unit location, type, capacity, setting specifications. Fire tube and water tube boilers. Super-heaters, economizers, condensers, deaerators. Steam table use. Pressure regulation devices.
		Boilers and Accessories	
		(Boiler Trim)	Use of specifications, schematic and working drawings. Applicable regulations. Piping connections to safety valves, blow-down valves, boiler header, gauges. Safety features; valves, low water cut-off. Blow-down valves, tanks and piping. Water columns. Steam separators. Fusible plugs; internal, external. Pressure gauge. Gauge glass.
		(Pipeline Accessories)	Piping symbols; significance and use. Controllers and regulators. Expansion joints; anchoring and guides. Steam headers. Pressure reducing stations. Condensate elimination. Exhaust heads. Back pressure valves.
		(Exhaust Steam Equipment)	Exhaust steam uses. Back pressure effects. Oil separators. Fluctuating pressure effect. Continuous service connections. Condensate elimination.
		(Power Equipment)	Piping connections to steam engines, turbines, water heaters and process equipment in hospitals, kitchens, laundries.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		(Heating Equipment)	Installing water supply. Pump types; turbine, reciprocating, centrifugal. Water treatment. Float and thermal controls. Injector. Water softeners. Feed water heaters; open, closed types.
		(Firing of Boilers)	Combustion and fuels; coal, gas, oil. Firing, draft and combustion controls. Soot blower. Ash removal systems. Coal conveyors. Fuel supply; tower and bin feed stokers, light and bunker fuel oils, gas, pulverized coal. Oil piping and storage tanks. Oil pre-heater and pumping set types, connections.
		Return and Accessories	Condensate return; temperature, high pressure effects on piping and handling methods. Condensate cooler to vacuum return; specifications, piping and by-pass connections, air elimination. Flash tank to vacuum return; theory, piping connections, venting, types of controls. Designs and function of high pressure steam traps. Accumulator tanks; piping connections, venting methods, low return lines. Co-operation with electrical and plumbing trades. Designs of controls. Vacuum breakers.
10	Process Piping	Installation Procedures Piping	System requirements; blueprint and specification use. Action of chemicals on pipe materials. Pipe selection. Quantities, capacities, schedules for pressures. Pipe joining methods.
		Pumps	Types and location; centrifugal, rotary, reciprocating, injector. Vibration isolation. Base material, anchor bolt location and measurement checks. Pump shaft alignment with driving mechanism. Pump lubrication, seals, rotation. Volume and pressure rating tests. Leak detection.
		Valves	Location, type and construction; gate, globe, plug, cylinder, check, ball, butterfly, needle. Operating methods; manual, motorized, pneumatic, hydraulic. Use for controlling material flow, safety, automatic control, metering, venting, vacuum breaking. Valve servicing procedures.
		Miscellaneous Systems (Automatic Sprinkler)	Regulations, codes. Locating, sizing pipe, sprinkler heads. Wet and dry systems.
		(Heating and Cooling)	Piping systems. Free-standing heating and cooling coils. Controls. Place and set industrial equipment; cooling towers, absorption units, condensers and compressors.
		(Control Systems)	Purpose of various controls, sensing devices, thermostats, aquastats, humidistats.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		(Gas)	Piping systems for air, natural or manufactured gas, oxygen, acetylene, nitrogen, carbon dioxide, carbon monoxide. Applicable regulations and codes. Proper installation procedures, hanging, insulation, moisture elimination, material selection, special equipment.
		(Testing and Purging)	Local codes. Pressure requirements and procedures. Manufacturers specifications.
11	Pumps	<p>Installation</p> <p>Condensate and Circulating Pumps</p> <p>(Boiler Feed Pumps)</p> <p>(Pump Discharge)</p> <p>(Testing and Servicing)</p> <p>Vacuum Pumps</p> <p>(Lift Fittings)</p>	<p>Types and theory. Locating position. Conditions requiring pump use. Other trades co-operation. High temperature effects. Piping procedures. Alignment. Noise and vibration elimination.</p> <p>Required boiler water level. Return connections. Make-up water supply. Multiple boiler installations. Duplex pump connections. Suction head. Safety features. Vibration isolation.</p> <p>Length of discharge run. Sizing; use of friction loss tables. Pump pressure head calculations.</p> <p>Manufacturers specifications. Pump failure causes and effects. Lubrication, cooling, adjustments. Pump alignment and rotation. Electrical requirements.</p> <p>Types and operation. Location requirements. Heating system type. Condensate and vacuum system theory. Steam and condensate temperatures. Requirements for high pressure steam systems. Co-operation with electrical trade. Use of manufacturers specifications, working drawings. Installation and piping procedures. Discharge pipe sizing, friction loss. Pump negative and positive pressure. Boiler pressure. By-pass connections. Venting. Vacuum pump testing methods. Control adjustments; high and low limits. Noise and vibration elimination.</p> <p>Theory. Steam pressure and vacuum. Water hammer. Lift fitting types and connections.</p>
12	Controls and Valves	<p>Installation Procedures</p> <p>Operating Controls</p>	<p>Location of units. Use of plans, blueprints, specifications, symbols. Valve designs and operation; manual, automatic. Piping connections; alignment and support. Location relationship to controlled unit. By-pass. Direction of flow effects. Co-operation with electrical trade. Circulator control. Testing controls; valve opening and closing methods, noise elimination, common faults and adjustment. Safety procedures.</p>

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Safety Controls	System requirements, location of units. Safety controls, designs and operation; pressure reducing, temperature and humidity control, pressure relief, pressure regulating, steam control, check and non-return. Alignment and support. Direction of flow effects. Gauges; principles, manufacturers specifications. Local regulations, boiler codes. Motorized feed water control valve. Indoor-outdoor controls.
		(Pneumatic Controls)	System theory and operation. Compressors. Controllers. Controlled devices; fans, dampers, valves. Control panels. Pressure regulating control. Piping connections.
		(Valve Testing)	Correct operating characteristics. Common faults, necessary adjustments. Preventive maintenance.
13	Equipment Maintenance and Repair	Valves	Design and function of components. Packing types and purpose. Valve service ratings. Deterioration causes; pressure, temperature, corrosion, improper use, wire drawing. Trouble shooting, evaluating conditions. Repair and adjustment procedures. Preventive maintenance.
		Boilers	Operation and servicing; conditions and symptoms. Safe shut down procedures; normal, emergency (low water, relief valve failure). Cleaning methods; blow-down, scale removal. Boiler compounds. Water treatment. Manufacturers specifications.
		(Controls)	Cleaning and adjustment procedures. Boiler codes. Safety valves. Low water cut-off. Water columns. Automatic water feeder. Feed-water pump control. Firing and limit controls.
		(Fuel Quality)	Testing procedures. Characteristics of fuels and combustion. Elimination of combustion products. Chimney effect. Flues and breeching.
		(Repair or Replacement)	Economics and comparative costs. Safety considerations. Working with other trades.
		Heating Systems	Operation of systems. Trouble shooting procedures; common problems, causes, effects. Routine tests. Power source related problems. Isolating trouble. Shut down procedures; effects, local conditions, building type, usage. Protecting water coils and piping against freezing; draining, use of anti-freeze.
		(Steam Supply)	Adjusting to overcome related troubles; failure of controls, corrosion and scale, riser drips, steam pressure, venting, location of thermostats, building construction changes.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		(Return Lines) (Accessories)	Adjusting to correct trap failure, sagging or low spots, insufficient vacuum, corrosion and scale, condensate return to boiler. Servicing procedures. Use of working drawings, manufacturers specifications. Miscellaneous valves; pressure reducing, pressure regulating; temperature, flow and zone control. Condensate receivers. Cushion tanks. Altitude gauge. Circulation pumps. Thermometers. Repairing valve and expansion joint leaks. Packing types and methods, parts replacement, safety precautions.
14	Underground Distribution Systems	Pipework	Underground system types; ric-wil, ebco, clay pipe installation, tryclite, durante, others. Installation methods. Curing, testing. Backfilling (materials). External corrosion of casings. Cathodic protection. Trenchwork safety precautions.
15	Rigging	Scaffolding and Ladders Hoists Placing Equipment Ropes and Slings	Types, uses, safe handling, erecting and securing methods. Clearance from high voltage lines. Building and safety codes. Care and maintenance. Types and use of chain hoists, rope blocks, winches, tripods. Anchoring hoists. Safe loads. Gin pole. Hooks. Air tuggers. Snatch blocks. Care and maintenance. Jacking, blocking procedures. Use of rollers. Lowering, raising and handling. Standard hoist signals. Rope and cable sizes, materials, load capacities. Sling fabrication. Rope splicing, cable clamping, Knot tying.

O. Reg. 124/73, Schedule 1.

Schedule 2

STEAMFITTER

Work Experience Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
1	Trade Practice (As detailed in Schedule I)	General	Safety rules and removal of all hazards. The <i>Workmen's Compensation Act</i> , the <i>Building Code Act</i> , the <i>Boilers and Pressure Vessels Act</i> , the <i>Energy Act</i> and the regulations thereunder. The <i>Occupational Health and Safety Act</i> . Care and use of hand and portable power tools and equipment, measuring devices. Pipe work (ferrous, non-ferrous and non-metallic); cutting, reaming, threading, bending, flaring. Making, fitting and installing joints, flanges, expansion joints, hangers and supports. Pipe and tubing welding, cutting, brazing and soldering.
2	Hot Water Systems	Installing Systems	Familiarization with gravity and forced hot water heating theory and types of systems. Roughing-in piping. Zoning and balancing systems. High temperature hot water systems.
		Boilers	Setting and erecting sectional and package units. Making boiler connections. Installing boiler trim, circulators, hot water converters.
		Expansion Tanks	Installing expansion, compression and cushion tanks. Venting systems.
		Radiation	Familiarization with radiation theory. Installing radiators and convectors, unit heaters, base board heating, radiant panels, heating and cooling units.
		Miscellaneous Operations	Installing controls. Firing of boiler. Testing system. Balancing. Noise elimination.
3	Low Pressure Systems	Installing Systems	Familiarization with gravity and mechanical systems, theory of returns. Installing steam mains, return mains, risers. Special accessories.
		Boilers	Installing low pressure boilers. Boiler connections. Installing boiler trim. Making water feed connections. Cleaning and testing boiler, operating and initial start-up. Water tests and treatment.
		Radiation	Installation of convectors, wall hung radiators. Radiator valves, traps. Manual and automatic venting. Piping connections.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
		Steam Traps	Installing and testing steam traps. Dripping of risers and steam mains. Installing bucket traps, return traps, alternate receivers.
		Unit Heaters	Installing unit heaters, cabinet heaters and window units. Thermostats. Testing installations.
4	High Pressure Systems	Steam Supply	Installing boilers and accessories, boiler trim. Pipe-line accessories. Exhaust steam equipment. Piping connections to steam engines, turbines, water heaters and process equipment in hospitals, kitchens, laundries. Installing water supply to heating equipment; pumps, controls, injector. Feedwater heaters. Water treatment. Water softeners. Firing of boilers.
		Return and Accessories	Installing condensate return, condensate cooler to vacuum return, flash tank to vacuum return, accumulator tanks.
5	Process Piping	General	Selecting and installing pipe to carry various materials. Pump installation, alignment and testing. Valve installation and servicing. Installing wet and dry automatic sprinkler systems to relevant codes. Heating and cooling piping systems and controls, cooling towers, absorption units, condensers and compressors. Miscellaneous gas piping systems. Testing and purging in accordance with relevant codes and specifications.
6	Pumps	General	Installing condensate, circulating and boiler feed pumps, pump discharge. Testing and servicing. Installing vacuum pump and testing. Installing lift fittings.
7	Controls and Valves	General	Installing operating controls and testing. Installing safety controls and accessories. Pneumatic control systems. Valve testing.
8	Equipment Maintenance and Repair	Valves	Evaluating deterioration. Repairing, repacking, re-seating, adjusting, lubrication. Preventive maintenance.
		Boilers	Servicing operations; familiarization with operation, conditions and symptoms, safe normal and emergency shut down. Cleaning boilers; blowdown, scale removal, boiler compounds and water treatment. Cleaning and adjusting boiler controls. Fuel quality tests. Economical and safe boiler repairs or replacement.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Experience Training
		Heating Systems	Familiarization with types and operation. Isolating trouble. Shutting down systems. Protecting against freezing. Correcting steam supply and return line troubles. Servicing pressure reducing and regulating valves; temperature, flow and zone control valves. Condensate receivers, cushion tanks, altitude gauges, circulation pumps, thermometers. Repairing valve and expansion joint leaks.
9	Underground Distribution Systems	Pipework	Familiarization with system types and installation. Curing, testing, backfilling. Cathodic protection of casings.
10	Rigging	General	Erecting scaffolding and ladders. Use of hoists, ropes, cables, slings. Placing equipment, use of hand signals. Care and maintenance of rigging equipment.

O. Reg. 124/73, Schedule 2.

REGULATION 60

under the Apprenticeship and Tradesmen's Qualification Act

TOOL AND DIE MAKER

INTERPRETATION

1. In this Regulation,

(a) "certified trade" means the trade of tool and die maker;

(b) "tool and die maker" means a person who,

(i) sets up and operates to prescribed tolerance engine lathes and milling, grinding, drilling, sawing and boring machines,

(ii) reads and interprets blueprints, operation and product-related reference charts and tables and selects mechanical measuring, checking and layout tools and devices,

(iii) performs measuring, checking and layout operations and selects work piece materials and the required cutting tools and abrasives for metal removal operations,

(iv) performs metal removing operations using hand and power tools and selects work piece clamping and holding devices and product-related components,

(v) performs finishing and assembly operations on dies and sets up dies on presses for testing purposes, and

(vi) manufactures component parts and assembles and tests tools, jigs and fixtures,

but does not include a person or class of persons in a limited purpose occupation that in the opinion of the Director does not equate with the definition of tool and die maker.

O. Reg. 868/80, s. 1.

2. The trade of tool and die maker is designated as a certified trade for the purposes of the Act. O. Reg. 868/80, s. 2.

3. An apprentice training program is established for the certified trade and shall consist of four periods of related training and work experience training of 2,000 hours per period,

(a) at full-time educational day classes provided at a location approved by the Director or in

courses that in the opinion of the Director are equivalent thereto in each of the units of study contained in Schedule 1; and

(b) work experience training provided by the employer of the apprentice in the units of study contained in Schedule 2. O. Reg. 868/80, s. 3.

4. The subjects of examination for an apprentice in the certified trade are the units of study contained in Schedules 1 and 2. O. Reg. 868/80, s. 4.

5. The rate of wages for an apprentice in the certified trade, whether for his regular daily hours of work or for hours of work in excess of his regular daily hours of work, shall be not less than,

(a) 50 per cent during the first 1,000 hours of related training and work experience training;

(b) 55 per cent during the second 1,000 hours of related training and work experience;

(c) 60 per cent during the third 1,000 hours of related training and work experience;

(d) 65 per cent during the fourth 1,000 hours of related training and work experience;

(e) 70 per cent during the fifth 1,000 hours of related training and work experience;

(f) 75 per cent during the sixth 1,000 hours of related training and work experience;

(g) 80 per cent during the seventh 1,000 hours of related training and work experience; and

(h) 85 per cent during the eighth 1,000 hours of related training and work experience,

of the average hourly rate of wages or its equivalent for journeymen employed by the employer in that trade and with whom the apprentice is working. O. Reg. 868/80, s. 5.

6. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

(a) where the employer is a journeyman in the trade, one apprentice plus an additional apprentice for each additional journeyman employed by that employer in the trade and with whom the apprentice is working; and

(b) where the employer is not a journeyman in the trade, one apprentice for each journeyman

employed by that employer in the trade and with whom the apprentice is working. O. Reg. 868/80, s. 6.

7. Notwithstanding section 6, on the recommendation of the provincial advisory committee or a local apprenticeship committee appointed under the Act for the certified trade, the Director may determine the ratio of apprentices to journeymen who may be employed by an employer in the certified trade. O. Reg. 868/80, s. 7.

8. The Director shall issue a progress record book to an apprentice for the purpose of recording his related training and work experience training time and the apprentice shall be responsible for keeping his progress record book up to date and for its safekeeping. O. Reg. 868/80, s. 8.

9. An applicant for a certificate of qualification in the certified trade who is required to satisfy the Direc-

tor under clause 11 (4) (b) or (c) of the Act shall submit to the Director, proof of experience within the trade that, in the opinion of the Director, is equivalent to work experience training described in the units of study contained in Schedule 2. O. Reg. 868/80, s. 9.

10.—(1) Subsection 11 (2) of the Act does not apply to a person who works or is employed in the certified trade.

(2) Subsection 11 (3) of the Act does not apply to an employer in the certified trade. O. Reg. 868/80, s. 10.

11. Section 5 of Regulation 36 of Revised Regulations of Ontario, 1980 does not apply to the certified trade. O. Reg. 868/80, s. 11.

12: A certificate of qualification in the certified trade is not required to be renewed. O. Reg. 868/80, s. 12.

Schedule 1

TOOL AND DIE MAKER

In-School Training

ITEM	COLUMN 1	COLUMN 2
	Unit of Study	Instruction to be given
1	Safety	Safe work habits. Protective clothing and equipment.
2	Blueprint Reading Reference Charts and Sketching	Interpretation of blueprints, reference charts and sketching.
3	Hand Tools and Benchwork	Care and use of hand tools. Fasteners and their application.
4	Measuring Tools	Care and use of precision measuring devices.
5	Trade Calculations	Calculation of geometrical values, ratios and formulae.
6	Layout	Care and use of layout tools. Surface preparation and layout techniques.
7	Metallurgy	Heat treatment of ferrous metals including furnace and torch hardening, cyaniding and hardness testing. Chemical and physical properties and identification of ferrous, non-ferrous and plastic materials.
8	Power Tools	Drilling, reaming, tapping, knurling, lapping, boring procedures. Set up and operate power hack-saws, vertical band saws, radial drill presses, engine lathes, horizontal boring mills, horizontal cylindrical universal and tool and cutter grinders. Set up and operate metal filing, universal pantograph and automatic duplicator, milling machines. Set up and operate numerical controlled machine tools and Electrical Discharge machines.
9	Tool and Die Making	Tool and die making operations, special hand/power tools and assembly procedures.

Schedule 2

TOOL AND DIE MAKER

Work Experience Training

ITEM	COLUMN 1	COLUMN 2
	Unit of Study	Instruction to be given
1	Safety	Knowledge and application of safe work practices; recognition of hazards and precautionary measures.
2	Shop Techniques/ Practices	Care and use of hand, bench and portable power tools, jigs and fixtures, precision measuring equipment. Application of tool geometry, twist drills, tool bits, cutters and abrasives, edges, clearances and angles.
3	Power Saws	Machine nomenclature, care and use of reciprocating, circular band, vertical cut-off saws. Speeds and feeds. Coolants. Blade replacement.
4	Radial and Drill Presses	Set up and operation, speed, feed and coolant. Function and purpose; i.e., drilling, countersinking, spot facing, reaming, boring, counter-boring, lapping, polishing, tapping, grooving, flycutting.
5	Lathes	Set up and operation, use of accessories, speed, feed, coolants, centering, drilling, turning, boring, counter-boring, reaming, threading, tapping, knurling tapers, lapping.
6	Pantograph Milling Machine	Set up and operate Pantograph, engraving cutters, copy mill contoured surfaces, engrave symbols.
7	Duplicator Milling Machine	Set up and operate Duplicator, copy mill contoured surfaces.
8	Metal Filing Machine	Set up and operate Filer, select file, machine file surfaces/shapes.
9	Numerical Controlled Machines	Program, set up and operate numerically controlled machine tools.
10	Electrical Discharge Machine	Develop electrodes, set up and operate electrical discharge machine, discharge machine surfaces/shapes.
11	Hand/Power Tools Operation	Select and use portable hand/power devices to drill, grind, polish, burr, hone surfaces, shapes and holes.
12	Mechanical Assembly	Assemble keyed, dowelled, force fitted, slide/locational fitted, and running fitted components. Assemble rack/pinion, cam/follower combinations.
13	Tool and Die Making Operations	Read Tool and Die Component and Assembly and part/producer prints including tables/charts. Calculate Tool and Die Related Values. Select Tool Steels. Read jig and fixture component prints, assembly prints, part/product prints. Lay out jig and fixture components and details. Set up punch press. Assemble jigs and fixtures. Assemble press Dies. Operate punch press. Try out dies. Develop blanks. Select abrasive hand stones. Select polishing abrasive powders/compounds. Select abrasive powder/compound hand applicators. Select abrasive powder/compound hand/power applicators/hand power finish die surfaces. Hand finish Die surfaces. Torch flame harden and temper dies.

ITEM	COLUMN 1	COLUMN 2
	Unit of Study	Instruction to be given
14	Milling Machines	Horizontal, Vertical, Universal, Ram and Turret Type. Horizontal Boring Mill and accessories. Set up and operation, speed, feed, coolants, work piece holding, mounting, milling operations, keyways, angles, splines, slots, gears, cams, contour spirals.
15	Grinders and Grinding Accessories	Horizontal Surface, Cylindrical, Universal, Tool and Cutter. Set up and operation, speed, feed, coolants, wheel and form dressing, machine grinding.

O. Reg. 868/80, Sched. 2.

REGULATION 61

under the Apprenticeship and Tradesmen's Qualification Act

TRANSMISSION MECHANIC

1. In this Regulation,

- (a) "certified trade" means the trade of transmission mechanic;
- (b) "motor vehicle" means a vehicle propelled by an internal combustion engine, or a vehicle operated or controlled from a vehicle propelled by an internal combustion engine, that is registered for use on a highway under the *Highway Traffic Act* and is used primarily for the transport of persons, equipment or goods but does not include a vehicle,
 - (i) operated only on rails,
 - (ii) used for transportation solely within an employer's actual place of business, or
 - (iii) used for farming operations but not used for carrying a load;
- (c) "transmission mechanic" means a person engaged in the repair and maintenance of motor vehicles who inspects, maintains and repairs motor vehicle transmissions. R.R.O. 1970, Reg. 49, s. 1.

2. The trade of transmission mechanic is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 49, s. 2.

3. An apprentice training program for the certified trade is established and shall consist of,

- (a) training and instruction at full-time educational day classes provided at a College of Applied Arts and Technology or in classes that, in the opinion of the Director, are equivalent thereto; and
- (b) in practical training and instruction provided by an employer of the apprentice,

in the subjects contained in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 49, s. 3.

4.—(1) Subject to subsections (2) and (3), an apprentice shall complete three periods of training and instruction of 1800 hours per period.

(2) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma or has Ontario Grade 12 standing in English, Mathematics and Science or has such other academic qualification that, in the opinion of the Director, is equivalent thereto, he shall complete three periods of training and instruction of 1600 hours per period.

(3) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma majoring in auto mechanics or has such other academic qualification that, in the opinion of the Director, is equivalent thereto, he shall complete three periods of training and instruction of 1200 hours per period. R.R.O. 1970, Reg. 49, s. 4.

5. Any person who,

- (a) applies in the prescribed form for apprenticeship in the certified trade; and
- (b) becomes an apprentice in the certified trade within three months after commencing to work in that trade,

is exempt from subsection 11 (2) of the Act. R.R.O. 1970, Reg. 49, s. 5.

6. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

- (a) 50 per cent during the first period of training and instruction;
- (b) 70 per cent during the second period of training and instruction; and
- (c) 90 per cent during the third period of training and instruction,

of the average rate of wages for journeymen employed by the employer in that trade or, where the employer is the only journeyman employed, of the average rate of wages for journeymen in the area. R.R.O. 1970, Reg. 49, s. 6.

7. The subjects of examination for an apprentice are the subjects set out in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 49, s. 7.

Schedule

TRANSMISSION MECHANIC

PART 1

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics	Arithmetic	Addition, subtraction and division of whole numbers and fractions, ratio and proportion, areas and volumes.
		Geometry	Lines, planes and angles.
2	Science	Physics Mechanics	Basic laws and principles, formulae. (Given as required in shop instruction.)
3	English	Basic Usage and Business Communications	Trade terminology and usage. Letter and report writing. Work and parts orders. Interpretation and use of manufacturers' manuals.
4	Drafting	Basic Drafting and Interpretation	Preparation of elementary working drawings and dimensioned sketches of automotive components. Interpretation of exploded drawings, electrical and hydraulic circuits and schematics used in manufacturers' manuals.
5	General Shop Practice	Safety	Safety rules and safe operating procedures. First aid. Fire prevention. Use and maintenance of fire-fighting equipment. Handling of gasoline, oils and cleaning solvents. Danger of carbon monoxide fumes. Correct use of lifting and hoisting equipment. Good housekeeping.
		Hand Tools	Selection and use of hammers, punches, chisels, pliers, wrenches, sockets, screwdrivers, hacksaws, files, drifts, scrapers, snips, clamps, vises, drill bits, reamers, taps and dies. Stud extractors. Hones.
		Power Tools	Care and use of portable air and electric drills, grinders and impact tools.
		Benchwork Operations	Cutting with hacksaw, filing, scraping, drilling; use of drill press. Use of benchgrinder; grinding of drill bits, chisels, etc. Fitting bushings, honing, cutting and flaring tubing. Soldering. Gasket making. Oxy-acetylene and arc welding and cutting. Brazing techniques. Care and maintenance of welding equipment.
		Measuring Instruments	Use of rules, straight edges and squares. Feeler gauges, calipers, verniers, micrometers, telescopic gauges, dial indicators and pressure gauges.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Fastening Devices	Types of bolts, nuts, studs, screws, and tube fittings. Thread identification and classification. Tensile strengths. Installation procedures. Tightening torques. Cutting internal and external threads. Removing broken studs. "Heli-Coil" inserts.
			Types of rivets, keys, springs, flat and lock washers, snap rings, circlips, cotter pins. Installation and removal. Thread lubricants, sealers and locking compounds.
		General Shop Equipment	Types, purpose, capacities and correct usage of floor cranes, hoists, jacks, stands, hydraulic presses, pullers. Operation and maintenance of degreasing and steam-cleaning equipment.
6	Internal Combustion Engines	Principles and Types	Principles of operation. 2 stroke and 4 stroke cycles. Engine types—single and multi-cylinder. Inline, "V" types, slanted, horizontal, etc.
		Engine components	Function of major engine components. Heat dissipation, effects of cylinder wear and defective valves on engine performance. Vacuum and compression tests.
		Lubrication Systems	Types and function of lubricating systems. Characteristics of lubricants: Detergent, non-detergent. S.A.E. viscosity ratings, A.P.I. classification. Additives.
		Cooling Systems	Air and liquid cooled systems. Temperature indicating and controlling devices. Automatic transmission coolers. Purpose, testing and hazards of pressurized systems. Coolant, additives, sealers and anti-freeze.
		Fuel Systems	Principles of carburetor operation, circuits and systems. Operating characteristics of an engine attributable to the carburetor. Effects of carburetor adjustments on engine performance and automatic transmission operation. Use of tachometers and vacuum gauges. Engine speed settings; adjustments to operating linkage and effect on automatic transmission operation. Effects of dash pots, throttle return checks, anti-stall devices on engine operation.
		Fuel Injection Systems	Principles of operation. Differences between gasoline and diesel systems. Shutting down runaway engines.
		Fuel Systems (Liquefied Petroleum Gas)	Types, characteristics, use and operation of L.P.G. systems.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
7	Electrical Systems	Basic Electricity	Definition of amperes, voltage, resistance, Ohm's Law. Electron flow, electro-magnetism. Series and parallel circuits. Voltage drop. Use of voltmeters, ammeters and ohmmeters. Conductors and insulators.
		Automotive Electrical Circuits	Automotive wire and cables. Insulation materials. Joining, splicing and soldering wires and cables. Removal and installation of terminals, connectors and plugs. Effects of temperature, shorts, grounds, poor connections. Resistances and fuses. Identification, tracing and testing of circuits.
		Batteries	Principles, and function of lead acid batteries. Inspection and testing. Charging methods; hazards involved.
		Primary Circuit Switches and Resistors	Types, function and characteristics. Safety features—automatic transmission protection.
		Primary and Secondary Circuits	Equipment and procedures for testing primary and secondary circuits. Effects of defective primary and secondary circuits on vehicle operation. Effects of suppression equipment on tests.
		Starter Motors	Motor solenoids and switches. Solenoid circuits. Neutral safety switch.
8	Power Trains	Clutches	Characteristics and construction features; single plate, multi-plate. Function of controls: mechanical, hydraulic, vacuum, air and electrically operated. Adjustments. Removal, disassembly, inspection and overhaul of clutches and components. Cleaning methods. Assembly lubricants. Clutch reinstallation. Aligning procedures. Control adjustment. Clearances. Testing.
		Standard Transmissions	Characteristics of spur gears, planetary gears (over-drives). Synchronizing mechanisms, over-running clutches, dog clutches and internal shift mechanisms. Characteristics of manual shift transmissions (passenger and commercial vehicles), over-drive units, and auxiliary transmissions. Gear ratios. Transmission control mechanisms; direct, remote and assist mechanisms. Servicing and adjusting. Lubrication. Oil sealing and venting. Removal of transmissions and controls. Construction features of transmission components. Overhauling transmissions, linkages and controls. Cleanliness. Inspection procedures. Serviceability of parts and components. Maintaining operating relationship of parts. Gear and spline fits. Reinstallation and adjusting controls. Testing.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Automatic Transmissions	Characteristics and construction features of automatic transmissions. Transmission cooling. Mechanical, electrical, vacuum operated controls. Principles of operation of planetary gears, friction clutches, over-running clutches, servos, bands and drums, fluid couplings and torque converters. Hydraulic components and circuits. Transmission fluids. Draining, refilling, and level checking procedures. Oil seals and vents. Shop test procedures; performance characteristics: shifting, non-shifting. Specifications. Band and linkage adjustments, control settings, checking external connections and fluid levels prior to tests. Effects of defective engines, related components and worn parts on transmission operation. Tools and testing equipment. Pressure testing transmission oil circuits; interpretation of results. Locating fluid leaks. Fluid characteristics due to burnt clutch or band linings. Air testing transmission circuits and units with controls partially disassembled. Stall testing transmissions. Testing oil—coolers. Effects of leaks. Results of introducing air into pressure circuits. Overhauling automatic transmissions. Pre-disassembly inspection. Removal and replacement. Tools and equipment for handling and lifting automatic transmissions. Gauges and test equipment. Marking and protecting parts during disassembly. Cleanliness. Cleaning solvents. Inspection of parts. Tolerance specifications. Fits and clearances. Torquing procedures. Air testing components on reassembly. Road and dynamometer tests.
		Drive Shafts	Characteristics of open drive shafts, support bearings, universal joints, slip joints and enclosed drive lines. Disassembly, overhaul or relubing, reassembly and installation. Torquing. Effects of imbalance.

PART 2

Work Instruction and Experience

Item	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	General Shop Practice	General	Safety rules and removal of all safety hazards. Use of hand and power tools, measuring instruments, fastening devices, general shop equipment. Bench-work operations. (As detailed in Part 1.)

Item	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
2	Internal Combustion Engines	Engine Operation	Familiarization with characteristics of correctly functioning engines. Use of dynamometers, analyzing and test equipment and road tests to diagnose engine malfunction and faults in cooling, fuel and electrical systems, affecting power assisted clutch—standard transmission operation, automatic transmission operation, for corrective action.
3	Power Trains	Clutches	Single and multiplate; mechanical, hydraulic, vacuum, air and electrically operated controls; servicing and adjustment. Removal, disassembly, cleaning, inspection, overhauling and reinstallation. Control adjustments and clearances. Testing.
		Standard Transmissions	Standard transmissions; direct and remote controls, power assist mechanisms, over-drives, auxiliary drives. Servicing and adjustment. Removal, disassembly, cleaning, inspection, overhaul and reinstallation. Control adjustments. Lubrication. Testing.
		Automatic Transmissions	Shop testing; preliminary band and linkage adjustments; mechanical, electrical and vacuum control settings; checking of external connections and fluid levels. Familiarization with performance characteristics and specifications. Pressure testing transmission oil circuits; locating fluid leaks; interpretation of results. Air testing circuits and units (controls, partially disassembled). Testing oil coolers. Stall testing automatic transmissions. Transmission removal. Pre-disassembly inspection. Disassembly, cleaning, inspection and overhaul procedures for planetary gears, friction clutches, over-running clutches, servos, bands and drums, fluid couplings, torque converters and hydraulic components. Torquing procedures. Air testing components on reassembly. Reinstallation of transmissions; control adjustments and settings. Road and dynamometer testing.
		Drive Shafts	Open drive shafts, support bearings, universal joints, slip joints. Enclosed drive lines. Removal, disassembly, overhaul, reassembly and reinstallation. Torquing.

REGULATION 62

under the Apprenticeship and Tradesmen's Qualification Act

TRUCK-TRAILER REPAIRER

1. In this Regulation,

- (a) "certified trade" means the trade of truck-trailer repairer;
- (b) "truck-trailer" means any type of trailer vehicle, including a single or multi-axle semi-trailer whereby part of the load is carried on the tractor unit by means of the upper and lower coupler assembly, and a full load bearing trailer, normally hauled by a truck unit, that is registered for use on a highway under the *Highway Traffic Act* and is used primarily for the transport of equipment or goods but does not include a vehicle,
 - (i) used for transportation solely within an employer's actual place of business, or
 - (ii) used for farming operations but not used for carrying a load;
- (c) "truck-trailer repairer" means a person engaged in the repair and maintenance of truck-trailers who,
 - (i) disassembles, adjusts, repairs and re-assembles suspension systems, including bogies, axles, wheels, and rims, brake systems and electrical systems,
 - (ii) inspects, repairs and realigns frames,
 - (iii) inspects and repairs appurtenances such as tow-bars, hitches, turntables, landing gear and upper couplers, and
 - (iv) inspects, tests, adjusts, overhauls and replaces truck-trailer refrigeration system components, electrical circuits, pressure lines and fittings, and installs and removes truck-trailer refrigeration systems. R.R.O. 1970, Reg. 50, s. 1.

2. The trade of truck-trailer repairer is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 50, s. 2.

3. An apprentice training program for the certified trade is established and shall consist of,

- (a) training and instruction at full-time educational day classes provided at a College of Applied Arts and Technology or in classes

that, in the opinion of the Director, are equivalent thereto; and

- (b) practical training and instruction provided by an employer of the apprentice,

in the subjects contained in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 50, s. 3.

4.—(1) Subject to subsection (2), an apprentice shall complete three periods of training and instruction of 1800 hours per period.

(2) Where the apprentice is the holder of an Ontario Secondary School Graduation Diploma or has Ontario Grade 12 standing in English, Mathematics and Science or has such other academic qualification that, in the opinion of the Director, is equivalent thereto, he shall complete three periods of training and instruction of 1600 hours per period. R.R.O. 1970, Reg. 50, s. 4.

5. Any person who,

- (a) applies in the prescribed form for apprenticeship in the certified trade; and
- (b) becomes an apprentice in the certified trade within three months after commencing to work in that trade,

is exempt from subsection 11 (2) of the Act. R.R.O. 1970, Reg. 50, s. 5.

6. The rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular hours shall not be less than,

- (a) 50 per cent during the first period of training and instruction;
- (b) 70 per cent during the second period of training and instruction; and
- (c) 90 per cent during the third period of training and instruction,

of the average rate of wages for journeymen employed by the employer in that trade or, where the employer is the only journeyman employed, of the average rate of wages for journeymen in the area. R.R.O. 1970, Reg. 50, s. 6.

7. The subjects of examination for an apprentice are the subjects set out in Parts 1 and 2 of the Schedule. R.R.O. 1970, Reg. 50, s. 7.

Schedule

TRUCK-TRAILER REPAIRER

PART 1

In-School Training

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics	Arithmetic	Addition, subtraction and division of whole numbers and fractions, ratio and proportion, areas and volumes.
		Geometry	Lines, planes and angles.
2	Science	Physics Mechanics	Basic laws and principles, formulae. (Given as required in shop instruction.)
3	English	Basic Usage and Business Communications	Trade terminology and usage. Letter and report writing. Work and parts orders. Interpretation and use of manufacturers' manuals.
4	Drafting	Basic Drafting and Interpretation	Preparation of elementary working drawings and dimensioned sketches of automotive components. Interpretation of exploded drawings, electrical and hydraulic circuits and schematics used in manufacturers' manuals.
5*	General Shop Practice	Safety	Safety rules and safe operating procedures. First aid. Fire prevention. Use and maintenance of fire-fighting equipment. Handling of gasoline, oils, paints, thinners and solvents. Danger of carbon monoxide fumes. Correct use of lifting and hoisting equipment. Good housekeeping.
		Hand Tools	Selection and use of hammers, punches, chisels, pliers, wrenches, sockets, screwdrivers, hacksaws, files, drifts, scrapers, snips, clamps, vises, drill bits, reamers, taps and dies. Stud extractors. Hones. Care and use of wood-working tools—saws, planes, mallets, chisels, wood drill bits, rasps. Care and use of body-working tools—hammers, dollies, picks, panel cutters, body-files. Paint brushes, spray guns.
		Power Tools	Care and use of portable air and electric drills, screwdrivers, grinders, disc sanders, orbital sanders, belt sanders, impact tools, nibblers, skil-saws.
		Benchwork	Cutting with hacksaw, filing, scraping, drilling wood and metal; use of drill press. Use of bench grinder; grinding drill bits, chisels. Fitting bushings, honing, cutting and flaring tubing. Soldering, gasket making. Oxy-acetylene and arc welding and cutting. Brazing techniques. Care and maintenance of welding equipment.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Measuring Instruments	Use of rules, straight edges, squares, feeler gauges, calipers, verniers, micrometers, telescopic gauges, dial indicators, pressure gauges, trammel gauges.
		Fastening Devices	Types of bolts, nuts, studs, screws and tube fittings. Thread identification and classification. Tensile strengths. Installation procedures. Tightening torques. Cutting internal and external threads. Removing broken studs. "Heli-Coil" inserts. Types of rivets, keys, springs, flat and lock washers, snap rings, circlips, cotter pins. Installation and removal. Thread lubricants, sealers and locking compounds.
		General Shop Equipment	Capacities and correct usage of floor cranes, hoists, jacks, stands, pullers, hydraulic presses, power hacksaws; circular and cut-off saws, bandsaws, jointers and planers. Lumber selection and storage. Sawing, ripping, planing, jointing, shiplapping. Maintenance of equipment. Operation and maintenance of steamcleaning and degreasing equipment and air compressors.
6	Truck-Trailer Suspension Systems	Suspensions	Types and characteristics. Leaf-spring, torsion bar, rubber and air cushion; single, tandem and multi-axle. Hangers and suspension control rods, articulated torque beams, compensators, trunnion pivots. Trimming suspension mountings. Overhauling suspensions and related components. Assembly realignment. Removing and installing compressed springs and related parts. Replacing bushings; maintaining preloading. Removing and installing torsion bars. Torquing suspension components. Lubrication. Handling heavy preloaded components.
		Trailer Axles	Types and characteristics. Semi and full load bearing trailers. Towbars, hitches and turn-tables. Landing gear. Inspection. Effects of misalignment, incorrect tire sizes and pressures on trailer operation. Removing, overhauling and installing axles and related components; towbars, hitches, turn-tables and landing gear. Hazards involved.
		Axle Bearings	Types and characteristics. Removing, relubing, replacing, adjusting or torquing. Characteristics of oil seals. Replacement methods.
		Wheels and Rims	Types and characteristics. Single and duals. Wheel and rim removal and installation. Wheel wrenches. Handling heavy wheel and tire assemblies. Wheel to hub fastening and locating devices. Inspecting and servicing wheels and rims. Permissible run-out.
		Tires and Tubes	Types, characteristics; size and application. Demounting and mounting. Equipment and lubricants used. Repair of tires, tubes and valves. Tire in-

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
			flation precautions. Inspection; identification of tire wear, damage and faults; effects of misalignment. Tire rotation. Retreaded tires.
7	Truck-Trailer Frames	Standard Trailer Frames	Types, construction, materials and characteristics of semi-trailer and trailer frames. Effects of damaged frames. Inspection. Measuring tools and equipment; straightening and alignment equipment. Frame realignment methods and hook-ups. Cross-member replacement techniques. Methods of riveting, welding and bolting frame members. Reinforcement and bracing. Removal and installation of 5th wheel pin. Heat straightening frame members. Effects of improper repair or modification of frames. Hazards of improper use of equipment.
		Unitized Construction	Types and characteristics of unitized body-frames and suspension mountings. Unitized frame damage. Inspection. Measuring tools and equipment. Effects of underbody damage on tractor-trailer operation. Use of straightening and alignment equipment. Replacement and realignment of underbody sections. Heat straightening. Sealing, painting and insulating after repairs.
8	Truck-Trailer Brake Systems	Trailer Brakes	Types, function and principles of brake actuating devices and brake operating systems; vacuum suspended, air, air-hydraulic, electric. Operation of system components; air compressors, reservoirs; emergency relay valves, treadle controls, limiting quick release valves, 2-way valves, tractor protection valves, checkvalves, low pressure indicators, flexible hoses and fittings. Operation of brake assemblies; brake chambers(piston and diaphragm), slack adjusters, brake shoes and linings, combination linings, anchor pins, camshafts and rollers, actuating wedges. Effects of defective trailer brakes. Inspection, overhaul, reassembly, adjustment and testing of brake assemblies and systems. Servicing intervals. Checking for external leaks. Reassembly lubrication. Relining brake shoes. Reconditioning brake drums.
9	Truck-Trailer Electrical Systems	Basic Electricity	Definition of amperes, voltage, resistance, Ohm's Law. Electron flow. Electro-magnetism. Typical series and parallel circuits. Voltage drop. Use of voltmeter, ammeter and ohmmeter. Conductors and insulators. Ground circuits.
		Truck-Trailer Electrical Circuits	Automotive wire and cables. Insulation materials. Joining, splicing and soldering of wires and cables. Removal and installation of terminals, connectors and plugs. Effects of temperature, shorts, grounds, poor connections, etc. Resistances and fuses. Identification, tracing and testing of circuits.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		Lights	Commercial vehicle lighting regulations. Characteristics of lights. Type and rating of bulbs. Candle power and wattage. Lenses and holders. Signal lights; flasher units. Vapour-proof lights. Replacement procedures.
		Batteries	Characteristics and function of lead acid batteries. Inspecting and testing. Use of voltmeters, ammeters, load resistances and hydrometers. Battery charging. Charging equipment. Charging and handling hazards.
10	Truck-Trailer Body Repair (Basic)	General Construction	Types, construction, materials and characteristics of truck-trailer bodies; platform, stake, van, dump, tanker and bulk carrier.
		Platform Bodies	Repairs to front bulkhead and floors.
		Stake Bodies	Replacement of stakes. Repairs to racks. Replacement of hinges and latches. Floor repairs. Repairs to ridge-poles. Minor tarp repairs.
		Vans	Removal and replacement of exterior mouldings and trim. Panel repairs; patching methods; use of sheet metal screws or "blind" rivetting. "Cold-filling" damaged panel areas; filler materials, hardeners, application and finishing. Panel replacement; cutting, forming and installation. Repair or replacement of pillars and rails; square tube and top-hat sections. Repair or replacement of door hinges, bolts and locking assemblies. Rehang and adjusting doors. Replacing weather-stripping, insulation and lining panels. Floor repairs.
		Dump Boxes	Repair and reinforcement of bodies and tail gates. Repair or replacement of tail gate hinges, locking and spreader mechanisms. Servicing and overhaul of hydraulic dumping gear.
		Tankers and Bulk Carriers	Hazards involved in "hot" welding repairs to tankers or bulk carriers used for flammable, explosive, poisonous or corrosive liquids and materials. Repairs to be made by authorized personnel only, where cleaning facilities and test equipment are available.
		Priming and Touch-up	Priming and touch-up procedures for repaired areas.
11	Truck-Trailer Refrigeration Equipment	Refrigeration Principles	Heat transfer; conduction, convection, radiation. British thermal units. Latent heat of vaporization; effects of liquid change to vapor and vapor to liquid. Effects of pressure on boiling point and condensation. Refrigerant. The basic refrigeration system. Air induction and condensation removal systems.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
		System Components	Types, characteristics and operation. Drive units, compressors and clutch drives, condensers, receivers, expansion valves, evaporators, control valves, thermostatic controls, blowers, electrical circuits. Refrigerant (Freon—12), refrigeration oils, pressure lines and fittings.
		Inspection and Maintenance	Safety precautions and correct use of safety equipment. Inspection, testing, adjustment, overhaul and replacement procedures. Use of gauges and test equipment. Importance of exercising systems. Oil level checks and replenishment procedures. Testing for leaks. Purging, evacuating and recharging procedures. Procedures for installation and removal of truck-trailer refrigeration systems.

PART 2

Work Instruction and Experience

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	General Shop Practice	General	Safety rules and removal of all safety hazards. Use of hand and power tools, measuring instruments, fastening devices and general shop equipment. Benchwork operations. Lumber selection and storage; sawing and machining. (As detailed in Part 1.)
2	Truck-Trailer Suspension Systems	Suspensions	Leaf spring, torsion bar, rubber and air cushion types; single, tandem and multi-axle. Inspection and servicing. Disassembly, overhaul and reassembly of suspension systems and related components. Torquing and realignment. Trimming dimensions. Lubrication.
		Trailer Axles	Trailer axles, towbars, hitches, turn-tables, landing gear. Inspection and servicing. Disassembly, overhaul and reassembly. Lubrication.
		Axle Bearings	Removal, inspection, relubing or replacing, adjusting or torquing. Oil seal replacement.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		Wheels and Rims	Inspection and servicing. Removal and installation. Checking run-out.
		Tires, Tubes and Valves	Inspection. Identification of tire wear, damage and faults. Demounting and mounting tires. Inflation precautions. Repairs. Tire rotation.
3	Truck-Trailer Frames	Standard Trailer Frames	Inspection. Frame straightening and alignment. Cross member replacement. Rivetted, welded and bolted repairs to frames. Reinforcing and bracing frames. Heat straightening. Replacement of 5th wheel pins.
		Unitized Construction	Inspection. Straightening and alignment. Replacement and realignment of underbody sections. Heat straightening; sealing, insulating and painting after repairs.
4	Truck-Trailer Brake Systems	Trailer Brakes	Vacuum suspended, air, air-hydraulic, electric, operated systems. Inspection and servicing. Overhaul, repair or replacement of brake systems and assemblies; brake chambers, slack adjusters, brake shoes and linings, anchor pins, camshafts and rollers, wedges, flexible hoses and fittings. Relining brake shoes and reconditioning brake drums. Adjusting and testing systems.
5	Truck-Trailer Electrical Systems	Electrical Circuits and Lights	Identification, tracing and testing of trailer circuits. Replacing lights, bulbs, wiring, terminals, connectors and plugs.
		Batteries	Inspection—testing and charging. Charging hazards.
6	Truck-Trailer Body Repair (Basic)	Platform Bodies	Repairs to front bulkhead and floor, etc.
		Stake Bodies	Replacement of stakes; repairs to racks. Replacement of hinges and latches. Floor repairs. Repairs to ridge poles. Minor tarp repairs.
		Vans	Removal and replacement of mouldings and trim. Panel repairs; patching and "cold-filling" of damaged areas. Panel replacement. Repair or replacement of pillars or rails. Repair or replacement of door hinges, bolts and locking assemblies. Door re-hanging and adjustment. Replacing weather-stripping, insulation and lining panels. Floor repairs.
		Dump Boxes	Repair and reinforcement of boxes and tailgates. Repair or replacement of tailgate hinges, locking and spreader mechanisms. Servicing and overhaul of hydraulic dumping gear.
		Priming and Touch-up	Priming and touch-up of repaired areas.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		Tankers and Bulk Carriers	Hazards involved in "hot" welding repairs. Repairs to be made by authorized personnel only, where cleaning facilities and test equipment are available.
7	Truck-Trailer Refrigeration Equipment	Inspection and Maintenance	Familiarization with safety precautions and use of safety equipment. Inspection, testing, adjustment, overhaul or replacement of drive units, compressors and clutch drives, condensers, receivers, expansion valves, evaporators, control valves, thermostatic controls, blowers, electrical circuits, pressure lines and fittings, refrigerant. Oil level checks and replenishment. Purging, evacuating and recharging operations. Installation and removal of truck-trailer refrigeration systems.

R.R.O. 1970, Reg. 50, Sched.

REGULATION 63

under the Apprenticeship and Tradesmen's Qualification Act

WATCH REPAIRERS

1. In this Regulation,

- (a) "certified trade" means the trade of watch repairer;
- (b) "watch repairer" means a person who,
 - (i) makes or fits parts for time-pieces,
 - (ii) repairs, alters, takes apart, assembles or reassembles time-pieces or any part thereof,
 - (iii) determines the condition of time-pieces and estimates the repairs necessary,
 - (iv) cleans, polishes or lubricates time-piece movements or any part thereof, or
 - (v) tests, adjusts or regulates time-pieces or any part thereof. R.R.O. 1970, Reg. 51, s. 1.

2. The trade of watch repairer is designated as a certified trade for the purposes of the Act. R.R.O. 1970, Reg. 51, s. 2.

3.—(1) An apprentice training program for the certified trade is established and shall consist of,

- (a) training and instruction at full-time educational day classes provided at a College of Applied Arts and Technology or in courses that, in the opinion of the Director, are equivalent thereto, in the subjects contained in Schedule 1; and
- (b) practical training and instruction provided by the employer of the apprentice in the subjects contained in Schedule 2.

(2) An apprentice shall complete three periods of training and instruction of 1,800 hours per period. R.R.O. 1970, Reg. 51, s. 3.

4.—(1) The graduate of a course in which the candidate is required to attend full-time educational day classes provided at a College of Applied Arts and Technology for a period of three years or courses that, in the opinion of the Director, are equivalent thereto, may be excused from complying with the provisions of section 3 and upon passing the examination referred to in section 6 shall be granted a certificate of qualification.

(2) The graduate of a course in which the candidate is required to attend full-time educational day classes provided at a College of Applied Arts and Technology for a period of two years or courses that, in the opinion of the Director, are equivalent thereto, may be enrolled as an apprentice and upon enrolment shall complete one period of training and instruction and may be excused from all or such part of the training and instruction referred to in clause 3 (1) (a) as the Director prescribes.

(3) A person who has completed a portion of a course in which he is required to attend full-time educational day classes provided at a College of Applied Arts and Technology for a period less than two years or courses that, in the opinion of the Director, are equivalent thereto, may be enrolled as an apprentice and upon enrolment shall complete such training and instruction as the Director prescribes. R.R.O. 1970, Reg. 51, s. 4.

5. The hourly rate of wages for an apprentice in the certified trade whether for his regular daily hours or for hours in excess of his regular daily hours shall not be less than,

- (a) 40 per cent during the first period of training and instruction;
- (b) 60 per cent during the second period of training and instruction; and
- (c) 80 per cent during the third period of training and instruction,

of the average hourly rate of wages for journeymen employed by the employer in the trade or, where the employer is the only journeyman employed, of the average hourly rate of wages for journeymen in the area. R.R.O. 1970, Reg. 51, s. 5.

6. The subjects of examination for a certificate of qualification are the subjects contained in schedules 1 and 2. R.R.O. 1970, Reg. 51, s. 6.

7. The number of apprentices who may be employed by an employer in the certified trade shall not exceed,

- (a) where the employer is a journeyman in the certified trade, two apprentices plus an additional two apprentices for every journeyman employed in the certified trade and with whom the apprentices are working; and

(b) where the employer is not a journeyman in the certified trade, two apprentices for every journeyman employed by the em-

ployer in the certified trade and with whom the apprentices are working. R.R.O. 1970, Reg. 51, s. 7.

Schedule 1

WATCH REPAIRER

In-School Training

Item	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
1	Mathematics (Trade Related)	Arithmetic	Addition, subtraction, multiplication, division. Fractions, decimals, percentage, interest and discount.
		Business Mathematics	Fundamental operations. Basic bookkeeping, balance sheets, financial statements. Retailing, insurance, taxes, licensing, leases.
		Geometry	Lines, planes and angles.
2	Language and Communication	Composition	Grammar, sentence and paragraph structure. Written and oral composition.
		Basic Usage and Business Communications	Trade terminology and usage. Letter and report writing. Work and parts orders; interpretation and use of manufacturers' parts catalogues.
3	Science	Physics	Basic laws and principles, formulae. (Given as required in shop instruction)
4	General Shop Practice	Safety	Safety rules and safe operating procedures. First aid. Fire prevention. Use and maintenance of fire-fighting equipment. Handling and storage of acids, oils, cleaning solvents and toxic materials. Good housekeeping.
		Hand Tools	Care and use of general purpose and hairspring tweezers, general purpose and jewel screwdrivers, smooth or knurled-jaw pliers and cutters, loupes; staking, jewellery and poisoning tools, non-magnetic tweezers, files, gravers, drills, taps and dies. Tool sharpening and dressing procedures.
		Power Tools	Care, use and maintenance of watchmaker's lathes; cutting tools, accessories, polishing and grinding laps.
		Measuring Instruments	Care and use of micrometers, vernier gauges, trueing calipers.
		Shop Equipment	Care, use and maintenance of agitator and ultra-sonic cleaning machines. Drill presses and attachments. Demagnetizers. Microscopes. Crystal fitting machines. Timing and electronic test equipment. Waterproof watch case-openers and test equipment.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
5	Watch and Clock Theory	Principles and Design	Watch and clock history. Principles of watch mechanical designs; winding and setting mechanisms and main springs, including self-winding types; gear trains, escapements, balance wheels and hairsprings, jewelled and plain bearings, plates and bridges. Principles and designs of electric and electronic watches. Principles and designs of clock movements.
		Construction and Operation	Types and characteristics; cases, dials, movements, crystals, crowns, and hands. Waterproof, non-waterproof, self-winding, calendar, chronograph, electric and electronic types.
6	Watch Repair Practice	Dismantling	Identification of watch type, required tools and dismantling sequence. Care and precautions. Stem and crystal removal procedures for all types. Removal procedures for hands and dial, automatic winding assemblies, balance and escapement assemblies, barrel and train assemblies. Chronographs, electric and electronic types. Reference to manufacturers' specifications.
		Malfunctions	Identification and recognition of faults; required adjustments, worn, loose, damaged, broken, poorly fitted or incorrect parts, rust, foreign matter, insufficient or over-lubrication.
		Parts Replacement	Identification and knowledge of interchangeability of parts and components by use of part numbers and parts catalogues for: balance staff, stem and crown, main spring, escapement assembly, jewels, gear trains, electronic assembly, dial, hands and crystal, power unit, calendar unit and dial train. Repair kits.
		Lathe Work	Watchmakers' lathe set-up and operation. Grinding cutting tools. Procedures and techniques for parts alterations and polishing. Removal and fitting of balance staff. Stem alterations. Parts fitting techniques; tolerances and adjustments.
		Parts Fitting	Tool selection, techniques and procedures for drilling-out broken screws and case lugs. Reaming plates, bushings and hands. Staking balance staff, roller and hairspring to the balance; staking staff to pallets, staking jewels. Shellacking roller and pallet jewels. Polishing and burnishing pivots.
		Crystals	Techniques and procedures for grinding, filing and fitting round or fancy glass or unbreakable crystals. Use of cements or sealants for waterproof types.
		Cleaning Operations (Movements)	Procedures and techniques for machine and ultra-sonic cleaning. Cleaning solvent types and cleaning durations. Rinsing; solvent effects of rinses on

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
			jewel shellac; care and precautions to be taken. Drying procedures; precautions against overheating. Use of peg and pith wood.
		(Dials)	Recognition of dial type and applicable cleaning technique; brushing, light wiping, art gum use and dipping methods.
		(Cases)	Cleaning by buffing, polishing and burnishing operations. Ultrasonic cleaning methods. Use of cleaning solutions.
		Lubrication	Watch lubricant types. Oiler types, lubrication points and techniques; precision application and amount, progressive reassembly and final assembly lubrication.
		Preassembly Adjustments	Techniques and procedures for trueing and poising balance and polishing pivots.
		Watch Reassembly	Techniques, tools and required assembly sequence and operations. Testing and checking parts functioning during assembly. Assembly and final lubrication. Importance of finished appearance of dial, hands and case.
		Watch Adjustment	Techniques for balance assembly adjustment. Trueing hairsprings in the flat and in the round. Trueing regulator pins. Escapement assembly; pallet adjustment techniques. Run, lockslide and safety roller action. Use of specialized test equipment for electric and electronic watches. Adjustment techniques for hands, dial and movement to case.
		Regulation	Checking by timing in shop. Use of electric timing machine to measure errors in rate, position, beat and magnetism. Adjustment techniques for position regulator, timing screws, regulator pins, hairspring length. Electronic watch regulation techniques, phasing, positioning of tuning-fork regulators. Use of manufacturers' specifications.
		Waterproofing	Recognition of snap, screw-back and one-piece type waterproof cases. Inspection procedures for fit of crystal to case, fit of crown and pendant, condition of gasket and fit of back to case. Reassembly techniques and use of correct casing tools. Application of silicone grease. Use of immersion test equipment for tightness and pressure.
7	Clock Repair Practice	Adjustments	Recognition of clock types and malfunctions. Procedures and techniques to set-up and adjust; pendulum, alarm, strike and chime types.
8	Estimating	Procedure	Inspection and recognition of malfunction; economics of repairs. Listing parts or components for replace-

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Instruction To Be Given
			ment by name and part number. Estimating labour costs based on current or association rates. Handling costs and overheads. Profit mark-up. Validity of repairs and guarantees. Customer relations.

R.R.O. 1970, Reg. 51, Sched. 1.

Schedule 2

WATCH REPAIRER

Work Instruction and Experience

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
1	General Shop Practice	General	Safety rules and removal of all safety hazards. Use of hand and power tools, measuring instruments and shop equipment. (As detailed in Schedule 1).
2	Watch and Clock Theory	Principles and Design Construction and Operation	Familiarization with principles of watch mechanical designs; winding and setting mechanisms and main-springs, including self-winding types; gear trains, escapements, balance wheels and hairsprings, jewelled and plain bearings, plates and bridges. Principles and designs of electric and electronic watches. Principles and designs of clock movements. Familiarization with construction types and characteristics: cases, dials, movements, crystals, crowns and hands. Waterproof, non-waterproof, self-winding calendar, chronograph, electric and electronic types
3	Watch Repair Practice	Crystals Cases Dismantling Malfunctions	Fitting round or fancy glass or unbreakable types. Cementing and sealing. Cleaning, buffing and polishing operations. Familiarization with watch type, dismantling sequence and precautions. Removing stems and crystals, hands and dials, automatic winding assemblies, balance and escapement assemblies, barrel and train assemblies. Recognition of faults and economics of required action. Use of part numbers and parts catalogues for part and component identification and interchangeability.

ITEM	COLUMN 1	COLUMN 2	COLUMN 3
	Course	Subject	Work Instruction and Experience
		Lathe Work	Set-up and operation. Turning and polishing. Parts alterations, fitting and adjustments.
		Cleaning Operations	Cleaning movements by machine or ultrasonic methods. Rinsing and drying operations. Cleaning dials by applicable method.
		Parts Fitting	Drilling, reaming, staking, shellacking; polishing and burnishing operations.
		Reassembly and Adjustments	Assembly operations up to, and including train. Checking parts functioning during assembly. Fitting mainspring, crown and stem. Assembly lubrication. Assembly of escapement and pallet adjustment. Assembly of balance (Conventional types). Trueing and adjusting hair-spring. Installation of automatic (self-winding) action. Final lubrication. Fitting dial and hands. Synchronizing day-date dials. Reassembly of electric watches with conventional balance assemblies and electronic types with tuning-fork regulation, according to manufacturers' specifications. Recasing.
		Regulation	Checking and adjusting errors in rate, position, beat and magnetism in conventional movements. Phasing and positioning tuning-fork regulators in electronic types.
		Waterproofing	Checking fit of case components and gaskets. Re-assembly and silicone grease application as required. Immersion testing.
4	Clock Repair Practice	Adjustments	Determining and correcting malfunction. Setting-up and adjusting; pendulum, alarm, strike and chime type clocks.
5	Estimating	Estimate Preparation	Determining required action, necessary parts, labour costs, overhead and profit mark-up. Use of current or association rate guides. Guaranteeing workmanship.

R.R.O. 1970, Reg. 51, Sched. 2.

REGULATION 64

under the Arbitrations Act

FEES CHARGEABLE BY ARBITRATORS	
1. The fees chargeable by arbitrators under the Act are the following fees:	
1. For each sitting where a reference is not proceeded with and a postponement is made at the request of a party,	
not less than.....	\$ 40
nor more than.....	80
2. For each day's sitting, consisting of at least six hours,	
not less than.....	150
nor more than.....	250
3. For each additional hour over six hours, where a day's sitting consists of at least six hours,	
not less than.....	20
nor more than.....	30
4. For each day's sitting, consisting of less than six hours where a reference is proceeded with, except for fractions of an hour, for each hour,	
not less than.....	20
not more than.....	30

O. Reg. 401/73, s. 1.

REGULATION 65

under the Architects Act

COMPLAINTS

1. At its discretion, the Board may suspend or cancel the membership of any member or licensee whom it finds guilty of misconduct or incompetence such as to render it desirable in the public interest that he should be so dealt with. R.R.O. 1970, Reg. 55, s. 1.

2. The Board shall not take any such action until after a complaint, setting forth the alleged misconduct or incompetence and giving reasonable particulars, has been made under oath and filed with the secretary of the Board. R.R.O. 1970, Reg. 55, s. 2.

3.—(1) When a complaint is received, the secretary or the chairman or vice-chairman shall, within seven days thereafter, call a meeting of the Board to consider and act upon the complaint.

(2) The meeting shall be held not earlier than fourteen days and not later than twenty-one days after the day on which the complaint was received.

(3) The meeting may be adjourned from time to time. R.R.O. 1970, Reg. 55, s. 3.

4.—(1) Notice of the meeting, with a copy of the complaint, shall be sent by registered mail to each member of the Board, to the member complained of, at his address shown in the register, and to the person making the complaint.

(2) The notice to the person making the complaint shall state that he may bring witnesses to substantiate his complaint and that, if he fails to attend the meeting, the matter may be dealt with in his absence. R.R.O. 1970, Reg. 55, s. 4.

5. The notice to the member complained of shall state that he will have an opportunity of submitting evidence and calling witnesses in his defence at the meeting and of examining opposing witnesses, and the notice to him shall state that, if he fails to attend, the Board may, in his absence, suspend or cancel his membership. R.R.O. 1970, Reg. 55, s. 5.

6. The member and any person complaining may be represented by counsel at the hearing of the complaint and the Board may call in a solicitor or a counsel for assistance and advice. R.R.O. 1970, Reg. 55, s. 6.

7. The Board may cause notice of any order of cancellation or suspension, and the reason therefor, to be published in the public press. R.R.O. 1970, Reg. 55, s. 7.

REGULATION 66

under the Artificial Insemination of Live Stock Act

ARTIFICIAL INSEMINATION—GENERAL

1. In this Regulation "certificate of registration" means a certificate issued under the *Live Stock Pedigree Act* (Canada). O. Reg. 11/76, s. 1.

2. Persons engaged in the artificial insemination of goats, horses or sheep are exempt from the provisions of the Act and this Regulation with respect to such goats, horses or sheep. O. Reg. 11/76, s. 2.

PART I

3. This Part applies only to the artificial insemination of cattle. O. Reg. 11/76, s. 3.

4.—(1) The owner of a herd of cattle, or his full-time employee, who is engaged in the breeding of cows in the herd by artificial insemination is, in respect of the artificial insemination so performed, exempt from the provisions of the Act and this Regulation.

(2) Where semen produced outside Ontario is stored in the premises of a Class A semen-producing business and is transferred and delivered through the facilities of that Class A semen-producing business, a person selling or offering such semen for sale is exempt from subsection 16 (2) of the Act. O. Reg. 11/76, s. 4.

5.—(1) An application for a licence to commence or continue to engage in a semen-producing business (cattle) shall be in Form 1.

(2) A licence to commence or continue to engage in a semen-producing business (cattle) shall be in Form 2 and the fee therefor is \$1.

(3) An application for a licence to commence or to continue to engage in an inseminating business (cattle) shall be in Form 3.

(4) A licence to commence or continue to engage in an inseminating business (cattle) shall be in Form 4 and the fee therefor is \$1.

(5) An application for a licence to commence or continue to act as an inseminator (cattle) shall be in Form 5.

(6) A licence to commence or continue to act as an inseminator (cattle) shall be in Form 6 and the fee therefor is \$1.

(7) An application for a licence to commence or continue to act as a semen processing supervisor (cattle) shall be in Form 7.

(8) A licence to commence or continue to act as a semen processing supervisor (cattle) shall be in Form 8. O. Reg. 11/76, s. 5.

6.—(1) The fee for a licence in Form 2, 4, 6 or 8 shall accompany the application for the licence.

(2) A licence in Form 2, 4, 6 or 8 expires with the 31st day of December of the year of issue.

(3) A licence in Form 2, 4, 6 or 8 is not transferable. O. Reg. 11/76, s. 6.

7.—(1) Subject to subsection (3), the Commissioner shall not issue a licence in Form 6 unless the person to whom the licence would issue has successfully completed an examination approved by the Commissioner in the theory and practice of artificial insemination.

(2) Subject to subsection (3), the Commissioner shall not issue a licence in Form 8 unless the applicant therefor has successfully completed an examination approved by the Commissioner in the theory and practice of semen collecting, processing and storage.

(3) Notwithstanding subsections (1) and (2), the Commissioner may issue a licence to a person who has not successfully completed an examination under subsection (1) or (2) but he may cancel the licence unless the examination is successfully completed within one year after a licence was first issued under this subsection. O. Reg. 11/76, s. 7.

8. The following grounds are prescribed for the refusal to renew, suspension or cancellation of a licence in addition to those grounds referred to in clauses 10 (1) (a) and (b) of the Act:

1. With respect to a Class "B" semen-producing business, the shipment of semen to any place other than a Class "A" semen-producing business.

2. With respect to a Class "A" semen-producing or a Class "B" semen-producing business, the sale or offering for sale in Ontario of semen from a bull that is affected with or has been exposed to an infectious or contagious disease capable of being transmitted in semen or the sale or offering for sale in Ontario of semen that is affected by any condition that would render it harmful or ineffective for inseminating cattle. O. Reg. 11/76, s. 8.

9.—(1) Every Class "A" semen-producing business shall have a building or buildings adequate for the stabling of bulls, the collecting of semen and the maintaining of records.

(2) Every Class "B" semen-producing business shall have a building or buildings adequate for the stabling of bulls and the maintaining of records and, unless all semen is collected, evaluated and processed at the facilities of a Class A semen-producing business, adequate for the collecting of semen. O. Reg. 11/76, s. 9.

10.—(1) Every Class "A" semen-producing business shall have a laboratory with adequate facilities for,

- (a) sterilization of equipment;
- (b) evaluation of semen;
- (c) shipping of semen; and
- (d) frozen storage of semen.

(2) Every Class "B" semen-producing business shall, unless all semen is collected, evaluated, processed and stored at the facilities of a Class "A" semen-producing business, have a laboratory with adequate facilities for,

- (a) sterilization of equipment;
- (b) evaluation of semen;
- (c) shipping of semen; and
- (d) frozen storage of semen. O. Reg. 11/76, s. 10.

11. Every inseminating business shall have facilities with adequate refrigeration for the storage of semen. O. Reg. 11/76, s. 11.

12. Every operator of a semen-producing business or an inseminating business shall prominently display in his place of business, in respect of each bull maintained at the business from which semen is offered for sale,

- (a) a copy of the certificate of registration for a registered bull that is maintained by the business;
- (b) a statement of the identification of the sire and dam and the identification and date of birth of an unregistered bull that is maintained by the business;
- (c) a full statement concerning the performance record of each beef bull that is maintained by the business from which semen is offered for sale through the business; and

- (d) a full statement of the current information pertaining to the performance and type of the progeny of each bull maintained by the business from which semen is offered for sale, through the business,

and shall have readily available information equivalent to that mentioned in clauses (a), (b), (c) and (d) with respect to bulls that are not maintained by the business and from which semen is offered for sale through the business. O. Reg. 11/76, s. 12.

13.—(1) Semen collected by a semen-producing business for the purpose of freezing shall be frozen at a laboratory approved by the Commissioner.

(2) Semen frozen by a semen-producing business shall bear positive identification including identification of the bull and the date and location of the freezing. O. Reg. 11/76, s. 13.

14.—(1) Subject to subsection (3), no semen-producing business or inseminating business shall collect any semen unless the parentage of the bull that produced the semen has been verified by means of blood types by the appropriate breed registry organization.

(2) A blood test of a parent of a bull is not required where the Commissioner is of the opinion that it is impossible or impractical to obtain a blood sample of the parent and waives the blood test in writing.

(3) Semen may be collected prior to the verification of parentage by blood types where the Commissioner is of the opinion that verification prior to collection is impractical and authorizes the collection in writing but, subject to subsection (2), no semen shall be sold or offered for sale prior to completion of verification of parentage by blood type. O. Reg. 11/76, s. 14.

15.—(1) No semen shall be collected for processing and storage from a bull unless the bull has,

- (a) undergone examination and inspection by a full-time veterinarian of the Health of Animals Branch of the Department of Agriculture of Canada; and
- (b) within thirty days prior to entering the premises of a semen-producing business has passed tests with negative results,

respecting tuberculosis, brucellosis, leptospirosis, leucosis and bluetongue.

(2) Upon entering the premises of a semen-producing business each bull shall be segregated from all other animals in an isolation section maintained for that purpose for at least thirty days and shall not be released from the isolation section into the premises until, after the expiration of such thirty-day period, it has been retested with negative

results respecting tuberculosis, brucellosis and leptospirosis.

(3) Each bull maintained on the premises of a semen-producing business shall be tested at six-month intervals respecting tuberculosis, brucellosis and leptospirosis and shall not continue to be maintained on the premises of the semen-producing business unless it achieves negative results on such tests.

(4) Each bull maintained on the premises of a semen-producing business shall be tested annually respecting trichomoniasis, leucosis and bluetongue and shall not continue to be maintained on the premises of the semen-producing business unless it achieves negative results on such tests.

(5) An inspector may enter and inspect the premises of a semen-producing business or an inseminating business at any time, and may conduct such tests as are considered necessary by the Commissioner.

(6) An inspector may obtain and remove samples of semen from a semen-producing business or an inseminating business and cause the samples to be examined to determine whether or not the semen is affected by a condition that would render it harmful or ineffective for inseminating cattle.

(7) An inspector may examine books, records and other documents in the premises of a semen-producing business or an inseminating business relating to quality of semen and disposition of semen.

(8) Any bull affected with or exposed to any infectious or contagious disease shall be segregated from all other bulls.

(9) The Commissioner may order that semen be destroyed if, in his opinion, the bull from which the semen was collected is affected with or has been exposed to an infectious or contagious disease capable of being transmitted in semen.

(10) The Commissioner may order that semen be destroyed if, in his opinion, the semen is affected by any condition that would render it harmful or ineffective for inseminating cattle. O. Reg. 11/76, s. 15.

16. Every person operating a Class "A" semen-producing business or an inseminating business shall make returns to the Commissioner annually, at the end of each fiscal year of the business, consisting of,

- (a) an audited financial statement of the operations of the business for the fiscal year then ended;
- (b) a record of the number of cattle artificially inseminated to each bull from which semen

has been offered for sale by the business regardless of whether or not the bull was owned by the business; and

- (c) a record of the number of young sires of each breed that were entered during the year in a young sire proving program approved by the Commissioner. O. Reg. 11/76, s. 16.

17. Every Class "B" semen-producing business shall make returns to the Commissioner annually at the end of each fiscal year of the business consisting of a report of the number of doses of semen sold to residents of Ontario from each bull that is maintained by the business. O. Reg. 11/76, s. 17.

18. Every semen-producing business shall conduct such program for the proving of the breeding value of bulls as the Commissioner approves. O. Reg. 11/76, s. 18.

19. No person who sells, offers for sale or holds in possession for sale semen from a bull for or on behalf of a semen-producing business or an inseminating business shall publish or cause to be published any advertisement or statement respecting the bull that is untrue, deceptive, misleading or likely to mislead. O. Reg. 11/76, s. 19.

20.—(1) The Minister may make grants to inseminating businesses in,

- (a) territorial districts; and
- (b) such other parts of Ontario as are designated in subsection (3). O. Reg. 11/76, s. 20 (1).

(2) Grants may be made under subsection (1) to an inseminating business in an amount not exceeding \$4 for each cow artificially inseminated on and after the 1st day of April, 1976. O. Reg. 353/76, s. 1.

(3) The following areas are designated for the purposes of this section:

- 1. The County of Hastings. O. Reg. 11/76, s. 20 (3).

PART II

21. This Part applies to the artificial inseminating of swine. O. Reg. 11/76, s. 21.

22. The owner of a herd of swine, or his full-time employee, who is engaged in the breeding of sows in the herd by artificial insemination is, in respect of the artificial insemination so performed, exempt from the provisions of the Act and this Regulation. O. Reg. 11/76, s. 22.

23.—(1) An application for a licence to commence or continue to engage in a semen-producing business (swine) shall be in Form 9.

(2) A licence to commence or continue to engage in a semen-producing business (swine) shall be in Form 10 and the fee therefor is \$1.

(3) An application for a licence to commence or to continue to engage in an inseminating business (swine) shall be in Form 11.

(4) A licence to commence or continue to engage in an inseminating business (swine) shall be in Form 12 and the fee therefor is \$1.

(5) An application for a licence to commence or continue to act as an inseminator (swine) shall be in Form 13.

(6) A licence to commence or continue to act as an inseminator (swine) shall be in Form 14 and the fee therefor is \$1.

(7) An application for a licence to commence or continue to act as a semen processing supervisor (swine) shall be in Form 15.

(8) A licence to commence or continue to act as a semen-producing supervisor (swine) shall be in Form 16. O. Reg. 11/76, s. 23.

24.—(1) The fee for a licence in Form 10, 12, 14 or 16 shall accompany the application for the licence.

(2) A licence in Form 10, 12, 14 or 16 expires with the 31st day of December of the year of issue.

(3) A licence in Form 10, 12, 14 or 16 is not transferable. O. Reg. 11/76, s. 24.

25.—(1) Subject to subsection (3), the Commissioner shall not issue a licence in Form 14 unless the person to whom the licence would issue has successfully completed an examination approved by the Commissioner in the theory and practice of artificial insemination.

(2) Subject to subsection (3), the Commissioner shall not issue a licence in Form 16 unless the applicant therefor has successfully completed an examination approved by the Commissioner in the theory and practice of semen collecting, processing and storage.

(3) Notwithstanding subsections (1) and (2), the Commissioner may issue a licence to a person who has not successfully completed an examination under subsection (1) or (2) but he may cancel the licence unless the examination is successfully completed within one year after a licence was first issued under this subsection. O. Reg. 11/76, s. 25.

26.—(1) Every semen-producing business shall have a building or buildings adequate for the stabling of boars and the collecting, processing and storing of semen.

(2) The buildings referred to in subsection (1) shall be kept clean and sanitary at all times. O. Reg. 11/76, s. 26.

27. Every semen-producing business shall have a laboratory with adequate facilities for,

(a) the sterilization of equipment;

(b) the evaluation of semen;

(c) the shipping of semen; and

(d) the storage of semen. O. Reg. 11/76, s. 27.

28. Every operator of a semen-producing business shall prominently display at his place of business in respect of each boar maintained at the business from which semen is offered for sale,

(a) a copy of the certificate of registration for a registered boar that is owned by the business;

(b) a full statement concerning the performance record for each boar that has been performance tested from which semen is offered for sale; and

(c) a full statement of the current information pertaining to the performance of the progeny of each boar from which semen is offered for sale through the business. O. Reg. 11/76, s. 28.

29.—(1) Semen collected by a semen-producing business for the purpose of freezing shall be frozen at a laboratory approved by the Commissioner.

(2) Semen shall bear positive identification including identification of the boar and the date and location of collection. O. Reg. 11/76, s. 29.

30.—(1) No semen shall be obtained by a semen-producing business from a boar that does not test negative on tests for brucellosis, tuberculosis and leptospirosis conducted thirty days apart and immediately preceding first use of the boar by the semen-producing business.

(2) An inspector may enter and inspect the premises of a semen-producing business at any time and may conduct such tests as are considered necessary by the Commissioner.

(3) An inspector may obtain and remove samples of semen from a semen-producing business or an inseminating business and cause the samples to be examined to determine whether or not the semen is affected by a condition that would render it harmful or ineffective for inseminating swine.

(4) An inspector may examine books, records and other documents in the premises of a semen-producing business or an inseminating business

relating to quality of semen and disposition of semen.

(5) Every boar affected with or exposed to any infectious or contagious disease shall be segregated from all other boars.

(6) The Commissioner may order that semen be destroyed if, in his opinion, the boar from which the semen was collected is affected with or has been exposed to an infectious or contagious disease capable of being transmitted in semen.

(7) The Commissioner may order that semen be destroyed if, in his opinion, the semen is affected by any condition that would render it harmful or ineffective for inseminating swine. O. Reg. 11/76, s. 30.

31. Every semen-producing business shall conduct such program for the proving of the breeding value of boars as the Commissioner approves. O. Reg. 11/76, s. 31.

32. No person who sells, offers for sale or holds in possession for sale semen from a boar for or on behalf of a semen-producing business shall publish or cause to be published any advertisement or statement respecting the boar that is untrue, misleading or likely to mislead. O. Reg. 11/76, s. 32.

Form 1

Artificial Insemination of Live Stock Act

APPLICATION FOR A LICENCE TO ENGAGE IN A SEMEN-PRODUCING BUSINESS (CATTLE)

To The Live Stock Commissioner,
Ministry of Agriculture and Food,
Legislative Buildings,
Toronto, Ontario.

.....
(name of applicant)

.....
(address)

applies for a licence to engage in a semen-producing business (cattle) for the year ending with the 31st day of December, 19.... under the *Artificial Insemination of Live Stock Act* and the regulations, and in support of this application, the following facts are stated:

1. Business address of applicant:

2. Name of semen-producing business:

3. Location of semen-producing business:
(lot and

.....
concession, municipality, county, etc., or district)

4. Class of licence applied for:
(A or B)

Dated at, this....day of,

19....

.....
(signature of applicant)

O. Reg. 5/77, s. 1.

Form 2

Artificial Insemination of Live Stock Act

LICENCE TO ENGAGE IN A SEMEN- PRODUCING BUSINESS (CATTLE)

Year..... Class..... No.....

Under the *Artificial Insemination of Live Stock Act* and the regulations, and subject to the limitations thereof, this licence is issued to,

.....
(name)

.....
(address)

to engage in a semen-producing business (cattle) at

.....
(location)

This licence expires with the 31st day of December,

19....

Issued at Toronto, this....day of,

19....

.....
(Live Stock Commissioner)

O. Reg. 11/76, Form 2.

Form 3

Artificial Insemination of Live Stock Act

APPLICATION FOR A LICENCE TO ENGAGE IN AN INSEMINATING BUSINESS (CATTLE)

To The Live Stock Commissioner,
Ministry of Agriculture and Food,
Legislative Buildings,
Toronto, Ontario.

.....
(name of applicant)

.....
(address)

applies for a licence for the year ending with the
31st day of December, 19.... to engage in an
inseminating business (cattle) for the area.....

.....
.....

under the *Artificial Insemination of Live Stock Act*
and the regulations, and in support of this application
the following fact is stated:

Business address of applicant:.....
.....

Dated at....., this....day of.....,
19....

.....
(signature of applicant)

O. Reg. 11 /76, Form 3.

Form 4

Artificial Insemination of Live Stock Act

**LICENCE TO ENGAGE IN AN
INSEMINATING BUSINESS (CATTLE)**

Year..... No.....

Under the *Artificial Insemination of Live Stock Act*
and the regulations, and subject to the limitations
thereof, this licence is issued to,

.....
(name)

.....
(address)

to engage in an inseminating business (cattle) for the
area.....
.....

This licence expires with the 31st day of December,
19....

Issued at Toronto, this....day of.....,
19....

.....
(Live Stock Commissioner)

O. Reg. 11 /76, Form 4.

Form 5

Artificial Insemination of Live Stock Act

**APPLICATION FOR A LICENCE TO ACT
AS AN INSEMINATOR (CATTLE)**

To The Live Stock Commissioner,
Ministry of Agriculture and Food,
Legislative Buildings,
Toronto, Ontario.

.....
(name of applicant)

.....
(address)

applies for a licence to act as an inseminator (cattle)
for the area.....

under the *Artificial Insemination of Live Stock Act*
and the regulations for the year ending with the
31st day of December, 19....

Dated at....., this....day of.....,
19....

.....
(signature of applicant or manager
of inseminating business where
applicable)

O. Reg. 11 /76, Form 5.

Form 6

Artificial Insemination of Live Stock Act

**LICENCE TO ACT AS AN INSEMINATOR
(CATTLE)**

Year..... No.....

Under the *Artificial Insemination of Live Stock Act*
and the regulations, and subject to the limitations
thereof, this licence is issued to,

.....
(name)

.....
(address)

to act as an inseminator (cattle) for the area

.....
This licence expires with the 31st day of December,
19....

Issued at Toronto, this....day of.....,

19....

.....
(Live Stock Commissioner)

O. Reg. 11/76, Form 6.

Form 7

Artificial Insemination of Live Stock Act

APPLICATION FOR A LICENCE TO ACT AS A SEMEN PROCESSING SUPERVISOR (CATTLE)

To The Live Stock Commissioner,
Ministry of Agriculture and Food,
Legislative Buildings,
Toronto, Ontario.

.....
(name of applicant)

.....
(address)

applies for a licence to act as a semen processing
supervisor (cattle) in connection with.....
(name of

.....
semen-producing business)

under the *Artificial Insemination of Live Stock Act*
and the regulations for the year ending with the

31st day of December, 19....

Dated at....., this....day of.....,

19....

.....
(signature of applicant)

O. Reg. 11/76, Form 7.

Form 8

Artificial Insemination of Live Stock Act

LICENCE TO ACT AS A SEMEN PROCESSING SUPERVISOR (CATTLE)

Year..... No.....

Under the *Artificial Insemination of Live Stock Act*
and the regulations, and subject to the limitations
thereof, this licence is issued to,

.....
(name)

.....
(address)

to act as a semen processing supervisor (cattle) in
connection with.....
(name of semen-producing business)

and such other semen-producing business as may be
required under the said Act and regulations.

This licence expires with the 31st day of December,
19....

.....
(Live Stock Commissioner)

O. Reg. 11/76, Form 8.

Form 9

Artificial Insemination of Live Stock Act

APPLICATION FOR A LICENCE TO ENGAGE IN A SEMEN-PRODUCING BUSINESS (SWINE)

To The Live Stock Commissioner,
Ministry of Agriculture and Food,
Legislative Buildings,
Toronto, Ontario.

.....
(name of applicant)

.....
(address)

applies for a licence to engage in a semen-producing
business (swine) for the year ending with the 31st

day of December, 19.... under the *Artificial
Insemination of Live Stock Act* and the regulations,
and in support of this application, the following
facts are stated:

1. Business address of applicant:.....
.....
2. Name of semen-producing business:.....
.....
3. Location of semen-producing business:.....
(lot and
.....
concession, municipality, county, etc., or district)
4. Where applicant is a corporation without share
capital, state number of members:.....
5. Breed or breeds to be serviced:
.....
6. Service fee charged:.....
- Dated at....., this....day of.....,
19....

.....
(signature of applicant)
O. Reg. 11/76, Form 9.

Form 10

Artificial Insemination of Live Stock Act

LICENCE TO ENGAGE IN A SEMEN-
PRODUCING BUSINESS (SWINE)

Year..... Class..... No.....

Under the *Artificial Insemination of Live Stock Act*
and the regulations, and subject to the limitations
thereof, this licence is issued to,

.....
(name)

.....
(address)

to engage in a semen-producing business (swine) at

.....
(location)

This licence expires with the 31st day of December,
19....

Issued at Toronto, this....day of.....,
19....

.....
(Live Stock Commissioner)
O. Reg. 11/76, Form 10.

Form 11

Artificial Insemination of Live Stock Act

APPLICATION FOR A LICENCE TO ENGAGE
IN AN INSEMINATING BUSINESS (SWINE)

To The Live Stock Commissioner,
Ministry of Agriculture and Food,
Legislative Buildings,
Toronto, Ontario.

.....
(name of applicant)

.....
(address)

applies for a licence for the year ending with the
31st day of December, 19.... to engage in an
inseminating business (swine) for the area.....

.....
.....

under the *Artificial Insemination of Live Stock Act*
and the regulations, and in support of this application
the following fact is stated:

Business address of applicant:.....
.....

Dated at....., this....day of.....,
19....

.....
(signature of applicant)

O. Reg. 11/76, Form 11.

Form 12

Artificial Insemination of Live Stock Act

LICENCE TO ENGAGE IN AN
INSEMINATING BUSINESS (SWINE)

Year..... No.....

Under the *Artificial Insemination of Live Stock Act*
and the regulations, and subject to the limitations
thereof, this licence is issued to,

.....
(name)

.....
(address)

to engage in an inseminating business (swine) for the
area.....

This licence expires with the 31st day of December,
19....

Issued at Toronto, this....day of.....,
19....

.....
(Live Stock Commissioner)

O. Reg. 11/76, Form 12.

Form 13

Artificial Insemination of Live Stock Act

APPLICATION FOR A LICENCE TO ACT
AS AN INSEMINATOR (SWINE)

To The Live Stock Commissioner,
Ministry of Agriculture and Food,
Legislative Buildings,
Toronto, Ontario.

.....
(name of applicant)

.....
(address)

applies for a licence to act as an inseminator (swine)
for the area.....

under the *Artificial Insemination of Live Stock Act*
and the regulations for the year ending with the
31st day of December, 19....

Dated at....., this....day of.....,
19....

.....
(signature of applicant or manager
of inseminating business where
applicable)

O. Reg. 11/76, Form 13.

Form 14

Artificial Insemination of Live Stock Act

LICENCE TO ACT AS AN INSEMINATOR
(SWINE)

Year.....

No.....

Under the *Artificial Insemination of Live Stock Act*
and the regulations, and subject to the limitations
thereof, this licence is issued to,

.....
(name)

.....
(address)

to act as an inseminator (swine) for the area
.....

This licence expires with the 31st day of December,
19....

Issued at Toronto, this....day of.....,
19....

.....
(Live Stock Commissioner)

O. Reg. 11/76, Form 14.

Form 15

Artificial Insemination of Live Stock Act

APPLICATION FOR A LICENCE TO ACT
AS A SEMEN PROCESSING SUPERVISOR
(SWINE)

To The Live Stock Commissioner,
Ministry of Agriculture and Food,
Legislative Buildings,
Toronto, Ontario.

.....
(name of applicant)

.....
(address)

applies for a licence to act as a semen processing
supervisor (swine) in connection with.....
(name of

.....
semen-producing business)

under the *Artificial Insemination of Live Stock Act*
and the regulations for the year ending with the
31st day of December, 19....

Dated at Toronto, this....day of.....,
19....

.....
(signature of applicant)

O. Reg. 11/76, Form 15.

Form 16

Artificial Insemination of Live Stock Act

LICENCE TO ACT AS A SEMEN
PROCESSING SUPERVISOR (SWINE)

Year..... No.....

Under the *Artificial Insemination of Live Stock Act* and the regulations, and subject to the limitations thereof, this licence is issued to,

.....
(name)

.....
(address)

to act as a semen processing supervisor (swine) in connection with.....
(name of semen processing business)

and such other semen-producing business as may be required under the said Act and regulations.

This licence expires with the 31st day of December, 19....

.....
(Live Stock Commissioner)

O. Reg. 11/76, Form 16.

REGULATION 67

under the Assessment Act

ASSESSMENT AREAS AND REGIONS

1. The following assessment areas are established:

1. The Eastern Ontario Assessment Area consisting of:

- i. Assessment Region Number 1
- ii. Assessment Region Number 2
- iii. Assessment Region Number 3
- iv. Assessment Region Number 4
- v. Assessment Region Number 5
- vi. Assessment Region Number 6
- vii. Assessment Region Number 7

as established by section 2.

2. The Central Ontario Assessment Area consisting of:

- i. Assessment Region Number 8
- ii. Assessment Region Number 9
- iii. Assessment Region Number 10
- iv. Assessment Region Number 11
- v. Assessment Region Number 12
- vi. Assessment Region Number 13
- vii. Assessment Region Number 14
- viii. Assessment Region Number 15
- ix. Assessment Region Number 16

as established by section 2.

3. The Western Ontario Assessment Area consisting of:

- i. Assessment Region Number 17
- ii. Assessment Region Number 18
- iii. Assessment Region Number 19
- iv. Assessment Region Number 20

v. Assessment Region Number 21

vi. Assessment Region Number 22

vii. Assessment Region Number 23

viii. Assessment Region Number 24

ix. Assessment Region Number 25

x. Assessment Region Number 26

as established by section 2.

4. The Northern Ontario Assessment Area consisting of:

- i. Assessment Region Number 27
- ii. Assessment Region Number 28
- iii. Assessment Region Number 29
- iv. Assessment Region Number 30
- v. Assessment Region Number 31

as established by section 2.

O. Reg. 34/72, s. 1; O. Reg. 113/74, s. 1.

2. The following Assessment Regions are established:

- 1. Assessment Region Number 1, consisting of the counties of Prescott, Russell, Glengarry, Stormont and Dundas.
- 2. Assessment Region Number 2, consisting of the counties of Grenville, Lanark and Leeds.
- 3. Assessment Region Number 3, consisting of The Regional Municipality of Ottawa-Carleton.
- 4. Assessment Region Number 4, consisting of the County of Renfrew.
- 5. Assessment Region Number 5, consisting of the counties of Lennox and Addington and Frontenac.
- 6. Assessment Region Number 6, consisting of the counties of Hastings, Prince Edward and Northumberland.

7. Assessment Region Number 7, consisting of the counties of Haliburton, Victoria and Peterborough.
8. Assessment Region Number 8, consisting of the City of Toronto.
9. Assessment Region Number 9, consisting of the City of North York.
10. Assessment Region Number 10, consisting of the boroughs of Scarborough and East York.
11. Assessment Region Number 11, consisting of the boroughs of Etobicoke and York.
12. Assessment Region Number 12, consisting of The Regional Municipality of Durham.
13. Assessment Region Number 13, consisting of The Regional Municipality of York.
14. Assessment Region Number 14, consisting of The Regional Municipality of Halton and The Regional Municipality of Peel.
15. Assessment Region Number 15, consisting of the County of Simcoe.
16. Assessment Region Number 16, consisting of The District Municipality of Muskoka.
17. Assessment Region Number 17, consisting of The Regional Municipality of Niagara.
18. Assessment Region Number 18, consisting of The Regional Municipality of Hamilton-Wentworth.
19. Assessment Region Number 19, consisting of the County of Brant and The Regional Municipality of Haldimand-Norfolk.
20. Assessment Region Number 20, consisting of The Regional Municipality of Waterloo.
21. Assessment Region Number 21, consisting of the counties of Wellington and Dufferin.
22. Assessment Region Number 22, consisting of the counties of Middlesex, Elgin and Oxford.
23. Assessment Region Number 23, consisting of the counties of Huron and Perth.
24. Assessment Region Number 24, consisting of the counties of Grey and Bruce.
25. Assessment Region Number 25, consisting of the counties of Lambton and Kent.
26. Assessment Region Number 26, consisting of the County of Essex.
27. Assessment Region Number 27, consisting of the territorial districts of Nipissing and Parry Sound.
28. Assessment Region Number 28, consisting of the territorial districts of Cochrane and Timiskaming.
29. Assessment Region Number 29, consisting of the territorial districts of Sudbury and Manitoulin.
30. Assessment Region Number 30, consisting of the Territorial District of Algoma.
31. Assessment Region Number 31, consisting of the territorial districts of Thunder Bay, Kenora and Rainy River. R.R.O. 1970, Reg. 57, s. 2; O. Reg. 113/74, s. 2.

REGULATION 68

under the Assessment Act

ASSESSMENT NOTICES

1. Subject to section 2, a Notice of Assessment under subsection 30 (1) of the Act shall be in Form 1, and where a person assessed is liable for business assessment such Notice of Assessment shall be in Form 2. O. Reg. 520/79, s. 1.

2. Where the assessment of which notice is given under subsection 30 (1) of the Act has been altered pursuant to subsection 63 (1) of the Act, the Notice may be in Form 3 or, in the case of a person liable for business assessment, in Form 4. O. Reg. 520/79, s. 2.

Form 1

Assessment Act

NOTICE OF ASSESSMENT

(This is not a Tax Bill)

NOTICE OF ASSESSMENT (This is not a Tax Bill)				NBHD	REFERENCE
DATE MAILED	For Taxation Commencing	ROLL NUMBER	CNTY. MUN. MAP SUB	PARCEL	*PRIM/SUB
LOCATION AND DESCRIPTION OF REAL PROPERTY - PERSON(S) ASSESSED			DIRECT ENQUIRIES TO: THE REGIONAL ASSESSMENT OFFICE		
			COMPLAINTS SEE INSTRUCTIONS ON REVERSE SIDE LAST DATE FOR MAILING COMPLAINT MAIL TO: REGIONAL REGISTRAR ASSESSMENT REVIEW COURT		

REAL PROPERTY TAX — The Tax Bill will be calculated by applying the appropriate mill rate(s) to the taxable value indicated below.

BUSINESS TAX — The Tax Bill will be calculated by applying the appropriate mill rate(s) to the business assessment indicated below.

REAL PROPERTY

ASSESSED VALUE & TAX STATUS

Residential/Farm/Commercial/Exempt

COMPLAINT PROCEDURES

(Section 39 of the *Assessment Act*. R.S.O. 1980, Chapter 31)

If you believe you have been improperly assessed in any way, you or your agent may give notice of the complaint in writing to the Regional Registrar of the Assessment Review Court. See the front of this Notice for the address of the Regional Registrar and the last day for mailing a complaint.

NOTICE OF COMPLAINT

IF YOU WISH TO USE THIS NOTICE for lodging a complaint against your assessment, state your reason(s) in the space below, sign and forward to the Regional Registrar.

.....
.....
.....

Complainant or Agent (Please Print) .....	.....
Telephone No. Residence	SIGNATURE OF COMPLAINANT OR AGENT
Business	MAILING ADDRESS OF COMPLAINANT OR AGENT



IF YOU WISH TO LODGE A COMPLAINT AGAINST YOUR ASSESSMENT AND RETAIN THIS NOTICE, include the following information on a separate sheet of paper headed 'Notice of Complaint', and forward to the Regional Registrar of the Assessment Review Court at the address shown on the front of this Notice.

- 1. Name, Mailing Address, and Telephone No. of Complainant or Agent.
- 2. Location and Description of Property under Complaint (see front of Notice of Assessment).
- 3. Assessment Roll Number (see front of this Notice).
Please ensure all numbers are correctly transcribed.
- 4. Reason(s) for Complaint.
- 5. Signature of Complainant or Agent

Form 2

Assessment Act

NOTICE OF ASSESSMENT
(This is not a Tax Bill)

DATE MAILED		For Taxation Commencing		ROLL NUMBER 		CNTY. MUN. MAP SUB	PARCEL	"PRIM/SUB"
LOCATION AND DESCRIPTION OF REAL PROPERTY - PERSON(S) ASSESSED						DIRECT ENQUIRIES TO: THE REGIONAL ASSESSMENT OFFICE		
						COMPLAINTS SEE INSTRUCTIONS ON REVERSE SIDE LAST DATE FOR MAILING COMPLAINT  MAIL TO: REGIONAL REGISTRAR ASSESSMENT REVIEW COURT		

REAL PROPERTY TAX — The Tax Bill will be calculated by applying the appropriate mill rate(s) to the taxable value indicated below.
BUSINESS TAX — The Tax Bill will be calculated by applying the appropriate mill rate(s) to the business assessment indicated below.

REAL PROPERTY	ASSESSED VALUE & TAX STATUS
Residential/Farm/Commercial/ Exempt	
Business Assessment	

COMPLAINT PROCEDURES

(Section 39 of the *Assessment Act*. R.S.O. 1980, Chapter 31)

If you believe you have been improperly assessed in any way, you or your agent may give notice of the complaint in writing to the Regional Registrar of the Assessment Review Court. See the front of this Notice for the address of the Regional Registrar and the last day for mailing a complaint.

NOTICE OF COMPLAINT

IF YOU WISH TO USE THIS NOTICE for lodging a complaint against your assessment, state your reason(s) in the space below, sign and forward to the Regional Registrar.

.....

.....

.....

Complainant or Agent (Please Print)

Telephone No. Residence SIGNATURE OF COMPLAINANT OR AGENT

Business MAILING ADDRESS OF COMPLAINANT OR AGENT

IF YOU WISH TO LODGE A COMPLAINT AGAINST YOUR ASSESSMENT AND RETAIN THIS NOTICE, include the following information on a separate sheet of paper headed 'Notice of Complaint', and forward to the Regional Registrar of the Assessment Review Court at the address shown on the front of this Notice.

- 1. Name, Mailing Address, and Telephone No. of Complainant or Agent.
- 2. Location and Description of Property under Complaint (see front of Notice of Assessment).
- 3. Assessment Roll Number (see front of this Notice).
Please ensure all numbers are correctly transcribed
- 4. Reason(s) for Complaint.
- 5. Signature of Complainant or Agent.

Form 3

Assessment Act

NOTICE OF ASSESSMENT

(This is not a Tax Bill)

DATE MAILED		For Taxation Commencing		ROLL NUMBER	CNTY.	MUN.	MAP	SUB	PARCEL	"PRIM/SUB"
LOCATION AND DESCRIPTION OF REAL PROPERTY - PERSON(S) ASSESSED					DIRECT ENQUIRIES TO: THE REGIONAL ASSESSMENT OFFICE					
					COMPLAINTS SEE INSTRUCTIONS ON REVERSE SIDE LAST DATE FOR MAILING COMPLAINT MAIL TO: REGIONAL REGISTRAR ASSESSMENT REVIEW COURT					

REAL PROPERTY TAX — The Tax Bill will be calculated by applying the appropriate mill rate(s) to the taxable value indicated below.

BUSINESS TAX — The Tax Bill will be calculated by applying the appropriate mill rate(s) to the business assessment indicated below.

ASSESSMENT MADE UNDER SEC. 63 OF THE ASSESSMENT ACT

REAL PROPERTY VALUE FACTOR ASSESSED VALUE & TAX STATUS

Residential/Farm/Commercial/Exempt

COMPLAINT PROCEDURES

(Section 39 of the *Assessment Act*. R.S.O. 1980, Chapter 31)

If you believe you have been improperly assessed in any way, you or your agent may give notice of the complaint in writing to the Regional Registrar of the Assessment Review Court. See the front of this Notice for the address of the Regional Registrar and the last day for mailing a complaint.

NOTICE OF COMPLAINT

IF YOU WISH TO USE THIS NOTICE for lodging a complaint against your assessment, state your reason(s) in the space below, sign and forward to the Regional Registrar.

.....
.....
.....

Complainant or Agent (Please Print)

Telephone No. Residence SIGNATURE OF COMPLAINANT OR AGENT

Business MAILING ADDRESS OF COMPLAINANT OR AGENT

IF YOU WISH TO LODGE A COMPLAINT AGAINST YOUR ASSESSMENT AND RETAIN THIS NOTICE, include the following information on a separate sheet of paper headed 'Notice of Complaint', and forward to the Regional Registrar of the Assessment Review Court at the address shown on the front of this Notice.

- 1. Name, Mailing Address, and Telephone No of Complainant or Agent.
- 2. Location and Description of Property under Complaint (see front of Notice of Assessment).
- 3. Assessment Roll Number (see front of this Notice).
Please ensure all numbers are correctly transcribed.
- 4. Reason(s) for Complaint.
- 5. Signature of Complainant or Agent.

Form 4

Assessment Act

NOTICE OF ASSESSMENT
(This is not a Tax Bill)

NBHD REFERENCE

DATE MAILED	For Taxation Commencing	ROLL NUMBER	CNTY. MUN. MAP SUB	PARCEL	"PRIM/SUB"
LOCATION AND DESCRIPTION OF REAL PROPERTY - PERSON(S) ASSESSED			DIRECT ENQUIRIES TO: THE REGIONAL ASSESSMENT OFFICE		
			COMPLAINTS SEE INSTRUCTIONS ON REVERSE SIDE LAST DATE FOR MAILING COMPLAINT MAIL TO: REGIONAL REGISTRAR ASSESSMENT REVIEW COURT		

REAL PROPERTY TAX — The Tax Bill will be calculated by applying the appropriate mill rate(s) to the taxable value indicated below.
BUSINESS TAX — The Tax Bill will be calculated by applying the appropriate mill rate(s) to the business assessment indicated below.

ASSESSMENT MADE UNDER SEC. 63 OF THE ASSESSMENT ACT

REAL PROPERTY VALUE FACTOR ASSESSED VALUE & TAX STATUS

Residential/Farm/Commercial/Exempt

Business Assessment

COMPLAINT PROCEDURES

(Section 39 of the *Assessment Act*. R.S.O. 1980, Chapter 31)

If you believe you have been improperly assessed in any way, you or your agent may give notice of the complaint in writing to the Regional Registrar of the Assessment Review Court. See the front of this Notice for the address of the Regional Registrar and the last day for mailing a complaint.

NOTICE OF COMPLAINT

IF YOU WISH TO USE THIS NOTICE for lodging a complaint against your assessment, state your reason(s) in the space below, sign and forward to the Regional Registrar.

.....
.....
.....

Complainant or Agent (Please Print)

Telephone No. Residence SIGNATURE OF COMPLAINANT OR AGENT

Business MAILING ADDRESS OF COMPLAINANT OR AGENT

IF YOU WISH TO LODGE A COMPLAINT AGAINST YOUR ASSESSMENT AND RETAIN THIS NOTICE, include the following information on a separate sheet of paper headed 'Notice of Complaint', and forward to the Regional Registrar of the Assessment Review Court at the address shown on the front of this Notice.

1. Name, Mailing Address, and Telephone No. of Complainant or Agent.
2. Location and Description of Property under Complaint (see front of Notice of Assessment).
3. Assessment Roll Number (see front of this Notice).
Please ensure all numbers are correctly transcribed.
4. Reason(s) for Complaint.
5. Signature of Complainant or Agent.

REGULATION 69

under the Assessment Act

INTERIOR INFORMATION QUESTIONNAIRE

1. The questionnaire referred to in section 10 of the Act shall be in the following Form:

Form

Assessment Act

CNTY. MUN. MAP-DIV. SUB-DIV. PARCEL TENANT

INTERIOR INFORMATION QUESTIONNAIRE

QUESTIONNAIRE FOR OWNER OR OCCUPANT

Number of Rooms	
1st floor	
2nd floor	
3rd floor	

Floors	
sub floor only	
finished, hardwood /tile	
softwood	
partly finished	

Interior Walls	
plaster	
drywall	
panelling	
other	
partitions, finished one side	
partitions, finished both sides	
unfinished	

Ceilings	
plaster	
drywall	
panelling	
unfinished	
other	

Insulation		
	Fully	Partially
exterior wall		
ceiling		

Plumbing	
toilet(s)	
basin(s)	
bathtub(s)	
shower stall(s)	
kitchen sink(s)	
chemical toilet	

Fire Place	
brick	
stone	

.....
Mailing Address.....
.....
Signature.....

Year House Built.....
Date of any Renovations or Remodelling..... O. Reg. 423/72, s. 1.

REGULATION 70

under the Assessment Act

MUNICIPAL ENUMERATION NOTICE

- 1. Subject to section 2, for the purpose of taking a census required under the Act, an assessment commissioner shall use Form 1, or in an area where the assessment commissioner considers that a significant number of people reside whose preferred language is French, Form 2. O. Reg. 323/79, s. 1.
- 2. For the purpose of taking a census required under the Act in the Town of Penetanguishene, the assessment commissioner shall use Form 3. O. Reg. 323/79, s. 2.

Form 1

Assessment Act

MUNICIPAL ENUMERATION NOTICE

A) If the information is correct and complete, keep this notice.

B) See reverse side for additional instructions before correcting this notice.

C) Please return corrected notices immediately to the Regional Assessment Office.

FOR OFFICE USE ONLY		MUNICIPAL ENUMERATION NOTICE			
U/C		<p>A) If the information is correct and complete, keep this notice.</p> <p>B) See reverse side for additional instructions before correcting this notice.</p> <p>C) Please return corrected notices immediately to the Regional Assessment Office.</p>			
AT:					
WD	NAME AND MAILING ADDRESS				
PL					
CARD	ACT	RECORD MAILING ADDRESS CHANGES HERE			
		APT. NO.	R.R. NO.	P.O. BOX.	POSTAL STATION
		STREET NUMBER, STREET NAME			
		CITY,	PROVINCE,	(COUNTRY)	POSTAL CODE
THIS NOTICE IS FOR THE PROPERTY DESCRIBED HERE					
ROLL NUMBER					
MUNICIPALITY					
<p>IF ANY OF THE INFORMATION SHOWN IS INCORRECT, CHECK THE INSTRUCTIONS ON THE REVERSE CORRECT THE FORM SIGN IT HERE AND SEND IT TO THE ABOVE ADDRESS BY RETURN MAIL.</p>					
SIGNATURE OF PERSON ENUMERATED					
REMARKS					

[illegible]

MUNICIPAL ENUMERATION NOTICE

PURPOSE OF THIS NOTICE:

The information on this notice is required for the following purposes:

- To prepare the Preliminary List of Electors for municipal and school board elections
- To direct the education portion of the property tax to the appropriate school board
- To select prospective jurors
- For the preparation of the Ontario population report, and
- For updating assessment records on ownership and tenancies

INSTRUCTIONS:

If the information shown on the front of this notice is **CORRECT** and **COMPLETE**, no further action is required. Keep this notice for your records.

If any of the information is incorrect or incomplete, or if it relates to the previous occupants, owners or tenants **MAKE THE NECESSARY CHANGES** in the manner shown in this example:

EXAMPLE:

SEQUENCE	ACT	NAME IN FULL (SEE NOTE 1 ON REVERSE SIDE) PRINT ALL REQUIRED CHANGES IN BLOCK LETTERS								
0001		JONES PETER JOHN	M	O			U	A	43	
		WILSON MARY JANE	F	O	R	S	U		49	

STRIKE OUT the **INCORRECT** information with a single line and **PRINT** the correct information in capital letters underneath.

SIGN the form in the space provided and

RETURN it to the Regional Assessment Commissioner at the address shown on the front **BY RETURN POST.**

Note 1: - NAMES

The first name(s) should be the owner(s) or tenant(s) who direct(s) the school taxes.

The name of the spouse should appear next.

IF this is your permanent place of residence,

LIST children, other relatives, boarders and lodgers etc. who live with you in this unit.

IF this is NOT your permanent place of residence,

LIST ONLY Owners, Tenants and Spouses.

ENTER your **SURNAME** first, then your full given names each separated by a space.

Note 2: - SCHOOL SUPPORT

The option to be a separate school elector/supporter is available **ONLY** to Roman Catholics (which includes Greek and Ukrainian Catholics).

The Education Act permits Roman Catholics (which includes Greek and Ukrainian Catholics) who are owners or tenants of property located in a Separate School Zone, to direct the education portion of their property tax to the Separate School Board if they so desire.

Any Roman Catholic living in a separate school zone may be a separate school elector if (s)he so desires.

Any queries on specific school support problems should be addressed to your local Separate or Public School Board.

MUNICIPAL ENUMERATION NOTICE

PURPOSE OF THIS NOTICE

The information on this notice is required for the following purposes:

- To prepare the Preliminary List of Electors for municipal and school board elections.
- To direct the education portion of the property tax to the appropriate school board.
- To select prospective jurors.
- For the preparation of the Ontario population report.
- For updating Assessment records on ownership and tenancies.

INSTRUCTIONS

If the information shown on the front of this notice is correct and complete no further action is required. Keep this notice for your records.

If any of the information is incorrect or incomplete, or if it relates to the previous occupants, owners or tenants make the necessary changes in the manner shown in this example:

EXAMPLE/EXEMPLE

SEQUENCE	ACT	NAME IN FULL/NOMS AU COMPLET PLEASE PRINT ALL REQUIRED CHANGES IN BLOCK LETTERS (See Note 1 on reverse side) VEUILLEZ ECRIRE TOUTS CHANGEMENTS EN LETTRES MOULEES (Voir Remarque 1 au verso)
0001		<div><div>J O N E S P E T E R J O H N</div><div>M O U A 43</div></div> <div><div>W I L S O N M A R Y J A N E</div><div>F O R S U 49</div></div>

Strike out the incorrect information with a single line and enter the correct information in capital letters underneath.

Sign the form in the space provided and return it to the Regional Assessment Commissioner at the address shown on the front by return post.

Note 1: - NAMES

The first name(s) should be the owner(s) or tenant(s) who direct(s) the school taxes.

The name of the spouse should appear next.

If this is your permanent place of residence.

List children, other relatives, boarders, lodgers etc. who live with you in this unit.

If this is not your permanent place of residence.

List only owners, tenants and spouses.

Enter your surname first, then your full given names each separated by a space.

Note 2: SCHOOL SUPPORT

The option to be a separate school elector/supporter is available only to Roman Catholics (which includes Greek and Ukrainian Catholics).

The Education Act permits Roman Catholics (which includes Greek and Ukrainian Catholics) who own or rent property located in a Separate School Zone, to direct the education portion of their property tax to the Separate School Board if they so desire.

Any Roman Catholic living in a separate school zone may be a separate school elector if (s)he so desires.

Any queries on specific school support problems should be addressed to your local Separate or Public School Board.

AVIS DE RECENSEMENT MUNICIPAL

OBJET DE CET AVIS

Les renseignements au recto servent à:

- Dresser la liste préliminaire des électeurs pour les élections municipales et des conseils scolaires.
- Allouer la part de l'impôt foncier destinée à l'éducation au conseil scolaire voulu.
- La sélection des membres de juré.
- La rédaction du rapport annuel sur la population de l'Ontario.
- A la mise à jour des rôles d'évaluation.

INSTRUCTIONS

Si les renseignements au recto sont complets et exacts, aucune démarche est nécessaire. Conservez ce formulaire pour vos dossiers.

Si les renseignements ne sont ni exacts ni complets, ou si les personnes indiquées sont les anciens propriétaires, les anciens locataires, ou les anciens occupants, faites les corrections voulues au recto comme le modèle ci-dessous l'indique.

Biffez tous les renseignements inexacts par une simple ligne et inscrivez les corrections voulues en lettres majuscules.

Signez l'imprimé et retournez-le immédiatement par la poste au Commissaire régional de l'évaluation à l'adresse qui figure au recto.

Remarque 1: - NOMS

Le nom du propriétaire ou du locataire qui décide de l'allocation des taxes scolaires doit figurer en tête de liste.

Le nom du conjoint est inscrit ensuite.

Si vous êtes domicilié à cette adresse, veuillez inscrire le nom de vos enfants, des parents, pensionnaires et logeurs qui demeurent chez vous.

Si vous n'êtes pas domicilié à cette adresse, n'indiquez sur cet avis que le nom des propriétaires ou des locataires, ainsi que le nom des conjoints.

Inscrire d'abord le nom, puis les prénoms au complet, séparés par des espaces.

Remarque 2: TAXE SCOLAIRE

Seulement les catholiques ont le droit d'être électeurs des écoles séparées et d'allouer leurs taxes scolaires au Conseil des écoles séparées.

Si vous êtes catholique et que cette propriété est située dans une zone d'école séparée, La Loi Sur l'Education vous autorise à allouer vos taxes scolaires au Conseil des écoles séparées.

Si vous êtes catholique, et que cette propriété est située dans une zone d'école séparée, vous avez le droit d'être électeur des écoles séparées.

Pour tous renseignements au sujet des taxes scolaires, veuillez vous adresser aux bureaux régionaux des Conseils des écoles séparées ou publiques.

Form 3

Assessment Act

MUNICIPAL ENUMERATION NOTICE

A) If the information is correct and complete, keep this notice.

B) See reverse side for additional instructions before correcting this notice.

C) Please return corrected notices immediately to the Regional Assessment Office

FOR OFFICE USE ONLY		MUNICIPAL ENUMERATION NOTICE			
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">U/C</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">WD</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">PL</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">CARD</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">ACT</div>		<p>A) If the information is correct and complete, keep this notice.</p> <p>B) See reverse side for additional instructions before correcting this notice.</p> <p>C) Please return corrected notices immediately to the Regional Assessment Office.</p>			
AT:		<div style="border: 1px solid black; padding: 5px; text-align: center;">NAME AND MAILING ADDRESS</div>			
		<div style="border: 1px solid black; height: 100px;"></div>			
		<div style="border: 1px solid black; padding: 5px; text-align: center;">ROLL NUMBER</div>			
		<div style="border: 1px solid black; height: 40px;"></div>			
		<div style="border: 1px solid black; padding: 5px; text-align: center;">MUNICIPALITY</div>			
		<p>IF ANY OF THE INFORMATION SHOWN IS INCORRECT, CHECK THE INSTRUCTIONS ON THE REVERSE CORRECT THE FORM SIGN IT HERE AND SENT IT TO THE ABOVE ADDRESS BY RETURN MAIL.</p>			
		<div style="border: 1px solid black; padding: 5px; text-align: center;">SIGNATURE OF PERSON ENUMERATED</div>			
THIS NOTICE IS FOR THE PROPERTY DESCRIBED HERE		<div style="border: 1px solid black; padding: 5px; text-align: center;">REMARKS</div>			
		<div style="border: 1px solid black; height: 100px;"></div>			

[illegible]

REGULATION 71

under the Assessment Act

PIPE LINE RATES

1. In lieu of the rates contained in subsection 24 (4) of the Act for the assessment for taxation of pipe lines, the rates contained in the Schedule shall apply to the assessment for taxation of all pipe lines liable to assessment and taxation under section 24 of the Act and located in or on the boundary of any municipality, or territory without municipal organization comprised in a locality, or in any part of a municipality or of such territory, in which an assessment at market value is or has been made as a result of the making of a proclamation under section 70 of the Act. O. Reg. 122/74, s. 1.
2. For the purpose of clause 24 (16) (b) of the Act,
- (a) where two or more pipe lines occupy the same right of way, the second and subsequent pipe lines occupying that right of way are designated to be each pipe line occupying that right of way, except that which bears the higher or highest assessed value computed by applying the

rates in the Schedule to this Regulation without the reduction in rates for the second and subsequent pipe lines occupying the same right of way provided for in clause (b), and where two or more pipe lines occupying the same right of way have the same assessed value so computed and that assessed value is the higher or highest assessed value or is the only assessed value for the pipe lines occupying that right of way, each of such pipe lines is designated as a second and subsequent pipe line except that one that was first in use as a pipe line; and

(b) where a right of way occupied by a pipe line that is not designated to be a second or subsequent pipe line under clause (a) is occupied by a pipe line that is so designated, each pipe line so designated shall be assessable and taxable at 75 per cent of the rate in the Schedule that is applicable to each pipe line so designated. O. Reg. 122/74, s. 2.

Schedule

PIPE LINE RATES

Size of Pipe				ASSESSMENT IN DOLLARS PER FOOT OF LENGTH		
				Gas	Oil	Field and
				Transmission Pipe Line	Transmission Pipe Line	Gathering Pipe Line
Not over 1"	Nominal Inside Diameter			1.07	1.07	0.80
Over 1" and not over 2"	"	"	"	1.34	1.28	0.96
Over 2" and not over 3"	"	"	"	1.71	1.66	1.34
Over 3" and not over 4"	"	"	"	2.14	2.09	1.61
Over 4" and not over 5"	"	"	"	2.62	2.51	1.93
Over 5" and not over 6"	"	"	"	3.16	3.05	2.35
Over 6" and not over 8"	"	"	"	4.39	4.17	3.32
— 10"	"	"	"	6.47	6.10	4.87
— 12"	"	"	"	8.03	7.44	6.05

		ASSESSMENT IN DOLLARS PER FOOT OF LENGTH		
Size of Pipe	Outside Diameter	Gas	Oil	Field and
		Transmission Pipe Line	Transmission Pipe Line	Gathering Pipe Line
— 14"		9.68	8.93	
— 16"		11.45	10.43	
— 18"		13.32	11.88	
— 20"		16.75	14.87	
— 22"		18.51	16.26	
— 24"		20.38	17.82	
— 26"		22.36	19.26	
— 28"		24.45	20.76	
— 30"		26.64	22.36	
— 32"		28.94	23.97	
— 34"		31.30	25.63	
— 36"		33.87	27.50	

O. Reg. 122/74, Sched.

REGULATION 72

under the Assessment Act

PIPE LINE RATES IN MUSKOKA
AND PARRY SOUND

1. In lieu of the rates contained in the Schedule to Regulation 71 of Revised Regulations of Ontario, 1980, commencing with the year 1980, the rates contained in the Schedule to this Regulation shall apply to the assessment for taxation of all pipe lines liable to assessment and taxation under section 24 of the Act and located in or on the boundary of any municipality or territory without municipal organization comprised in a locality, or in any part of a municipality situated within either The District Municipality of Muskoka or the District of Parry Sound. O. Reg. 1092/80, s. 1.
2. For the purpose of clause 24 (16) (b) of the Act,
- (a) where two or more pipe lines occupy the same right of way, the second and subsequent pipe lines occupying that right of way are designated to be each pipe line occupying that right of way, except that which bears the higher or

highest assessed value computed by applying the rates in the Schedule to this Regulation without the reduction in rates for the second and subsequent pipe lines occupying the same right of way provided for in clause (b), and where two or more pipe lines occupying the same right of way have the same assessed value so computed and that assessed value is the higher or highest assessed value or is the only assessed value for the pipe lines occupying that right of way, each of such pipe lines is designated as a second and subsequent pipe line except that one that was first in use as a pipe line; and

(b) where a right of way occupied by a pipe line that is not designated to be a second or subsequent pipe line under clause (a) is occupied by a pipe line that is so designated, each pipe line so designated shall be assessable and taxable at 75 per cent of the rate in the Schedule that is applicable to each pipe line so designated. O. Reg. 1092/80, s. 2.

Schedule
PIPE LINE RATES

			Assessment in Dollars per Foot of Length		
Size of Pipe				Gas	Oil
				Transmission Pipe Line	Transmission Pipe Line
Nominal Inside Diameter					Field and Gathering Pipe Line
Not over 1"			2.75	2.75	2.05
Over 1" and not over 1½"	"	"	3.00	2.90	2.25
Over 1½" and not over 2½"	"	"	3.70	3.60	2.75
Over 2½" and not over 3¾"	"	"	4.70	4.55	3.50
Over 3¾" and not over 4½"	"	"	5.70	5.55	4.25
Over 4½" and not over 5 ⁵ / ₈ "	"	"	6.60	6.35	4.95
Over 5 ⁵ / ₈ " and not over 6 ⁵ / ₈ "	"	"	7.55	7.25	5.65
Over 6 ⁵ / ₈ " and not over 8"	"	"	10.50	10.00	7.85
—10"	"	"	14.05	13.20	10.55
—12"	"	"	17.70	16.45	13.25
—14"			21.40	19.70	
Outside Diameter					
—16"	"	"	25.05	22.80	
—18"	"	"	29.00	25.80	
—20"	"	"	32.95	29.35	
—22"	"	"	36.90	32.45	
—24"	"	"	40.85	35.55	
—26"	"	"	44.80	38.55	
—28"	"	"	48.75	41.45	
—30"	"	"	52.65	44.25	
—32"	"	"	56.60	47.00	
—34"	"	"	60.55	49.65	
—36"	"	"	64.50	52.25	
—38"	"	"	68.45	54.75	
—40"	"	"	72.40		
—42"	"	"	76.35		

REGULATION 73

under the Assessment Act

PROPERTY INCOME QUESTIONNAIRE

1. A property income questionnaire under subsection 10 (1) of the Act shall be in Form 1. O. Reg. 267/74, s. 1.

2. Notwithstanding section 1, a property income questionnaire under subsection 10 (1) of the Act for use in the assessment of hotels and motels shall be in Form 2. O. Reg. 503/75, s. 1, *part*.

Form 1

Assessment Act

PROPERTY INCOME QUESTIONNAIRE

INSTRUCTIONS

A. The provisions of the Assessment Act, R.S.O. 1980, c. 31 require that the form be completed and returned within ten days after receipt of this form. The form must be returned to the Assessment Commissioner or Assessor at the address shown.

Name	
Mailing address	

Title	Telephone No.

B. Please return with this completed form, a SCHEDULE OF OCCUPANTS as of the date of this form is received, showing the following information: name of tenant, locations of tenant within the building, total area occupied by tenant, date of lease, terms of lease including renewal options, rent, including parking, all additional income data relating to overages, escalator payments, common area maintenance charges and any other charges recovered from the tenant, location and area of vacant units.

C. PARTICULARS TO BE FURNISHED BY OWNER

Name of Owner	Assessment Roll No.
Mailing Address	Property Address
-----	-----

1A.

What was the ACTUAL GROSS INCOME received from the property during the year ending in 19 , or if a corporation, during the fiscal year ending in 19 ?	TOTAL
---	-------

1B.

What was the estimated loss in income due to VACANCY?	TOTAL
---	-------

1C. PLEASE BREAK DOWN THE ACTUAL GROSS INCOME AS FOLLOWS: (where applicable)

I. Income received from rents	II. Income from parking	III. Income from gross receipts	IV. Income from tax escalator clauses	V. Income from other escalator clauses	=	TOTAL
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>		

1D. SERVICE INCOME RECEIVED FROM TENANTS:

a. Hydro	b. Water	c. Air Conditioning	d. Heating	=	TOTAL
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>		

1E. OTHER INCOME (please specify)

-----	TOTAL
-----	+
-----	TOTAL
-----	+
-----	TOTAL
-----	=
-----	TOTAL

2.

What were the ACTUAL OPERATING EXPENSES for the above year OR fiscal year (excluding mortgage payments and capital cost allowance).

TOTAL

PLEASE BREAK DOWN THE EXPENSES AS FOLLOWS:

I. Property taxes		VI. Wages (other)		XI. Snow Removal	
II. Heating		VII. Maintenance and Repairs		XII. Legal and Audit Fees	
III. Hydro		VIII. Decorating		XIII. Air Conditioning	
IV. Water		IX. Property and Liability Insurance		XIV. Management	
V. Janitor		X. Supplies		XV. Other Expenses (please specify)	

Date

Signature

Form 2

Assessment Act

HOTEL/MOTEL INFORMATION QUESTIONNAIRE

INSTRUCTIONS

A. The provisions of the *Assessment Act*, R.S.O. 1980, c. 31, require that the form be completed and returned within ten days after receipt of this form. The form must be returned to the Assessment Commissioner or Assessor at the address shown opposite.

Name	
Mailing Address	
Title	Telephone No.

B. Only to be answered if portion of premises occupied by business tenants. Please return with this completed form, a SCHEDULE OF OCCUPANTS as of the date this form is received, showing the following information: name of tenant, locations of tenant within the building, total area occupied by tenant, date of lease, terms of lease including renewal options, rent, including parking, all additional income data relating to overages, escalator payments, common area maintenance charges and any other charges recovered from the tenant, location and area of vacant units.

C. PARTICULARS TO BE FURNISHED BY OWNER

Name of Owner	Assessment Roll No.
Mailing Address	Property Address

PART 1: DESCRIPTIVE DATA (Please check)

Type(s) of Liquor Licence(s) Held:		Charges Incl./Not Incl. in Room Rates:	Recreational Facilities	Length of Hotel/Motel Season
<input type="checkbox"/> Full Year	<input type="checkbox"/> Dining Lounge	1. Telephone— <input type="checkbox"/> Incl.	<input type="checkbox"/> Pool	<input type="checkbox"/> Full Year
<input type="checkbox"/> Seasonal	<input type="checkbox"/> Dining Room	<input type="checkbox"/> Not Incl.	<input type="checkbox"/> Gym	<input type="checkbox"/> Seasonal
<input type="checkbox"/> None	<input type="checkbox"/> Lounge	Amount/Room \$ _____	<input type="checkbox"/> Sauna	
	<input type="checkbox"/> Public Lounge	2. Parking— <input type="checkbox"/> Incl.	<input type="checkbox"/> Shuffle Bd.	
	<input type="checkbox"/> Club	<input type="checkbox"/> Not Incl.	<input type="checkbox"/> Tennis	
		Amount/Day \$ _____	<input type="checkbox"/> Cinema	
			<input type="checkbox"/> Other-Specify	

PART 2: ROOM RATES (present Rack rates only)

For Fiscal Year Ending 19____.

ROOM TYPES	NO. OF EACH	SINGLE RATE	DOUBLE RATE	TOTAL NO. OF ROOMS
				Average Room Rate \$
				No. of Days Open
				Average Occup. %
				Total Ann. Gross Room Sales \$

PART 3: FOOD/BEVERAGE SALES

For Fiscal Year Ending 19____.

Public Facilities	Days of Oper.	No. of Seats	Floor Area	Annual Food Sales	Food Sales Per Seat	Ann. Bev. Sales	Bev. Sale Per Seat
Coffee Shop							
Dining Room							
Dining Lounge							
Supper Club							
Lounge Bar							
Cafeteria							
Beverage Room							
Entertain. Lounge							
Banquet Facilities							
Room Service							
TOTAL ANNUAL GROSS SALES FOR:				FOOD \$		BEVERAGE \$	

The expenses are herein listed in the order set up for standard hotel accounting procedures, commencing with Departmental Expenses. These may be itemized or shown as a total for each department, as desired.

PART 5: OPERATING EXPENSES

For Fiscal Year Ending 19__

ITEM	AMOUNT	ITEM	AMOUNT
Administrative		Maintenance	
Office Staff		Decorating	
Office supplies		Supplies	
Advertising		Property and Liability Ins.	
Heat		Legal and Audit Fees	
Light		Air Conditioning	
Water		Elevators	
Repairs		Property taxes	
COLUMN TOTAL	\$	COLUMN TOTAL	\$
		TOTAL OPERATING EXPENSES	\$

Date Completed

Signature

Title/Position

O. Reg. 503/75, s. 1, *part.*

REGULATION 74

under the Assessment Review Court Act

PROCEDURE

1. The parties to a hearing of a complaint under the *Assessment Act* include,

- (a) the person complaining, referred to in subsection 39 (1) or (2) of the *Assessment Act*, or the person appealing the assessment under section 34 of the *Assessment Act*;
- (b) the assessment commissioner;
- (c) the board of the locality or the municipality, as the case may be;
- (d) all persons whose assessment is complained of, referred to in subsection 39 (4) of the *Assessment Act*; and
- (e) the persons added as parties pursuant to subsection 39 (9) of the *Assessment Act*.
O. Reg. 980/76, s. 1.

2. The Court may, by written notice given to the parties at least fourteen days before the day for appearance, require the parties to a hearing of a complaint or appeal under the *Assessment Act* to appear before the Court for the purpose of fixing a day for hearing the complaint or appeal. O. Reg. 980/76, s. 2.

3.—(1) Where a notice of hearing under the *Assessment Act* has been given to a complainant or appellant and he,

- (a) fails to appear at the hearing; and
- (b) has not made a written submission to the Court,

and there is not sufficient evidence to enable the Court to consider the matter on the merits, the

Court may consider the appeal or complaint, as the case may be, abandoned.

(2) Where an appeal or complaint has been considered to be abandoned under subsection (1) and where the chairman or vice-chairman of the Court is satisfied that the failure of a party to attend or to make written submissions to the Court is due to circumstances beyond the control of the party, the chairman or vice-chairman may fix a new day for the hearing. O. Reg. 980/76, s. 3.

4. The parties to a hearing before the Court under the *Assessment Act* shall identify all properties that are under consideration and such identification shall include the roll numbers, the names of the assessed owners and the municipal descriptions of the properties. O. Reg. 980/76, s. 4.

5. The assessor's explanation required by subsection 39 (6) of the *Assessment Act* shall include the information required by section 4, the amount of the assessment and the manner in which the assessment was made. O. Reg. 980/76, s. 5.

6. The complainant, in the explanation required by subsection 39 (6) of the *Assessment Act*, shall state whether it is claimed that the assessment is too high or too low and whether the complaint is as to the complainant or any other person. O. Reg. 980/76, s. 6.

7. Where notice of hearing is not given under subsection 39 (4) of the *Assessment Act* and the chairman or a vice-chairman of the Court is satisfied, upon application by the complainant, that notice of the complaint was mailed within the time fixed by subsection 39 (3) of the *Assessment Act*, the chairman or vice-chairman, as the case may be, may fix a day for the parties to appear to fix the day for hearing the complaint or appeal or may fix the day for hearing the complaint or appeal. O. Reg. 980/76, s. 7.

REGULATION 75

under the Athletics Control Act

AMOUNT OF TAX

1. The amount payable to the Minister under subsection 5 (1) of the Act is 2 per cent of the gross receipts of the contest or exhibition. R.R.O. 1970, Reg. 64, s. 1.

REGULATION 76

under the Athletics Control Act

GENERAL

INTERPRETATION

1. In this Regulation and in the Act,

(a) "amateur", when used in respect of a natural person, means a person who has not at any time,

(i) entered or competed in any athletic contest or exhibition for a staked bet, private or public money or gate receipts, or received any consideration for his services as an athlete except merchandise or an order for merchandise not exceeding \$35 in value, or reasonable travelling and living expenses actually incurred while going to, remaining at, and returning from, the place of contest or exhibition,

(ii) taught, pursued or assisted in the pursuit of any athletics as a means of livelihood,

(iii) sold or pledged his prizes, or

(iv) promoted or managed an athletic contest or exhibition for personal gain;

(b) "amateur", when used in respect of an athletic association, club, corporation, league or unincorporated organization, means that the association, club, corporation, league or unincorporated organization is composed of amateurs or is ordinarily recognized as being composed of amateurs;

(c) "professional", when used in respect of a natural person, means a person other than an amateur;

(d) "professional", when used in respect of a professional contest or exhibition, means,

(i) that the participants or contestants represent or are members of an athletic association, club, corporation, league or unincorporated organization that is composed of professionals or is ordinarily recognized as being composed of professionals, or

(ii) that the participants or contestants are, or represent or are members of, a team or group of participants or contestants that is professional or is ordinarily recognized as being professional. R.R.O. 1970, Reg. 65, s. 1.

2. In this Regulation,

(a) "appearance forfeit" means the amount of money that a boxer, under a written contract to appear in a professional boxing contest or exhibition, agrees to pay in accordance with this Regulation upon his failure to so appear;

(b) "bout" means a contest or exhibition between two contestants;

(c) "catch-weights" when used in a professional boxing contract means the actual weights of the contestants where no mention of specific weights is made in the contract;

(d) "weight forfeit" means the amount of money that a boxer, under a written contract to take part in a professional boxing contest or exhibition, agrees to pay his opponent upon failure to comply with the weight requirements under the contract. R.R.O. 1970, Reg. 65, s. 2.

POWERS AND DUTIES OF THE COMMISSIONER

3. The Commissioner may,

(a) issue licences under this Regulation;

(b) assist, promote and encourage,

(i) amateur sports in community centres under the *Community Recreation Centres Act*, and

(ii) associations of amateur sportsmen; and

(c) be responsible for the supervision of professional contests and exhibitions and under the direction and control of the Minister, assist in the administration of the Act and this Regulation. O. Reg. 271/71, s. 1.

LICENCES

4.—(1) Where the Commissioner is of the opinion that he should not issue a licence, he may refuse to issue it. R.R.O. 1970, Reg. 65, s. 4 (1).

(2) The commissioner shall not issue a licence to a female to take part in an amateur or professional boxing contest or exhibition, or an amateur wrestling contest or exhibition. O. Reg. 271/71, s. 2.

(3) The Commissioner may in his discretion cancel a licence at any time after the date of its issuance. O. Reg. 271/71, s. 3, *part*.

(4) An applicant for a licence to hold a professional or amateur boxing or wrestling contest or exhibition, shall fully disclose the identity of all persons involved in holding, conducting or promoting the contest or exhibition. O. Reg. 271/71, s. 3, *part*.

5. Where a person holding a licence fails to comply with any provision of the Act or this Regulation, the Commissioner may fine him an amount not exceeding \$50 or suspend his licence, or both. R.R.O. 1970, Reg. 65, s. 5 (1).

6. The fees for licences are payable to the Minister and shall be collected by the Commissioner. R.R.O. 1970, Reg. 65, s. 6.

PART I

AMATEUR BOXING

7. This Part applies to amateur boxing contests and exhibitions. R.R.O. 1970, Reg. 65, s. 7.

8. In this Part, "competition" means a contest in which more than two boxers take part. R.R.O. 1970, Reg. 65, s. 8.

9. The weight-classes in amateur boxing are,

- (a) fly-weight of not more than 112 pounds, 6 ounces, 15 drams;
- (b) bantam-weight of more than 112 pounds, 6 ounces, 15 drams, but not more than 119 pounds, 0 ounces, 12 drams;
- (c) feather-weight of more than 119 pounds, 0 ounces, 12 drams, but not more than 125 pounds, 10 ounces, 9 drams;
- (d) light-weight of more than 125 pounds, 10 ounces, 9 drams, but not more than 132 pounds, 4 ounces, 7 drams;
- (e) light welter-weight of more than 132 pounds, 4 ounces, 7 drams, but not more than 139 pounds, 15 ounces, 14 drams;
- (f) welter-weight of more than 139 pounds, 15 ounces, 14 drams, but not more than 147 pounds, 11 ounces, 5 drams;

(g) light middle-weight of more than 147 pounds, 11 ounces, 5 drams, but not more than 156 pounds, 8 ounces, 7 drams;

(h) middle-weight of more than 156 pounds, 8 ounces, 7 drams, but not more than 165 pounds, 5 ounces, 8 drams;

(i) light heavy-weight of more than 165 pounds, 5 ounces, 8 drams, but not more than 178 pounds, 9 ounces, 3 drams; and

(j) heavy-weight of more than 178 pounds, 9 ounces, 3 drams. R.R.O. 1970, Reg. 65, s. 9.

10.—(1) In championship contests there shall be three three-minute rounds.

(2) In other contests or in exhibitions there shall be three two-minute rounds or five two-minute rounds.

(3) There shall be a one-minute interval between rounds. R.R.O. 1970, Reg. 65, s. 10.

11.—(1) Except under a licence in Form 1, no person shall hold an amateur boxing contest or exhibition.

(2) The fee for the licence is \$5.

(3) The licence is valid only for the contest or exhibition specified therein. R.R.O. 1970, Reg. 65, s. 11.

12. A person holding a licence in Form 1 shall make a report in Form 2 to the Commissioner not later than ten days after the contest or exhibition is held. R.R.O. 1970, Reg. 65, s. 12.

13.—(1) Except under a licence in Form 3, no person shall take part in an amateur boxing contest or exhibition.

(2) No fee is payable for a licence in Form 3.

(3) The licence expires with the 31st day of March next following the date of issue.

(4) Where a licensee takes part in a contest or exhibition, he shall not take part in another contest or exhibition for at least three days. R.R.O. 1970, Reg. 65, s. 13.

14.—(1) No person shall referee an amateur boxing contest or exhibition except under a licence in Form 4.

(2) The fee for the licence is \$1.

(3) The licence expires with the 31st day of March next following the date of issue.

(4) No person shall be granted a licence in Form 4 unless he passes a medical examination conducted by

a legally qualified medical practitioner. R.R.O. 1970, Reg. 65, s. 14.

15. Where the Commissioner considers it necessary in the interests of organized sport, he may order any amateur boxing contest or exhibition to be stopped and every person holding, officiating at or taking part in the contest or exhibition shall obey the order. R.R.O. 1970, Reg. 65, s. 15.

16.—(1) Notwithstanding section 7 but subject to sections 11, 12, 13, 14 and 15, Canadian and International amateur championship bouts may be conducted in accordance with the rules of the International Boxing Association. O. Reg. 271/71, s. 5.

(2) Notwithstanding section 7 but subject to sections 11, 12, 13, 14, 15, 21, 41, 51 and 54, amateur bouts other than such championship bouts referred to in subsection (1) may be conducted in accordance with the rules of the International Boxing Association. O. Reg. 14/72, s. 1.

RULES

17.—(1) A boxer who enters an amateur boxing contest or exhibition shall weigh in not sooner than six hours or later than one hour before the contest or exhibition begins, but during this period he may weigh in more than once.

(2) The boxer shall weigh in in boxing attire without gloves or in the nude.

(3) Where a competition lasts more than one day, boxers who have not been eliminated shall weigh in once only on each day after the first day. R.R.O. 1970, Reg. 65, s. 16.

18.—(1) A boxer in an amateur boxing contest or exhibition shall take a medical examination conducted by a legally qualified medical practitioner at the time of the weighing-in.

(2) A boxer in a competition shall take a medical examination conducted by a legally qualified medical practitioner each day of the competition at the time of the weighing-in.

(3) Where the boxer is unable to pass the examination, he shall not take part in the contest, exhibition or competition. R.R.O. 1970, Reg. 65, s. 17.

19.—(1) The medical practitioner conducting the examination under section 18 or a substitute appointed by the Commissioner shall be in attendance at the contest, exhibition or competition.

(2) The medical practitioner shall not enter the ring unless the referee requests him to do so. R.R.O. 1970, Reg. 65, s. 18.

20.—(1) Where there are more than four boxers in a competition, the draw shall be so arranged

that the number of boxers remaining after the first series is four or a multiple thereof.

(2) Boxers shall each draw a number by lot at the time of the weighing-in, and the byes shall be the high numbers.

(3) Boxers drawing byes shall not take part in the first series.

(4) Boxers drawing byes shall take part in the second series before those who have taken part in the first series.

(5) There shall be only one draw and each boxer shall retain his number until the end of the competition. R.R.O. 1970, Reg. 65, s. 19.

21. A boxer in a competition shall not take part in more than three bouts a day. R.R.O. 1970, Reg. 65, s. 20.

22.—(1) A boxer may have one or two seconds.

(2) Where a boxer has two seconds, he shall designate one as chief second and the other as assistant second.

(3) The chief second is responsible for the conduct of the assistant second.

(4) A boxer is responsible for the conduct of his seconds. R.R.O. 1970, Reg. 65, s. 21.

23. Subject to subsection 26 (1), no person other than a second shall be in a boxer's corner between rounds. R.R.O. 1970, Reg. 65, s. 22.

24. A second shall,

(a) wear a clean white jersey, sweater or shirt; and

(b) during a round remain seated and silent outside the ropes and the apron but near the corner of his charge. R.R.O. 1970, Reg. 65, s. 23.

25.—(1) The chief second shall not enter the ring until the bell or gong indicates the end of a round.

(2) When the chief time-keeper's whistle sounds, the seconds shall leave the ring and its apron and take with them their buckets, stools and equipment. R.R.O. 1970, Reg. 65, s. 24.

26.—(1) Between rounds the chief second may,

(a) enter the ring and attend his charge; and

(b) request the referee to,

(i) visit his corner to discuss any point relevant to the bout,

- (ii) comment on any injury to his charge,
- (iii) have the medical practitioner in attendance examine his charge, or
- (iv) stop the bout.

(2) Between rounds the assistant second may attend his charge but in doing so shall remain outside the ropes on the apron of the ring.

(3) Notwithstanding clause 27 (a), the chief second may instruct the referee to stop the bout and concede defeat for his boxer at any time. R.R.O. 1970, Reg. 65, s. 25.

27. During a round a second shall not,

- (a) interfere in any way with the progress of the bout;
- (b) give any advice, assistance or encouragement to his charge; or
- (c) throw anything into the ring,

and, if he does so, his charge may be warned or disqualified by the referee. R.R.O. 1970, Reg. 65, s. 26.

28. Where a second violates any of the provisions of sections 17 to 49, the referee may order him to leave the ring or the premises where the bout is being held, and may direct that he cease to act as a second during that bout. R.R.O. 1970, Reg. 65, s. 27.

29.—(1) A boxer shall be on the premises where the contest or exhibition is to be held at least one hour before the time scheduled for the commencement of the bout in which he is taking part.

(2) Where a boxer does not comply with subsection (1), the Commissioner may disqualify him. R.R.O. 1970, Reg. 65, s. 28.

30.—(1) Subject to subsection (2), no boxer shall use grease or vaseline or any substance that might handicap or injure his opponent.

(2) A boxer may use a light application of grease or vaseline on his eyebrows and the bridge of his nose and behind his ears. R.R.O. 1970, Reg. 65, s. 29.

31.—(1) There shall be a chief time-keeper and a knock-down time-keeper, each equipped with a stop-watch.

(2) The chief time-keeper shall,

- (a) sit immediately outside the ring close to a bell or gong;
- (b) have a whistle that can be heard distinctly by the boxers;

- (c) ten seconds before the end of each interval between rounds, blow his whistle;
- (d) at the end of ten seconds indicate the beginning of the round by ringing the bell or striking the gong but only where the seconds have left the ring and taken with them their buckets, stools and equipment;
- (e) at the end of each round ring the bell or strike the gong; and
- (f) where the referee orders the boxers to stop and then to box, extend the time of the round in accordance with instructions from the referee.

(3) Where a boxer is down, the knock-down time-keeper shall immediately stand up and, upon the referee calling "one", indicate aloud and by waving one arm the additional seconds as they elapse according to his stop-watch.

(4) Where a boxer is knocked out, the time-keeper shall advise the master of ceremonies of the round in which the knock-out took place and the part of the round that had elapsed. R.R.O. 1970, Reg. 65, s. 30.

32. There shall be an examiner who shall,

- (a) superintend the putting on of bandages and gloves; and
- (b) examine the protection cup of each boxer to ensure it is of the proper type. R.R.O. 1970, Reg. 65, s. 31.

33. There shall be a master of ceremonies who shall,

- (a) ensure that equipment necessary for the contest or exhibition is available;
- (b) take such action as is necessary to have the boxers ready for the bout in which they are to take part;
- (c) at the beginning of the bout, introduce the boxers to the spectators, announce their names and weights, and the length and other particulars of the bout;
- (d) before a round begins, announce or otherwise indicate to the spectators the number of that round;
- (e) at the end of the bout,

- (i) obtain first the stub of the referee's score-card and then the stubs of the judges' score-cards, and

- (ii) announce the result of the bout; and

- (f) make no other announcements except those authorized or directed by the Commissioner. R.R.O. 1970, Reg. 65, s. 32.

34.—(1) There shall be a referee and two or three judges for a bout.

(2) The judges shall be seated outside the ring, each on a different side thereof and at least six feet from the spectators.

(3) The referee and judges shall be neutral and function independently of each other. R.R.O. 1970, Reg. 65, s. 33.

35. Before a bout begins the referee shall ascertain the names of the chief seconds, call the boxers and their chief seconds to the centre of the ring, issue instructions as to the conduct of the bout and direct the boxers to return to their corners and upon the time-keeper's signal to go to the centre of the ring, touch gloves and begin the bout. R.R.O. 1970, Reg. 65, s. 34.

36.—(1) During a round the boxers and referee shall be the only persons permitted in the ring.

(2) The referee shall,

- (a) require the boxers and their seconds to observe the provisions of sections 17 to 49; and
- (b) warn or disqualify a boxer or his second who violates any provision of sections 17 to 49.

(3) The referee shall use three words of command to boxers, as follows:

1. To stop the bout, "stop".
2. To instruct them to continue, "box".
3. When breaking a clinch, "break".

(4) Upon the command "break" the boxers shall step back one full pace before continuing to box. R.R.O. 1970, Reg. 65, s. 35.

37.—(1) The result of a bout shall be determined by the referee and two judges, or by three judges.

(2) A judge, or a referee acting as a judge, shall,

- (a) determine the winner and loser of each round by a system of points scored in accordance with section 42;
- (b) immediately a round is completed, record on a score-card the points awarded each boxer in that round;
- (c) when the bout ends, total the number of points awarded each boxer and on the stub

of the score-card write the name of the boxer to whom he has awarded the greater number of points;

(d) sign the score-card and stub, and hand the stub to the master of ceremonies; and

(e) within twenty-four hours after the bout, transmit his score-card to the Commissioner. R.R.O. 1970, Reg. 65, s. 36.

38.—(1) A boxer may win a bout,

- (a) by a knock-out;
- (b) by an accident to his opponent;
- (c) through the disqualification of his opponent; or
- (d) on points.

(2) In competitions a winner shall be declared in every bout. R.R.O. 1970, Reg. 65, s. 37.

39. Subject to section 40, when a boxer,

- (a) touches the floor of the ring for ten seconds or more with any part of his body other than his feet;
- (b) hangs unconscious on the ropes; or
- (c) in the opinion of the referee, is at any time incapable of continuing or is outclassed,

he shall be deemed to be knocked out. R.R.O. 1970, Reg. 65, s. 38.

40.—(1) Where in the opinion of the referee a boxer is incapable of continuing the bout because of a cut near the eye, the referee shall,

- (a) stop the bout; and
- (b) if the cut was,
 - (i) caused by a blow, award the decision to the boxer delivering the blow,
 - (ii) caused by an intentional butt, award the decision to the injured boxer after disqualifying his opponent, or
 - (iii) accidental, subject to subsection (2), declare the bout a draw.

(2) Where the bout is in a competition and in the opinion of the referee a boxer is incapable of continuing because of an accidental cut near the eye, the referee shall stop the bout and award the decision to the boxer with the greater number of points. R.R.O. 1970, Reg. 65, s. 39.

41.—(1) A boxer shall be deemed to be down when he,

- (a) touches the floor of the ring with any part of his body other than his feet;
- (b) is hanging over the ropes in a helpless manner and the referee so indicates and begins to count; or
- (c) is knocked through the ropes but not off the ring apron.

(2) When a boxer is down, his opponent shall at once go to a neutral corner, and thereupon the referee shall call aloud at one-second intervals "one", "two", "three", "four", "five", "six", "seven", "eight", "nine", "out", as the knock-down time-keeper indicates the seconds as they elapse.

(3) Where a boxer is knocked down, he shall not rise before the count of eight.

(4) Where the boxer rises before the referee calls "out", the referee shall stop counting, call aloud "box" and thereupon the bout shall continue.

(5) Where a boxer is down and his opponent leaves the neutral corner while the referee is counting, the referee shall stop counting and resume where he left off when the opponent is again in the neutral corner.

(6) Where a boxer who has been down rises before the referee calls "out", but falls without again being hit by his opponent, the referee shall resume counting where he left off.

(7) Where the boxers go down at the same time, the referee shall continue to count until both of them rise or until he calls "out", whichever happens sooner.

(8) When the boxers are both counted out, the referee shall stop the bout and the decision shall be given in accordance with the points awarded before the count began.

(9) Where a boxer fails to resume the bout immediately after the interval between rounds, the referee shall count as if the boxer were down.

(10) Where a boxer is knocked down and while the referee is counting the bell or gong indicates the end of the round, the referee shall,

- (a) stop counting where the round is the last round of the bout; or
- (b) continue to count, where the round is not the last round of the bout, until he calls "out" or the boxer rises, whichever happens sooner.

(11) Where a boxer is knocked through the ropes and out of the ring, he shall be given

eighteen seconds to re-enter the ring. R.R.O. 1970, Reg. 65, s. 40.

42.—(1) At the end of a round, the boxer making the better showing shall receive five points and his opponent shall receive fewer than five points, the number to be determined by his showing.

(2) Where a round is even, each boxer shall receive five points.

(3) Where, at the end of a bout in a competition, the boxers have an equal number of points, the decision shall be given to the boxer who has been the aggressor or who has shown the better style.

(4) In awarding points the referee and judges shall take into consideration,

- (a) the number of correct hits landed in accordance with section 43;
- (b) a defence that prevents blows from landing and the attack of the opponent from being successful; and
- (c) aggressiveness and tactics.

(5) Where the referee warns a boxer for a foul, the referee and judges shall award points to the other boxer. R.R.O. 1970, Reg. 65, s. 41.

43.—(1) The judges, and the referee when acting as a judge, shall award points for a direct hit with the knuckle part of the closed glove on any part of the front or side of the head or body above the belt.

(2) No points shall be awarded for blows landing on the arms of an opponent. R.R.O. 1970, Reg. 65, s. 42.

44.—(1) In sections 17 to 49, "foul" means,

- (a) holding or hitting below the belt;
- (b) tripping, kicking or butting;
- (c) hitting with the head, shoulder, forearm or elbow;
- (d) choking;
- (e) pressing an arm or elbow in the face of the opponent;
- (f) pressing the head of the opponent back over the ropes;
- (g) hitting with an open glove or the inside of a glove;
- (h) hitting with a wrist or the side of a hand;
- (i) a back-hand blow;

- (j) a blow landing on the neck or back of the opponent;
- (k) a kidney punch;
- (l) a pivot blow;
- (m) attacking when holding or using the ropes in any manner;
- (n) wrestling, lying on or throwing in the clinch;
- (o) attacking an opponent who is down;
- (p) clinching, holding or locking of the opponent's arm or head;
- (q) holding and hitting, pulling and hitting, or hitting on the break;
- (r) ducking below the belt of the opponent;
- (s) completely passive defence by covering up and intentionally failing to avoid a blow; or
- (t) rebuking an opponent, or aggressive or offensive utterances during the round.

(2) When a boxer states he has been fouled and that he is unable to continue, the referee shall stop the bout and disqualify the other boxer,

- (a) if he has seen the foul committed; and
- (b) if in his opinion the boxer is unable to continue because of the foul. R.R.O. 1970, Reg. 65, s. 43.

45.—(1) Where a boxer,

- (a) does not obey the instructions of the referee;
- (b) violates any provision of sections 17 to 49;
- (c) acts in an unsportsmanlike manner; or
- (d) commits a foul,

the referee may warn or disqualify him.

(2) Where after receiving two warnings a boxer violates subsection (1), the referee shall thereupon disqualify him. R.R.O. 1970, Reg. 65, s. 44.

46. Subject to section 47, the decision,

- (a) of the judges; or
- (b) of the judges and the referee when acting as a judge,

as to the winner of a bout is final. R.R.O. 1970, Reg. 65, s. 45.

47.—(1) An appeal against a decision may be made by a boxer only on the grounds that the score-sheets have been added incorrectly or that there has been an incorrect announcement of the result of the bout.

(2) The appeal shall be made to the Commissioner no more than twenty-four hours after the bout ends.

(3) The decision of the Commissioner is final. R.R.O. 1970, Reg. 65, s. 46.

48. When the bell or gong indicates the end of the bout, the boxers shall,

- (a) immediately return to their corners and await the announcement of the result of the bout; and
- (b) when the announcement is given, shake hands. R.R.O. 1970, Reg. 65, s. 47.

49. A boxer who has been knocked out during a bout shall be suspended from boxing for thirty days after the bout. R.R.O. 1970, Reg. 65, s. 48.

EQUIPMENT

50. There shall be a ring not less than sixteen feet square or more than twenty feet square. R.R.O. 1970, Reg. 65, s. 49.

51.—(1) The floor of the ring shall,

- (a) extend beyond the ropes at least eighteen inches; and
- (b) be padded with felt or other soft material at least one and one-half inches thick and covered with canvas.

(2) The portion of the floor of the ring outside the ropes is called the "apron". R.R.O. 1970, Reg. 65, s. 50.

52.—(1) There shall be three ropes each at least three-quarters of an inch in diameter, and fixed securely to posts at each corner of the ring.

(2) One of the posts shall be red and the post diagonally opposite it shall be blue.

(3) The ropes shall be two, three and four feet, respectively, above the floor of the ring. R.R.O. 1970, Reg. 65, s. 51.

53.—(1) There shall be a bell or gong of sufficient volume that when rung or sounded it can be heard distinctly by the boxers and officials.

(2) Where a gong is used, it shall be attached securely to the ring or to some other suitable object close at hand. R.R.O. 1970, Reg. 65, s. 52.

54.—(1) A boxer shall wear gloves each weighing at least ten ounces.

(2) The padding of gloves shall be unbroken.

(3) The laces shall be tied on the outside of the back of the wrist of the gloves. R.R.O. 1970, Reg. 65, s. 53.

55.—(1) A boxer may wrap on each hand not more than eight feet of soft cloth bandage not more than two inches wide.

(2) The boxer may use a sufficient amount of surgeon's adhesive tape to hold the bandage in place.

(3) The adhesive tape shall not be applied across the knuckles or be more than one inch wide. R.R.O. 1970, Reg. 65, s. 54.

56.—(1) A boxer may wear gum-shields.

(2) A boxer shall wear a protection cup. R.R.O. 1970, Reg. 65, s. 55.

57.—(1) A boxer shall wear,

(a) clean, neat trunks, other than tights, extending from a point not above the navel to a point not higher than half-way between the knees and the crotch; and

(b) shoes of soft material and without heels, cleats, spikes or hard soles.

(2) The trunks of opposing boxers shall be of contrasting colours. R.R.O. 1970, Reg. 65, s. 56.

58. The person holding the contest or exhibition shall provide boxers with resin suitable for application to their shoes. R.R.O. 1970, Reg. 65, s. 57.

PART II

PROFESSIONAL BOXING

59. This Part applies to professional boxing contests and exhibitions. R.R.O. 1970, Reg. 65, s. 58.

60. The weight-classes in professional boxing contests and exhibitions are,

(a) fly-weight of not more than 112 pounds;

(b) bantam-weight of from 113 to 118 pounds, both inclusive;

(c) feather-weight of from 119 to 126 pounds, both inclusive;

(d) light-weight of from 127 to 135 pounds, both inclusive;

(e) welter-weight of from 136 to 147 pounds, both inclusive;

(f) middle-weight of from 148 to 160 pounds, both inclusive;

(g) light heavy-weight of from 161 to 175 pounds, both inclusive; and

(h) heavy-weight of over 175 pounds. R.R.O. 1970, Reg. 65, s. 59.

61.—(1) A person eighteen years of age or under shall not take part in a professional boxing contest or exhibition.

(2) A person nineteen years of age shall not take part in a professional boxing contest or exhibition of more than eight three-minute rounds.

(3) Except with the approval of the Commissioner, a person twenty years of age or over shall not take part in a professional boxing contest or exhibition of more than ten three-minute rounds.

(4) There shall be a one-minute interval between rounds. R.R.O. 1970, Reg. 65, s. 60.

62. No person shall hold a contest or exhibition under this Part unless the Commissioner issues to him a licence in Form 9 and the premises at which the contest or exhibition is held have a seating capacity not greater than the seating capacity shown on the licence. O. Reg. 271/71, s. 6, *part*.

63.—(1) An application for a licence under section 62 shall be in Form 8. O. Reg. 271/71, s. 6, *part*.

(2) The fee for the licence shall be based on the seating capacity stated in the application and shall be:

i. for less than 2,500 persons.....	\$ 50
ii. For 2,500 persons or more but less than 5,000 persons.....	100
iii. For 5,000 persons or more but less than 10,000 persons.....	150
iv. For 10,000 persons or more but less than 15,000 persons.....	200
v. For 15,000 persons or more but less than 25,000 persons.....	250
vi. For more than 25,000 persons.....	500

O. Reg. 372/71, s. 1.

64. Subject to subsection 4 (3), a licence issued under section 62 expires one year after the date of its issue. O. Reg. 271/71, s. 6, *part*.

65. Except under a licence in Form 11, no contest or exhibition shall be held under this Part. O. Reg. 271/71, s. 6, *part*.

66.—(1) An application for a licence under section 65 shall be in Form 10.

(2) An application for a licence under section 65 shall be made thirty days prior to the contest or exhibition and be accompanied by a written acknowledgement from the owner, occupier or manager of the premises to be used that the premises will be available for the contest or exhibition on the date stated in the application. O. Reg. 271/71, s. 6, *part*.

67.—(1) Except under a licence in Form 12, no person shall take part in a professional boxing contest or exhibition.

(2) An application for the licence shall be in Form 13.

(3) The fee for the licence is \$5.

(4) The licence expires with the 31st day of March next following the date of issue.

(5) No person who is a resident of Ontario shall be granted a licence in Form 12 unless at the time of his original application for the licence he undergoes an electroencephalographic examination.

(6) The Commissioner may require any applicant for a licence in Form 12 to undergo an electroencephalographic examination.

(7) A person who is resident outside Ontario shall not be granted a licence in Form 12 unless at the time of his original application for the licence he presents a subsisting licence issued by the jurisdiction in which he resides that entitles him to box in that jurisdiction. R.R.O. 1970, Reg. 65, s. 66.

68.—(1) Except under a licence in Form 14, no person shall manage a professional boxer.

(2) A licence in Form 14 shall not be issued to a person holding a licence in Form 8 or Form 9.

(3) The fee for a licence in Form 14 is \$5 and the licence expires with the 31st day of March next following the date of issue. R.R.O. 1970, Reg. 65, s. 67.

69.—(1) A contract between a professional boxer and his manager shall be in Form 15.

(2) A contract between a professional boxer and a person holding a professional boxing contest or exhibition shall be in Form 16.

(3) Contracts shall be read and construed in accordance with the Act and this Regulation and are subject to the provisions of each of them. R.R.O. 1970, Reg. 65, s. 68.

70.—(1) Except under a licence in Form 17, no person shall referee a professional boxing contest or exhibition.

(2) The fee for the licence is \$2 for each professional boxing contest or exhibition.

(3) No person shall be granted a licence in Form 17 unless he passes a medical examination conducted by a legally qualified medical practitioner. R.R.O. 1970, Reg. 65, s. 69.

71.—(1) Subject to subsection (4), no person shall act as a second at a professional boxing contest or exhibition except under a licence in Form 18.

(2) The fee for the licence is \$2.

(3) The licence expires with the 31st day of March next following the date of issue.

(4) Where a person holds a licence in Form 14, he may, without holding a licence under subsection (1), act as a second at any professional boxing contest or exhibition in which a boxer managed by him takes part. R.R.O. 1970, Reg. 65, s. 70.

72.—(1) A person holding a professional boxing contest or exhibition shall,

(a) at least seven days before the date of the contest or exhibition deposit with the Commissioner security in an amount equal to the total of,

(i) the purses or other remuneration to be paid boxers and, where one or more boxers are to be paid a percentage of the gross receipts, the estimated amount thereof, and

(ii) the fees payable to officials appointed for the contest or exhibition;

(b) at least seven days before the date of the contest or exhibition transmit to the Commissioner contracts of the boxers in the main bout, in Form 15 and Form 16; and

(c) at least three days before the date of the contest or exhibition transmit to the Commissioner contracts of the boxers in the other bouts, in Form 15 and Form 16.

(2) The security shall be in the form of,

(a) money; or

(b) direct or guaranteed securities of the Government of Canada or Ontario, payable to bearer.

(3) Where the person holding the contest or exhibition does not make the payments referred to in subclauses (1) (a) (i) and (ii) within ten days after the contest or exhibition, the security is forfeited.

(4) Where the security is forfeited and is not in the form of money, the Commissioner shall sell the security within ten days of the forfeiture.

(5) Where the security is forfeited, or forfeited and sold, the Commissioner shall,

- (a) use part or all of it to make the payments referred to in subclauses (1) (a) (i) and (ii); and
- (b) refund any balance to the holder of the licence. R.R.O. 1970, Reg. 65, s. 71.

73.—(1) A person holding a professional boxing contest or exhibition shall,

- (a) furnish the equipment required under this Regulation;
- (b) furnish each boxer with a stool, bucket, bandages and a pair of boxing gloves;
- (c) provide proper facilities for making announcements that can be heard or seen clearly by the spectators;
- (d) provide a separate room for use only by the Commissioner, referees and judges;
- (e) ensure that the contest or exhibition is begun at the time advertised and conducted throughout in an orderly manner and without unnecessary delay; and
- (f) make a report in Form 19 to the Commissioner not later than ten days after the contest or exhibition is held.

(2) A person holding a professional boxing contest or exhibition may pay a boxer his expenses but shall not pay the boxer for his services until after the contest or exhibition. R.R.O. 1970, Reg. 65, s. 72.

74.—(1) Where the Commissioner fines a boxer, the person holding the professional boxing contest or exhibition shall,

- (a) retain the amount of the fine out of the purse or other remuneration of the boxer; and
- (b) be deemed to be a person who has received money for the Crown and for which he is accountable within the meaning of the *Financial Administration Act*.

(2) The boxer has no claim for the amount retained under subsection (1). R.R.O. 1970, Reg. 65, s. 73.

75. A person shall not have any financial interest in a boxer taking part in a professional boxing contest or exhibition held on premises owned or leased by that person or in which he is otherwise interested. R.R.O. 1970, Reg. 65, s. 74.

76. No person shall advertise a professional boxing contest or exhibition unless the contracts of the boxers

taking part in the main bout, in Form 15 and Form 16, have been approved by the Commissioner. R.R.O. 1970, Reg. 65, s. 75.

77.—(1) A boxer under contract to take part in a professional boxing contest or exhibition shall weigh in, in the nude, at 2 o'clock in the afternoon on the day of the contest or exhibition at a place designated by the Commissioner.

(2) Where, after the weighing-in, the contest or exhibition is postponed more than twenty-four hours, the boxer shall again weigh in on the day of the contest or exhibition.

(3) Where the boxer is overweight, he shall be allowed an hour to bring himself within the weight required by his contract.

(4) Where the boxer remains overweight, the Commissioner shall direct the contest or exhibition to be held unless he considers the difference in weight between the boxers to be too great for a fair contest or proper exhibition. R.R.O. 1970, Reg. 65, s. 76.

78.—(1) Subject to subsection (4), a boxer under contract to take part in a professional boxing contest or exhibition shall take a medical examination immediately after the weighing-in.

(2) Where the contest or exhibition is postponed more than twenty-four hours, the boxer shall take a medical examination on the day of the contest or exhibition.

(3) Where the boxer is unable to pass the examination or is under the influence of drugs or of liquor as defined in the *Liquor Licence Act*, he shall not take part in the contest or exhibition.

(4) Where a Professional Boxing Licence Class 1 has been issued, a contestant in the main bout shall take an additional medical examination not more than six days and not less than three days before the scheduled bout.

(5) Where the contestant is unable to pass the examination, he shall not take part in the professional boxing contest or exhibition.

(6) A medical examination required by this section shall be conducted by a legally qualified medical practitioner appointed by the Commissioner. R.R.O. 1970, Reg. 65, s. 77.

79.—(1) The medical practitioner conducting the examination under section 78 or a substitute appointed by the Commissioner shall be in attendance at the contest or exhibition. R.R.O. 1970, Reg. 65, s. 78 (1).

(2) The medical practitioner may enter the ring at any time when in his opinion a boxer is injured.

(3) The medical practitioner shall sit next to the time keeper who shall on the advice of the medical prac-

itioner sound the bell twice to stop a fight in order for the medical practitioner to enter the ring. O. Reg. 631/80, s. 1.

80. Where a boxer under contract to take part in a professional boxing contest or exhibition does not make the weight required under the contract, his opponent is entitled to the weight forfeit set out in the contract. R.R.O. 1970, Reg. 65, s. 79.

81. Where a boxer under contract to take part in a professional boxing contest or exhibition,

- (a) fails to pass his medical examination;
- (b) does not appear for his bout; or
- (c) appears for his bout but, in the opinion of the medical practitioner, is not in a proper physical or mental condition to take part therein,

he is not entitled to any purse or other remuneration, or expenses not already paid to him. R.R.O. 1970, Reg. 65, s. 80.

82.—(1) Where a boxer is unable or refuses to take part in a professional boxing contest or exhibition in accordance with the terms of his contract, the person holding the contest or exhibition shall notify the Commissioner forthwith.

(2) At the request of the person holding the professional boxing contest or exhibition, the Commissioner may permit a boxer to substitute for the boxer unable or refusing to take part. R.R.O. 1970, Reg. 65, s. 81.

83.—(1) Where a boxer is unable or refuses to take part in a professional boxing contest or exhibition, his opponent shall take part against any substitute permitted by the Commissioner.

(2) The substitute shall take a medical examination conducted by a legally qualified medical practitioner appointed by the Commissioner.

(3) The Commissioner shall determine the time and place of the examination. R.R.O. 1970, Reg. 65, s. 82.

84.—(1) Where a boxer under contract to take part in a professional boxing contest or exhibition fails to take part therein, and no substitute is obtained for him, his opponent is entitled to,

- (a) the appearance forfeit; and
- (b) his expenses for travelling to and from and in training for the contest or exhibition, to be paid by the person holding the contest or exhibition.

(2) When there is a dispute as to the expenses, the parties shall refer the matter to the Commissioner for settlement and his decision is final.

(3) When a boxer under contract to take part in a professional boxing contest or exhibition fails to take part therein and a substitute is obtained, his opponent is entitled to the purse, or other remuneration specified in the contract, and the person holding the contest or exhibition is entitled to the appearance forfeit of the boxer who failed to take part. R.R.O. 1970, Reg. 65, s. 83.

85. Where,

- (a) a boxer is under contract to take part in a professional boxing contest or exhibition and before it is held takes part in another contest or exhibition; and
- (b) the Commissioner, after an investigation, is of the opinion that the boxer has thereby lessened his value or efficiency for the contest or exhibition specified in the contract,

the Commissioner may void the contract by endorsing thereon "This contract is void". R.R.O. 1970, Reg. 65, s. 84.

RULES

86.—(1) A boxer may have one or two seconds.

(2) Where a boxer has two seconds, he shall designate one of them as chief second and the other as assistant second.

(3) The chief second is responsible for the conduct of the assistant second.

(4) A boxer is responsible for the conduct of his seconds.

(5) Subject to subsection 90 (1), no person other than a second shall be in a boxer's corner between rounds. R.R.O. 1970, Reg. 65, s. 85.

87. A second shall,

- (a) wear a clean white jersey, sweater or shirt; and
- (b) during a round remain seated and silent outside the ropes and the apron but near the corner of his charge. R.R.O. 1970, Reg. 65, s. 86.

88.—(1) The chief second shall not enter the ring until the bell or gong indicates the end of a round.

(2) When the chief time-keeper's whistle sounds, the seconds shall leave the ring, and take with them their buckets, stools and equipment. R.R.O. 1970, Reg. 65, s. 87.

89.—(1) Between rounds the chief second may request the referee to,

- (a) visit his corner to discuss any point relevant to the bout;

- (b) comment on any injury to his charge;
- (c) have the medical practitioner in attendance examine his charge; or
- (d) stop the bout.

(2) Between rounds the assistant second may attend his charge but in doing so he shall remain outside the ropes on the apron of the ring. R.R.O. 1970, Reg. 65, s. 88.

90. During a round a second shall not,

- (a) interfere in any way with the progress of the bout;
- (b) give any advice, assistance or encouragement to his charge; or
- (c) throw anything into the ring.

and if he does his charge may be warned or disqualified by the referee. R.R.O. 1970, Reg. 65, s. 89.

91. Where a second violates a rule, the referee may order his removal from the ring or from the premises on which the bout is being held and may direct that he cease to act as a second during that bout. R.R.O. 1970, Reg. 65, s. 90.

92.—(1) A boxer shall be on the premises on which the contest or exhibition is to be held at least two hours before the time scheduled for the commencement of the bout in which he is taking part.

(2) Where the boxer does not comply with subsection (1), the Commissioner may disqualify him. R.R.O. 1970, Reg. 65, s. 91.

93.—(1) Subject to subsection (2), no boxer shall use grease or vaseline or any slippery substance that might handicap or injure his opponent.

(2) A boxer may use a light application of grease or vaseline on his eyebrows and the bridge of his nose and behind his ears. R.R.O. 1970, Reg. 65, s. 92.

94.—(1) No boxer shall,

- (a) take part in more than one contest or exhibition on the same day; or
- (b) take part in a contest of ten or more three-minute rounds within four days of his last contest.

(2) Where a boxer takes part in a contest or exhibition of fewer than ten three-minute rounds, he shall not take part in any other contest or exhibition for three days. R.R.O. 1970, Reg. 65, s. 93 (1, 2).

(3) A boxer who has been knocked out during a bout shall be suspended from boxing for sixty days.

O. Reg. 631/80, s. 2.

95.—(1) The following are major fouls:

1. Hitting below the belt.
2. Hitting an opponent who is down or rising from a down.
3. Butting with the head or shoulder.
4. Kicking, tripping, hacking or gouging.
5. Striking on or over the kidneys or on the back of the neck.
6. Striking a pivot blow or half-pivot blow.
7. Any physical action, other than fair boxing, that might injure an opponent.

(2) Disobeying the referee shall be deemed to be a major foul.

(3) The following are minor fouls:

1. Holding or maintaining a clinch.
2. Hitting while only one arm is free.
3. Hitting or scraping with the inside of the glove, wrist or elbow.
4. Hitting or flicking with an open glove.
5. Purposely going down without being hit. R.R.O. 1970, Reg. 65, s. 94.

96.—(1) A boxer shall be deemed to be down when he,

- (a) touches the floor of the ring with any part of his body other than his feet;
- (b) is hanging over the ropes in a helpless manner, and when the referee so indicates and begins the count; or
- (c) is rising from a down position.

(2) When a boxer is down, his opponent shall at once go to a neutral corner and thereupon the referee shall call aloud at one-second intervals "one", "two", "three", "four", "five", "six", "seven", "eight", "nine", "out", as the knock-down time-keeper indicates the seconds as they elapse.

(3) Where a boxer is knocked down, he shall not rise before the count of eight.

(4) When the referee calls "out", he shall raise his hands over his head and declare the boxer in the neutral corner to be the winner by a knock-out.

(5) Where a boxer is down and his opponent leaves the neutral corner while the referee is counting, the referee shall stop counting and resume where he left off only when the opponent is again in the neutral corner.

(6) Where a boxer who has been knocked down or through the ropes rises before the referee calls "out", but falls without again being hit by his opponent, the referee shall resume counting where he left off.

(7) Where the boxers go down at the same time, the referee shall continue to count until both of them get up or until he calls "out", whichever happens sooner.

(8) When the boxers are both counted out, the referee shall stop the bout and the decision shall be given in accordance with the points awarded before the count began.

(9) Where a boxer fails to resume boxing immediately after the interval between rounds, the referee shall count as if the boxer were down.

(10) Where a boxer is knocked down and while the referee is counting the bell or gong indicates the end of the round, the referee shall,

- (a) stop counting where the round is the last round of the bout; or
- (b) continue to count, where the round is not the last round of the bout, until he calls "out" or the boxer rises, whichever happens sooner.

(11) Where a boxer is knocked through the ropes and out of the ring, he shall be given eighteen seconds to re-enter the ring. R.R.O. 1970, Reg. 65, s. 95.

97. Where a boxer is down through accident or weakness, he shall rise immediately, but, where he is knocked down, he shall not rise before the count of eight. R.R.O. 1970, Reg. 65, s. 96.

98. Where a boxer,

- (a) touches the floor of the ring for ten seconds or more with any part of his body other than his feet;
- (b) hangs unconscious on the ropes; or
- (c) in the opinion of the referee is at any time incapable of continuing or is outclassed,

he shall be deemed to be knocked out. R.R.O. 1970, Reg. 65, s. 97.

99. Where, in the opinion of the referee, a boxer is incapable of continuing the bout because of a cut near the eye, the referee shall,

- (a) stop the bout; and
- (b) if the cut was,
 - (i) caused by a blow, award the decision to the boxer delivering the blow,
 - (ii) caused by an intentional butt, award the decision to the injured boxer after disqualifying his opponent, or

(iii) accidental, declare the bout a draw
R.R.O. 1970, Reg. 65, s. 98.

100.—(1) There shall be a chief timekeeper and knock-down timekeeper, each equipped with a stop-watch.

(2) The chief timekeeper shall,

- (a) sit outside the ring close to a bell or gong;
- (b) have a whistle that can be heard clearly by the boxers;
- (c) ten seconds before the end of each interval between rounds blow his whistle;
- (d) at the end of ten seconds indicate the beginning of the round by ringing the bell or striking the gong but only where the seconds have left the ring and taken with them their buckets, stools and equipment; and
- (e) at the end of each round ring the bell or strike the gong.

(3) Where a boxer is down, the knock-down timekeeper shall immediately stand up and, upon the referee calling "one" indicate aloud and by waving one arm the additional seconds as they elapse according to his stop-watch.

(4) Where a boxer is knocked out, the timekeeper shall advise the master of ceremonies of the round in which the knock-out took place and the part of the round that has elapsed. R.R.O. 1970, Reg. 65, s. 99.

101. There shall be an examiner who shall,

- (a) superintend the putting-on of bandages and gloves; and
- (b) examine the protection cup of each boxer to ensure it is of the proper type. R.R.O. 1970, Reg. 65, s. 100.

102. There shall be a master of ceremonies who shall,

- (a) ensure that equipment necessary for the contest or exhibition is available;
- (b) take such action as is necessary to have the boxers ready for the contest or exhibition in which they are to take part;
- (c) at the beginning of the contest or exhibition, introduce the boxers to the spectators, announce their names and weights, and the length and other particulars of the contest or exhibition;

- (d) before a round begins, announce or otherwise indicate to the spectators the number of that round;
- (e) at the end of the bout,
 - (i) obtain first the slip of the referee and then the slips of the judges, and
 - (ii) announce the result of the bout;
- (f) make no other announcements except those authorized or directed by the Commissioner; and
- (g) transmit the slips to the Commissioner forthwith. R.R.O. 1970, Reg. 65, s. 101.

103.—(1) There shall be two judges seated outside the ring on opposite sides thereof and at least six feet from the spectators.

- (2) A judge shall,
 - (a) determine the winner and loser of each round by a system of points scored in accordance with section 104;
 - (b) record on a score-sheet points awarded boxers in each round;
 - (c) at the end of the contest, total the number of points awarded each boxer and on a slip of paper write,
 - (i) the name of the boxer awarded the greater number of points, or
 - (ii) the word "draw" where each boxer has been awarded the same number of points,
- and hand the slip to the master of ceremonies; and
- (d) within twenty-four hours after the contest, transmit the score-sheet to the Commissioner.

(3) Where the judges are agreed upon a winner, their decision is final.

(4) Where the judges name different winners, or one judge names a winner and the other calls the bout a draw, the referee shall determine the result of the contest. R.R.O. 1970, Reg. 65, s. 102.

104.—(1) The winner of a round shall be awarded five points and the loser the number of points to which he is entitled in accordance with subsections (3) and (4).

(2) Where a round is even, each boxer shall be awarded five points.

(3) A boxer shall be given credit for,

- (a) clean, forceful blows on any part of his opponent's head or on the front of his opponent's body above the belt, according to the damaging effect of the blows;
- (b) aggressiveness;
- (c) forcing the fight with skilful attack;
- (d) cleverness in avoiding or blocking blows;
- (e) cleverness in preventing his opponent from landing a blow;
- (f) ring generalship, including the ability to take advantage of opportunities to cope with situations as they arise, to foresee and neutralize his opponent's method of attack and to force his opponent to adopt a style at which he is not skilful or which is to his disadvantage;
- (g) the art of boxing as distinct from mere fighting; and
- (h) sportsmanship in the ring, including adherence to the spirit of the provisions of sections 86 to 112 and refraining from taking any unfair advantage of his opponent.

(4) A boxer shall have points deducted for,

- (a) persistently delaying a contest by clinching, holding, or lacking in aggressiveness; and
- (b) committing an intentional or unintentional foul not sufficiently serious to warrant his disqualification. R.R.O. 1970, Reg. 65, s. 103.

105. Before a contest or exhibition begins the referee shall,

- (a) ascertain the names of the chief seconds; and
- (b) call the boxers and seconds to the centre of the ring and give instructions for the conduct of the contest or exhibition. R.R.O. 1970, Reg. 65, s. 104.

106.—(1) During a round the referee and boxers shall be the only persons in the ring.

(2) Where a person violates subsection (1), the referee may, if he has reason to believe the person is connected in any way with one of the boxers, disqualify the boxer. R.R.O. 1970, Reg. 65, s. 105.

107. The referee shall,

- (a) inspect the gloves, faces and bodies of the boxers in the ring, and subject to subsection 93 (2), take precautions to prevent a boxer from using grease or other substance that might handicap his opponent or result in an unfair advantage;
- (b) determine the winner and loser of each round by a system of points scored in accordance with section 104;
- (c) record on a score-sheet points awarded boxers in each round;
- (d) at the end of the contest, total the number of points awarded each boxer and on a slip of paper write,
 - (i) the name of the boxer awarded the greater number of points, or
 - (ii) the word "draw" where each boxer has been awarded the same number of points,

and hand the slip to the master of ceremonies;

- (e) stop a contest or exhibition if he considers the boxers so unevenly matched that the contest or exhibition is not a fair one and award the decision to the boxer who is leading;
- (f) stop a contest or exhibition if he considers it advisable because of the condition of a boxer; and
- (g) within twenty-four hours after the contest or exhibition transmit the score-sheet to the Commissioner. R.R.O. 1970, Reg. 65, s. 106.

108.—(1) Where a boxer commits a major foul, the referee shall stop the bout and disqualify him if he is of the opinion that the other boxer, because of the foul, is unable to continue or is unable to resume the contest or exhibition after what the referee considers a reasonable length of time.

(2) Where the boxer is disqualified under subsection (1), the referee shall award the decision to the other boxer. R.R.O. 1970, Reg. 65, s. 107.

109. The referee may consult the judges as to whether a boxer has struck the other boxer below the belt. R.R.O. 1970, Reg. 65, s. 108.

110. Subject to subsection 108 (1), the referee shall warn a boxer who commits a foul. R.R.O. 1970, Reg. 65, s. 109.

111.—(1) The referee may stop a contest or exhibition where he considers that,

- (a) one of the boxers is not trying to win;
- (b) one of the boxers has committed an act detrimental to boxing; or
- (c) neither boxer is trying to win.

(2) Where the contest or exhibition is stopped under clause (1) (a) or (b), the referee shall award the decision to the other boxer. R.R.O. 1970, Reg. 65, s. 110.

112. The referee shall not touch the boxers during a contest or exhibition unless they fail to separate upon his command "break". R.R.O. 1970, Reg. 65, s. 111.

EQUIPMENT

113.—(1) There shall be a ring at least eighteen feet square but not more than twenty-four feet square.

(2) The floor of the ring shall,

- (a) extend beyond the ropes at least eighteen inches; and
- (b) be padded with felt or other soft material at least one and one-half inches thick.

(3) The portion of the floor of the ring outside the ropes shall be called the "apron".

(4) The padding on the floor of the ring shall,

- (a) extend at least one foot beyond the ropes; and
- (b) be covered with canvas, duck or other similar material tightly stretched and laced to the floor of the ring. R.R.O. 1970, Reg. 65, s. 112.

114. The ring shall,

- (a) be not more than four feet above the surrounding floor; and
- (b) have steps leading to it suitable for use by boxers and officials. R.R.O. 1970, Reg. 65, s. 113.

115. At each corner of the ring there shall be a wood or metal post,

- (a) at least eighteen inches from the ropes;
- (b) not more than three inches in diameter; and
- (c) extending from the floor of the ring to a height of fifty-eight inches. R.R.O. 1970, Reg. 65, s. 114.

116.—(1) There shall be three ropes each at least an inch in diameter

(2) The ropes shall be,

(a) eighteen, thirty-five and fifty-two inches, respectively, above the floor of the ring; and

(b) wrapped with a soft material. R.R.O. 1970, Reg. 65, s. 115.

117.—(1) There shall be a bell or gong of sufficient volume that when rung or sounded it can be heard distinctly by the boxers and officials.

(2) Where a gong is used, it shall be attached securely to the ring or to some other suitable object close at hand. R.R.O. 1970, Reg. 65, s. 116.

118. A boxer shall wear new gloves in a main bout. R.R.O. 1970, Reg. 65, s. 117.

119.—(1) Each glove shall weigh at least eight ounces.

(2) The laces shall be tied on the outside of the back of the wrists of the gloves. R.R.O. 1970, Reg. 65, s. 118.

120.—(1) A boxer may wrap on each hand not more than six feet of soft, cloth bandage not more than two inches wide.

(2) The bandage may be held in place by surgeon's adhesive tape,

(a) not more than one inch wide;

(b) for heavy-weights and light heavy-weights, not more than three feet long; and

(c) for other weights, not more than two feet long.

(3) Before a bandage is applied, a boxer may apply, to the back of each hand, surgeon's adhesive tape not more than six inches long or one inch wide.

(4) The adhesive tape shall not be applied across the knuckles. R.R.O. 1970, Reg. 65, s. 119.

121. A person who holds a professional boxing contest or exhibition shall provide,

(a) each boxer with a water bucket and powdered resin for canvas; and

(b) a stool for each of the chief seconds. R.R.O. 1970, Reg. 65, s. 120.

122.—(1) A boxer may wear gum-shields.

(2) A boxer shall wear a protection cup. R.R.O. 1970, Reg. 65, s. 121.

123.—(1) A boxer shall wear,

(a) clean, neat trunks, other than tights, extending from a point not above the navel to a point not higher than half-way between the knees and the crotch; and

(b) shoes of a soft material and without heels, cleats, spikes or hard soles.

(2) The trunks of opposing boxers shall be of contrasting colours. R.R.O. 1970, Reg. 65, s. 122.

124.—(1) No boxer shall wear clothing bearing any advertising or wording other than his name.

(2) No manager or second shall wear clothing bearing any advertising or wording other than the name of the boxer he represents. R.R.O. 1970, Reg. 65, s. 123.

PART III

AMATEUR WRESTLING

125. This Part applies to amateur wrestling contests and exhibitions. R.R.O. 1970, Reg. 65, s. 124.

126. Contests and exhibitions under this Part may be conducted in accordance with the rules of the International Amateur Wrestling Federation. O. Reg. 271/71, s. 7.

127.—(1) Except under a licence in Form 5, no person shall hold an amateur wrestling contest or exhibition.

(2) The fee for the licence is \$2.

(3) The licence is valid only for the contest or exhibition specified therein. R.R.O. 1970, Reg. 65, s. 127.

128. A person holding a licence in Form 5 shall make a report in Form 2 to the Commissioner not later than ten days after the contest or exhibition is held. R.R.O. 1970, Reg. 65, s. 128.

129.—(1) Except under a licence in Form 6, no person shall take part in an amateur wrestling contest or exhibition.

(2) No fee is payable for a licence in Form 6.

(3) The licence expires with the 31st day of March next following the date of issue. R.R.O. 1970, Reg. 65, s. 129.

130.—(1) Except under a licence in Form 7, no person shall referee an amateur wrestling contest or exhibition.

(2) No fee is payable for a licence in Form 7.

(3) The licence expires with the 31st day of March next following the date of issue. R.R.O. 1970, Reg. 65, s. 130.

131. Where the Commissioner considers it necessary in the interests of organized sport, he may order any amateur wrestling contest or exhibition to be stopped and every person holding, officiating at, or taking part in the contest or exhibition shall obey the order. R.R.O. 1970, Reg. 65, s. 131.

PART IV

PROFESSIONAL WRESTLING

132. This Part applies to professional wrestling exhibitions. R.R.O. 1970, Reg. 65, s. 181.

133. In this Part, "fall" means the pinning of both shoulders of a wrestler to the floor of the ring for at least three seconds. R.R.O. 1970, Reg. 65, s. 182.

134.—(1) A professional wrestling match shall be deemed to be an exhibition only.

(2) The word "exhibition" shall appear in the advertising of professional wrestling. R.R.O. 1970, Reg. 65, s. 183.

135.—(1) No championship of the world or other professional wrestling championship shall be recognized by the Commissioner.

(2) Where a bout is advertised as one in which a championship awarded outside Ontario is being contested, it shall be deemed to affect the championship only so far as the authority awarding that championship outside Ontario had power to award it. R.R.O. 1970, Reg. 65, s. 184.

136.—(1) No professional wrestling exhibition shall be held except,

- (a) a match of one fall;
- (b) a match of two falls out of three;
- (c) team or tag-team matches with not more than two wrestlers on each team, and decided by one fall or by two falls out of three; or
- (d) a match of not more than ten eight-minute rounds with an interval of one minute between rounds and decided by one fall or by two falls out of three.

(2) The time limit for exhibitions under clause (1) (a), (b) or (c) is one hour unless extended by the Commissioner. R.R.O. 1970, Reg. 65, s. 185.

137.—(1) No battle royal shall be held.

(2) For the purposes of subsection (1), "battle royal" means an exhibition, other than an exhibition of team wrestling, in which more than two wrestlers are in the ring at the same time.

(3) In team or tag-team wrestling there shall be not more than two teams. R.R.O. 1970, Reg. 65, s. 186.

138. No person shall hold a professional wrestling contest or exhibition,

- (a) at a carnival, fair or exhibition; or
- (b) where male and female wrestlers are in the ring at the same time. O. Reg. 271/71, s. 10.

139. Except under a licence in Form 21 or Form 22, no person shall hold a professional wrestling exhibition. R.R.O. 1970, Reg. 65, s. 188.

140. A licence in Form 21 shall be issued for the holding of professional wrestling exhibitions in a city having a population of at least 500,000, according to the last revised assessment roll, and,

- (a) shall be known as a Professional Wrestling Licence Class 1;
- (b) is valid only for the exhibition specified in the licence; and
- (c) expires with the 31st day of March next following the date of issue. R.R.O. 1970, Reg. 65, s. 189.

141.—(1) An applicant for a Professional Wrestling Licence Class 1 shall,

- (a) make application in Form 20 to the Commissioner on or before the 31st day of March, in the year for which the application is made; and
- (b) deposit with the Commissioner security of at least \$1000 in the form of,
 - (i) money, or
 - (ii) direct or guaranteed securities of the Government of Canada or Ontario payable to bearer.

(2) The fee for the licence is \$500. R.R.O. 1970, Reg. 65, s. 190.

142. Where more than one Professional Wrestling Licence Class 1 is issued for the same city, the Commissioner may require the licensees to furnish him with a list setting forth the dates when and places where they propose to hold exhibitions. R.R.O. 1970, Reg. 65, s. 191.

143.—(1) A licence in Form 22 shall be issued for the holding of a professional wrestling exhibition in a municipality having a population under 500,000, according to the last revised assessment roll, and,

- (a) shall be known as a Professional Wrestling Licence Class 2; and

(b) is valid only for the exhibition specified in the licence.

(2) The fee for the licence is \$5.

(3) An applicant for the licence shall deposit with the Commissioner security of at least \$300 in the form of,

(a) money; or

(b) direct or guaranteed securities of the Government of Canada or Ontario payable to bearer. R.R.O. 1970, Reg. 65, s. 192.

144.—(1) Where the holder of a licence in Form 21 or Form 22 does not pay,

(a) the fees of officials; and

(b) the purses or other remuneration of wrestlers,

within thirty days after an exhibition is held, the security is forfeited.

(2) Where the security is forfeited, and is not in the form of money, the Commissioner shall sell the security within ten days of the forfeiture.

(3) Where the security is forfeited, or forfeited and sold, the Commissioner shall,

(a) use part or all of it to make the payments referred to in clauses (1) (a) and (b); and

(b) refund any balance to the holder of the licence.

(4) Before holding another exhibition, the holder of the licence in Form 21 shall deposit again with the Commissioner security of at least \$1000 in the form set forth in clause 190 (1) (b). R.R.O. 1970, Reg. 65, s. 193.

145. Where a licence in Form 21 or Form 22 expires and the holder has complied with the Act, and this Regulation, the Commissioner shall return the security. R.R.O. 1970, Reg. 65, s. 194.

146.—(1) Except under a licence in Form 23, no person shall take part in a professional wrestling exhibition.

(2) An applicant for the licence shall make application in Form 13.

(3) The fee for the licence is \$5 payable with the application.

(4) The licence expires with the 31st day of March next following the date of issue. R.R.O. 1970, Reg. 65, s. 195.

147.—(1) Except under a licence in Form 24, no person shall referee a professional wrestling exhibition.

(2) The fee for the licence for a resident of Ontario is,

(a) \$25 where the licence is to be used in a city having a population of at least 500,000, according to the last revised assessment roll; and

(b) \$10 where the licence is to be used elsewhere.

(3) The fee for the licence for a non-resident is \$25.

(4) The licence expires with the 31st day of March next following the date of issue. R.R.O. 1970, Reg. 65, s. 196.

148.—(1) A person holding a professional wrestling exhibition shall,

(a) furnish the equipment required by sections 162 to 168;

(b) provide proper facilities for making announcements that can be heard or seen clearly by the spectators;

(c) provide a separate room for use only by the Commissioner, referees and judges;

(d) ensure that the exhibition is begun at the time advertised and conducted throughout in an orderly manner and without unnecessary delay;

(e) where he holds a licence in Form 21, make a report in Form 19 to the Commissioner not later than thirty days after the exhibition is held; and

(f) where he holds a licence in Form 22, make a report in Form 19 to the Commissioner not later than thirty days after the exhibition is held.

(2) A person holding a professional wrestling exhibition may pay a wrestler his expenses but shall not pay the wrestler for his services until after the exhibition. R.R.O. 1970, Reg. 65, s. 197.

149.—(1) Where the Commissioner fines a wrestler, the person holding the professional wrestling exhibition shall,

(a) retain the amount of the fine out of the purse or other remuneration of the wrestler; and

(b) be deemed to be a person who has received money for the Crown and for which he is

accountable within the meaning of the *Financial Administration Act*.

(2) The wrestler has no claim for the amount so retained. R.R.O. 1970, Reg. 65, s. 198.

150. No person shall have any financial interest in a wrestler taking part in a professional wrestling exhibition held on premises owned or leased by that person or in which he is otherwise interested. R.R.O. 1970, Reg. 65, s. 199.

151.—(1) A wrestler under contract to take part in a professional wrestling exhibition shall take a medical examination on the day of the exhibition at a time and place designated by the Commissioner.

(2) Where the exhibition is postponed for more than twenty-four hours, the wrestler shall take a medical examination on the day of the exhibition.

(3) Where the wrestler is unable to pass the examination or is under the influence of drugs or of liquor as defined in the *Liquor Licence Act*, he shall not take part in the exhibition.

(4) The examination shall be conducted by a legally qualified medical practitioner appointed by the Commissioner. R.R.O. 1970, Reg. 65, s. 200.

152.—(1) The medical practitioner conducting the examination under section 151 or a substitute appointed by the Minister shall be in attendance at the exhibition.

(2) The medical practitioner shall not enter the ring unless the referee requests him to do so. R.R.O. 1970, Reg. 65, s. 201.

153. No person other than the referee and contestants shall enter the ring during an exhibition. R.R.O. 1970, Reg. 65, s. 202.

RULES

154.—(1) A wrestler may have a second.

(2) The second shall,

- (a) wear a clean white jersey, sweater or shirt; and
- (b) during a match, remain seated and silent outside the ring but near the corner of his charge. R.R.O. 1970, Reg. 65, s. 203.

155. There shall be a timekeeper who shall,

- (a) sit outside the ring close to a bell or gong;
- (b) be equipped with a stop-watch;
- (c) indicate the beginning and end of a match by ringing the bell or striking the gong; and

- (d) when the match ends before the time limit, advise the master of ceremonies of the time of the match. R.R.O. 1970, Reg. 65, s. 204.

156. There shall be a master of ceremonies who shall,

- (a) ensure that equipment necessary for the exhibition is available;
- (b) take such action as is necessary to have the wrestlers ready for the match in which they are to take part;
- (c) at the beginning of the match introduce the wrestlers to the spectators, announce their names and weights and the length and other particulars of the match;
- (d) announce the result of the match; and
- (e) make no other announcements except those authorized or directed by the Commissioner. R.R.O. 1970, Reg. 65, s. 205.

157. No wrestler shall,

- (a) use grease or vaseline or any slippery substance that might handicap or injure an opponent;
- (b) disobey the referee;
- (c) push, strike, kick, interfere with or threaten the referee;
- (d) apply a strangle hold to his opponent in any manner;
- (e) tangle or hang the neck, arm, foot or leg of an opponent in the ropes;
- (f) kick an opponent with his foot or knee;
- (g) gouge, rub or apply pressure, perspiration or foreign matter to an opponent's eyes;
- (h) scratch or bite an opponent;
- (i) pull the hair of an opponent;
- (j) bend the fingers of an opponent;
- (k) apply or maintain a hold upon an opponent while any part of the opponent's body is outside the ropes;
- (l) touch the ropes with any part of his body while applying or maintaining a hold upon an opponent;
- (m) remove or interfere with his opponent's tights;
- (n) throw an opponent out of the ring over the top rope;

- (o) wrestle or fight with an opponent outside the ring;
- (p) strike or apply pressure to or in the region of an opponent's scrotum;
- (q) have in his possession or use any foreign matter during the match;
- (r) continue to wrestle or fight after the match ends;
- (s) make any gesture indicating that he is committing any action under clauses *c* to *r*;
- (t) do any act to unduly excite the spectators; or
- (u) do any act not in keeping with decency and good taste. R.R.O. 1970, Reg. 65, s. 206.

158. Where a referee is injured during a match and is incapable of continuing to officiate, the wrestlers shall retire to their corners until a substitute referee enters the ring and directs the match to continue. R.R.O. 1970, Reg. 65, s. 207.

159. Where a wrestler,

- (a) is unable to return to the ring after a fall that does not end the match; or
- (b) in the opinion of the referee is in a condition that renders it inadvisable for the wrestler to continue the match,

the referee shall stop the match and award the decision to the other wrestler. R.R.O. 1970, Reg. 65, s. 208.

160. Where the referee declares a fall or awards a decision to a wrestler, the referee and wrestlers shall leave the ring immediately. R.R.O. 1970, Reg. 65, s. 209.

161. The referee shall warn a wrestler who violates a rule and may disqualify him. R.R.O. 1970, Reg. 65, s. 210.

EQUIPMENT

162.—(1) There shall be a ring at least eighteen feet square but not more than twenty feet square.

(2) The floor of the ring shall,

- (a) extend beyond the ropes at least eighteen inches; and

- (b) be padded with felt or other soft material at least one and one-half inches thick.

(3) The portion of the floor of the ring outside the ropes shall be called the "apron".

(4) The padding on the floor of the ring shall,

- (a) extend at least one foot beyond the ropes; and
- (b) be covered with canvas, duck or other similar material tightly stretched and laced to the floor of the ring. R.R.O. 1970, Reg. 65, s. 211.

163. The ring shall,

- (a) be not more than four feet above the surrounding floor; and
- (b) have steps leading thereto suitable for use by wrestlers and officials. R.R.O. 1970, Reg. 65, s. 212.

164. At each corner of the ring there shall be a post,

- (a) at least eighteen inches from the ropes;
- (b) made of metal not more than three inches in diameter; and
- (c) extending from the floor of the ring to a height of fifty-eight inches. R.R.O. 1970, Reg. 65, s. 213.

165.—(1) There shall be three ropes each at least an inch in diameter.

(2) The ropes shall be,

- (a) eighteen, thirty-five and fifty-two inches, respectively, above the floor of the ring; and
- (b) wrapped with a soft material. R.R.O. 1970, Reg. 65, s. 214.

166.—(1) There shall be a bell or gong of sufficient volume that when rung or sounded it can be heard distinctly by the wrestlers and officials.

(2) Where a gong is used, it shall be attached securely to the ring, or to some other suitable object close at hand. R.R.O. 1970, Reg. 65, s. 215.

167.—(1) A wrestler in a professional wrestling exhibition shall,

- (a) be dressed decently;
- (b) wear neat, clean tights and an athletic supporter; and

RECEIPTS	DISBURSEMENTS
.....tickets at \$.....	Prizes.....\$.....
.....tickets at \$.....	Advertising.....\$.....
.....tickets at \$.....	Equipment and gloves.....\$.....
.....tickets at \$.....	Rent for premises.....\$.....
Total.....\$.....	Travelling expenses.....\$.....
	Telephone.....\$.....
	Officials.....\$.....
	Other expenses.....\$.....
	Total.....\$.....
Surplus or deficit.....	

NAMES OF OFFICIALS
Referees.....
Judges.....
Timekeeper.....
Examiner.....
Master of ceremonies.....
Medical practitioner.....

I certify that this report is true and correct.

.....

(signature of licensee)

R.R.O. 1970, Reg. 65, Form 3.

Form 3

Athletics Control Act

LICENCE TO TAKE PART IN AMATEUR BOXING CONTESTS AND EXHIBITIONS

Licence No.....

Under the *Athletics Control Act* and the regulations, and subject to the limitations thereof, this licence is issued to to take part in amateur boxing contests and exhibitions.

This licence expires with the 31st day of March, 19....

Date.....

.....

Commissioner

R.R.O. 1970, Reg. 65, Form 3.

Form 4

Athletics Control Act

LICENCE TO REFEREE AMATEUR BOXING CONTESTS AND EXHIBITIONS

Licence No.....

Under the *Athletics Control Act* and the regulations, and subject to the limitations thereof, this licence is issued to to referee amateur boxing contests and exhibitions.

This licence expires with the 31st day of March, 19....

Date.....

.....

Commissioner

R.R.O. 1970, Reg. 65, Form 4.

Form 5

Athletics Control Act

LICENCE FOR THE HOLDING OF AN
AMATEUR WRESTLING CONTEST
OR EXHIBITION

Licence No.....
Under the *Athletics Control Act* and the regula-
tions, and subject to the limitations thereof, this
licence is issued to
to hold an amateur wrestling
(contest or exhibition)
on the day of, 19....,
at
.....
Date.....

.....
Commissioner
R.R.O. 1970, Reg. 65, Form 5.

Form 6

Athletics Control Act

LICENCE TO TAKE PART IN AMATEUR
WRESTLING CONTESTS AND EXHIBITIONS

Licence No.....

Under the *Athletics Control Act* and the regula-
tions, and subject to the limitations thereof, this
licence is issued to
to take part in amateur wrestling contests and
exhibitions.
This licence expires with the 31st day of March, 19...
Date.....
.....
Commissioner
R.R.O. 1970, Reg. 65, Form 6.

Form 7

Athletics Control Act

LICENCE TO REFEREE AMATEUR
WRESTLING CONTESTS AND EXHIBITIONS

Licence No.....

Under the *Athletics Control Act* and the regula-
tions, and subject to the limitations thereof, this

licence is issued to
to referee amateur wrestling contests and exhibitions.
This licence expires with the 31st day of March, 19...
Date.....
.....
Commissioner
R.R.O. 1970, Reg. 65, Form 7.

Form 8

Athletics Control Act

APPLICATION FOR A PROFESSIONAL
BOXING LICENCE

To the Commissioner:
I,
(print name in full)
of
(post office address)
apply for a Professional Boxing Licence for premises
having a seating capacity of.....persons.
I enclose a fee of \$.....
.....
(month) (day) (year)
.....
(signature of applicant)
O. Reg. 271 /71, s. 11, *part.*

Form 9

Athletics Control Act

PROFESSIONAL BOXING LICENCE

Licence No.....
Under the *Athletics Control Act* and the regula-
tions, and subject to the limitations thereof, this
licence is issued to
to hold professional boxing contests or exhibitions
at premises having a seating capacity of not more
thanpersons.
This licence expires.....
Date.....
.....
Commissioner
O. Reg. 271 /71, s. 11, *part.*

Form 10

*Athletics Control Act*APPLICATION FOR A LICENCE TO HOLD A
PROFESSIONAL BOXING CONTEST
OR EXHIBITION

To The Commissioner:

I,
(print name in full)of
(post office address)

apply for a licence to hold a professional boxing

..... at
(contest or exhibition).....
(name of town or city)on
(date)

I enclose herewith an acknowledgement from

.....

the of
(owner, occupier, manager)

the said

stating that the said

will be available for this
(contest or exhibition)

on the aforementioned date.

Date

.....
(signature of applicant)O. Reg. 271 /71, s. 11, *part.*

Form 11

*Athletics Control Act*LICENCE TO HOLD A PROFESSIONAL
BOXING CONTEST OR EXHIBITIONUnder the *Athletics Control Act* and the regula-
tions, and subject to the limitations thereof, this

licence is issued to to hold a

professional boxing
(contest or exhibition)

at in

on
(date of contest or exhibition)

Date

.....
CommissionerO. Reg. 271 /71, s. 12, *part.*

Form 12

*Athletics Control Act*LICENCE TO TAKE PART IN PROFESSIONAL
BOXING CONTESTS AND EXHIBITIONS

Licence No.

Under the *Athletics Control Act* and the regula-
tions, and subject to the limitations thereof, this

licence is issued to

to take part in professional boxing contests and
exhibitions.

This licence expires with the 31st day of March, 19...

.....
Commissioner

R.R.O. 1970, Reg. 65, Form 11.

Form 13

*Athletics Control Act*APPLICATION BY A PROFESSIONAL
BOXER OR WRESTLER

Date

I apply to the Commissioner for a licence to take
part in,(check ☐ (a) professional boxing contests and
proper exhibitions; or
square) ☐ (b) professional wrestling exhibitions,for the year 19...., and furnish the
following particulars:.....
(given name).....
(surname).....
(post office address)

Age I hold Licence No.

for the Province of
State

My ring name is

I enclose licence fee of \$5.

.....
(signature of applicant)

R.R.O. 1970, Reg. 65, Form 12.

Form 14

Athletics Control Act

LICENCE TO MANAGE PROFESSIONAL BOXERS

Licence No.

Under the *Athletics Control Act* and the regulations, and subject to the limitations thereof, this

licence is issued to

to manage professional boxers.

This licence expires with the 31st day of March, 19...

Date

.....
Commissioner

R.R.O. 1970, Reg. 65, Form 13.

Form 15

Athletics Control Act

CONTRACT BETWEEN A PROFESSIONAL BOXER AND HIS MANAGER

This agreement made in triplicate theday of

....., 19.... between
(name of manager)

of
(municipality or township)

in the Province of
State

called the "Manager", and
(name of boxer)

of
(municipality or township)

Province
in the State of
State

called the "Boxer".

The Manager and Boxer agree as follows:

1. The Boxer appoints the Manager for

years from and including theday of,

19.... to manage him in all boxing contests and exhibitions in which the Boxer takes part.

2. The Manager shall arrange all contests and exhibitions for the Boxer, at such times and places, with such opponents and at such weights as the Manager considers advisable.

3. The Boxer shall not engage in any contest or exhibition without the consent of the Manager.

4. The Manager may advertise any contest or exhibition in which the Boxer is under contract to take part.

5. The Manager shall arrange and pay for the advertising, provide and post forfeits and arrange guarantees, of contests or exhibitions in which the Boxer takes part.

6. Except where the Manager is negligent, the loss of all forfeits shall be borne equally by the Manager and Boxer.

7. The Manager shall, in respect of contests and exhibitions in which the Boxer takes part,

(a) keep proper books of account;

(b) be responsible for the collection and receipt of funds and the payment of accounts; and

(c) give an accounting to the Boxer when he so requests.

8. The Boxer shall,

(a) take part in contests or exhibitions that are arranged by the Manager and conducted in accordance with the *Athletics Control Act* and the regulations thereunder;

(b) keep himself in a proper physical condition; and

(c) train, diet and prepare himself for contests and exhibitions under the supervision and direction of the Manager.

9. The expenses of the Boxer incurred in training for a contest or exhibition and the advertising thereof shall be deducted from the purse or other remuneration of the Boxer for the contest or exhibition and the balance divided as follows:

1. For the Boxer

2. For the Manager

In witness whereof the Manager and Boxer have signed.

.....
(witness) (signature of Manager)

.....
(witness) (signature of Boxer)

R.R.O. 1970, Reg. 65, Form 14.

Form 16

Athletics Control Act

CONTRACT TO TAKE PART IN
A PROFESSIONAL BOXING CONTEST
OR EXHIBITION

This agreement made in triplicate the.....
day of....., 19...., between.....
(name of person
holding the contest or exhibition)
of....., called the Holder, and
(name of municipality)
.....of.....
(name of Boxer) (post office address)
called the Boxer.

The Holder and Boxer agree as follows:

1. The Boxer shall take part in a.....
(contest or
.....of.....three-minute rounds
exhibition)
to be held by the Holder in.....
(name of municipality)
on the.....day of....., 19....,
against.....
(name of opponent)

or a substitute as permitted by the Commissioner,
at catch-weights.

a weight not exceeding.....pounds,
but with a tolerance of one pound either way.

2.—(1) The Holder shall pay the Boxer for his
services, after the.....
(contest or exhibition)
dollars in Canadian money, or.....per cent of the
gross receipts of the.....
(contest or exhibition)

less the amount deducted from those receipts under
subsection 5 (1) of the Act.

(2) The Holder shall pay the Boxer his expenses
in Canadian money, as follows:.....
.....
.....

3.—(1) The Boxer shall deposit with the Holder
money, accepted cheque or bank draft of.....

dollars, to be forfeited in accordance with section 84
of Regulation 76 of Revised Regulations of Ontario,
1980, if he fails to pass his medical examination, does

not appear for the....., or appears
(contest or exhibition)
but in the opinion of the medical practitioner is not
in a physical or mental condition to take part
therein.

(2) The Boxer shall deposit with the Holder money,
accepted cheque or bank draft ofdollars,
to be forfeited in accordance with section 80 of Regu-
lation 76 of Revised Regulations of Ontario, 1980, if he
fails to make the weight specified herein.

4. Where the Boxer is overweight, he shall take
part in the.....unless the Commis-
(contest or exhibition)
sioner considers the difference in weight between the
Boxer and his opponent too great for a.....
(fair contest
.....
or proper exhibition)

5. The Boxer shall be in.....
(name of municipality)
.....days
where the contest or exhibition is to be held)
before the date of the contest or exhibition.

6. The Boxer shall not take part in another
contest or exhibition for at least.....
days before the date of the contest or exhibition set
forth in paragraph 1.

7. Where the Boxer is a non-resident of Ontario,
he shall show to the Commissioner his boxing licence
or card for the province or state in which he resides.

RECEIPTS

.....tickets at \$.....	I enclose.....in the
.....tickets at \$.....	(cheque or money)
.....tickets at \$.....	sum of \$.....as follows:
.....tickets at \$.....	.....per cent of the gross
.....tickets at \$.....	receipts.....\$.....
.....tickets at \$.....	Fines (total of column 3).....\$.....
<hr/>	
Total gross receipts.....\$.....	Total.....\$.....

NAMES OF OFFICIALS

Referees.....

Judges.....

Timekeepers.....

Examiner.....

Master of ceremonies.....

Medical practitioner.....

I certify that this report is true and correct.

.....

(signature of licensee)

R.R.O. 1970, Reg. 65, Form 18.

Form 20

Athletics Control Act

APPLICATION FOR A PROFESSIONAL
WRESTLING LICENCE CLASS 1

To the Commissioner:

I,

(print name in full)

of

(post office address)

apply for a Professional Wrestling Licence Class 1,

for use in

(name of city)

I enclose licence fee of \$500.

.....

(month) (day) (year)

.....

(signature of applicant)

O. Reg. 271/71, s. 12, *part.*

Form 21

Athletics Control Act

PROFESSIONAL WRESTLING LICENCE
CLASS 1

Licence No.....

Under the *Athletics Control Act* and the regula-
tions, and subject to the limitations thereof, this
licence is issued to.....
to hold professional wrestling exhibitions at.....

This licence expires with the 31st day of March, 19...

Date.....

.....

Commissioner

R.R.O. 1970, Reg. 65, Form 19.

Form 22

Athletics Control Act

PROFESSIONAL WRESTLING LICENCE

CLASS 2

Licence No.....

Under the *Athletics Control Act* and the regulations, and subject to the limitations thereof, this licence is issued to.....
to hold a professional wrestling exhibition on the....
day of....., 19... at.....
.....
Date.....

.....
Commissioner

R.R.O. 1970, Reg. 65, Form 20.

Form 23

Athletics Control Act

LICENCE TO TAKE PART IN PROFESSIONAL WRESTLING EXHIBITIONS

Licence No.....

Under the *Athletics Control Act* and the regulations, and subject to the limitations thereof, this

licence is issued to.....
to take part in professional wrestling exhibitions.
This licence expires with the 31st day of March, 19...
Date.....

.....
Commissioner

R.R.O. 1970, Reg. 65, Form 21.

Form 24

Athletics Control Act

LICENCE TO REFEREE PROFESSIONAL WRESTLING EXHIBITIONS

Licence No.....

Under the *Athletics Control Act* and the regulations, and subject to the limitations thereof, this licence is issued to.....
to referee professional wrestling exhibitions at.....
.....
This licence expires with the 31st day of March, 19...
Date.....

.....
Commissioner

R.R.O. 1970, Reg. 65, Form 22.

REGULATION 77

under the Bailiffs Act

GENERAL

1. A fee of \$40 shall be paid to the Registrar at the time of application for appointment. O. Reg. 518/79, s. 1.

2. The bond required by section 14 of the Act shall be,

(a) in Form 1, where the bond is a personal bond;

(b) in Form 2, where the bond is a bond of a guarantee company approved under the *Guarantee Companies Securities Act*; and

(c) in Form 3, where the bond is a bond of a guarantor, other than a guarantee company. R.R.O. 1970, Reg. 66, s. 2.

3.—(1) Subject to subsection (2), where the bailiff is a corporation or the owner or a partner of the business in which he acts as bailiff, the amount of the bond shall be \$5,000.

(2) Where the bailiff is one to whom subsection (1) does not apply or where the bailiff is also appointed as a small claims court bailiff, the amount of the bond shall be \$1,000. R.R.O. 1970, Reg. 66, s. 3.

Form 1

Bailiffs Act

PERSONAL BOND

KNOW ALL MEN BY THESE PRESENTS,
THAT I,.....

.....
(hereinafter called the Obligor) am firmly bound unto Her Majesty in right of Ontario (hereinafter

called the Oblige) in the sum of.....Dollars

(\$.....) of lawful money of Canada, to be paid unto the Oblige, her successors and assigns, for

which payment well and truly to be made, I, the said.....

(name of Obligor)

bind myself, my heirs, executors, administrators and

assigns and I, the said.....

(name of Obligor)

deposit with the Oblige.....
as collateral security to this bond.

1. This bond may be cancelled by the obligor by giving to the Inspector of Legal Offices at least two months notice in writing of intention to cancel and it shall be deemed to be cancelled on the date stated in the notice, which date shall be not less than two months after receipt of the notice by the Inspector of Legal Offices.

2. For the purposes of every act or omission occurring during the period in which this bond is in force, this bond shall continue in force and the collateral security shall remain on deposit for a period of two years after the revocation of the appointment of the obligor, as bailiff, or the cancellation of the bond, whichever occurs first.

SEALED with my Seal and dated this.....day

of....., 19...

NOW THE CONDITION of the above obligation is such that if the obligation does not by reason of any act, matter or thing at any time hereafter become or be forfeit under the Act, then the obligation shall be void, but otherwise shall be and remain in full force and effect.

Signed, Sealed and Delivered in the presence of

.....
(Obligor)

R.R.O. 1970, Reg. 66, Form 1.

Form 2

Bailiffs Act

GUARANTEE COMPANY BOND

KNOW ALL MEN BY THESE PRESENTS,
THAT WE,.....

.....

(hereinafter called the Principal) as Principal, and

.....

(hereinafter called the Surety) as Surety, are held and firmly bound unto Her Majesty in right of Ontario

(hereinafter called the Obligee) in the sum of.....

Dollars (\$.....) of lawful money of Canada, to be paid unto the Obligee, her successors and assigns, for which payment well and truly to be made, I, the

said.....
(name of Principal)

bind myself, my heirs, executors, administrators and assigns and we, the said.....
(name of Surety)

bind ourselves, our successors and assigns jointly and firmly by these presents.

1. This bond may be cancelled by the Surety by giving to the Inspector of Legal Offices at least two months notice in writing of intention to cancel and it shall be deemed to be cancelled on the date stated in the notice, which date shall be not less than two months after receipt of the notice by the Inspector of Legal Offices.

2. For the purposes of every act or omission occurring during the period in which this bond is in force, this bond shall continue in force and shall remain on deposit for a period of two years after the revocation of the appointment of the Principal, as bailiff, or the cancellation of the bond, whichever occurs first.

SEALED with our Seals and dated this.....

day of....., 19....

NOW THE CONDITION of the above obligation is such that if the obligation does not by reason of any act, matter or thing at any time hereafter become or be forfeit under the Act, then the obligation shall be void, but otherwise shall be and remain in full force and effect.

Signed, Sealed and Delivered in the presence of

..... Principal.....

..... Surety.....

Form 3

Bailiffs Act

BOND BY GUARANTOR
OTHER THAN GUARANTEE COMPANY

KNOW ALL MEN BY THESE PRESENTS,

THAT WE,.....

.....
(hereinafter called the Principal) as Principal, and

.....
(hereinafter called the Guarantor) as Guarantor, are held and firmly bound unto Her Majesty in right of Ontario (hereinafter called the Obligee) in the sum of

.....Dollars (\$.....) of lawful money of Canada, to be paid unto the Obligee, her successors and assigns, for which payment well and truly to

be made, I, the said.....
(name of Principal)

bind myself, my heirs, executors and administrators and

I, the said.....
(name of Guarantor)

guarantee the payment of the said sum of.....

Dollars (\$.....) to the Obligee and I, the said
.....
(name of Guarantor)

bind myself, my heirs, executors, administrators and assigns jointly and firmly by these presents and by

depositing with the Obligee.....
as collateral security to this bond.

1. This bond may be cancelled by the Guarantor by giving to the Inspector of Legal Offices at least two months notice in writing of intention to cancel and it shall be deemed to be cancelled on the date stated in the notice, which date shall be not less than two months after receipt of the notice by the Inspector of Legal Offices.

2. For the purposes of every act or omission occurring during the period in which this bond is in force, this bond shall continue in force and the collateral security shall remain on deposit for a period of two years after the revocation of the appointment of the Principal, as bailiff, or the cancellation of the bond, whichever occurs first.

SEALED with our Seals and dated this.....
day of....., 19....

NOW THE CONDITION of the above obligation is such that if the obligation does not by reason of any act, matter or thing at any time hereafter become or be forfeit under the Act, then the obligation shall be void, but otherwise shall be and remain in full force and effect.

Signed, Sealed and Delivered in the presence of

..... Principal.....

..... Guarantor.....

REGULATION 78

under the Beach Protection Act

GENERAL

LICENCES

1. A licence issued under section 2 of the Act shall be in Form 1. R.R.O. 1970, Reg. 68, s. 1.

2. Unless otherwise stated in the licence, each licence expires with the 31st day of March following the date of issue. R.R.O. 1970, Reg. 68, s. 2.

3.—(1) Subject to subsections (2) and (3), the fee for a licence is \$10.

(2) Where the capacity of the boat, vessel or other water craft in which the sand is to be carried away does not exceed 230 cubic metres, the fee for a licence is \$25.

(3) Where the capacity of the boat, vessel or other water craft in which the sand is to be carried away exceeds 230 cubic metres, the fee for a licence is \$100.

(4) Where a licence is issued after the 30th day of September in any year, the fee is one-half of that prescribed in subsection (1), (2) or (3), as the case may be. O. Reg. 201/79, s. 1.

4. An applicant for a licence shall, upon the request of the Minister, file a plan of the geographical area in which he desires to operate, indicating as nearly as possible the extent and nature of the deposit of sand, the depth of water covering it and the proposed method of taking sand. R.R.O. 1970, Reg. 68, s. 4.

5.—(1) A licensee shall make a return on or before the tenth day of each month showing the quantity of sand taken during the previous month.

(2) Where the licensee operates a drag-line or takes sand with equipment that is not mechanical equipment, the return shall be in Form 2.

(3) Where the licensee operates a dredging vessel, the return shall be in Form 3 verified by an affidavit in Form 4. R.R.O. 1970, Reg. 68, s. 5.

6. A licence does not give the licensee the exclusive right to take sand from any geographical area. R.R.O. 1970, Reg. 68, s. 6.

7. A licensee shall not interfere with the free use of any geographical area by the public for navigation or other purposes. R.R.O. 1970, Reg. 68, s. 7.

8. A licensee shall obey the instructions of the District Engineer of the Department of Public

Works of Canada or his representative as to the location on which dredging operations may be conducted and the depth to which excavation may be made. R.R.O. 1970, Reg. 68, s. 8.

9. A licence shall not be assigned or transferred without the consent in writing of the Minister. R.R.O. 1970, Reg. 68, s. 9.

BOND

10. A bond required to be given under subsection 16 (3) of the Act shall be the bond of a guarantee company as defined in the *Guarantee Companies Securities Act* and shall be in Form 5. R.R.O. 1970, Reg. 68, s. 10.

RETURNS

11. The captain, master or person in charge of a dredging vessel or equipment of any kind for taking or moving sand shall make, when and as often as required by the Minister a verified return in Form 6 of the quantity of sand taken or moved, giving dates, localities, quantities and points of delivery. R.R.O. 1970, Reg. 68, s. 11.

12. The Minister or his agent may at any time enter upon any vessel, premises, plant or equipment of a licensee and shall have full and complete access to all his log-books or other books and all accounts, letters and records of all kinds used for or in respect of his operations in taking sand and may examine and take copies thereof or abstracts therefrom. R.R.O. 1970, Reg. 68, s. 12.

13. Section 11 of the Act applies to the areas described in the Schedule. R.R.O. 1970, Reg. 68, s. 13.

Form 1
Beach Protection Act

LICENCE TO TAKE SAND

Fee..... No.....

Under the *Beach Protection Act* and the regulations, and subject to the limitations thereof, this licence is issued to

to takefrom the

.....

within the geographical area described as follows:

.....

.....

excepting therefrom that area lying within metres of the shore line with an operating plant known as, upon the condition that the licensee on or before the 10th day of each month pay to the Treasurer of Ontario a sum of cents for every cubic metre removed from the geographical area herein described.

This licence expires with the 31st day of March, 19....

.....
Minister of

Dated at Toronto, this....day of, 19..

O. Reg. 201/79, s. 2, *part.*

Form 2

Beach Protection Act

RETURN OF SAND SALES

Licence No.....

Date of Sale	Purchaser	Quantity Cubic Metres	Municipal Sales	
			Name of Municipality	Quantity Cubic Metres

I certify that this return contains a full, true and complete record of all sand sold from the..... day of, 19...., to the..... day of, 19...., both inclusive.

.....
(licensee)

O. Reg. 201/79, s. 2, *part.*

Form 3

Beach Protection Act

RETURN OF SAND TAKEN OR MOVED BY.....

Licence No.....

Date of Removal	Name of Carrying Vessel	Cleared at Canadian Customs Port of	Date of Clearing	Delivered at Port of	Cubic Metres of Material moved	Rate per Cubic Metre	Amount

O. Reg. 201/79, s. 2, *part.*

Form 4

Beach Protection Act

I, of the
..... of in the
..... of make oath and say:

1. That the return annexed hereto numbered contains a true, full and complete record of all sand taken or moved during the period from 19.... to 19...., both inclusive, under Licence to Take Sand No.

Sworn before me at the

..... of .....	.....
in the of	(signature of licensee, manager, agent, etc., as the case may be)
..... this	
day of	
19....	

A Commissioner, etc.

R.R.O. 1970, Reg. 68, Form 4.

Form 5

Beach Protection Act

BOND

KNOW ALL MEN BY THESE PRESENTS

THAT WE,
(hereinafter called the Principal) as Principal, and

.....
(hereinafter called the Surety) as Surety, are held and firmly bound unto Her Majesty in right of Ontario, hereinafter called the Obligee, in the sum of

..... Dollars (\$.....) of lawful money of Canada, to be paid unto the Obligee, her successors and assigns, for which payment well and

truly to be made, I,
(name of Principal)

the Principal bind myself, my executors, administrators, successors and assigns, and, We,

....., the Surety bind ourselves,
(name of Surety)

our successors and assigns jointly and firmly by these presents.

SEALED with our seals and dated this
day of, 19....

WHEREAS the Minister of Mines and Northern Affairs for the Province of Ontario did on or about the day of 19... issue Licence No. under the *Beach Protection Act* to

..... for the taking of sand from the geographical area described in the licence, subject to the payment to the Treasurer of Ontario of the sum of money therein stated and subject to certain other conditions and restrictions as by reference to the licence will more fully appear.

The total liability imposed upon the Principal or Surety by this Bond and any and all renewals thereof shall be concurrent and not cumulative and shall in no event exceed the sum written above or the amount substituted for such sum by any subsequent endorsement or renewal certificate.

AND WHEREAS the Principal has been required to give security for the payment of the sum as aforesaid.

THE CONDITION of the above obligation is such that if the said obligation does not by reason of any act, matter or thing at any time hereafter become or be forfeit under the *Beach Protection Act*, the obligation shall be void but otherwise shall be and remain in full force and effect and shall be subject to forfeiture.

Signed, sealed and delivered in the presence of	..... Principal
.....	..... Surety
.....	

R.R.O. 1970, Reg. 68, Form 5.

Form 6

Beach Protection Act

RETURN

Return of sand taken or moved by operated in respect of Licence No. issued to from geographical area for

the period commencing with the.....day of
....., 19.... and ending on the.....
day of....., 19....

Date of Delivery	Point of Delivery	Cargo Cubic Metres	Trip No.	Remarks

Sworn before me at the
.....of.....
in the.....of
.....this.....
day of.....,
19....

I hereby make oath and say
that this return is a true, full
and complete record of all
sand taken or moved during
the period set forth above.

(captain, master or
person in charge)

A Commissioner, etc.

O. Reg. 201/79, s. 2, *part*.

Schedule

1. That part of the shore of Lake Erie in the County of Essex lying in front of Lot 97 in the 1st Conces-

sion of the Township of Colchester South and the easterly 1500 feet of Lot 60 in the Township of Malden, including the allowance for road (town line) between the townships of Colchester South and Malden.

2. That part of the shore of Lake Erie in the County of Kent lying within the limits described as follows:

BEGINNING at a point 700 feet east of the road allowance between lots 2 and 3 in the 4th Concession of Communication Road and extending easterly to the westerly limit of Lot 433, registered plan No. 421, which plan is a redivision of lots 1, 2, "E" and "F", in the 4th Concession of Communication Road, in the Township of Harwich, in the County of Kent, excepting therefrom the following area:

BEGINNING at the road allowance between lots 2 and 3 in the 4th Concession west of Communication Road in the township; thence easterly 700 feet to where a post has been planted at the high-water mark of Lake Erie, being the place of beginning; thence southerly to the water's edge of Lake Erie; thence easterly along the water's edge 142 feet to a wooden groyne; thence northerly to the highwater mark; thence westerly thereon to the place of beginning.

3. That part of the shore of Lake Ontario lying within the limits of the former Township of Grant-ham in the former County of Lincoln, which now forms part of the City of St. Catharines and the Town of Niagara-on-the-Lake in The Regional Municipality of Niagara.

R.R.O. 1970, Reg. 68, Sched.

REGULATION 79

under the Beef Cattle Marketing Act

LICENCE FEES

INTERPRETATION

1. In this Regulation,

- (a) "plant operator" means a person operating a plant;
- (b) "public auction sale" means a sale or offering for sale of cattle by public auction;
- (c) "public auction sale operator" means a person engaged in the business of operating public auction sales. R.R.O. 1970, Reg. 69, s. 1.

ASSOCIATION

2. The Ontario Cattlemen's Association is designated as the association for the purposes of the Act and regulations thereunder. O. Reg. 903/76, s. 1.

LICENCES

3. A licence to sell cattle shall be in Form 1. R.R.O. 1970, Reg. 69, s. 3.

4. The licence fees payable respecting a licence in Form 1 shall be, in respect of each head of cattle sold,

- (a) 35 cents for each head of cattle that weighs 225 kilograms or more, live weight; and
- (b) 25 cents for each head of cattle that weighs less than 225 kilograms, live weight. O. Reg. 425/80, s. 1.

5. Subject to section 6, the holder of a licence in Form 1 shall pay the licence fees referred to in section 4 to the association. R.R.O. 1970, Reg. 69, s. 5.

6.—(1) Every plant operator and every public auction sale operator who receives cattle from a seller thereof shall deduct, from the moneys payable to the seller, the licence fees payable by the seller to the association respecting the cattle.

(2) On the 15th day of each month, a plant operator or a public auction sale operator shall forward to the association all licence fees deducted by him pursuant to subsection (1) respecting cattle received during the preceding calendar month together with a statement showing the number of cattle that were received that weighed 500 pounds or more, live weight, and the number of cattle that were received that weighed less than 500 pounds, live weight. R.R.O. 1970, Reg. 69, s. 6.

7. The association may recover licence fees owing to the association by suit in a court of competent jurisdiction. R.R.O. 1970, Reg. 69, s. 7.

REFUNDS

8.—(1) An application for a refund of licence fees shall,

- (a) be in writing;
- (b) be addressed to the association at its usual place of business;
- (c) be made within ninety days of the date of the sale of the cattle respecting which the licence fees were paid; and
- (d) include a statement in writing issued by the person who deducted the licence fees indicating the amount of licence fees deducted by him and forwarded to the association on behalf of the applicant.

(2) Where an applicant has complied with subsection (1), the association shall, within ninety days of receipt of the application, refund the licence fees paid by or on behalf of the applicant and for which application for refund was made. R.R.O. 1970, Reg. 69, s. 8.

(3) Notwithstanding subsection (1), an application for a refund may be submitted to the association by or on behalf of the same applicant only once in each quarter of the calendar year. O. Reg. 664/78, s. 1.

EXEMPTIONS

9.—(1) Cattle are exempt from this Regulation where,

- (a) the cattle are, to the time of sale thereof, owned by a person who does not reside in Ontario;
- (b) the cattle are sold through a public auction sale that is organized for the purpose of selling only cattle for the production of milk;
- (c) the cattle are sold through a public auction sale that is organized for the purpose of selling only cattle for breeding;
- (d) the cattle are sold through a public auction sale in which all of the cattle that are sold

or offered for sale are owned by the person on whose premises the public auction sale is held; or

(e) the cattle are sold neither through a public auction sale nor to a plant operator.

(2) Persons who sell cattle that are, for such sale, exempt under subsection (1), are, in respect of those cattle so sold, exempt from this Regulation. R.R.O. 1970, Reg. 69, s. 9.

Form 1

Beef Cattle Marketing Act

LICENCE TO SELL CATTLE

Under the *Beef Cattle Marketing Act* and the regulations, and subject to the limitations thereof, this licence is issued to,

.....
(name)
of
(address)

to sell cattle.

Dated at Toronto, this day of

19....

THE ONTARIO CATTLEMEN'S
ASSOCIATION:

.....
(President)

.....
(Secretary)

O. Reg. 903/76, s. 2.

REGULATION 80

under the Beef Cattle Marketing Act

WEIGHING OF BEEF CARCASSES

1. In this Regulation,

- (a) "beef carcass" means the entire carcass of a head of beef cattle except,
 - (i) the hide, that part of the head and neck forward of the first cervical joint, that part of the fore-shank below the knee joint, that part of the hind-shank below the hock joint, the alimentary canal, liver, kidneys, spleen, genital tract and genitalia, mammary system, heart, lungs, membranous portion of the diaphragm, pillar of the diaphragm (hanging tender), spinal cord, internal fats that have been removed in accordance with good commercial practices, including channel fat, kidney fat, pelvic fat and heart fat, external cod fat and udder fat, and the tail posterior to the first coccygeal vertebrae, or
 - (ii) any part of the carcass the removal of which is required under the *Meat Inspection Act* (Canada) or the *Meat Inspection Act* (Ontario) or any regulation made under either of them;
 - (b) "Commissioner" means the Live Stock Commissioner of Ontario;
 - (c) "graded" means graded under the *Farm Products Grades and Sales Act* or the *Canada Agricultural Products Standards Act*;
 - (d) "grader" means a person appointed under the *Farm Products Grades and Sales Act* or the *Canada Agricultural Products Standards Act* for the purpose of grading beef carcasses;
 - (e) "head of beef cattle" means a head of cattle that has been sold by the producer thereof to an operator for a price calculated on the basis of the weight of the carcass thereof;
 - (f) "operator" means a person operating a plant and includes his agent or employee;
 - (g) "sale weight" means the hot weight of a beef carcass less any tare in respect thereof;
 - (h) "tare" means an allowance for the weight of materials and equipment that are weighed with the beef carcass but do not form part thereof. O. Reg. 586/76, s. 1.
2. Where a beef carcass is weighed to determine its sale weight, the operator shall weigh the entire beef carcass without removing any portion thereof. O. Reg. 586/76, s. 2.
- 3.—(1) No operator shall deduct any allowance in respect of shrinkage or any tare in calculating the sale weight of a beef carcass other than a tare respecting materials and equipment used for carrying or supporting the beef carcass while it is being weighed.
- (2) Where a tare is deducted from the weight of a beef carcass, the operator shall not, in respect of the beef carcass, deduct a total tare that exceeds the plant standard declared by the operator under clause 7 (f). O. Reg. 586/76, s. 3.
4. An operator shall weigh a beef carcass to determine its sale weight before the beef carcass is placed in a cooler and record the weight on a weight sheet in a form approved by the Commissioner. O. Reg. 586/76, s. 4.
- 5.—(1) Subject to subsection (4), every operator of a plant in which a beef carcass is weighed or graded shall deliver to the person from whom he purchased the head of beef cattle a copy of the grading certificate issued under the *Farm Products Grades and Sales Act* or the *Canada Agricultural Products Standards Act*.
- (2) Every operator of a plant shall designate one or more persons, satisfactory to an inspector assigned to the plant, to be scale operators for the plant.
- (3) After the weighing of each lot of beef carcasses the scale operator shall, upon the request of an inspector or otherwise at the next interruption of the kill, provide an inspector who has been designated by the Minister to supervise weights with a signed copy of the weight sheet upon which the weight of each beef carcass is recorded.
- (4) This section does not apply where the beef carcass that was weighed or graded was sold to the operator on the basis of its live weight. O. Reg. 586/76, s. 5.

6. Every inspector who has been designated by the Minister to supervise weights shall, with respect to the plant to which he is assigned,

(a) check the accuracy of the weighing mechanism and the accuracy of the tare adjustment at least twice each day on days when carcasses are weighed for settlement on the basis of carcass weight;

(b) check the weight of items comprising the tare allowance on a random basis in order to verify whether or not,

(i) there is uniformity of tare for all carcasses, and

(ii) the operator of the plant is conforming, within plus or minus one-half pound or, where the plant is using metric weights within plus or minus 225 grams, to the plant standard referred to in clause 7 (f);

(c) mark and set aside any tare items that in his opinion do not comply with clause 7 (f) and, where he is satisfied such tare items subsequently comply, release the tare items for use in the plant;

(d) post a notice on every scale, signed by himself, indicating the plant standard tare weight;

(e) report any malfunction of scales or any other irregularity affecting weight or sale price to the Commissioner within twenty-four hours;

(f) submit to the Commissioner reports on tare weights after each inspection of tare items and a log of scale inspection reports on forms provided by the Commissioner;

(g) promptly advise the operator of any action necessary to achieve compliance with the Act or this Regulation;

(h) record on the log of scale inspection a record of action taken by an operator to achieve compliance with the Act or this Regulation and conduct such inspection as is necessary to confirm the efficacy of such action;

(i) order the operator to reweigh any beef carcasses that, in his opinion, may not have been weighed or recorded properly; and

(j) prior to grading, provide to the grader assigned to the plant, the weight sheet referred to in subsection 5 (3) and the manifest referred to in clause 7 (g). O. Reg. 586/76, s. 6.

7. An operator shall,

(a) subject to clause (b), supply, for the use of inspectors, adequate test weights for checking scales and arrange for annual certification of such weights under the *Weights and Measures Act* (Canada);

(b) in the case of an operator slaughtering fewer than 50 cattle per week and where the Commissioner has given his approval in writing, in lieu of supplying the test weights referred to in clause a, maintain and use a scale in determining sale weight that is certified annually under the *Weights and Measures Act* (Canada);

(c) supply for the use of inspectors in weighing tare items a suitable small scale certified under the *Weights and Measures Act* (Canada);

(d) provide all necessary assistance in handling weights to an inspector performing his duties under section 6;

(e) provide adequate storage for weights supplied under clause (a) and maintain the weights in a clean condition;

(f) establish and declare to the inspector a plant standard for tare deduction and shall conform to such standard within plus or minus one-half pound per beef carcass, or where the plant is using metric weights, within plus or minus 225 grams per beef carcass; and

(g) provide, prior to slaughter, to the inspector designated to supervise weights, a manifest indicating the name and address of the person from whom the operator purchased the animals, the number and sex of the animals and identification to be used to identify the lot of animals and beef carcasses. O. Reg. 586/76, s. 7.

REGULATION 81

under the Bees Act

GENERAL

REGISTRATION

1. The Provincial Apiarist shall keep a register of all bee-keepers in Ontario showing the name and address of each bee-keeper, the location of each apiary and the number of colonies of bees kept by each bee-keeper. R.R.O. 1970, Reg. 71, s. 1.

2.—(1) An application for a certificate of registration to keep bees shall be in Form 1. R.R.O. 1970, Reg. 71, s. 2 (1).

(2) A certificate of registration shall be in Form 2. R.R.O. 1970, Reg. 71, s. 2 (3).

RECORDS

3.—(1) The records kept by every bee-keeper shall show,

- (a) the location of each apiary;
- (b) the period of time the apiary is at each location; and
- (c) the number of colonies in each apiary.

(2) The records kept by every person who sells bees shall show,

- (a) the name and address of every person to whom he sells bees or package bees;
- (b) the quantity of bees or package bees sold;
- (c) the date of shipment of the bees or package bees; and
- (d) the place from which the bees or package bees were shipped. R.R.O. 1970, Reg. 71, s. 3.

RETURNS BY BEE-KEEPERS

4.—(1) Every person who sells bees shall make a return to the Provincial Apiarist in writing stating the name and address of the buyer, the quantities of bees or package bees sold and the date of shipment of each quantity.

(2) The return shall be made within thirty days of the date of sale of the bees or package bees. R.R.O. 1970, Reg. 71, s. 4.

REPORT OF INSPECTOR

5.—(1) Subject to subsection (3), each inspector shall report to the Provincial Apiarist within ten days of each inspection of an apiary.

(2) The report of an inspector shall be in Form 3.

(3) Where an inspector finds colonies of bees infected with American foul brood, he shall immediately notify in writing the Provincial Apiarist of the location and number of the colonies so infected and the name and address of the owner. R.R.O. 1970, Reg. 71, s. 5.

ORDER OF INSPECTOR

6. An order of an inspector under subsection 5 (1) or (2) of the Act shall be in Form 4. R.R.O. 1970, Reg. 71, s. 6.

PERMITS

7. A permit under subsection 12 (1) of the Act shall be in Form 5. R.R.O. 1970, Reg. 71, s. 7.

8. A permit under section 13 of the Act shall be in Form 6. R.R.O. 1970, Reg. 71, s. 8.

Form 1

Bees Act

APPLICATION FOR A CERTIFICATE OF REGISTRATION TO KEEP BEES

To the Provincial Apiarist,
University of Guelph,
Guelph, Ontario.

I,
(name of applicant)

.....
(address of applicant)

in the County, etc., ofmake application under the *Bees Act* for a certificate of registration to keep bees for the year ending with the 31st day of

May, 19.... and in support of this application the following facts are stated:

1. I am the owner or person in possession of
(state number)
colonies.

Remarks: (specify inspection No.)

Date of report

.....
(signature of inspector)
R.R.O. 1970, Reg. 71, Form 3.

Form 4
Bees Act

ORDER OF INSPECTOR
UNDER SECTION 5 OF THE ACT

To.....
(name of bee-keeper)
.....
(address)

Upon inspection on the.....day of.....,
19.... of bees, hives or equipment pertaining to the
keeping of bees owned by you at
(location)

*I found as follows:

- 1. Disease of a virulent type exists in the bees.
- 2. Disease not of a virulent type exists in the bees.
- 3. Causal organisms of disease of a virulent type exist in or on hives or equipment pertaining to the keeping of bees.
- 4. Causal organisms of disease not of a virulent type exist in or on hives or equipment pertaining to the keeping of bees.

Under subsection 5 (...) of the Act, you are
(insert 1 or 2)

hereby ordered

.....
(state whether to disinfect the bees, hives or
.....
equipment and give description and give manner of
.....
disinfection, or to destroy by fire the bees, hives
.....
or equipment and give description)

This order shall be complied with on or before the
.....day of....., 19....
Dated at....., Ontario, this.....
day of....., 19....
.....
(signature of inspector)

*Strike out paragraphs not applicable and initial
deletions.
R.R.O. 1970, Reg. 71, Form 4.

Form 5
Bees Act

PERMIT UNDER SECTION 12 (1) OF THE ACT

Permit No.

Under subsection 12 (1) of the Act this permit
is issued to
(name)
.....
(address)

.....
(state whether to sell or remove or cause to be removed)

from his premises, the bees, hives or equipment
pertaining to the keeping of bees described as
follows:
.....
.....
.....
.....
the bees, hives or equipment (as the case may be)

were inspected and found to be free from disease or infection.

This permit expires with the.....day of
....., 19....

Dated at Guelph, Ontario, this.....day of
....., 19....

(Provincial Apiarist)

R.R.O. 1970, Reg. 71, Form 5.

Form 6

Bees Act

PERMIT UNDER SECTION 13 OF THE ACT

Permit No.....

Under section 13 of the Act this permit is issued

to.....
(name)

.....
(address)

(state whether to receive or transport)

bees other than package bees or used hives or used equipment pertaining to the keeping of bees obtained from outside Ontario described as follows:

to.....
(state location at which bees, used hives or used

equipment are to be received)

I am satisfied that such bees are free from disease and that such used hives or used equipment are not infected.

Dated at Guelph, Ontario, this.....day of
....., 19....

(Provincial Apiarist)

R.R.O. 1970, Reg. 71, Form 6.

REGULATION 82

under the Bills of Sale Act

GENERAL

1. A renewal statement made under subsection 13 (2) of the Act shall be in Form 1. O. Reg. 268/76, s. 2.
2. The fee to be paid on the registration of a bill of sale or renewal statement thereof is \$3.00. O. Reg. 268/76, s. 3.
3. The fees to be paid in respect of the following matters are:

1. For a search..... \$0.50

2. For a certificate of registration..... 0.50

3. For a photocopy of a document for each page required, including production of the document..... 0.50

4. For certifying a copy to which item 3 applies..... 0.50

5. For production of a bill of sale for inspection..... 0.25

O. Reg. 268/76, s. 4.

Form 1
Bills of Sale Act

RENEWAL STATEMENT

TAKE NOTICE that a Bill of Sale registered under the *Bills of Sale Act* executed on the day of, 19.... and registered (or last renewed, as the case may be) on the day of, 19.... in the office of the branch registrar at as Number..... between as Seller (give full name and address) —and— as Buyer (give full name and address) is hereby (further) renewed. (signature of buyer) O. Reg. 268/76, Form 2.

REGULATION 83

under the Blind Persons' Rights Act

DOG GUIDES

1. A dog that has successfully completed the training program at any of the following facilities is qualified as a dog guide:

1. Eye Dog Foundation for the Blind, Los Angeles, California.
2. The Seeing Eye, Inc., Morristown, New Jersey.
3. Guide Dogs for the Blind Inc., San Rafael, California.
4. International Guiding Eyes Inc., Hollywood, California.
5. Eye of the Pacific Guide Dogs Inc., Honolulu, Hawaii.
6. Leader Dogs for the Blind, Rochester, Michigan.
7. Guide Dog Foundation for the Blind Inc., Forest Hills, New York.
8. Guiding Eyes for the Blind Inc., New York, New York.
9. Pilot Dogs Inc., Columbus, Ohio.
10. Guide Dogs for the Blind Association, Windsor, England. O. Reg. 535/76, s. 1; O. Reg. 843/79, s. 1.

REGULATION 84

under the Boilers and Pressure Vessels Act

GENERAL

INTERPRETATION

1. In this Regulation,

- (a) "air receiver" means a pressure vessel that contains, distributes or otherwise handles air under pressure.
- (b) "Canadian Registration Number" means the registration number given under section 10 to a boiler or pressure vessel;
- (c) "compressed-air plant" means a plant in which pressure vessels contain, distribute or otherwise handle air under a pressure of more than fifteen pounds;
- (d) "compressed-gas plant" means a plant in which pressure vessels may be used for compressed gas but does not include a refrigeration plant;
- (e) "cushion tank" means a pressure vessel designed for installation in a closed hot water heating system to provide an air cushion for the expansion of water;
- (f) "direct expansion coils" means the piping in which liquid refrigerant is vaporized to produce ice in a rink for hockey, skating or curling;
- (g) "head" means,
 - (i) when used in respect of a fire-tube boiler, the plate into which the ends of the tubes are fitted,
 - (ii) when used in respect of a water-tube boiler, the plate closing the ends of the drum, and
 - (iii) when used in respect of a pressure vessel, the plate closing the part in which the gas, vapour or liquid is under pressure;
- (h) "heat exchanger" means a pressure vessel under pressure of more than fifteen pounds used exclusively for transferring heat from one substance to another;
- (i) "hot water storage tank" means a pressure vessel used for the storage of hot water;
- (j) "locomotive boiler" means a high pressure boiler that may be used to furnish motivating power for travelling on rails;
- (k) "miniature boiler" means a boiler having a shell,
 - (i) with an inside diameter not greater than sixteen inches,
 - (ii) with an over-all length not greater than forty-two inches measured from outside to outside of the heads at their centres,
 - (iii) with a water-heating surface not more than twenty square feet, and
 - (iv) with a maximum working pressure not greater than one hundred pounds;
- (l) "oil-refining plant" means a plant in which the pressure vessels may be used for separating, evaporating, cracking, desalting, purifying or refining oil or any of its constituents;
- (m) "power boiler" means any high pressure boiler other than a locomotive boiler or a miniature boiler;
- (n) "power rating" means,
 - (i) when used in respect of a compressed-air plant, or compressed-gas plant, the total horse-power of the machinery-units driving the compressors,
 - (ii) when used in respect of an electric boiler in a steam plant, the quotient obtained by dividing the total maximum capacity of the heating elements in kilowatts by ten, or
 - (iii) when used in respect of a boiler in a steam plant, other than an electric boiler, the quotient obtained by dividing the total heating surface of the boiler in square feet by ten;
- (o) "pressure piping" means piping in which a pressure of more than fifteen pounds is exerted internally;
- (p) "refrigerant vessel" means a pressure vessel that is a component part of a refrigeration system;
- (q) "steam plant" means a plant in which the boilers may be used for generating or utilizing steam and includes any pipe, fitting or other equipment that is attached to the boilers and constitutes one unit with them. R.R.O. 1970, Reg. 75, s. 1; O. Reg. 164/72, s. 1; O. Reg. 542/73, s. 1.

CLASSIFICATION OF BOILERS, PLANTS AND REFRIGERANTS

2.—(1) High pressure boilers are classified as,

- (a) locomotive boilers;
- (b) miniature boilers; and
- (c) power boilers.

(2) Low pressure boilers are classified as,

- (a) hot-water-heating boilers;
- (b) hot-water-supply boilers; and
- (c) steam-heating boilers.

(3) Plants are classified as,

- (a) compressed-air plants;
- (b) compressed-gas plants;
- (c) oil-refining plants;
- (d) refrigeration plants; and
- (e) steam plants. R.R.O. 1970, Reg. 75, s. 2 (1-3).

(4) Refrigerants are classified as,

- (a) Group 1 refrigerants;
- (b) Group 2 refrigerants; and
- (c) Group 3 refrigerants consisting of the chemical substances specified in Tables 1, 2 and 3 respectively. O. Reg. 221/79, s. 1.

CAPACITY

3.—(1) The capacity of a boiler or of a compressed-air plant or a compressed-gas plant shall be determined by its power rating.

(2) The capacity of a refrigeration plant shall,

- (a) be determined by dividing the total horsepower of the machinery-units driving the compressors by $1\frac{1}{2}$; and
- (b) be expressed in tons. R.R.O. 1970, Reg. 75, s. 3.

INSPECTORS

4.—(1) A person is qualified to be appointed an inspector or to make inspections under the Act when he,

- (a) is not under twenty-five years of age; and
- (b) subject to subsection (2), has had experience,

(i) in mechanical engineering in respect of designing, constructing, installing and operating boilers or pressure vessels,

(ii) in steam engineering,

(iii) in the inspection of high pressure boilers, or

(iv) in any combination of the matters referred to in subclauses (i), (ii) and (iii) or any two of them for a period of at least five years.

(2) Where a person holds a degree in any class of engineering from a Canadian university, the period of experience under clause (1) (b) shall be at least three years. R.R.O. 1970, Reg. 75, s. 4.

5. An application for a certificate of competency shall be,

(a) in writing; and

(b) subject to subsection 6 (1), accompanied by the fee prescribed by paragraph 1 of Table 4. R.R.O. 1970, Reg. 75, s. 5 (1).

6.—(1) The Minister may issue a certificate of competency without examination to any person,

(a) who is qualified to inspect boilers and pressure vessels in any other province of Canada or in any of the states of the United States of America; and

(b) upon payment of the fee prescribed by clause (b) of paragraph 1 of Table 4.

(2) Where a person who is qualified under section 4 complies with subsection 5 (1) and passes the examinations and tests required by the Minister, the Minister shall issue to him a certificate of competency. R.R.O. 1970, Reg. 75, s. 6.

7. A certificate of competency issued to an inspector continues in force during the period of his appointment as an inspector. R.R.O. 1970, Reg. 75, s. 7.

8.—(1) Every certificate of competency issued to a person other than an inspector continues in force during the year in which it is issued and until the date of renewal prescribed under subsection (2).

(2) The renewal date under subsection (1) is the first Monday of March in each year.

(3) Where a person who may make inspections under the Act, other than an inspector, on or before the renewal date pays the renewal fee prescribed by clause (b) of paragraph 1 of Table 4, the Minister shall issue a renewal certificate to him.

(4) Where the holder of a certificate does not apply for a renewal certificate on or before the renewal date

prescribed in subsection (2), no renewal certificate shall be issued until he has paid the late-application fee prescribed under clause (c) of paragraph 1 of Table 4 in addition to the renewal fee. R.R.O. 1970, Reg. 75, s. 8 (1-4).

9. The Minister may suspend or cancel a certificate of competency if the person to whom the certificate is issued,

(a) is found to be,

(i) untrustworthy, or

(ii) wilfully negligent in making inspections; or

(b) is proved to have knowingly falsified an inspection report. R.R.O. 1970, Reg. 75, s. 9.

REGISTRATION AND NUMBERING

10.—(1) The chief inspector shall maintain a register of the designs of all boilers, pressure vessels or plants registered under the Act.

(2) The register shall contain,

(a) in respect of the design of a boiler or pressure vessel,

(i) the name and address of the manufacturer submitting the design,

(ii) the classification of the boiler or pressure vessel,

(iii) the date the design was approved by the chief inspector,

(iv) the Canadian Registration Number, and

(v) such additional information as is necessary for departmental administration; and

(b) in respect of the design of a plant,

(i) the name and address of the person submitting the design,

(ii) the location of the plant,

(iii) the classification of the plant,

(iv) the date the design was approved by the chief inspector,

(v) the departmental serial number given to the design, and

(vi) such additional information as is necessary for departmental administration.

(3) The register shall be maintained in two sections, one of which shall be for registration of the designs of boilers and of pressure vessels and the other for registration of the designs of plants.

(4) In each section the designs shall be registered in the sequence in which they are approved.

(5) Where the design of a boiler or pressure vessel is approved in Ontario before it has been approved in another province, it shall be given a number,

(a) in the sequence in which it is approved;

(b) preceded by a capital letter of the alphabet; and

(c) followed by a decimal point and the figure "5".

(6) Where the design of a boiler or pressure vessel that has been given a registration number in a province other than Ontario is approved in Ontario, the registration number given in that other province shall be retained in Ontario and the figure "5" shall be added at the end thereof. R.R.O. 1970, Reg. 75, s. 10.

11.—(1) An application for registration of the design of a boiler, pressure vessel or plant shall be accompanied by three sets of drawings, calculations and specifications of the boiler, pressure vessel or plant.

(2) Where the person who submits a design of a boiler, pressure vessel or plant for registration desires more than one set of drawings and specifications to be returned to him marked with the registration number, he shall send to the chief inspector, with the application, the extra sets he desires to be so marked. O. Reg. 221/79, s. 4.

12.—(1) When a design of a boiler, pressure vessel or plant is approved, the chief inspector shall,

(a) register the design and number it in the manner prescribed in section 10; and

(b) return to the person who submitted it one of the sets of drawings and specifications,

(i) marked "approved",

(ii) showing the date of approval, and

(iii) showing the registration number given to the design.

(2) When the chief inspector does not approve a design, he shall return to the applicant one of the sets of drawings and specifications together with a memorandum of his reasons for withholding his approval. R.R.O. 1970, Reg. 75, s. 12.

13.—(1) An approved and registered design may be revised by the owner of the design by submitting three sets of drawings and specifications of the proposed revised design to the chief inspector. R.R.O. 1970, Reg. 75, s. 13 (1).

(2) The fees payable for registration of a revised design are the same as the fees prescribed by paragraphs 2, 3, 4 and 5, as the case may be, of Table 4 for an original registration. O. Reg. 221/79, s. 5.

IDENTIFICATION MARKINGS

14.—(1) Every high pressure boiler manufactured from a design registered under section 10 shall be identified and marked as required by Section I of the Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers, 1977 Edition.

(2) Every low pressure boiler manufactured from a design registered under section 10 shall be identified and marked as required by Section IV of the Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers, 1977 Edition.

(3) Every boiler shall be marked with its Canadian Registration Number issued under section 10. O. Reg. 221/79, s. 6, *part*.

15.—(1) Every pressure vessel, other than those designated as "nuclear", manufactured from a design registered under section 10, shall be identified and marked as required by Section VIII of the Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers, 1977 Edition.

(2) Every nuclear pressure vessel manufactured from a design registered under section 10 shall be identified and marked as required by Section III of the Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers, 1977 Edition.

(3) Every pressure vessel shall be marked with its Canadian Registration Number issued under section 10. O. Reg. 221/79, s. 6, *part*.

16. The markings under section 14 or 15 shall be in a conspicuous place on the boiler or pressure vessel and shall be not less than three-eighths of an inch in height. R.R.O. 1970, Reg. 75, s. 16.

17.—(1) Subject to subsections (2) and (3), the markings under section 14 or 15 shall be stamped into the plate of the boiler or pressure vessel but not into the plate of the smoke-box of a boiler.

(2) The markings on a cast iron boiler shall be,

- (a) cast into the boiler; or
- (b) stamped upon a metal plate permanently attached to the boiler.

(3) Where the material of which the plate of a pressure vessel is manufactured is not suitable for the markings to be stamped into it, the chief inspector may permit that vessel to be identified by markings stamped upon a metal plate permanently attached to the vessel. R.R.O. 1970, Reg. 75, s. 17.

18.—(1) The area on which an identification is marked shall be painted and outlined in a contrasting colour with the words "this area not to be covered" clearly legible on the painted area.

(2) Subsection (1) does not apply where the identification on a fire-tube boiler is,

- (a) marked on the front head and exposed to the products of combustion; and
- (b) accessible through the smoke-box door. R.R.O. 1970, Reg. 75, s. 18.

19.—(1) Subject to subsection (2), no person shall cover or obliterate any identification markings on a boiler or pressure vessel.

(2) Where it is impracticable to comply with subsection (1), the markings shall be reproduced on a metal plate permanently attached to the boiler or pressure vessel so as to be readily accessible. R.R.O. 1970, Reg. 75, s. 19.

PLANT DESIGNS

20. The drawings and specifications accompanying an application for approval and registration of a design of a steam plant shall include,

- (a) drawings of the plan of the boiler room, showing the location of the boilers, pressure piping and safety devices installed in it;
- (b) drawings of the layout of the pressure piping, if any, installed outside the boiler room;
- (c) specifications of the pipes or fittings, if any, to be used in conjunction with the boilers; and
- (d) information in respect of the power rating of each boiler in the plant, and the aggregate power rating of the plant. R.R.O. 1970, Reg. 75, s. 20.

21. The drawings and specifications accompanying an application for approval and registration of a design of a compressed-air plant or a compressed-gas plant shall include,

- (a) drawings of a plan of the machinery room, showing the location of the compressors, pressure vessels, pressure piping and safety devices installed in it;
- (b) drawings of the layout of the pressure piping, if any, installed outside the machinery room;

- (c) specifications of any pipes or fittings, if any, to be used in conjunction with the pressure vessels; and
- (d) information in respect of the power rating of the plant. R.R.O. 1970, Reg. 75, s. 21.

22.—(1) The drawings and specifications accompanying an application for approval and registration of a design of a refrigeration plant shall include,

- (a) drawings of the plan of the machinery room, showing the location of the refrigerating equipment in it and the safety devices used in conjunction therewith;
- (b) drawings of the layout of the piping in the plant,
 - (i) showing relief connections or safety connections, and
 - (ii) indicating the type of occupancy of the plant;
- (c) the specifications required by subsections (2) and (3); and
- (d) information in respect of the construction of the floor, walls and ceilings of the machinery room, including materials, dimensions and strength.

(2) Attached to the drawing submitted under subsection (1) shall be a schedule setting forth,

- (a) in respect of each compressor,
 - (i) the name of the manufacturer,
 - (ii) the size,
 - (iii) the speed,
 - (iv) the number of cylinders and the internal diameter and displacement of each,
 - (v) the stroke of the pistons,
 - (vi) the name of the manufacturer of the relief valve,
 - (vii) the size of the relief valve,
 - (viii) the pressure at which the relief valve is to be set;
- (b) the total horse-power of the machinery-units driving the compressors;
- (c) in respect of each receiver or condenser-receiver,

- (i) the dimension and cubic content,
- (ii) the size and number of safety valves or rupture-discs,
- (iii) the name of the manufacturer of the safety valves or of the rupture-discs, and
- (iv) the pressure at which the safety valves are to be set or at which the rupture-discs will rupture;

(d) in respect of each evaporator,

- (i) the dimensions and cubic content,
- (ii) the size and number of safety valves or rupture-discs,
- (iii) the name of the manufacturer of the safety valves or of the rupture-discs, and
- (iv) the pressure at which the safety valves are to be set or at which the rupture-discs will rupture;

(e) the dimensions and cubic content of all other pressure vessels to contain liquid refrigerant;

(f) the refrigerant to be used in the plant; and

(g) the maximum number of pounds of refrigerant the system will contain.

(3) Where, at the time of making the application, refrigerating equipment is already installed in the machinery room, the same specifications as are required by subsection (2) shall be given in respect of that equipment. R.R.O. 1970, Reg. 75, s. 22.

23.—(1) In this section, "Class T machinery room" means a room in which,

- (a) machinery operating the system is permanently installed;
- (b) machinery but no flame-producing apparatus is permanently installed;
- (c) all doors through which fumes may penetrate a building are self-closing and tight-fitting;
- (d) all walls, doors, windows, floors and ceilings are tight and are so constructed as to resist fire for at least one hour;
- (e) an exit door provides means of escape to the outer air directly or through a vestibule exit that is equipped with self-closing and tight-fitting doors;

- (f) no exterior opening is located under,
 - (i) a fire escape,
 - (ii) an open stairway, or
 - (iii) open seating-accommodation;
- (g) every pipe piercing an interior wall, ceiling or floor is tightly sealed to the wall, ceiling or floor through which it passes;
- (h) emergency remote controls to stop the action of the refrigerant-compressor are located immediately outside the room;
- (i) mechanical means of ventilation is provided; and
- (j) emergency remote controls for the mechanical ventilation are located outside the room.

(2) Subject to subsection (3), any Group 1 or Group 2 refrigerant may be used in a rink for hockey, skating or curling.

(3) Where a Group 2 refrigerant is used under subsection (2), the following conditions govern its use in that refrigerant plant:

1. The liquid-receivers shall be of sufficient aggregate capacity to contain all the refrigerant to be used in the system.
2. Subject to subsection (4), all control valves and all parts of the system that contain the refrigerant, except expansion coils, shall be installed in a Class T machinery room that is hermetically sealed from the rink.
3. The expansion coils shall be provided with pipes and control valves installed outside the building in such a manner as to permit immediate discharge of the refrigerant to the atmosphere in case of emergency.
4. A point at which refrigerant is discharged to the atmosphere under paragraph 3 shall be located away from any opening for a door, window or air-inlet of the rink or of any adjacent building,
 - (a) so that the fumes of the refrigerant will not enter the rink or building, and
 - (b) not less than fifteen feet above any of those openings.
5. The expansion coils shall be protected by dual relief valves set to function at a pressure of seventy-five pounds.
6. Magnetically operated stop-valves that are energized and opened only when the motor driving the compressor is itself energized shall be provided on the high pressure side of the compressor.
7. The expansion coils shall be supported on solid foundations throughout their length.
8. Every circumferential joint in the expansion coils that is welded by electric arc shall be provided with a backing-ring at the time of welding.
9. The refrigerant shall be completely withdrawn from the expansion coils while the rink is being used for any purpose other than hockey, skating or curling.

(4) Paragraph 2 of subsection (3) does not apply to an outdoor rink. R.R.O. 1970, Reg. 75, s. 23.

PERIODIC INSPECTIONS

24.—(1) The owner of every low pressure hot water boiler in operation or use shall have the boiler inspected at least once every twenty-four months.

(2) The owner of every cushion tank and every refrigerant vessel in operation or use shall have the cushion tank or refrigerant vessel inspected at least once every twenty-four months.

(3) The owner of every hot water storage tank in operation or use for which the product of the measurement in feet of the diameter or width of the tank multiplied by its length-over-heads is not greater than thirty, shall have the tank inspected at least once every thirty-six months.

(4) The owner of every hot water storage tank in operation or use for which the product of the measurement in feet of the diameter or width of the tank multiplied by its length-over-heads is greater than thirty, shall have the tank inspected at least once every twenty-four months. O. Reg. 542/73, s. 2, *part*.

(5) Every owner of an air receiver in operation or use for which the product of the measurement in feet of the diameter or width of the air receiver by its length-over-heads is not greater than ten is exempted from the requirements of section 22 of the Act. O. Reg. 374/75, s. 1.

EXPENSES

25.—(1) In this section,

(a) "living expense" means reasonable charges incurred by an inspector for,

(i) sleeping accommodation, and

(ii) meals,

while on duty away from his home and includes reasonable customary tips incidental thereto; and

(b) "travelling expenses" means reasonable charges incurred by an inspector for transportation by the shortest route between,

(i) the place where an inspection is made, and

(ii) the place where the next inspection is to be made or where the inspector has his office, as the case may be,

and includes reasonable customary tips incidental thereto.

(2) Subject to subsection (3), the living expenses and travelling expenses incurred by an inspector shall be paid by,

(a) the manufacturer, where the inspection is made during construction of a boiler or pressure vessel; or

(b) the owner, where the inspection is made during or after installation of a plant.

(3) Subsection (2) applies only to inspections,

(a) of used boilers or used pressure vessels;

(b) made during or after the making of major repairs to a boiler or pressure vessel under section 32 of the Act;

(c) of boilers or pressure vessels during installation when erected on permanent foundations; and

(d) of boilers or pressure vessels installed in a mine within the meaning of the *Mining Act*. R.R.O. 1970, Reg. 75, s. 25.

26. The fees to be paid under the Act are those prescribed in Table 4. R.R.O. 1970, Reg. 75, s. 26.

TABLE 1

GROUP 1 REFRIGERANTS

Refrigerant	Name	Chemical Formula
R-11	Trichlorofluoromethane	CCl_3F
R-12	Dichlorodifluoromethane	CCl_2F_2
R-13	Chlorotrifluoromethane	CClF_3
R-13B1	Bromotrifluoromethane	CBrF_3
R-14	Tetrafluoromethane	CF_4
R-21	Dichlorofluoromethane	CHCl_2F
R-22	Chlorodifluoromethane	CHClF_2
R-30	Dichloromethane (Methylene chloride)	CH_2Cl_2
R-113	Trichlorotrifluoroethane	$\text{CCl}_3\text{FCClF}_2$
R-114	Dichlorotetrafluoroethane	$\text{CClF}_2\text{CClF}_2$
R-115	Chloropentafluoroethane	CClF_2CF_3
R-C318	Octafluorocyclobutane	C_4F_8
R-500	Dichlorodifluoromethane, 73.8% and Ethylidene fluoride, 26.2%	$\text{CCl}_2\text{F}_2/\text{CH}_3\text{CHF}_2$
R-502	Chlorodifluoromethane, 48.8% and Chloropentafluoroethane, 51.2%	$\text{CHClF}_2/\text{CClF}_2\text{CF}_3$
R-503	Trifluoromethane, 40.1% and Chlorotrifluoromethane, 59.9%	$\text{CHF}_3/\text{CClF}_3$
R-744	Carbon dioxide	CO_2

O. Reg. 221/79, s. 9, part.

TABLE 2
GROUP 2 REFRIGERANTS

Refrigerant	Name	Chemical Formula
R-40	Methyl chloride	CH_3Cl
R-611	Methyl formate	HCOOCH_3
R-717	Ammonia	NH_3
R-764	Sulphur dioxide	SO_2

O. Reg. 221/79, s. 9, *part*.

TABLE 3
GROUP 3 REFRIGERANTS

Refrigerant	Name	Chemical Formula
R-170	Ethane	C_2H_6
R-290	Propane	C_3H_8
R-600	Butane	C_4H_{10}
R-600(a)	Isobutane	$\text{CH}(\text{CH}_3)_3$
R-1150	Ethylene	C_2H_4

O. Reg. 221/79, s. 9, *part*.

TABLE 4
TARIFF OF FEES

1. For certificates of competency, the fee is,
- (a) by an applicant for examination ..

\$ 25
- (b) on the issue or renewal of a certificate

15
- (c) for late application

20

- 2.—(1) On examination and registration of the design of a boiler or of a heat-exchanger, but excluding the pressure piping referred to in paragraph 4, where the area of the heating surface is not more than 100 square feet, the fee is,
- (a) \$20, and

- (b) for each 10 square feet or fraction thereof exceeding 100 square feet, an additional \$1.50, the fee not to exceed \$300.
- (2) Where the boiler or heat-exchanger is classified as a nuclear vessel, the fee set out in subparagraph (1) shall be increased by 25 per cent.
- 3.—(1) On examination and registration of the design of a pressure vessel other than a heat-exchanger, but excluding the pressure piping referred to in paragraph 4, where the product of the diameter or the width of the pressure vessel in feet multiplied by its length-over-heads in feet is not greater than 30, the fee is,

(a) \$20, and

(b) for each additional square foot, or fraction thereof exceeding 30 square feet, an additional \$2.00, the fee not to exceed \$200.

(2) Where the pressure vessel is classified as a nuclear vessel, the fee set out in subparagraph (1) shall be increased by 25 per cent.

4. On examination and registration of any plant with respect to the design of the layout of the pressure piping, for each 500 linear feet or fraction thereof, the fee is

\$ 15

5. On the registration of the design of one fitting or the designs of more than one fitting where a submission for registration is made, the fee is

25

6. On examination and registration of the design of a refrigeration plant having a capacity of,

(a) not more than 100 tons, the fee is

35

(b) more than 100 tons but not more than 500 tons, the fee is

45

(c) more than 500 tons, the fee is ...

60

7. Fees payable for each set of extra copies of designs marked “approved”, the fee is

8

INSPECTIONS OF OBJECTS DURING CONSTRUCTION,
INSTALLATION OR MAKING OF MAJOR REPAIRS,
AND OF USED BOILERS AND PRESSURE VESSELS

8.—(1) On inspection during the construction or installation of, or making major repairs to,

(a) a boiler;	
(b) pressure piping;	
(c) a heat-exchanger;	
(d) a pressure vessel; or	
(e) a refrigeration plant, the fee is . . . \$35 an hour or part thereof	
(2) Where more than one object referred to in subparagraph (1) is inspected during one visit at a location, the fee shall be based on the time expended and not on the number of objects inspected.	
9. On an inspection of a used boiler or pressure vessel, the fee is . . . \$35 an hour or part thereof	
10. On inspection during installation of the direct expansion coils in a hockey rink, skating rink or curling rink, the fee is \$35 an hour or part thereof	
11. On the issue of,	
(a) a certificate of approval pursuant to section 16 of the Act, the fee is . .	\$ 5
(b) a certificate of inspection pursuant to an inspection made under subsection 29 (2), (3) or (4) of the Act, the fee is	25
IN-SERVICE INSPECTIONS	
12. Except for inspections referred to in paragraphs 8 and 9, on an inspection of any boiler, where the area of the heating surface is,	
(a) not more than 100 square feet, the fee is	20
(b) more than 100 square feet but not more than 500 square feet, the fee is	45
(c) more than 500 square feet but not more than 1,000 square feet, the fee is	55
(d) more than 1,000 square feet but not more than 2,000 square feet, the fee is	65
(e) more than 2,000 square feet but not more than 3,000 square feet, the fee is	85

(f) more than 3,000 square feet, the fee is	\$ 110
13. Except for inspections referred to in paragraphs 8 and 9, and for groups of pressure vessels referred to in paragraph 17, on an inspection of a pressure vessel, other than a heat-exchanger, where the product of the measurement in feet of the diameter or width of the pressure vessel multiplied by its length-over-heads is,	
(a) not greater than 10, the fee is . . .	6
(b) greater than 10 but not greater than 30, the fee is	18
(c) greater than 30 but not greater than 50, the fee is	30
(d) greater than 50 but not greater than 70, the fee is	40
(e) greater than 70, the fee is	50
14. Except for inspections referred to in paragraphs 10 and 11, on an inspection of a group of pressure vessels operating or used as a single machine or unit, the fee is	50
15. Except for inspections referred to in paragraphs 8 and 9, on an inspection of a heat-exchanger, where the area of the heating surface is,	
(a) not more than 500 square feet, the fee is	15
(b) more than 500 square feet but not more than 1,000 square feet, the fee is	20
(c) more than 1,000 square feet but not more than 2,000 square feet, the fee is	25
(d) more than 2,000 square feet but not more than 3,000 square feet, the fee is	30
(e) more than 3,000 square feet, the fee is	40
TESTS OF WELDING OPERATORS	
16.—(1) On the test of a welding operator, the fee is	20
(2) On the issue of a welder's identification card, where the test has not been witnessed by an inspector, the fee is	10

APPROVAL OF WELDING PROCEDURES

17. On the approval of procedures to be followed in the welding of boilers or pressure vessels, for each procedure, the fee is \$ 30

QUALITY ASSURANCE REVIEWS, AUDITS OR SURVEYS

18. On any survey or audit of a manufacturer's facilities, where requested by the manufacturer, or where required by regulation or code, per person (up to a maximum of \$250 per person per day),

the fee is\$35 an hour or part thereof

19. On any consultation by request with Ministry staff for the purpose of discussing or reviewing Quality Assurance manuals, or procedures, or advising thereon, the fee is per person\$35 an hour or part thereof

O. Reg. 221/79, s. 9, *part.*

REGULATION 85

under the Boundaries Act

GENERAL

1.—(1) An application under the Act shall be in Form 1.

(2) Where the applicant is a corporation, other than a municipal corporation, the application shall be signed by the proper officers of the corporation and have the seal of the corporation embossed thereon. O. Reg. 993/80, s. 1.

2. Where an application is made by the council of a municipality, it shall be supported by a copy of the by-law that authorizes the application. O. Reg. 993/80, s. 2.

3. Where an application is made by an owner of an interest in a parcel, proof of his ownership shall be filed with the application. O. Reg. 993/80, s. 3.

4. An application shall be accompanied by,

(a) a copy of every existing plan of land that relates to the boundary or boundaries to be confirmed;

(b) a copy of the field notes, if available, in respect of every plan referred to in clause (a);

(c) a copy of the registered document under which title to every parcel adjoining the boundaries to be confirmed is held;

(d) a copy of any other documentary evidence available to the applicant that relates to the position of the boundaries to be confirmed; and

(e) a money order or cheque payable to the Treasurer of Ontario in the amount of the fees prescribed by subsection 13 (1).

O. Reg. 993/80, s. 4.

5. When requested by the Director, the applicant shall submit a list of the names and addresses of the registered owners of all land adjoining the boundaries to be confirmed and sufficient copies of the plan of survey for the purpose of notice in accordance with section 7 of the Act. O. Reg. 993/80, s. 5.

6. A land registrar shall receive such material relating to an application under the Act as the Director furnishes and shall retain the material and, without payment of any fee, make it available for public inspection until the certified plan has been registered, or until otherwise directed by the Director. O. Reg. 993/80, s. 6.

7. A statement of objection filed under section 8 of the Act shall be supported by copies of all plans, field notes and documents on which the objector relies. O. Reg. 993/80, s. 7.

8. Any notice of hearing required under the Act may be served by personal service or registered mail addressed to the address for service, if any, or if none, addressed to the last known address of the party or person to be served. O. Reg. 993/80, s. 8.

9.—(1) No person is entitled to recover his costs or expenses except under an order of the Director.

(2) Where the Director orders costs to be paid by or to a party, the costs may be taxed by the Director or a taxing officer of the Supreme Court in accordance with the order. O. Reg. 993/80, s. 9.

10. Where, at the time of registration of a plan under the Act, the Director transmits to the land registrar an additional copy of the plan and so requests, the land registrar shall endorse the copy to show the particulars of registration of the plan and forward the copy to the clerk of the municipality in which the land affected by the plan is situate. O. Reg. 993/80, s. 10.

11. Sections 1 to 24 of Regulation 898 of Revised Regulations of Ontario, 1980 apply with necessary modifications to surveys and plans made for the purpose of the Act. O. Reg. 993/80, s. 11.

12.—(1) Any correction to a plan ordered by the Director under section 18 of the Act shall be carried out by the examiner of surveys appointed under section 13 of the *Land Titles Act*.

(2) The Director shall forward a copy of the order made under section 18 of the Act to the proper land registry office and the land registrar shall register the order and shall note on the plan or copy thereof registered under section 16 of the Act, "corrected under order registered as number"

(3) The examiner shall certify, in Form 2, his correction on the plan or copy thereof registered under section 16 of the Act. O. Reg. 993/80, s. 12.

13.—(1) The fee for an application for boundary confirmation is \$300, plus 75 cents for each lot or parcel adjoining the boundary to be confirmed.

(2) The fee for each copy of the recording of evidence under subsection 9 (2) of the Act is \$25 plus \$25 for each hour of recording or part thereof. O. Reg. 993/80, s. 13.

Form 1

Boundaries Act

APPLICATION FOR BOUNDARY
CONFIRMATION

To the Director of Titles:

1. I/We,
(full name (s) of applicant(s))

..... hereby apply
to have the boundary (or boundaries) of the land
described in the Schedule attached hereto con-
firmed under the *Boundaries Act*.
2. The address of the applicant(s) for the service of
any notices or other documents is:

.....

.....

.....
3. This application is made under subsection 3 (1) or
(2) of the Act.
4. The applicant(s) is (or are):

(a) the owner(s) of an interest in the parcel;

(b) the council of the municipality in
(insert the appropriate clause)
which the parcel is situate;

(c) a Minister of the Crown;

(d) the Surveyor General of Ontario;

(e) the Surveyor General of Canada;

(f) a surveyor who has the consent of the
owner of an interest in the parcel to
make this application;

(g) the Minister of Transportation and
Communications; or

(h) the council of a municipality or an
authority having jurisdiction over the
public highway(s) described in the
Schedule.

5. I am (We are) fully aware that I am (We are) liable
prima facie to pay all costs, charges and expenses of
and incidental to this application.
6. Where the application is made under subsection
3 (1), state briefly the doubt that exists in respect
of the location of the boundary (or boundaries)

.....

.....

.....

Dated at this day of,
19...

Signed
(signature of applicant(s))

O. Reg. 993/80, Form 1.

Form 2

Boundaries Act

CERTIFICATE OF CORRECTION

Corrected by an Order of the Director of Titles regis-
tered as number

(Date)

.....
Examiner of Surveys

O. Reg. 993/80, Form 2.

REGULATION 86

under the Brucellosis Act

VACCINATION

1. The vaccine to be used in vaccinating a calf is *Brucella Abortus Strain 19*. R.R.O. 1970, Reg. 77, s. 1.

2. The method to be used in vaccinating a calf is by injection of the vaccine immediately under the skin of the calf. R.R.O. 1970, Reg. 77, s. 2.

3. The age limits for vaccination of a calf are not earlier than two months and not later than eight months after the date of its birth. O. Reg. 434/77, s. 1.

IDENTIFICATION OF VACCINATED CALVES

4.—(1) Except in the case of a pure bred calf that bears a legible tattoo for registration purposes under the *Livestock Pedigree Act* (Canada), the veterinarian shall at the time of vaccination affix to the right ear of the calf an identification tag bearing a serial number and the words "C.V. ONT."

(2) Unless otherwise authorized by the Director, no person shall remove from a head of cattle a tag attached thereto in accordance with subsection (1). R.R.O. 1970, Reg. 77, s. 4.

APPOINTMENT OF VETERINARIANS

5. An application by a veterinarian for appointment for the purposes of the Act shall be in Form 1. R.R.O. 1970, Reg. 77, s. 5.

6. An agreement by the Minister with a veterinarian under subsection 3 (2) of the Act shall be in Form 2. R.R.O. 1970, Reg. 77, s. 6.

VACCINATION CERTIFICATES

7.—(1) Subject to subsection (2), a certificate of vaccination by a veterinarian under section 8 of the Act shall be in Form 3.

(2) Except in the case of pure bred calves, where a veterinarian vaccinates more than one calf of a beef breed, he may complete a certificate of vaccination in Form 4. R.R.O. 1970, Reg. 77, s. 7.

Form 1

Brucellosis Act

APPLICATION OF VETERINARIAN FOR APPOINTMENT

To: The Minister of Agriculture and Food,
Legislative Buildings,
TORONTO, Ontario.

.....
(name of applicant—please print)

.....
(address) (county, etc.)

applies for appointment as a veterinarian for the purposes of the *Brucellosis Act*, and, in support of this application, states as follows:

1. I am registered under the *Veterinarians Act*.
2. I undertake to comply with the Act and the regulations and any agreement to be made with the Minister under subsection 3 (2) of the Act.

Dated at, this day of, 19...

.....
(signature of applicant)

R.R.O. 1970, Reg. 77, Form 1.

Form 2

Brucellosis Act

AGREEMENT

MEMORANDUM OF AGREEMENT made this.....

day of, 19....

BETWEEN: The Minister of Agriculture and Food, hereinafter called "THE MINISTER"

of the FIRST PART,

— and —

.....
(name)

.....
(address)

a veterinarian appointed for the purposes of the Act, hereinafter called "THE VETERINARIAN"

of the SECOND PART.

WHEREAS the Minister has appointed the Veterinarian under section 3 of the Act;

Now THEREFORE the parties hereto agree as follows:

1. The Veterinarian shall,

- (a) where he has vaccinated one or more female calves, forward within ten days after the end of each month the certificates of vaccination referred to in subclause (b) (ii) in respect of such female calves to the Director of the Veterinary Services Branch of the Ministry of Agriculture and Food, Legislative Buildings, Toronto;
- (b) where he vaccinates any calf,
 - (i) identify the calf in the form and manner prescribed by the regulations, and
 - (ii) complete a certificate of vaccination and deliver or send it in accordance with section 8 of the Act;
- (c) use proper care in the storing and handling of vaccine and comply with any direction for the storing and handling of vaccine that is issued by the Director of the Veterinary Services Branch of the Ministry of Agriculture and Food; and
- (d) where this Agreement is terminated, return forthwith to the Director of the Veterinary Services Branch of the Ministry of Agriculture and Food any supplies in his possession that he has received under paragraph 2.

2. The Minister shall supply to the Veterinarian, as required,

- (a) vaccine;
 - (b) ear tags in the form prescribed by the regulations;
 - (c) equipment for the ear-tagging of calves; and
 - (d) forms on which to make certificates of vaccination.
3. This Agreement may be terminated,
- (a) by the Veterinarian, by giving to the Minister a notice in writing at least thirty days before the date of termination; or
 - (b) by the Minister,
 - (i) for any contravention of the Act, the regulations or this Agreement, forthwith by notice to the Veterinarian, and
 - (ii) for any other reason by giving to the Veterinarian a notice in writing at least thirty days before the date of termination.

This Agreement commences on the..... day of....., 19....

.....
Minister of Agriculture and Food
.....
(signature of the Veterinarian)

Witness to the signature
of the Veterinarian:

R.R.O. 1970, Reg. 77, Form 2.

Form 3
Brucellosis Act

CALFHOOD VACCINATION CERTIFICATE

Owner..... (name)..... (address)

Farm Location: (lot)..... (concession)..... (township)..... (county, etc.)

C.V. Ear Tag or Tattoo	Date of Birth	Sex	Description (Name, Registration No.)	
Breed	Date of Vaccination		Vaccine Batch No.	Expiration Date

I certify that this is a true record of the Brucella Calfhood Vaccination of the above-named animal in accordance with the *Brucellosis Act* and the regulations on the date indicated.

H. of A. Ear Tag No.
(if tagged)

.....
(Veterinarian)

.....
(address)

R.R.O. 1970, Reg. 77, Form 3.

Form 4

Brucellosis Act

CALFHOOD VACCINATION CERTIFICATE

Owner

(address)

Farm Location:
(lot) (concession) (township) (county, etc.)

Date of Vaccination		Vaccination Batch No.		Expiration Date
C. V. Ear Tag or Tattoo	Date of Birth	Sex	Description	H. of A. Ear Tag No. (if tagged)

I certify this is a true record of the Brucella Calfhood Vaccination of the above animals in accordance with the *Brucellosis Act* and the regulations on the date indicated.

.....
(Veterinarian)

.....
(address)

R.R.O. 1970, Reg. 77, Form 4.

REGULATION 87

under the Building Code Act

GENERAL

PART 1 DEFINITIONS

Section 1.1

In this Regulation,

1. "access to exit" means that part of a means of egress within a floor area that provides access to an exit serving the floor area;
2. "adfreezing" means the adhesion of wet soil to a foundation unit caused by freezing at the contact surface;
3. "air-supported structure" means a structure consisting of a pliable membrane which achieves and maintains its shape and support by internal air pressure;
4. "alarm signal" means a signal indicating an emergency such as an alarm for fire from a manual box, a water flow alarm, an alarm from an automatic fire alarm system or other emergency signal;
5. "allowable bearing pressure" means the maximum pressure that may be safely applied to a soil or rock by the foundation unit considered in design under expected loading and subsurface conditions;
6. "allowable load" means the maximum load that may be safely applied to a foundation unit considered in design under expected loading and subsurface conditions;
7. "appliance" means a device designed for use in heating and cooling systems operated by fuel or electricity and includes all components, controls, wiring and piping required to be part of the device by the applicable standard referred to in this Regulation;
8. "assembly occupancy" means the occupancy of a building, or part thereof, by a gathering of persons for civic, political, travel, religious, social, educational, recreational or like purposes, or for the consumption of food or drink;
9. "attic or roof space" means the space between the roof and the ceiling of the top storey or between a dwarf wall and a sloping roof;
10. "bachelor dwelling unit" means a dwelling unit for 1 or 2 adults with or without 1 bedroom;
11. "basement" means any storey below the first storey measured from the top of each floor to the top of the floor next below;
12. "bearing surface" means the contact surface between a foundation unit and the soil or rock upon which it bears;
13. "bearing support" means a structural member or system of structural members supporting masonry and resisting all applied loads;

14. "boiler" means an appliance intended to supply hot water or steam for space heating, processing or power purposes;
15. "breeching" means a flue pipe or chamber for receiving flue gases from 1 or more flue connections and for discharging these gases through a single flue connection;
16. "building area" means the greatest horizontal area of a building within the outside surface of exterior walls or when a firewall is to be constructed within the outside surface of exterior walls and the centre line of firewalls;
17. "building height" means the number of storeys contained between the roof and the floor of the first storey;
18. "business and personal services occupancy" means the occupancy of a building or part thereof for the transaction of business or the rendering or receiving of professional or personal services;
19. "canopy" means any roof-like structure projecting more than twelve inches from the face of a building, having a rigid frame and being attached to said building in such a manner as not to become an integral part thereof but does not include collapsible or fixed awnings or balconies;
20. "cavity wall" means a construction of masonry laid up with a cavity between the wythes tied together with metal ties or bonding units, the cavity of which may or may not contain insulation;
21. "cellar" means a basement that is more than 50 per cent below grade;
22. "chimney" means a primarily vertical shaft enclosing at least 1 flue for conducting flue gases to the outdoors;
23. "chimney liner" means a conduit containing a chimney flue used as a lining of a masonry or concrete chimney;
24. "closure" means a device for shutting off an opening through a construction assembly, such as a door or a shutter, and includes all components such as hardware, frames and anchors;
25. "combustible" means an elementary building material that fails to conform to CSA B54.1-1972. "Determination of Non-Combustibility in Building Materials", as revised to 1 May, 1975;
26. "combustible construction" means that type of construction that does not meet the requirements for noncombustible construction;
27. "composite pile" means a pile consisting of sections of dissimilar materials of varying lengths;
28. "constructor" means a person who contracts with an owner or his authorized agent to undertake a project, and includes an owner who contracts with more than 1 person for the work on a project or undertakes the work on a project or any part thereof;
29. "covered walkway" means a walkway that has more than 50 per cent of its perimeter open to the outdoors;
30. "dead load" means the weight of all permanent structural and nonstructural components of a building;
31. "deep foundation" means a foundation unit that provides support for a building by transferring loads either by end-bearing to a soil or rock at considerable depth below the building, or by adhesion or friction, or both, in the soil or rock in which it is placed;
32. "design bearing pressure" means the pressure applied by a foundation unit to soil or rock and which is not greater than the allowable bearing pressure;

33. "designer" means the person responsible for the design;
34. "design capacity" means the load that a foundation is designed to transfer to the supporting soil or rock;
35. "design load" means the load applied to a foundation unit and which is not greater than the allowable load;
36. "design properties" means the properties of the soil or rock used in proportioning and determining the design capacity of a foundation;
37. "ductile flexural wall" means a ductile flexural member cantilevering from the foundation consisting of a ductile reinforced concrete wall designed and detailed according to CSA A23.3-1974 "Code for the Design of Concrete Structures for Buildings," Special Provisions for Seismic Design, as revised to 1 May, 1975;
38. "ductile moment-resisting space frame" means a space frame that is designed to resist the specified seismic forces and in addition has adequate ductility or energy-absorptive capacity;
39. "dwelling unit" means a room or suite of rooms used or intended to be used as a domicile by one or more persons and usually containing cooking, eating, living, sleeping and sanitary facilities;
40. "electrically supervised control valve" means a valve permanently fitted with a mechanical device to actuate electrical contacts upon initiation of valve actuation;
41. "enclosed court" means a covered space enclosed by walls or buildings open to a roof having a horizontal dimension such that a cylinder at least 30 ft in diameter can be contained within the full height of the space, and the space is visually open in whole or in part to 3 or more storeys above the floor of the space;
42. "enclosed walkway" means a walkway that has 50 per cent or less of its perimeter open to the outdoors;
43. "excavation" means the space created by the removal of soil, rock or fill for the purposes of construction;
44. "exhaust duct" means a duct through which air is conveyed from a room or space to the outdoors;
45. "exit" means that part of a means of egress that leads from the floor area it serves, including any doorway leading directly from a floor area, to a public thoroughfare or to an open space;
46. "exit level" means the lowest level in an enclosed exit stairway from which an exterior door provides access to a public thoroughfare or to an open space with access to a public thoroughfare at approximately the same level either directly or through a vestibule or exit corridor;
47. "exit storey" means a storey from which an exterior door provides direct access at approximately the same level to a public thoroughfare or to an open space with access to a public thoroughfare;
48. "exposing building face" means that part of the exterior wall of a building which faces one direction and is located between ground level and the ceiling of its top storey, or where a building is divided into fire compartments, the exterior wall of a fire compartment which faces one direction;
49. "exterior cladding" means those components of a building which are exposed to the outdoor environment and are intended to provide protection against wind, water or vapour;
50. "factory-built chimney" means a chimney consisting entirely of factory-made parts, each designed to be assembled with the other without requiring fabrication on site;

51. "fill" means soil, rock, rubble, industrial waste such as slag, organic material or a combination of these whether compacted or not that is transported and placed on the natural surface of a soil or rock or organic terrain;
52. "fire compartment" means an enclosed space in a building that is separated from all parts of the building by enclosing construction providing a fire separation having a required fire-resistance rating;
53. "fire damper" means a closure which consists of a normally held open damper installed in an air distribution system or in a wall or floor assembly, and designed to close automatically in the event of a fire in order to maintain the integrity of the fire separation;
54. "fire load" means the combustible contents of a room or floor area expressed in terms of the average weight of combustible materials per square foot, and includes the furnishings, finished floor, wall and ceiling finishes, trim and temporary and movable partitions;
55. "fire-protection rating" means the time in hours or fraction thereof that a closure, window assembly or glass block assembly will withstand the passage of flame when exposed to fire under specified conditions of test and performance criteria, or as otherwise prescribed in this Regulation;
56. "fire resistance" means the property of a material or assembly to withstand fire or give protection from it and when it is applied to elements or buildings, it is characterized by the ability to confine a fire or to continue to perform a given structural function, or both;
57. "fire-resistance rating" means the time in hours or fraction thereof that a material or assembly of materials will withstand the passage of flame and the transmission of heat when exposed to fire under specified conditions of test and performance criteria, or as determined by extension or interpretation of information derived therefrom as prescribed in this Regulation;
58. "fire-retardant treated wood" means wood or a wood product that has its surface-burning characteristics such as flame spread, rate of fuel contribution and density of smoke developed, reduced by impregnation with fire-retardant chemicals;
59. "fire separation" means a construction assembly that acts as a barrier against the spread of fire and may not be required to have a fire-resistance rating or a fire-protection rating;
60. "fire stop" means a draft-tight barrier within or between construction assemblies that acts to retard the passage of smoke and flame;
61. "fire stop flap" means a device intended for use in horizontal assemblies required to have a fire-resistance rating and incorporating protective ceiling membranes, which operates to close off a duct opening through the membrane in the event of a fire;
62. "firewall" means a type of fire separation of noncombustible construction which subdivides a building or separates adjoining buildings to resist the spread of fire and which has a fire-resistance rating as prescribed in this Regulation and has structural stability to remain intact under fire conditions for the required fire-rated time;
63. "first storey" means the storey with its floor closest to grade and having its ceiling more than 6 ft above grade;
64. "flame-spread rating" means an index or classification indicating the extent of spread-of-flame on the surface of a material or an assembly of materials as determined in a standard fire test as prescribed in this Regulation;
65. "floor area" means the space on any storey of a building between exterior walls and required firewalls, including the space occupied by interior walls and partitions, but not including exits and vertical service spaces that pierce the storey;

66. "flue" means an enclosed passageway for conveying flue gases;
67. "flue collar" means the portion of a fuel-fired appliance designed for the attachment of the flue pipe or breeching;
68. "flue pipe" means the pipe connecting the flue collar of an appliance to a chimney;
69. "forced-air furnace" means a furnace equipped with a fan that provides the primary means for circulation of air;
70. "foundation" means a system or arrangement of foundation units through which the loads from a building are transferred to supporting soil or rock;
71. "foundation unit" means one of the structural members of the foundation of a building such as a footing, raft or pile;
72. "frost action" means the phenomenon that occurs when water in soil is subjected to freezing which, because of the water ice phase change or ice lens growth, results in a total volume increase or the build-up of expansive forces under confined conditions or both, and the subsequent thawing that leads to loss of soil strength and increased compressibility;
73. "furnace" means a space-heating appliance using warm air as the heating medium and usually having provision for the attachment of ducts;
74. "gas vent" means that portion of a venting system designed to convey vent gases vertically to the outside air from the vent connector of a gas-fired appliance, or directly from the appliance when a vent connector is not used, and includes any offsets;
75. "grade" means the average level of proposed or finished ground adjoining a building at all exterior walls;
76. "groundwater" means a free standing body of water in the ground;
77. "groundwater level" means the top surface of a free standing body of water in the ground;
78. "guard" means a protective barrier around openings in floors or at the open sides of stairs, landings, balconies, mezzanines, galleries, raised walkways or other locations to prevent accidental falls from one level to another and such barrier may or may not have openings through it;
79. "heat detector" means a device for sensing an abnormally high air temperature or an abnormal rate of heat rise and automatically initiating a signal indicating this condition;
80. "heavy timber construction" means that type of combustible construction in which a degree of fire safety is attained by placing limitations on the sizes of wood structural members and on thickness and composition of wood floors and roofs, by avoidance of concealed spaces under floors and roofs and by use of required fastenings, construction details and adhesives for structural members;
81. "high hazard industrial occupancy (Group F, Division 1)" means an industrial occupancy containing sufficient quantities of highly combustible and flammable or explosive materials which, because of their inherent characteristics, constitute a special fire hazard;
82. "high occupant load" means an occupant load where the number of persons in a room or floor area is such that the area of floor per person is not more than 12 sq ft;
83. "horizontal exit" means that type of exit connecting 2 floor areas at substantially the same level by means of a doorway, vestibule, bridge or balcony, such floor areas being located either in different buildings or located in the same building and fully separated from each other by a firewall;

84. "horizontal service space" means a space such as an attic, duct, ceiling, roof or crawl space oriented essentially in a horizontal plane, concealed and generally inaccessible, through which building service facilities such as pipes, ducts and wiring may pass;
85. "independent central station" means a continually supervised station under the control of a company independent of the owners of the building to be protected, that conforms with NFPA 71-1972, "Installation, Maintenance and Use of Central Station Protective Signaling Systems for Guard, Fire Alarm and Supervisory Service," as revised to the 1st day of May, 1975;
86. "indirect service water heater" means a service water heater that derives its heat from a heating medium such as warm air, steam or hot water;
87. "industrial occupancy" means the occupancy or use of a building or part thereof for assembling, fabricating, manufacturing, processing, repairing or storing of goods and materials;
88. "infirm persons" means all institutionalized persons whose age or health is such that they require institutional care or treatment;
89. "institutional occupancy" means the occupancy of a building or part thereof by persons who because of age, mental or physical limitations require special care or treatment or by persons involuntarily detained or whose liberties are restricted;
90. "limiting distance" means the distance from an exposing building face towards a property line, the centre line of a street, lane, public thoroughfare or an imaginary line between 2 buildings on the same property, measured at right angles to the exposing building face;
91. "listed means certified for its intended use as having been produced under the certification program of Underwriters' Laboratories of Canada or Canadian Standards Association;
92. "live load" means the load other than dead load to be assumed in the design of the structural members of a building and includes loads resulting from snow, rain, wind, earthquake and those due to occupancy, including movable partitions;
93. "loadbearing" as applying to a building element means subjected to or designed to carry loads in addition to its own dead load, excepting a wall element subjected only to wind or earthquake loads in addition to its own dead load;
94. "low hazard industrial occupancy (Group F, Division 3)" means an industrial occupancy in which the combustible content is not more than 10 lb or 100,000 Btu/sq ft of floor area;
95. "major occupancy" means the principal occupancy for which a building or part thereof is used or intended to be used, and shall be deemed to include the subsidiary occupancies which are an integral part of the principal occupancy;
96. "marquee" means any roof-like structure constructed as permanent part of the building over an entrance thereto and projecting more than twelve inches (12") from the exterior wall of any building;
97. "masonry or concrete chimney" means a chimney of brick, stone, concrete or masonry units constructed on site;
98. "means of egress" means a continuous path of travel provided by a doorway, hallway, corridor, exterior passageway, balcony, lobby, stair, ramp or other egress facility or combination thereof, for the escape of persons from any point in a building floor area, room or contained open space to a public thoroughfare or other open space and includes exits and access to exits;
99. "medium hazard industrial occupancy (Group F, Division 2)" means an industrial occupancy in which the combustible content is more than 10 lb or 100,000 Btu/sq ft of floor area and not classified as high hazard industrial occupancy;

100. "mercantile occupancy" means the occupancy or use of a building or part thereof for the displaying or selling of retail goods, wares or merchandise;
101. "metal chimney" means a single-wall chimney of metal constructed on site;
102. "mezzanine" means an intermediate floor between the floor and ceiling of any room or storey;
103. "noncombustible" means that such material conforms to CSA B54.1-1972, "Determination of Non-Combustibility in Building Materials," as revised to the 1st day of May, 1975;
104. "noncombustible construction" means that type of construction in which a degree of fire safety is attained by the use of noncombustible materials for structural members and other building assemblies;
105. "occupancy" means the use or intended use of a building or part thereof for the shelter or support of persons, animals or property;
106. "occupant load" means the number of persons for which a building or part thereof is designed;
107. "owner" means any person, firm or corporation controlling the property under consideration;
108. "panel wall" means a non-loadbearing exterior masonry wall having bearing support at each storey;
109. "partition" means an interior wall 1 storey or part-storey in height that is not loadbearing;
110. "party wall" means a wall jointly owned and jointly used by 2 parties under easement agreement or by right in law, and erected at or upon a line separating 2 parcels of land each of which is, or is capable of being, a separate real-estate entity;
111. "peat" means a highly organic soil consisting chiefly of more or less fragmented remains of vegetable matter sequentially deposited;
112. "perched groundwater" means a free standing body of water in the ground extending to a limited depth;
113. "pier or caisson" means a deep foundation unit, made of materials such as wood, steel or concrete or combination thereof, which is either premanufactured and placed by driving, jacking, jetting or screwing, or cast-in-place in a hole formed by driving, excavating or boring;
114. "pile" means a slender deep foundation unit, made of materials such as wood, steel or concrete or combination thereof, which is either premanufactured and placed by driving, jacking, jetting or screwing, or cast-in-place in a hole formed by driving, excavating or boring;
115. "plain masonry" means masonry without steel reinforcement;
116. "plenum" means an air compartment or chamber which may have one or more ducts connected to it and which forms part of an air distribution system;
117. "plumbing system" means a drainage system, a venting system and a water system or parts thereof;
118. "post-disaster building" means a building essential to provide services in the event of a disaster, and includes hospitals, fire stations, police stations, radio stations, telephone exchanges, power stations, electrical substations, pumping stations (water and sewage) and fuel depot buildings;

119. "private sewage disposal system" means a privately owned plant for the treatment and disposal of sewage including septic tanks and their absorption beds;
120. "products of combustion detector" means a device for sensing the presence of visible or invisible particles produced by combustion and automatically initiating a signal indicating this condition;
121. "proprietary control centre" means a continually supervised station under the control of the owner or others interested in the building or buildings to be protected that conforms with Class A proprietary signalling systems in NFPA 72D-1973, "Installation, Maintenance and Use of Proprietary Protective Signaling Systems for Guard, Fire Alarm and Supervisory Service," as revised to the 1st day of May, 1975;
122. "public corridor" means a corridor that provides access to exit from individually rented rooms, suites of rooms or dwelling units;
123. "rafter" means a sloping wood framing member which supports the roof sheathing and encloses an attic space, but does not support a ceiling;
124. "range" means a cooking appliance equipped with a cooking surface and one or more ovens;
125. "reinforced masonry" means masonry in which steel reinforcement is embedded in such a manner that the two materials act together in resisting forces;
126. "repair garage" means a building or part thereof where facilities are provided for the repair or servicing of motor vehicles;
127. "residential occupancy" means the occupancy or use of a building or part thereof by persons for whom sleeping accommodation is provided but who are not harboured or detained to receive medical care or treatment or are not involuntarily detained;
128. "restaurant" means any building or portion thereof where food is offered for sale for immediate consumption therein, but does not include any building or portion thereof where drink or prepackaged food requiring no further preparation before consumption is offered for sale;
129. "return duct" means a duct for conveying air from a space being heated, ventilated or air-conditioned back to the heating, ventilating or air-conditioning appliance;
130. "rock" means that portion of the earth's crust which is consolidated, coherent and relatively hard and is a naturally formed, solidly bonded, mass of mineral matter which cannot readily be broken by hand;
131. "roof joist" means a horizontal or sloping wood framing member that supports the roof sheathing and the ceiling finish, but does not enclose an attic space;
132. "sanitary drainage system" means a drainage system that conducts sewage;
133. "service room" means a room or space provided in a building to accommodate building service equipment such as air-conditioning or heating appliances, electrical services, pumps, compressors and incinerators;
134. "service space" means space provided in a building to facilitate or conceal the installation of building service facilities such as chutes, ducts, pipes, shafts or wires;
135. "service water heater" means a device for heating water for plumbing services;
136. "shallow foundation" means a foundation unit which derives its support from soil or rock located close to the lowest part of the building which it supports;

137. "smoke detector" means a device for sensing the presence of visible or invisible particles produced by combustion, and automatically initiating a signal indicating this condition;
138. "soil" means that portion of the earth's crust which is fragmentary, or such that some individual particles of a dried sample may be readily separated by agitation in water; it includes boulders, cobbles, gravel, sand, silt, clay and organic matter;
139. "space frame" means a three dimensional structural system composed of inter-connected members laterally supported so as to function as a complete self-contained unit with or without horizontal diaphragms;
140. "space heater" means a space-heating appliance for heating the room or space within which it is located, without the use of ducts;
141. "space-heating appliance" means an appliance intended for the supplying of heat to a room or space directly, such as a space heater, fireplace or unit heater, or to rooms or spaces of a building through a heating system such as a central furnace or boiler;
142. "sprinklered" means that the building or part thereof is equipped with a system of automatic sprinklers;
143. "stage" means a space designed primarily for theatrical performances with provision for quick change scenery and overhead lighting, including environmental control for a wide range of lighting and sound effects and which is traditionally, but not necessarily, separated from the audience by a proscenium wall and curtain opening;
144. "storage garage" means a building or part thereof intended for the storage or parking of motor vehicles and which contains no provision for the repair or servicing of such vehicles;
145. "storage-type water heater" means a service water heater with an integral hot water storage tank;
146. "storey" means that portion of a building which is situated between the top of any floor and the top of the floor next above it, and if there is no floor above it, that portion between the top of such floor and the ceiling above it;
147. "stove" means an appliance intended for cooking and space heating;
148. "street" means any highway, road, boulevard, square or other improved thoroughfare 30 ft or more in width, which has been dedicated or deeded for public use, and is accessible to fire department vehicles and equipment;
149. "subsurface investigation" means the appraisal of the general subsurface conditions at a building site by analysis of information gained by such methods as geological surveys, in situ testing, sampling, visual inspection, laboratory testing of samples of the subsurface materials and groundwater observations and measurements;
150. "supervisory signal" means a signal indicating the need for action in connection with the supervision of sprinkler and other extinguishing systems or equipment, or with the maintenance features of other protection systems;
151. "supply duct" means a duct for conveying air from a heating, ventilating or air-conditioning appliance to a space to be heated, ventilated or air-conditioned;
152. "theatre" means a place of public assembly intended for the production and viewing of the performing arts or the screening and viewing of motion pictures, and consisting of an auditorium with permanently fixed seats intended solely for a viewing audience;

153. "travel distance" means the distance from any point in the floor area to an exit measured along the path of exit travel, except that when floor areas are subdivided into rooms used singly, or into suites of rooms, and served by public corridors or exterior passage ways, the travel distance shall be measured from the door of such rooms or suites to the nearest exit;
154. "unit heater" means a suspended space heater with an integral air circulating fan;
155. "unprotected opening" means a doorway, window or opening other than one equipped with a closure having the required fire-protection rating, or any part of a wall forming part of the exposing building face that has a fire-resistance rating less than required for the exposing building face;
156. "vent connector" means the part of a venting system that conducts the flue gases or vent gases from the flue collar of a gas appliance to the chimney or gas vent, and may include a draft control device;
157. "vertical service space" means a shaft oriented essentially vertically that is provided in a building to facilitate the installation of building services including mechanical, electrical and plumbing installations and facilities such as elevators, refuse chutes and linen chutes;
158. "walkway" means a covered or roofed pedestrian thoroughfare used to connect 2 or more buildings in which the least horizontal dimension of the thoroughfare is less than 30 ft.

SECTION 1.2 ABBREVIATIONS

Subsection 1.2.1 Abbreviations of Names of Associations

1.2.1.1. In this Regulation:

ACI means American Concrete Institute

(P.O. Box 4754, Redford Station, Detroit, Michigan 48219 U.S.A.)

ACNBC means Associate Committee on the National Building Code

(National Research Council of Canada, Ottawa, Ontario K1A 0R6)

ANSI means American National Standards Institute

(1430 Broadway, New York, New York 10018 U.S.A.)

ASHRAE means American Society of Heating, Refrigerating and Air-Conditioning Engineers

(345 East 47th Street, New York, New York 10017 U.S.A.)

ASTM means American Society for Testing and Materials

(1916 Race Street, Philadelphia, Pa. 19103 U.S.A.)

AWS means American Welding Society

(2501 N.W. 7th Street, Miami, Florida 33125 U.S.A.)

BSI means British Standards Institution

(101-112 Pentonville Road, London N.1, Great Britain.)

CGSB means Canadian Government Specifications Board

(c/o Department of Supply and Services, 88 Metcalfe Street,
Ottawa, Ontario K1A 0S5)

CLA means Canadian Lumbermen's Association

(27 Goulburn Avenue, Ottawa, Ontario K1N 8C7)

CSA means Canadian Standards Association

(178 Rexdale Blvd., Rexdale, Ontario M9W 1R3)

- FS means Federal Specifications and Standards
(General Services Administration, Washington, D.C. 20405 U.S.A.)
- HI means Hydronics Institute (heating)
(35 Rusco Place, Berkeley Heights, New Jersey 07922 U.S.A.)
- HRA means Heating, Refrigeration and Air-Conditioning Institute of Canada
(Suite 267, 385 The West Mall, Etobicoke, Ontario M9C 1E7)
- NBC means National Building Code of Canada
(National Research Council of Canada, Ottawa, Ontario K1A 0R6)
- NFPA means National Fire Protection Association
(470 Atlantic Avenue, Boston, Massachusetts 02210 U.S.A.)
- NLGA means National Lumber Grades Authority
(1055 West Hastings Street, Vancouver, B.C. V6E 2E9)
- ULC means Underwriters' Laboratories of Canada
(7 Crouse Road, Scarborough, Ontario M1R 3A9)
- UL means Underwriters' Laboratories, Inc.
(207 East Ohio Street, Chicago, Illinois 60611 U.S.A.)
- WCLIB means West Coast Lumber Inspection Bureau
(1750 S.W. Skyline Blvd., P.O. Box 25406, Portland, Oregon 97225 U.S.A.)
- WWPA means Western Wood Products Association
(Yeon Building, Portland, Oregon 97204 U.S.A.)

Subsection 1.2.2. Abbreviations of Words and Phrases

1.2.2.1. In this Regulation:

- ASWG means American Standard Wire Gage
- B&SG means Brown and Sharpe Gage
- Btu means British thermal unit or units
- °C means degree or degrees Celsius
- cfm means cubic foot or feet per minute
- CLS means Canadian Lumber Standard
- deg. means degree or degrees
- diam. means diameter
- °F means degree or degrees Fahrenheit
- ft means foot or feet
- ft/sec. means foot or feet per second
- ga means gauge
- gal. means gallon or gallons
- gpm means gallon or gallons per minute
- GSG means Galvanized Sheet Gage
- hr means hour or hours

in.	means inch or inches
Inc.	means Incorporated
lb	means pound or pounds
max.	means maximum
min	means minimum
min.	means minute or minutes
MSG	means Manufacturers' Standard Gage
N/A	means not applicable
No.	means number or numbers
nom.	means nominal
o.c.	means on centre
oz.	means ounce or ounces
psf	means pound or pounds per square foot
psi	means pound or pounds per square inch
psig	means pound or pounds per square inch gauge
R	means thermal resistance
sec.	means second or seconds
sq ft	means square foot or feet
sq in	means square inch or inches
SWG	means Standard Wire Gage
temp.	means temperature
T&G	means tongue and groove
US gpm	means United States gallon or gallons per minute
USSG	means United States Standard Gage
W	means Watt or Watts
wt	means weight

PART 2 ADMINISTRATION

2.1 A chief official shall keep at least one copy of,

- (a) all applications received;
- (b) any drawings, specifications or other information accompanying an application;
- (c) all permits issued;
- (d) any order made by an inspector or a chief official;
- (e) all notices received pursuant to the Act;
- (f) reports of all inspections and tests made.

2.2.1 This Part and Part 1 apply to all buildings.

2.2.2 Parts 3, 4 and 6 of the building code, subject to the exceptions contained therein, apply to,

- (a) all buildings used or intended for assembly occupancy, institutional occupancy or high hazard industrial occupancy;
- (b) all buildings exceeding 6,000 square feet in building area or 3 storeys in building height used or intended for residential occupancy, business and personal services occupancy, mercantile occupancy, medium hazard industrial occupancy or low hazard industrial occupancy.

2.2.3 Part 5 applies to the types of buildings set out therein.

2.2.4 Subject to subsection 2.5.2, Part 8 applies to all buildings to be demolished.

2.2.5 Subject to the exceptions contained therein, Part 9 applies to all buildings that,

- (a) are 3 storeys or less in building height;
- (b) having a building area not exceeding 6,000 square feet and are used or intended for residential occupancy, business and personal services occupancy, mercantile occupancy, medium hazard industrial occupancy or low hazard industrial occupancy.

2.3.1 The following buildings shall be designed by an architect or professional engineer or a combination of both:

- (a) A building used or intended for assembly occupancy or institutional occupancy.
- (b) A building exceeding 6,000 square feet in building area or 3 storeys in building height used or intended for residential occupancy, business and personal services occupancy, mercantile occupancy or industrial occupancy.

2.3.2 Where the foundations of a building are to be constructed below the level of the footings of adjacent buildings and within the angle of repose of the soil, as drawn from the bottom of such footings, the foundations shall be designed by an architect or professional engineer or a combination of both.

2.4 A person who intends to construct or have constructed a building within the scope of Subsection 2.3.1. shall ensure that an architect, a professional engineer, or both are retained to undertake,

- (a) the design of the building; and
- (b) the general review of the building during construction in accordance with the requirements of the Ontario Association of Architects or the Association of Professional Engineers of Ontario, as applicable.

2.5.1 Subject to Subsection 2.5.2., where any of the conditions listed below exist, the applicant for a permit respecting the demolition of a building shall retain a professional engineer to undertake the general review of the project during demolition,

- (a) where the building structure includes pre-tensioned or post-tensioned members;
- (b) where it is proposed that the demolition will extend below the level of the footings of any adjacent building and occur within the angle of repose of the soil, drawn from the bottom of such footings; or
- (c) where explosives or a laser are to be used during the course of demolition.

2.5.2 Except where a building structure includes pre-tensioned or post-tensioned members, subsection 2.5.1 does not apply to the demolition of a building that does not exceed 3 storeys in building height or 6,000 square feet in building area.

2.6.1 Where a permit has been issued pursuant to the Act, the person to whom it is issued shall have the permit or a copy thereof posted at all times during construction or demolition in a conspicuous place on the property in respect of which the permit was issued.

2.6.2 The person in charge of the construction of a building shall keep and maintain on the site of the construction,

- (a) at least one copy of drawings and specifications, certified by the chief official to be a copy of those submitted with the application for the permit to construct the building together with changes that are authorized by him; and
- (b) authorization or facsimiles thereof received from the Building Materials Evaluation Commission, including specified terms and conditions.

2.7.1 Subject to subsection 2.7.2, a person may occupy or permit to be occupied any building that has not been fully completed at the date of occupancy where the chief official has issued a permit authorizing occupancy of the building prior to its completion and,

- (a) the structure of the building is completed to the roof;
- (b) the enclosing walls of the building are completed to the roof;
- (c) the walls enclosing the space to be occupied are completed, including balcony guards;
- (d) all required fire separations and closures are completed on all storeys to be occupied;
- (e) all required exits are completed and fire separated including all doors, door hardware, self-closing devices, balustrades and hand-rails from the uppermost floor to be occupied down to grade level and below if an exit connects with lower storeys;
- (f) all shafts including closures are completed to the floor-ceiling assembly above the storey to be occupied and have a temporary fire separation at such assembly;
- (g) measures have been taken to prevent access to parts of the building and site that are incomplete or still under construction;
- (h) floors, halls, lobbies and required means of egress are kept free of loose materials and other hazards;
- (i) if service rooms should be in operation, required fire separations are completed and all closures installed;
- (j) all water supply, drain, waste and vent systems are complete and operational for the storeys to be occupied;
- (k) required lighting in corridors, stairways and exits is complete and operational up to and including all storeys to be occupied;
- (l) required standpipe, sprinkler and fire alarm systems are complete and operational up to and including all storeys to be occupied, together with required pumper connections for such standpipes and sprinklers;
- (m) required fire extinguishers have been installed on all storeys to be occupied;

- (n) main garbage rooms, chutes and ancillary services thereto are completed to storeys to be occupied; and
- (o) required fire fighting access routes have been provided and are accessible.

2.7.2 Subject to section 7 of the Act, a person may occupy or permit to be occupied a building intended for residential occupancy provided that,

- (a) all required exits are completed and fire separated including all doors, door hardware, self-closing devices, balustrades and handrails from the uppermost floor to be occupied down to grade level and below if an exit connects with lower storeys;
- (b) a dwelling unit is not located above the third storey of the building and there is not more than one dwelling unit above another dwelling unit;
- (c) there is not a common means of egress for more than two dwelling units;
- (d) the dwelling units are not intended for tourist accommodation;
- (e) required water supply, sewage disposal, lighting and heating systems are complete and operational; and
- (f) required fire detection and fire separations are complete and operational.

2.8 A person may construct or demolish a building in territory without municipal organization without obtaining a permit under section 5 of the Act or giving notice under section 7 of the Act.

2.9.1 A person who intends to demolish a building located on a farm is exempted from the requirement to obtain a permit under section 5 of the Act.

2.9.2 A building intended for farming purposes and not intended for residential occupancy is exempt from compliance with the requirement of a permit for construction in a municipality where the council of the municipality has not passed a by-law prescribing a class of permits for the construction of such buildings.

2.9.3 A building to be constructed on a farm for farming purposes and not intended for residential purposes is exempt from the requirements of the building code except Sentence 4.1.1.2.(1).

2.10 Where the council of a municipality passes a by-law pursuant to clause e of subsection 2 of section 5 of the Act, the person to whom the permit has been issued shall notify the chief official of,

- (a) the commencement of construction of the building;
- (b) the completion of excavation;
- (c) the readiness to construct the footings;
- (d) the completion of foundations;
- (e) where the building is within the scope of Part 9, the completion of the structural framing;
- (f) where the building is not within the scope of Part 9, the completion of the structural framing of each storey;
- (g) the readiness to apply interior finishes; and
- (h) the completion of drawings of buildings as constructed.

2.11 Where the council of a municipality assigns to an inspector who is the chief of the fire department of the municipality specific responsibility for the enforcement of any portion of this Regulation respecting fire safety matters, the chief official shall not issue a permit to construct a building unless the inspector approves as complying with such portion of this Regulation the drawings submitted with the application for the permit.

2.12 In the event of conflict between this Regulation and any standard, document, manual or handbook referred to in this Regulation, this Regulation shall govern.

2.13 The fee on an application to the building Materials Evaluation Commission is \$200.

2.14.1 In addition to all other requirements, a building in the following designated areas shall be designed and constructed so that the annual average concentration of radon 222 does not exceed 7 picocuries per litre of air and the annual average concentration of the short lived daughters of radon 222 does not exceed 0.02 working levels inside the building:

- i. The Town of Elliot Lake in the Territorial District of Algoma.
- ii. The Township of Faraday in the County of Hastings.
- iii. The geographic Township of Hyman in the Territorial District of Sudbury.

PART 3 USE AND OCCUPANCY

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SECTION 3.1 GENERAL**Subsection 3.1.1. Scope**

3.1.1.1.(1) This Part applies to:

Application

- (a) all buildings that are used or intended to be used for,
 - (i) Group A, Assembly,
 - (ii) Group B, Institutional,
 - (iii) Group F, Division 1, High Hazard Industrial Occupancies; and
- (b) all buildings exceeding 6000 sq ft in building area or exceeding 3 storeys in building height that are used or intended to be used for,
 - (i) Group C, Residential,
 - (ii) Group D, Business and Personal Services,
 - (iii) Group E, Mercantile, and
 - (iv) Group F, Division 2 and 3, Medium and Low Hazard Industrial Occupancies.

(2) RESERVED.

3.1.1.2. RESERVED.

3.1.1.3. RESERVED.

3.1.1.4. RESERVED.

**Subsection 3.1.2. Classification of Buildings or Parts of
Buildings by Major Occupancy**

Classification
of buildings or
parts thereof

3.1.2.1.(1) Every building or part thereof shall be classified as belonging to one of the Groups or Divisions listed in Table 3.1.2.A.:

(a) Group A, assembly occupancy,

(i) Division 1,

(ii) Division 2,

(iii) Division 3, or

(iv) Division 4;

(b) Group B, institutional occupancy,

(i) Division 1, or

(ii) Division 2;

(c) Group C, residential occupancy;

(d) Group D, business and personal services occupancy;

(e) Group E, mercantile occupancy; or

(f) Group F, industrial occupancy,

(i) Division 1,

(ii) Division 2, or

(iii) Division 3.

(2) The purpose of classification is to determine the requirements in the building code applicable to a building, and classification shall be in accordance with every major occupancy for which the building is used or intended to be used.

(3) When it is intended to use a building for more than 1 major occupancy, the building shall be classified according to all major occupancies for which it is used or intended to be used.

Buildings
containing
occupancies of
same classifi-
cation

(4) Any building may be deemed to be occupied by a single major occupancy notwithstanding its use or intended use for more than one major occupancy provided that such occupancies are classified as belonging to the same Group classification or, where the Group is divided into Divisions, the same Division classification in Table 3.1.2.A.

(5) RESERVED.

(6) Where the occupants of a convalescent home or a children's custodial home are ambulatory and live as a single housekeeping unit in a dwelling unit with sleeping accommodation for not more than 10 persons, the occupancy shall be considered to be Group C.

TABLE 3.1.2.A.

Forming Part of Article 3.1.2.1.

CLASSIFICATION BY GROUP OR DIVISION OF TYPICAL OCCUPANCIES			
Group	Division	Description of Occupancies	Examples
A	1	Assembly occupancies intended for the production and viewing of the performing arts, including:	Motion picture theatres Opera houses Television studios admitting a viewing audience Theatres, including experimental theatres
A	2	Assembly occupancies not elsewhere classified in Group A, including:	<div> Art galleries Auditoria Bowling alleys Churches and similar places of worship Clubs, nonresidential Community halls Court rooms Dance halls Day Nurseries Exhibition halls (other than classified in Group E) Gymnasias </div> <div> Indoor swimming pools Lecture halls Libraries Licensed beverage establishments Lodge rooms Museums Passenger stations and depots Recreational piers Restaurants Schools and colleges, nonresidential Undertaking premises </div>
A	3	Arena-type occupancies including:	<div> Arenas Arena-type buildings intended for occasional use for trade shows and similar exhibition purposes </div> <div> Armouries Ice-rinks Indoor swimming pools with spectator seating </div>
A	4	Assembly occupancies in which provision is made for the congregation or gathering of persons for the purpose of participating in or viewing open air activities, including:	<div> Amusement park structures (not elsewhere classified) </div> <div> Bleachers Grandstands Reviewing stands Stadia </div>
B	1	Occupancies in which persons are detained for penal or correctional purposes, or for involuntary detention, or whose liberties are restricted, including:	<div> Jails Penitentiaries Police stations with detention quarters Prisons </div> <div> Psychiatric hospitals with detention quarters Reformatories with detention quarters </div>
B	2	Occupancies in which persons because of age, mental, or physical limitations require special care or treatment, including:	<div> Children's custodial homes⁽²⁾ Convalescent homes⁽²⁾ Homes for the aged Hospitals Infirmaries Orphanages </div> <div> Psychiatric hospitals without detention quarters Reformatories without detention quarters Sanitoria without detention quarters </div>
Col. 1	2	3	4

TABLE 3.1.2.A. (cont'd)

CLASSIFICATION BY GROUP OR DIVISION OF TYPICAL OCCUPANCIES				
Group	Division	Description of Occupancies	Examples	
C		Occupancies used for sleeping accommodation excluding those covered in Group B, institutional occupancies, including:	Apartments Boarding houses Children's custodial homes ⁽²⁾ Clubs, residential Colleges, residential Convalescent homes ⁽²⁾	Dormitories Hotels Houses Lodging houses Monasteries Motels Schools, residential
D		Occupancies for conducting business and the rendering of professional and personal services, including:	Banks Barber and hair-dressing shops Beauty parlours Dental offices Dry-cleaning, self-service not employing flammable or explosive solvents or cleaners	Fire stations Laundry, self-service Medical offices Offices Police stations without detention quarters Radio stations Small tool and appliance rental and service Telephone exchanges
E		Occupancies for the displaying, or selling of retail goods, wares or merchandise, including:	Department stores Exhibition halls Markets	Shops Stores Supermarkets
F	1	Occupancies involving sufficient quantities of highly combustible and flammable or explosive materials which because of their inherent characteristics constitute a special fire hazard, including:	Bulk plants for flammable liquids Bulk storage warehouses for hazardous substances Cereal mills ⁽¹⁾ Chemical manufacturing or processing plants ⁽¹⁾ Distilleries ⁽¹⁾ Dry cleaning plants Feed mills ⁽¹⁾	Flour mills ⁽¹⁾ Grain elevators ⁽¹⁾ Lacquer factories Mattress factories Paint, varnish and pyroxylin product factories Rubber processing plants Spray painting operations Waste paper processing plants
F	2	Occupancies in which the combustible content is more than 10 lb or 100,000 Btu's per square foot of floor area and not classified in Division F1 of this Group, including:	Aircraft hangars Box factories Candy plants Cold storage plants Dry cleaning plants not using flammable or explosive solvents or cleaners Electrical substations Factories Freight depots Helicopter landing areas on roofs Laboratories Laundries except self-service	Mattress factories Planing mills Printing plants Repair garages Salesrooms Service stations Storage rooms Television studios not admitting a viewing audience Warehouses Wholesale rooms Woodworking factories Workshops
Col. 1	2	3	4	

TABLE 3.1.2.A. (cont'd)

CLASSIFICATION BY GROUP OR DIVISION OF TYPICAL OCCUPANCIES			
Group	Division	Description of Occupancies	Examples
F	3	Occupancies in which the combustible content is not more than 10 lb or 100,000 Btu's per square foot of floor area, including:	Creameries Factories Laboratories Power plants Sales rooms Sample display rooms Storage garages including open air parking garages Storage rooms Warehouses Workshops
Col. 1	2	3	4

Notes to Table 3.1.2.A.

- (1) See Sentence 3.2.2.1.(2).
- (2) See Sentence 3.1.2.1.(6).

Subsection 3.1.3. Multiple Occupancy Fire Separations

3.1.3.1. RESERVED.

3.1.3.2.(1) Not more than 1 dwelling unit shall be contained within a building classified as Group F, Division 2 major occupancy.

Prohibited combinations of occupancies

(2) RESERVED.

3.1.3.3.(1) Except as provided in Sentences (2) and (4) of this Article, Sentences 3.3.7.7.(11), and 3.3.7.7.(12), two or more occupancies of different Groups or Divisions shall be separated from each other by a fire separation having a fire-resistance rating conforming to Table 3.1.3.A.

Separation of major occupancies

TABLE 3.1.3.A.
Forming Part of Sentence 3.1.3.3.(1).

Grade of Fire Separation, hr	Group A										FIRE SEPARATIONS BETWEEN OCCUPANCIES
	Division 1										
	Group A										
	Division 2										
	Group A										
	Division 3										
	Group A										
	Division 4										
	Group B										
	Division 1										
	Group B										
	Division 2										
	Group C										
	Group D										
	Group E										
Group F											
Division 1											
Group F											
Division 2											
Group F											
Division 3											

Separation of dwellings from mercantile occupancies

(2) Where not more than two dwelling units are contained within a building with a Group E occupancy not over 3 storeys in building height, the grade of fire separation between the two occupancies need not exceed 1-hr.

(3) RESERVED.

(4) RESERVED.

(5) Fire separations required for the separation of occupancies described in Sentence (4) need not conform to Sentence 3.1.6.2.(1) and Article 3.1.5.4.

Separation of same occupancy classification

(6) Fire separations between occupancies having the same occupancy classification within a floor area are regulated where applicable in Section 3.3.

Subsection 3.1.4. Construction Types**3.1.4.1. RESERVED.****COMBUSTIBLE CONSTRUCTION**

3.1.4.2. Where a building is permitted to be of combustible construction, it may be constructed of combustible materials described in Part 9 with or without noncombustible components.

Composition

3.1.4.3. Where combustible construction is permitted and is required to have a $\frac{3}{4}$ -hr fire-resistance rating, heavy timber construction may be used provided the construction conforms to Article 3.1.4.4.

Heavy timber
alternative to
 $\frac{3}{4}$ -hr
combustible
fire rating

3.1.4.4.(1) Wood elements in heavy timber construction shall be arranged in heavy solid masses and with essentially smooth flat surfaces as to avoid thin sections and sharp projections.

(2) Wood framing members, such as beams, columns and arches, that are built up of individual pieces shall be glued together as in glued laminated construction, or the individual pieces of the framing member shall conform to the minimum sizes for solid sawn timber in this Article.

(3) Wood columns shall be continuous or superimposed throughout all storeys and shall be,

Columns

(a) solid sawn or glued laminated at least,

(i) 8 in. by 8 in. nominal dimension when supporting floor loads, and

(ii) 6 in. by 8 in. nominal dimension when supporting roof and ceiling loads only; or

(b) round timber columns of uniform taper at least,

(i) 8 in. diam. at the top of the column when supporting floor loads, and

(ii) 7 in. diam. at the top of the column when supporting roof and ceiling only.

(4) Floors shall be supported by,

Floor
supports

(a) beams and girders of wood that are,

(i) solid sawn or glued laminated, and

(ii) at least 6 in. nominal width and 10 in. nominal depth; or

(b) framed or glued laminated wood arches that spring from the floor line and are at least 8 in. by 8 in. nominal dimension, or

(c) framed timber trusses having members that are at least 8 in. by 8 in. nominal dimension.

(5) Roof framing, when not supporting floor loads, shall be,

Roof
supports

(a) framed or glued laminated wood arches springing from the floor line and having members at least 6 in. nominal width, and,

(i) where there are eaves, at least 8 in. nominal depth below the eave elevation, and 6 in. nominal depth above the eave elevation, or

(ii) where there are no eaves, the depth of the entire arch shall be at least 6 in.; or

- (b) framed or glued laminated wood arches springing from the top of walls or abutments, framed timber trusses, wood beams and girders having members,
 - (i) at least 4 in. nominal width and 6 in. nominal depth,
 - (ii) at least 3 in. nominal thickness when made of two or more spaced members, provided intervening spaces are blocked solidly throughout or tightly closed by a continuous wood cover plate of at least 2 in. nominal thickness secured to the underside of the members, or
 - (iii) at least 3 in. nominal thickness when protected by automatic sprinklers under the roof deck; and
- (c) spliced where necessary with splice plates at least 3 in. nominal thickness.

Floors

- (6) Floors shall be of glued laminated or solid sawn plank that is at least 3 in. nominal thickness, splined or tongued and grooved, or at least 2 in. nominal width and 4 in. nominal depth set on edge and well spiked together, and
 - (a) laid so that no continuous line of end joints will occur except at points of support, and covered with 1 in. nominal dimension tongued and grooved flooring laid cross-wise or diagonally, or $\frac{1}{2}$ -in. tongued and grooved phenolic-bonded plywood, and
 - (b) laid not closer than $\frac{1}{2}$ in. to walls to provide for expansion, and the gap covered at top or bottom.

Roofs

- (7) Roofs shall be of at least $1\frac{1}{8}$ in. thick, tongued and grooved phenolic-bonded plywood, or glued laminated or solid sawn plank that is,
 - (a) at least 2 in. nominal thickness, splined or tongued and grooved; or
 - (b) at least 2 in. nominal width and 3 in. nominal depth set on edge and laid so that no continuous line of end joints will occur except at points of support.

Construction detail

- (8) Superimposed wood columns shall be connected by,
 - (a) reinforced concrete or metal caps with brackets;
 - (b) steel or iron caps with pintles and base plates;
 - (c) timber splice plates fastened to the columns by metal connectors housed within the contact faces; or
 - (d) other suitable methods.
- (9) Where beams and girders enter masonry, wall plates, boxes of self-releasing type or suitable hangers shall be provided.

(10) Wood girders and beams shall be closely fitted around columns and adjoining ends shall be connected by ties or suitable caps to transfer horizontal loads across the joints.

(11) Intermediate wood beams used to support a floor shall be supported on top of the girders or on suitable metal hangers into which the ends of the beams are closely fitted.

Concealed spaces

(12) Except as provided in Sentence (13), where floors and roofs are constructed with concealed spaces, such as ceiling or attic spaces, such spaces shall be sprinklered.

(13) Sprinkler protection as required in Sentence (12) may be omitted when,

- (a) the space is compartmented by fire stopping conforming to Sentence 3.1.9.1.(5), except that no compartment shall exceed 50 ft in any horizontal dimension, and

- (b) the suspended ceiling is constructed of material having a flame-spread rating of 25 or less on any exposed surface or any surface that would be exposed by cutting through the material in any direction.

NONCOMBUSTIBLE CONSTRUCTION

3.1.4.5.(1) Where a building or part of a building is required to be of noncombustible construction, the construction shall be made from noncombustible materials, except as permitted in Sentences (2) to (8), Articles 3.3.4.6., 3.3.5.2., 3.3.6.2., and Sentences 3.1.11.1.(2), 3.3.7.7.(7) and 3.2.2.5.(2).

Combustible
elements
permitted in
roofs, floors
and walls

- (2) Combustible elements of roofs, floors and walls shall be limited to,

- (a) the following minor components,

- (i) paint,
 - (ii) tightly adhering covering not exceeding 1/28 in. thickness applied to a noncombustible backing provided the assembly has a flame-spread rating of 25 or less,
 - (iii) insulation and jackets on electrical wiring, provided that where such wiring is located within a vertical shaft in buildings described in Subsection 3.2.6., except for Group C major occupancy apartment buildings, it has a flame-spread rate not greater than 25 and a smoke developed classification of not more than 50, or is enclosed within a raceway or conduit conforming to Sentence (5),
 - (iv) mastics and caulking materials applied to provide flexible seals between the major components of exterior wall construction,
 - (v) wood furring strips not exceeding 2 in. by 2 in. nominal dimension attached directly to a continuous noncombustible backing, or wood nailing strips set into a continuous noncombustible backing, for the attachment of interior finishes, and
 - (vi) similar minor components as permitted;
- (b) roof covering which has an A, B, or C classification determined in conformance with Subsection 3.1.13.;
 - (c) adhesives, vapour barriers and sheathing papers; and
 - (d) thermal and sound insulation having a flame-spread rating of not more than 25 on any exposed surface or any surface that would be exposed by cutting through the material in any direction except that,
 - (i) where the insulation is placed between two layers of noncombustible material having a melting point above 1200°F without an intervening air space, the flame-spread rating of the insulation shall not exceed 100 on any exposed surface or any surface that would be exposed by cutting through the material in any direction, and the insulation is installed in such a manner that no edge of the insulation is exposed,
 - (ii) no flame-spread rating shall be required for the surface of thermal insulation installed immediately beneath the roof covering when the surfaces of the insulation have been treated and installed so as to reduce the tendency of the bitumen to soak into or through cracks or gaps in the insulation, and
 - (iii) insulation installed on top of roofing shall have a flame-spread rating of not more than 100 on any exposed surface, or on any surface that would be exposed by cutting through the material.

- (3) Combustible millwork, interior cladding and finishing materials shall be limited to,

Combustible
finishes and
millwork

- (a) millwork such as interior trim, ordinary doors and door frames, show windows together with their frames, aprons and backing, handrails, shelves, cabinets and counters;
- (b) window sash and frames provided,

- (i) each window in an exterior wall face is an individual unit separated by noncombustible wall construction from every other opening in the wall,
 - (ii) windows in exterior walls in contiguous storeys are separated by at least 3 ft of noncombustible construction, and
 - (iii) the aggregate area of openings in an exterior wall face of a fire compartment does not exceed 40 per cent of the area of the wall face;
 - (c) finished flooring applied directly to a floor slab in which wood nailing strips may be incorporated or applied to wood sleepers on top of a floor slab, provided the space between the flooring is fire stopped in conformance with Subsection 3.1.9.;
 - (d) finished flooring applied as stage flooring to noncombustible structural members supporting the stage floor as referred to in Sentence 3.3.2.14.(1);
 - (e) stairs within a dwelling unit;
 - (f) interior finishes such as paint, wallpaper and other interior finishes not exceeding 1/28 in. in thickness;
 - (g) interior wall finish materials that,
 - (i) are not more than 1 in. in thickness, and
 - (ii) have a flame-spread rating of not more than 150 on any exposed surface, or any surface that would be exposed by cutting through the material in any direction; and
 - (h) interior ceiling finish materials that,
 - (i) are not more than 1 in. in thickness except for exposed fire-retardant treated wood battens, and
 - (ii) have a flame-spread rating of not more than 25 on any exposed surface or on any surface that would be exposed by cutting through the material in any direction.
- (4) Combustible ducts and connectors may be used in a building required to be of noncombustible construction provided such ducts,
- (a) are used only in horizontal runs; and
 - (b) are Class 1 ducts, conforming to Part 6.
- (5) Combustible pipe, associated adhesives and combustible conduit may be used in a building required to be of noncombustible construction provided such pipe, adhesives and conduit,
- (a) have a flame-spread rating of not more than 25 except when located as described in Subclauses (b)(i), (ii) and (iii); and
 - (b) when used in buildings described in Subsection 3.2.6., have a smoke developed classification of not more than 50 except where such pipe is,
 - (i) located within a concealed space in a wall,
 - (ii) located in a floor slab, or
 - (iii) enclosed in a noncombustible raceway or conduit.
- (6) Combustible electrical boxes shall have a flame-spread rating of not more than 25.
- (7) Combustible duct linings, duct coverings, duct insulation, vibration isolation connectors, duct tape, pipe insulation and pipe coverings may be used in buildings required to be of noncombustible construction provided they conform to the appropriate requirements in Part 6.
- (8) Combustible travelling cables may be used on elevating devices in buildings required to be of noncombustible construction.

TENTS AND AIR-SUPPORTED STRUCTURES

3.1.4.6.(1) Except as provided in Sentences (2), (3), (4) and (10), every tent and air-supported structure shall conform to Subsection 3.2.3.

(2) Tents and air-supported structures shall not be erected closer than 10 ft. to other structures on the same property except as provided in Sentences (3) and (4) and such structures shall be sufficiently distant from one another to provide an area to be used as a means of emergency egress.

(3) Tents and air-supported structures not occupied by the public need not be separated from one another and may be erected less than 10 ft from other structures on the same property provided such closer spacing does not create a hazard to the public.

(4) Tents, each not exceeding 1,200 sq ft in ground area, located on fair grounds or similar open spaces need not be separated from one another provided safety precautions are taken.

(5) Every tent and air-supported structure and all tarpaulins and decorative materials used in connection with such structures shall conform to the appropriate requirements for resistance for fire in NFPA 701-1969, "Standard Methods of Fire Tests for Flame Resistant Textiles and Films" or ULC S109-1969, "Standard for Flame Tests of Flame-Resistant Fabrics and Films", including all revisions to 1 May, 1975, for both standards.

(6) The ground enclosed by a tent or air-supported structure and extending at least 10 ft. outside of such structure shall be cleared of all flammable material or vegetation that will carry fire.

(7) Tents and air-supported structures shall conform to Sections 3.3. and 3.4.

(8) An air-supported structure used as a place of assembly shall have at least two blowers, each of which has adequate capacity to maintain full inflation pressure with normal leakage.

(9) An air-supported structure used as a place of assembly for more than 200 persons shall have either an automatic emergency engine-generator set capable of powering one blower continuously for 4-hr, or a supplementary blower powered by an automatic internal combustion engine.

(10) A tent used for camping, personal or other non-commercial uses, having an area of 300 sq ft or less need not comply with the requirements of this Article.

Subsection 3.1.5. Fire-Resistance Rating

3.1.5.1(1) Except as provided in Sentence (2) and (3), where a material assembly of materials or a structural member is required to have a fire resistance rating, it shall be determined on the basis of the results of tests conducted in accordance with the appropriate provisions of the following as revised to 1 May, 1975:

ASTM E119-73, "Standard Methods of Fire Tests of Building Construction and Materials,"

BS 476 Part 8 (1972), "Test Methods and Criteria for Fire-Resistance of Elements of Building Materials" (but excepting the reload tests),

ULC-S101-1971, "Fire Tests of Building Construction and Materials,"

UL 263 (1971), "Fire Tests of Building Construction and Materials," or

NFPA 251 (1972), "Standard Methods of Fire Tests of Building Construction and Materials."

(2) Fire-resistance ratings may be determined on the basis of the results of tests conducted in accordance with the earlier editions of the test standards described in Sentence (1) which were current at the time of test provided there is no significant difference in the test standard.

(3) A material, assembly of materials or a structural member may be assigned a fire-resistance rating on the basis of National Research Council of Canada publication No. 13987, "Fire-Performance Ratings 1975".

Exception for exterior walls

(4) The limitation on the rise of temperature on the unexposed surface of an assembly as required by the Standard tests in Sentence (1) shall not apply to an exterior wall that has a limiting distance of 4 ft or more provided correction is made for radiation from the unexposed surface in accordance with Article 3.2.3.9.

(5) Where a ceiling construction has a suspended membrane ceiling with lay-in panels or tiles which contribute to the required fire-resistance rating of the assembly, hold down clips or other means shall be provided to prevent the lifting of such panels or tiles in the event of a fire.

Application to various assemblies

3.1.5.2.(1) Floor and roof assemblies shall be rated for exposure to fire on the underside.

(2) Firewalls, interior vertical fire separations and shaft enclosures shall be rated for exposure to fire on both sides.

(3) Exterior walls shall be rated for exposure to fire from inside the building unless otherwise specified.

Minimum fire resistance rating applies

3.1.5.3. The use of materials or assemblies of materials having a greater fire-resistance rating than required shall entail no obligation to exceed in whole or in part the minimum fire-resistance ratings required by this Part.

Fire resistance of supporting construction

3.1.5.4. No structural member or assembly required to have a fire-resistance rating shall be supported on construction that has a lesser fire-resistance rating, except as permitted in Subsection 3.2.2. for mixed types of construction, Article 3.1.6.2., and elsewhere in this Part.

Exceptions to fire protection requirements

3.1.5.5.(1) Notwithstanding the requirements in Section 3.2., fire protection is not required for,

- (a) steel lintels over openings not more than 6 ft wide in load-bearing walls and not more than 10 ft wide in non-loadbearing walls;
- (b) steel lintels over openings greater than those in Clause (a) provided such lintels are supported at intervals of not more than 6 ft by structural members with the required fire-resistance rating;
- (c) the bottom flanges of shell angles and plates that are not a part of the structural frame;
- (d) steel and iron members for framework around elevator shaft doorways, steel for the support of elevator and dumbwaiter guides, counterweights and other such equipment, when entirely enclosed in a shaft and not in part of the structural frame of a building;
- (e) steel and iron members of stairways, including escalators, which are not a part of the structural frame of a building;
- (f) steel and iron members of porches, exterior balconies, exterior stairways, fire escapes, cornices, marquees and other similar appurtenances, provided they are outside an exterior wall of a building; and
- (g) loadbearing steel or concrete members wholly or partially outside of a building face in buildings not exceeding 4 storeys in building height, and classified as Group A, B, C, D or F 3 major occupancy, provided such members are,
 - (i) at least 10 ft from a property line or centre line of a public thoroughfare, and
 - (ii) at least 3 ft away from any unprotected opening in an exterior wall, or shielded from heat radiation in the event of a fire within a building by construction that will provide the same degree of protection that would be necessary if the member was located inside the building, with the

protection extending on either side of the member a distance equal to the projection of the member from the face of the wall.

3.1.5.6.(1) Every membrane forming part of an assembly required to have a fire-resistance rating may be pierced by openings for electrical and similar service outlet boxes provided such boxes are noncombustible and are tightly fitted to the membrane.

(2) Except as permitted in Sentence (3), every membrane ceiling forming a part of an assembly assigned a fire-resistance rating on the basis of information contained in National Research Council of Canada publication No. 13987, "Fire-Performance Ratings 1975", may be pierced by openings leading to ducts within the ceiling space provided such ducts are noncombustible and provided,

- (a) a single opening does not exceed 144 sq in. in area,
- (b) the aggregate area of all openings does not exceed 1 per cent of the ceiling area of the fire compartment,
- (c) the openings are located at least 7 ft apart, and
- (d) where an opening exceeds twenty square inches in area, it is protected by a fire stop flap that is held open with a fusible link conforming to ULC S 505-1974 "Fusible Links for Fire Protection Services" as revised to the 1st day of May, 1975, or other similar heat-activated device having a temperature rating approximately 50°F above the maximum temperature that would exist in the system either with the system in operation or shut down; and
- (e) asbestos paper is not exposed in supply and return air systems.

(3) Where the inside or outside of a duct within a ceiling space is protected within the assembly by a covering that has a fire-resistance rating assigned on the basis of information contained in National Research Council of Canada publication No. 13987, "Fire-Performance Ratings 1975", at least equivalent to $\frac{1}{2}$ the fire-resistance rating required for the assembly, the restrictions on openings in Sentence (2) do not apply to such duct.

(4) Where a fire-resistive assembly is tested in accordance with Article 3.1.5.1,

(a) openings described in Sentences (1), (2) and (3) shall not be permitted in addition to or as an alternative to those that may or may not have been incorporated in the tested assembly; and

(b) asbestos paper shall not be exposed in supply and return air systems.

(5) Where a ceiling assembly is used as a plenum, the requirements of Part 6 shall apply.

Subsection 3.1.6. Fire Separations

3.1.6.1.(1) Any wall, partition or floor assembly required to be a fire separation shall, Requirements and limitations

- (a) be constructed as a continuous element of a fire compartment, and
- (b) where required in this Part have a fire-resistance rating as specified.

(2) Except as provided in Subsections 3.2.2. and 3.2.3., openings in fire separations shall be protected with closures, shafts or by other means in accordance with Subsection 3.1.7.

Support of fire
separations

3.1.6.2.(1) Except as otherwise permitted in this Part, every fire separation required to have a fire-resistance rating shall be supported from the ground by construction having a fire-resistance rating at least equal to that required for the supported fire separation.

(2) Where a fire separation is required to be noncombustible construction having a fire-resistance rating, it shall be supported by noncombustible construction conforming to Sentence (1).

Combustible
elements and
construction

(3) Combustible construction that abuts on or is supported by a noncombustible fire separation shall be constructed so that its collapse under fire conditions will not cause the collapse of the fire separation.

(4) Where a fire separation required to be of noncombustible construction terminates at the exterior wall or roof surface, combustible material shall not extend across the end of the fire separation so that the fire could spread from one side of the fire separation to the other.

(5) Combustible members shall not pierce a noncombustible fire separation nor shall they reduce the thickness of the fire separation to less than 4 in.

Continuity
of fire
separations

3.1.6.3.(1) Except as provided in Sentence (2), a horizontal service space or other concealed space located above a required vertical fire separation shall be divided at the fire separation by an equivalent fire separation within the service space.

(2) Where a horizontal service space or other concealed space is located above a required vertical fire separation, such space need not be divided as required in Sentence (1), provided the membrane between such space and the spaces below is constructed as a fire separation having a fire-resistance rating assigned on the basis of information contained in National Research Council of Canada publication No. 13987, "Fire Performance Ratings 1975",

(a) at least equivalent to that required for the vertical fire separation; or

(b) at least equivalent to,

(i) one half that required for the vertical fire separation, and

(ii) fire stopping constructed as a fire separation having a fire-resistance rating at least equivalent to one half that required for the vertical fire separation is applied immediately above the vertical fire separation.

(3) Where a shaft, including exit enclosures, penetrates a fire separation, it shall extend through any horizontal service space or any other concealed space and shall terminate so that a smoke-tight joint is provided at the point where the shaft abuts on or intersects the floor, roof slab or deck, except as provided in Subsection 3.5.3. where the shaft pierces through a roof assembly.

Subsection 3.1.7. Protection of Openings in Fire Separations

Determination
of fire
protection
rating

3.1.7.1.(1) Except as provided in Sentence (2), where an opening in a fire separation is required to be protected with a closure having a fire-protection rating, such fire-protection rating shall be determined on the basis of the results of tests conducted in accordance with the appropriate provisions of the following as revised to 1 May, 1975:

ASTM E152-73, "Standard Methods of Fire Tests of Door Assemblies",

ASTM E163-65 (1972), "Standard Methods of Fire Tests of Window Assemblies",

ULC-S106-1962, "Fire Tests of Window Assemblies".

ULC-S104-1970, "Fire Tests of Door Assemblies",

ULC-S112-1973, "Fire Dampers",

UL 9(1970), "Fire Tests of Window Assemblies",

UL 10(b) (1974), "Fire Tests of Door Assemblies", or
NFPA 252(1972), "Standard Methods of Fire Tests of Door Assemblies".

(2) Fire protection ratings may be determined on the basis of results of tests conducted in accordance with the earlier editions of the test standards described in Sentence (1) which were current at the time of test provided there is no significant difference in the test standard.

(3) Except as otherwise specified in this Part, every closure required in fire separations shall be installed in conformance with the installation and operation requirements of NFPA 80 (1973), "Fire Doors and Windows", as revised to 1 May, 1975. Every closure required to have a fire-protection rating shall have labels or classification marks to identify the testing laboratory.

Installation

(4) The fire-protection rating of closures shall conform to Table 3.1.7.A. for the required grade of fire separation except as permitted otherwise in,

Rating of
closures

- (a) Sentence (9) of this Article;
- (b) Sentences 3.1.7.2.(4) and (7); or
- (c) Sentence 3.1.7.3.(1).

TABLE 3.1.7.A.
Forming Part of Sentence 3.1.7.1.(4)

Grade of Fire Separation hr	Required Fire Protection Rating of Closures hr
less than 3/4	0
3/4	3/4
1	3/4
1 1/2	1
2	1 1/2
3	2
4	3

(5) Except as provided in Sentence (9), a duct piercing a fire separation required to have a fire-resistance rating shall be equipped with a fire damper to act as a closure at the fire separation.

(6) A fire damper required in Sentence (5) or other fire damper used as a closure in a fire separation shall have a fire-protection rating conforming to Sentence (4), and shall be installed in conformance with Article 6.2.4.9.

(7) A fire damper referred to in Sentence (6), used in a fire separation required to have a fire-resistance rating of not more than 2-hr, but which is not a firewall, shall be constructed and rated in conformance with ULC-S112-1973, "Fire Dampers", as revised to 1 May, 1975.

(8) A fire damper referred to in Sentence (6), used in a fire separation required to have a fire-resistance rating of more than 2-hr or used in a firewall, shall be rated in conformance with one of the test methods in Sentence (1) for door assemblies.

(9) Fire dampers need not be provided in noncombustible branch ducts that have a melting point above 1,200°F and penetrate a required fire separation provided such ducts,

- (a) serve only air-conditioning units discharging air at not more than 4 ft above the floor where such ducts,
 - (i) serve only one storey,
 - (ii) have a cross sectional area not greater than 20 sq in. for the branch ducts, and
 - (iii) have a cross sectional area of not more than 20 sq in. for each connector between the branch duct and the air-conditioning unit; or

- (b) are branch ducts connected to exhaust duct risers in which the air flow is upward and such branch ducts are carried up inside the riser at least 22 in.

Maximum
openings

3.1.7.2.(1) Except for exits and as permitted in Sentence (2) and elsewhere in this Part, the size of an opening in an interior fire separation required to be protected with a closure shall not exceed 120 sq ft and shall have no dimension greater than 12 ft; the aggregate width of all openings shall not exceed 25 per cent of the length of a wall of a fire compartment.

Closures

(2) When the fire compartments on both sides of a fire separation are sprinklered, openings in the fire separation shall not exceed 240 sq ft.

(3) Except for closures described in Article 3.1.7.3. two closures of the same fire-protection rating installed on opposite sides of the same opening may be deemed to have a fire-protection rating equal to the sum of the fire-protection ratings of the closures.

(4) Except as permitted in Clause 3.2.9.6(1) (c), a door assembly having a 20-minute fire-protection rating may be used as a closure in a fire separation not required to exceed 1-hr. fire-resistance rating in,

- (a) a required fire separation located between a public corridor and an individually rented room or suite of rooms;
- (b) a required fire separation located between a corridor and adjacent sleeping rooms and bedrooms;
- (c) a required fire separation located between a corridor and adjacent rooms in schools except for those rooms specified in Sentence 3.3.2.2.(4) and Section 3.5; or
- (d) a fire separation required to have a $\frac{3}{4}$ -hr. fire-resistance rating in buildings not exceeding 3 storeys in building height.

(5) RESERVED.

(6) RESERVED.

(7) The fire-protection rating of closures in exit shafts need not be greater than 1½-hr.

(8) A closure in a fire separation required to be of noncombustible construction may have combustible elements.

(9) Except as provided in Sentence (10), Sentence (12), Article 3.3.2.7., Sentence 3.3.4.2.(3) and Article 3.3.5.4., every door in an interior fire separation shall have a self-closing device and a latch which shall be installed so as to return and hold the door in the closed position after each use.

(10) Where the safety of the occupants is not endangered thereby, hold-open devices may be installed on closures that are required to be self closing other than closures on vestibules required in Article 3.3.7.7. and on exit shafts.

(11) Hold-open devices permitted in Sentence (10) shall be actuated by smoke detectors or the building fire alarm system, except that where the door is not required to function as part of a smoke control system, the hold-open device may be actuated by a sprinkler system or a heat actuated device designed for this purpose.

(12) Self-closing devices need not be installed on doors provided as closures in fire separations required for dumbwaiters and freight elevators.

Wired glass
and glass
blocks as
closures

3.1.7.3.(1) Except as provided in Article 3.4.5.1. for separation of exits, an opening or openings in $\frac{3}{4}$ -hr and 1-hr interior fire separations may be protected with wired glass or glass blocks when installed in accordance with Sentences (2) and (3).

(2) Where wired glass is permitted in Sentence (1), such glass shall,

(a) not exceed the area limitation specified in Sentences 3.1.7.2.(1) and (2);

(b) provide a $\frac{3}{4}$ -hr fire protection rating or consist of glass that is,

(i) $\frac{1}{4}$ -in. thick, and

(ii) reinforced by a steel wire mesh in the form of diamonds, squares or hexagons having dimensions of approximately 1 in. across the flats, using wire of at least 25 ASW gauge, or approximately $\frac{1}{2}$ in. across the flats, using wire of at

least 26 ASW gauge, the wire to be centrally embedded during manufacture and welded or intertwined at each intersection;

(c) be set in steel frames; and

(d) be limited in area such that,

(i) individual panes are not more than 1,296 sq in. with neither height nor width exceeding 54 in., and

(ii) the maximum area unsupported by structural mullions does not exceed 80 sq ft.

(3) Where glass blocks are permitted in Sentence (1), they shall not exceed the area limitations specified in Sentences 3.1.7.2.(1) and (2) and they shall be installed in accordance with Section 4.4 and reinforced with steel reinforcement in each horizontal joint.

3.1.7.4.(1) Openings such as those for exit shafts, elevators and building service facilities through floors required to be fire separations shall be protected in accordance with Sections 3.4. and 3.5. as applicable.

Protection
of openings
between
storeys

(2) An escalator or inclined moving walk that pierces a required fire separation and serves as a required exit shall be enclosed in the same manner as exit stairs.

(3) Except as permitted in Sentence (4), when an escalator or an inclined moving walk is not a required exit but pierces a fire separation, it shall be enclosed in accordance with the requirements of this Subsection, except that in buildings that are sprinklered, escalators and moving walks may be protected in accordance with the Sprinkler-Vent Method, the Spray Nozzle Method, Rolling Shutter Method or Partial Enclosure Method as described in Section 6-12 of NFPA 101-1973, "Code for Safety to Life from Fire in Buildings and Structures", as revised to 1 May, 1975, or to the method described in Appendix A-4-4.8 of NFPA 13-1973, "Installation of Sprinkler Systems", as revised to 1 May, 1975.

(4) Notwithstanding the requirements of Article 3.1.6.1., in any building the first storey and either the storey next above or below, but not both, may be connected by an open stairway, escalator or inclined moving walkway not forming part of a required exit provided,

(a) it is occupied only by Group A, Division 1 or 2 or Group D or Group E occupancies;

(b) the building is sprinklered; and

(c) the building area is not greater than one half the area permitted in Subsection 3.2.2.

(5) An enclosed court shall be protected in accordance with Article 3.2.3.17.

3.1.7.5. Every assembly required to be a fire separation shall be continuous for the entire assembly except for openings protected with closures in accordance with the requirements of Article 3.1.7.1., or except for openings incorporated in an assembly at the time of testing, or as permitted in this Subsection and Subsection 3.1.5.

Integrity of fire
separation

3.1.7.6.(1) Openings for pipes are permitted in fire separations provided such pipes,

Openings for
pipes and ducts

(a) are enclosed in shafts conforming to Section 3.5.; or

(b) are tightly fitted or fire stopped to prevent the passage of smoke and flame.

(2) Openings for noncombustible ducts are permitted through fire separations provided such ducts,

(a) are enclosed in shafts, conforming to Section 3.5.; or

(b) conform to Article 3.1.7.1. and Sentence 3.1.7.7.(1) and they are tightly fitted or fire stopped to prevent the passage of smoke and flame.

Service equip-
ment pene-
trating fire
separations

3.1.7.7.(1) Every pipe, duct, electrical outlet box, electrical conduit or other similar service equipment partially or wholly penetrating through a fire separation shall be of

noncombustible materials, unless such service equipment has been incorporated in an assembly at the time of testing in conformance with Sentence 3.1.5.1.(1).

(2) Combustible drain, waste and vent piping shall not be used in a plumbing system within a building where part of the system is located within or passes through a fire separation, except that where drain, waste and vent piping penetrates through a vertical fire separation, the piping on one side of the separation may be combustible provided the combustible piping is not located in a vertical shaft or in a fire separation.

Subsection 3.1.8. Firewalls

General

3.1.8.1.(1) Every firewall shall be constructed in conformance with this Subsection; the requirement applying to fire separations of noncombustible construction shall also be applicable.

Grade of fire separation

(2) Where a required firewall separates a building into 2 or more parts, any part of which is a Group E occupancy or a Group F, Division 1 or 2 occupancy, such firewall shall be constructed as a 4-hr fire separation; where a firewall is required to separate other occupancies, it shall be constructed as a 2-hr fire separation.

Type of construction

(3) Every firewall shall be constructed of masonry, concrete or other similar noncombustible material.

Continuity and parapets

(4) Except as provided in Sentences (5), (6) and (7), every firewall shall extend from the ground continuously through all storeys and above the roof surface to form a parapet of not less than,

(a) 6 in. in height for a firewall required to be a 2-hr fire separation; and

(b) 36 in. in height for a firewall required to be a 4-hr fire separation.

(5) In buildings of noncombustible construction a firewall may terminate on the underside of a noncombustible roof slab or deck provided,

(a) the joint between the firewall and roof slab or deck is smoke tight;

(b) the roof assembly on both sides of the firewall has a,

(i) 1-hr fire-resistance rating if a 2-hr firewall is required, or

(ii) 2-hr fire-resistance rating if a 4-hr firewall is required; and

(c) there are no concealed spaces within the roof slab or deck in that portion immediately above the firewall.

Support

(6) A firewall may be supported by the structural frame of the building in buildings of noncombustible construction provided such supporting frame has a fire-resistance rating at least equal to that required for the firewall.

Offset

(7) In a building of noncombustible construction a firewall may be offset at any intermediate floor construction provided,

(a) the offset floor construction has a fire-resistance rating at least equal to that required for the firewall; and

(b) the fire separation for the complete assembly is continuous.

Openings

(8) Except as permitted in Sentence (9), openings in firewalls shall not exceed 120 sq ft in area nor shall the width or height be greater than 12 ft and the aggregate width of openings in each firewall of a fire compartment and at each floor level shall not exceed 25 per cent of the length of the firewall within the fire compartment.

(9) When the fire compartments on both sides of the firewall are sprinklered, openings designed for motor vehicles are permitted up to 240 sq ft in area.

(10) All openings in firewalls shall be protected with closures as required in Sentence 3.1.7.1.(4).

Subsection 3.1.9. Fire Stopping

3.1.9.1.(1) This Article applies to all types of construction unless otherwise specified.	Application
(2) Fire stops shall be provided at floor, ceiling and roof levels to cut off completely all concealed horizontal and vertical draft openings occurring between storeys and between top storeys and roof spaces, including,	Location
<ul style="list-style-type: none"> (a) every stud wall and partition at ceiling and floor levels; (b) every stud wall and partition of combustible construction so that the maximum vertical dimension of any concealed space is not greater than 10 ft; (c) every furred wall and partition so that concealed spaces between the furring strips are fire stopped at the floor and ceiling levels; (d) every coved ceiling of combustible construction at the springing line; (e) the top and bottom of each run of stairs at ceiling and floor levels; and (f) the top or bottom of every expansion joint between floors and walls in heavy timber construction. 	
(3) Where combustible floors are laid on wood sleepers on top of slabs in buildings required to be of noncombustible construction, the space between the underside of the flooring and the floor deck shall be filled with noncombustible material or fire stopping shall be provided so that there is no open space between the flooring and slab in excess of 100 sq ft in area.	Floors
(4) Where combustible ceiling finishes are attached to wood furring strips fastened to a noncombustible backing in buildings required to be of noncombustible construction; fire stopping shall be provided in such a manner that there is no open space in excess of 20 sq ft in area between the ceiling finish and the backing.	Ceiling
(5) A concealed space created by a suspended ceiling, roof space or unoccupied attic space in buildings of combustible construction shall, unless sprinklered, be separated by fire stops into draft-tight compartments not exceeding,	Concealed spaces
<ul style="list-style-type: none"> (a) 6,000 sq ft in area or 200 ft in any dimension where materials having a flame-spread rating of 25 or less are exposed; and (b) 3,000 sq ft in area or 150 ft in any dimension where materials having a flame-spread rating greater than 25 are exposed. 	
(6) The concealed spaces in exterior cornices including the mansard type, balconies, and canopies of combustible construction shall be fire stopped from the point where such concealed spaces extend across the end of required fire separations.	
(7) Every fire stop shall,	Firestopping materials
<ul style="list-style-type: none"> (a) be constructed of, <ul style="list-style-type: none"> (i) asbestos cement board, gypsum board or other non-combustible material having a melting point above 1,200°F, such as steel, (ii) solid lumber not less than 2 in. nominal thickness, or (iii) ½-in. thick plywood with joints backed with like material or two thicknesses of lumber not less than 1 in. nominal in thickness with joints staggered, where the width or height of this opening or space to be fire stopped is such that more than one piece of 2-in. thick lumber is necessary; and (b) conform to other appropriate requirements in this Part. 	
(8) Access openings through fire stops shall be protected with self-closing draft-tight closures of construction equivalent to the fire stop.	Openings

(9) Where fire stops are pierced by pipes, ducts or other elements or assemblies, the integrity of the fire stop shall be maintained.

(10) RESERVED.

Subsection 3.1.10. Flame-Spread Rating

3.1.10.1(1) Except as provided in Sentences (2) to (5), the flame-spread rating and smoke developed classification of a material, assembly of materials or structural member shall be determined on the basis of the average of at least three tests conducted in accordance with the appropriate provisions of the following as revised to 1 May, 1975:

ASTM E84-70, "Test for Surface Burning Characteristics of Building Materials".

ULC-S102-1972, "Standard Test Method for Fire Hazard Classification of Building Materials",

UL 723(1971), "Test Method for Fire Hazard Classification of Building Materials",

NFPA 255-1972, "Method of Test of Surface Burning Characteristics of Building Materials".

(2) The flame-spread rating and smoke developed classification of a material or assembly of materials for floor application shall be determined on the basis of results of tests conducted in accordance with the provisions of ULC S102.2-1973, "Standard Test Method for Fire Hazard Classification of Flooring and Floor Covering Materials", as revised to 1 May, 1975, provided that there is no significant difference in the test standard.

(3) Flame-spread rating or smoke developed classification may be determined on the basis of the results of tests conducted in accordance with the earlier editions of test standards listed in Sentence (1) which were current at the time of test but modified in conformance with Sentence (4).

(4) A material, assembly of materials or a structural member may be assigned a flame-spread rating on the basis of National Research Council publication No. 13987, "Fire-Performance Ratings 1975".

(5) Where the flame spread rating determined in accordance with the provision of Sentence (1) is between 55 and 78 the flame-spread rating shall be the greater of,

- (a) the value determined in accordance with the provisions of Sentence (1); or
- (b) the greatest value that can be determined by the formula $25\frac{d}{t}$ applied to observations of the progress of the flame front during the tests, where d =any distance of flame travel from the point of origin, in feet, that is greater than 10, and t =the time in minutes for the flame to travel distance d .

Subsection 3.1.11. Interior Finish

General

3.1.11.1(1) Interior finish material shall include any material that forms part of the interior surface of a floor, wall, partition or ceiling, such as,

- (a) interior cladding of plaster, wood or tile;
- (b) surfacing of fabric, paint, plastic, veneer or wallpaper;
- (c) doors, windows and trim;
- (d) transparent or translucent lighting elements such as light diffusers and lenses forming part of the finished surface of the ceiling; and
- (e) carpet material that overlies a floor, when such floor is not intended as the finished floor.

(2) Transparent or translucent lighting elements, such as light diffusers and lenses, need not meet the flame-spread rating for interior finish provided,

- (a) all combustible portions of the lighting elements when mounted in the test apparatus described in ULC S102-1972, "Standard Test Method For Fire Hazard Classification of Building Materials", as revised to 1 May, 1975, as modified in clauses (b) and (c), will fall to the bottom of the test apparatus before the test specimen ignites;
- (b) the test specimen is at least 12 ft in length, located at least 18 in. away from the centre line of the burners with an air gap of at least 2 in. between the test specimen and the top of the test apparatus so that the gap is closed off at each end of the specimen with an asbestos-cement board fire stop, and with the gap between the top of the test specimen and the burners lined with asbestos-cement board;
- (c) the test specimens are supported in the test apparatus in the same manner as is used in practice;
- (d) the lighting elements have a flame-spread rating of not more than 250 and a smoke developed classification of not more than 600 when tested in conformance with ULC S102.2-1973, "Standard Test Method For Fire Hazard Classification of Flooring and Floor Covering Materials", as revised to 1 May, 1975; and
- (e) the lighting elements are not used in corridors that are required to be separated from the remainder of the building by a fire separation or in exit shafts unless the element does not exceed 10 sq ft in area and is separated from any adjacent element by at least 4 ft of ceiling finish material having the required flame-spread rating.

(3) Open grid and translucent ceilings located below sprinkler systems shall be installed in conformance with NFPA 13-1973, "Installation of Sprinkler Systems", as revised to 1 May, 1975, paragraphs 4-4.15, 4-4.16 and the rules contained therein.

3.1.11.2.(1) Where a building or part of a building is required to be of noncombustible construction, foamed plastics shall not be used for interior wall or ceiling finish and, when used, they shall,

- (a) conform to Clause 3.1.4.5(2) (d); and
- (b) have their interior surface protected by,
 - (i) not less than ½-in. thick gypsum board, lath and plaster, or
 - (ii) other material that when subjected to the standard fire exposure described in ULC-S101-1975, "Fire Tests of Building Construction and Materials", will not exceed a temperature rise of 250°F on the unexposed face after a period of 10 min.

(2) Protective finishes described in Sentence (1) shall be mechanically fastened to the supporting structure unless it can be demonstrated on the basis of fire tests described in Sentence (1) that such fasteners are not necessary.

(3) Where a building or part of a building is permitted to be of combustible construction, foamed plastics may be used as interior finish provided the interior surface of the foamed plastic is protected by one of the interior finishes described in Section 9.30.

Subsection 3.1.12. Fire Retardant Treated Wood

3.1.12.1.(1) Where fire-retardant treated wood is specified in this Part, such wood shall,

Acceptable
material

- (a) be impregnated with fire retardant chemicals, in accordance with CSA 080-1974, "Wood Preservation", as revised to 1 May, 1975, or other similar method; and

- (b) be tested to determine its flame-spread rating in conformance with Sentence 3.1.10.1.(1) except as provided in Sentence (2), and bear identification showing this provision has been complied with.

Roof system

(2) Where a fire-retardant treated wood roof system is specified in Subsection 3.2.2., the assembly shall consist of,

- (a) wood material which, when tested in conformance with Sentence 3.1.10.1.(1) with the test period extended to 30 min., does not exhibit progressive combustion within that period in excess of 5 ft from the point of flame impingement, resulting in an equivalent flame-spread rating of 25, and bear identification that this provision has been complied with;
- (b) supports for the roof deck which are,
 - (i) fire-retardant treated wood exhibiting flame-spread properties as outlined in Clause (a),
 - (ii) heavy timber construction as prescribed in Article 3.1.4.4.,
 - (iii) noncombustible construction, or
 - (iv) a combination thereof;
- (c) a deck material of fire-retardant treated wood or plywood exhibiting flame-spread properties as outlined in Clause (a) and of not less than $\frac{1}{4}$ in. in actual thickness; and
- (d) a membrane of metallic material of not less than 0.002-in. thickness applied directly above the wood deck material.

Subsection 3.1.13. Roof Covering

Classification

3.1.13.1.(1) Except as provided in Sentence (2), where a roof covering is required to be a Class A, B or C roof covering, such classification shall conform to ULC-S107-1969, "Test Methods for Fire Resistance of Roof Covering Materials" as revised to 1 May, 1975, for Class A, B or C roof covering, and shall be determined on the basis of results of tests conducted in accordance with the following as revised to 1 May, 1975:

ASTM E108-58(1970), "Fire Tests of Roof Coverings",
ULC-S107-1969, "Test Methods for Fire Resistance of Roof Covering Materials",
UL 790(1973), "Test for Fire Resistance of Roof Covering Materials", or
NFPA 256-1970, "Methods of Fire Tests of Roof Coverings".

(2) A roof covering classification may be determined on the basis of the results of tests conducted in conformance with the earlier editions of test standards listed in Sentence (1) which were current at the time of test provided there is no significant difference in the test standard.

Subsection 3.1.14. Occupant Load

3.1.14.1.(1) The occupant load of every floor area, or part thereof, shall be,

- (a) the number of persons for which the floor area, or part thereof is designed; but
- (b) not less than the number of persons that can be accommodated on the floor area or part thereof as determined from Table 3.1.14.A., unless otherwise permitted.

(2) For the purposes of this Article, mezzanines, tiers and balconies shall be regarded as part of the floor area.

(3) Where a room or group of rooms is intended for 2 or more occupancies at different times, the value to be used from Table 3.1.14.A. shall be the value which gives the greatest number of persons for the occupancies concerned.

TABLE 3.1.14.A.

Forming Part of Article 3.1.14.1.

Item No.	Type of Use of Floor Area or Part Thereof	Area per Person, sq ft
Assembly uses		
1	space with fixed seats	See 3.1.14.1.(4)
2	space with nonfixed seats	8
3	space with nonfixed seats and tables	10
4	standing space	4
5	stadia and grandstands	6
6	bowling alleys, pool and billiard rooms	100
7	classrooms	20
8	school shops and vocational rooms	100
9	reading or writing rooms or lounges	20
10	dinning, beverage and cafeteria space	12
11	laboratories in schools	50
12	exhibition halls other than those classified in Group E	30
Institutional uses		
1	surgical and obstetrical suites	125
2	wards containing more than 2 beds	50
3	detention quarters	125
4	sleeping rooms containing 1 bed	75
Residential uses		
1	houses	See 3.1.14.1.(5)
2	dormitories	50
Business and Personal Services uses		
1	personal service shops	50
2	offices	100
Mercantile uses		
1	retail sales floors at ground, basement or cellar	30
2	other retail sales floors	60
Industrial uses		
1	manufacturing or process rooms	50
2	storage garage	500
3	storage space (warehouse)	300
4	aircraft hangars	500
Other uses		
1	cleaning and repair of goods	50
2	kitchens	100
3	storage	500

3.1.14.1.(4) In an Assembly Occupancy having fixed seating, the occupant load shall be based on the number of fixed seats provided.

(5) In a Residential Occupancy the occupant load shall be based on 2 persons per bedroom or area provided for sleeping.

SECTION 3.2 SIZE AND OCCUPANCY REQUIREMENTS FOR FIRE SAFETY

Subsection 3.2.1. Building Size Determination

3.2.1.1.(1) When a building is divided by a firewall or firewalls, each portion of the building separated from the remainder in this manner shall be considered as a separate building for the purposes of this Section.

Dividing buildings by firewalls

(2) Notwithstanding the requirements of Sentence 3.2.3.4.(1), when a building is divided by fire separations in accordance with Article 3.1.3.3. and Section 3.3 to create separately owned spaces within a building, such separations need not be constructed as firewalls and shall not be considered as firewalls in calculating the building area.

Exceptions to
building height
in storeys

3.2.1.2.(1) Roof-top enclosures provided for elevator machinery, stairways and service rooms, used for no purpose other than for service to the building, shall not be considered as a storey in calculating the building height.

(2) A balcony or gallery in places of assembly of Group A, Division 1 occupancy shall not be considered as a storey in calculating the building height.

(3) Space under tiers of seats in buildings of the arena-type shall not be considered as adding to the building height provided such space is used only for a purpose incidental to the major occupancy of the building, such as for dressing rooms or concession stands.

(4) A mezzanine shall not be considered as a storey in calculating the building height provided,

- (a) the aggregate area of the mezzanine floor does not exceed 40 per cent of the area of the room or storey in which it is located;
- (b) it is used as an open floor area except as provided in Sentence 3.3.2.12.(2); and
- (c) the space above the mezzanine floor and the space above the floor beneath it has no visual obstructions more than 42 in. above such floors, except as permitted in Sentence 3.3.1.1.(5).

Subsection 3.2.2. Building Size and Construction Relative to Occupancy

Application

3.2.2.1.(1) Buildings classified in accordance with Subsection 3.1.2. shall be constructed in conformance with this Subsection to minimize fire spread and collapse caused by the effects of fire.

Special
structures

(2) Grain elevators, towers, and similar structures which because of unusual proportions cannot be identified with the descriptions of buildings in Articles 3.2.2.9. to 3.2.2.52. and which have special occupancy hazards, shall be protected against fire spread and collapse in conformance with the National Fire Codes 1973-74 as revised to 1 May, 1975, of the National Fire Protection Association, the National Fire Code of Canada 1963 as revised to 1 May, 1975, or other similar, recognized handbooks.

(3) Buildings which are directly part of the mining operation and structures erected relative to the workings of a mine shall conform to The Mining Act.

Buildings
containing
multiple
occupancies

(4) Where any building contains more than one major occupancy classified in more than one Group or Division, the requirements of this Subsection concerning building size and construction relative to occupancy shall be applied according to Sentences (5) to (9).

Applicable
building
height and
area

(5) In determining the fire safety requirements of a building in relation to each of the major occupancies contained therein, the building height and building area of the entire building shall be used.

Construction
requirements
for multiple
occupancies

(6) Except as provided in Sentences (7) and (8), in any building containing more than 1 major occupancy the requirements of Subsection 3.2.2. for the most restricted major occupancy contained, shall apply to the whole building.

Supplementary
major
occupancies

(7) Except as provided in Sentence (8), in any building containing more than one major occupancy in which one major occupancy is located entirely above another major occupancy, the requirements in this Subsection for each portion of the building containing a major occupancy shall be applied to that portion as if the entire building was of that major occupancy.

(8) In a building containing more than one major occupancy where the aggregate area of all major occupancies in that particular group or division does not exceed 10 per cent of the floor area on the storey on which they are located, they need not be considered as

major occupancies for the purposes of this Subsection provided they are not classified as Group F, Division 1 or 2 occupancies except a helicopter landing area on a roof.

(9) Where the fire-resistance rating of construction required in Sentence (7) for that portion of the building containing the upper major occupancy is greater than that required for that portion of the building containing the lower major occupancy, the building need not conform to Article 3.1.5.4. or Sentence 3.1.6.2.(1) provided that portion of the building containing the upper major occupancy is supported from the ground by construction having a fire-resistance rating at least equal to that required for that portion of the building containing the lower major occupancy but not less than $\frac{3}{4}$ -hr except where the entire building is not required to have a fire-resistance rating.

3.2.2.2. When the building height or the building area is such that it could be regulated by more than 1 of Articles 3.2.2.9. to 3.2.2.52. for the same occupancy classification of the building, the least restrictive Article may be used.

When lesser restrictions apply

3.2.2.3.(1) For the purposes of Articles 3.2.2.9. to 3.2.2.52., a crawl space is considered to be a basement or cellar when,

Crawl spaces

- (a) it exceeds 6 ft in height between the lowest floor assembly and the ground or other surface below;
- (b) it is used for any occupancy;
- (c) it is used for the passage of flue pipes, combustible pipes or ducts; or
- (d) it is used as a plenum.

3.2.2.4.(1) Every building shall face at least 1 street, except that, for the purposes of this Subsection and Subsection 3.2.5., a yard may serve in lieu of a street or in conjunction with a street when such yard

Streets

- (a) is at least 30 ft wide; and
- (b) is located to provide access at all times from a street to the entire building face which it adjoins in conformance with Sentence 3.2.5.1.(5).

(2) Enclosed spaces, tunnels, bridges and similar structures even though used for vehicular or pedestrian traffic are not considered as streets for the purpose of this Part unless permitted.

3.2.2.5.(1) For the purpose of this Subsection, any part of a roof that is pitched at an angle of 60 degrees or more to the horizontal and adjoins a space intended for occupancy within a building shall be considered as part of an external wall of the building; and this type of roof structure shall not be considered as a canopy.

Roofs

(2) Skylight assemblies in all locations other than over stairwells and floor areas used for assembly occupancy may be constructed of plastics provided,

Skylights

- (a) the roof opening is not more than 50 sq ft in area or 10 ft in any dimension and not more than 20 per cent of the roof area is occupied by such installations;
- (b) the skylight assembly is constructed with a pitch of not less than 30 degrees to the horizontal or is dome shaped with a minimum rise at the centre of not less than 5 in. or 10 per cent of the maximum dimension whichever is the greater;
- (c) the units are installed on the roof with a minimum of 3 ft between adjoining units and have a curb not less than 4 in. in height above the level of the roof;
- (d) the plastic is mounted in a metal frame; and
- (e) the plastic material is one,

- (i) which is functionally suitable for use in skylights,

- (ii) which burns no faster than 2½ in. per minute in sheets 0.06 in. in thickness when tested in accordance with ASTM D635-74, "Flammability of Self-supporting Plastics," as revised to 1 May, 1975,
- (iii) which is not consumed in less than two minutes when tested in accordance with ASTM D568-74, "Flammability of Flexible Plastics," as revised to 1 May, 1975.

Exterior
balconies
marquees, and
canopies

3.2.2.6.(1) Exterior balconies shall be constructed in accordance with the type of construction required in Articles 3.2.2.9. to 3.2.2.52. as applicable to the occupancy classification of the building but need not comply with the fire-resistance rating requirement unless such balconies are used as a required means of egress.

(2) On buildings required to be of noncombustible construction, marquees and canopies not greater than 25 ft from grade to top of canopy may be of combustible construction provided every opening in the exposed exterior wall of the building within 15 ft horizontally and 30 ft vertically above such marquee or canopy is protected with wired glass in accordance with Article 3.1.7.3. or equivalent.

Roof-top
enclosures

3.2.2.7.(1) Roof-top enclosures provided for elevator machinery and service rooms, used for no purpose other than for service to the building, shall be constructed in accordance with the type of construction required in Articles 3.2.2.9. to 3.2.2.52., except that where such enclosure does not exceed 1 storey, it is not required to have a fire-resistance rating.

(2) Roof-top enclosures for stairways including exit stairways shall be constructed in conformance with Articles 3.2.2.9. to 3.2.2.52., except that such enclosures need not have a fire-resistance rating or be constructed as a fire separation.

Storeys below
ground

3.2.2.8.(1) Where a building is erected entirely below the adjoining finished ground level and does not extend more than 1 storey below such ground level, the minimum precautions against fire spread and collapse shall be the same as are required for basements or cellars under a building of 1 storey in building height having the same occupancy and building area.

(2) Where a building or portion thereof is erected below the adjoining finished ground level and extends more than 1 storey below such ground level the following minimum precautions against fire spread and collapse shall be taken:

- (a) the basements and cellars shall be sprinklered;
 - (b) floor assemblies below such ground level shall be constructed as a,
 - (i) 2-hr fire separation where the basements or cellars are occupied as Group A, D or Group F, Division 3 occupancies, and
 - (ii) 3-hr fire separation where the basements or cellars are occupied by other occupancies; and
 - (c) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equal to that required for the construction that they support.
- (3) Except as otherwise provided, all cellars exceeding 3,000 sq ft shall be sprinklered.

GROUP A—ASSEMBLY BUILDINGS

GROUP A, DIVISION 1, 1 STOREY

3.2.2.9.(1) A building classified as Group A, Division 1 shall conform to Sentence (2) provided the building,

- (a) is not more than 1 storey in building height;
- (b) has no part of the auditorium floor more than 15 ft above or below grade;

- (c) has no occupancy above or below the auditorium other than one which serves it or is dependent on it;
 - (d) is not more than 3,000 sq. ft. in building area; and
 - (e) is one in which the occupant load of the auditorium floor does not exceed 300 persons.
- (2) The building shall be of combustible or noncombustible construction used either singly or in combination, and
- (a) basements and cellars shall be sprinklered;
 - (b) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation;
 - (c) other floor assemblies shall be a $\frac{3}{4}$ -hr fire separation;
 - (d) balconies and mezzanines shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating;
 - (e) roof assemblies shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating; and
 - (f) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{1}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
 - (g) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP A, DIVISION 1, 1 STOREY

3.2.2.10.(1) A building classified as Group A, Division 1 shall conform to Sentence (2) provided the building,

- (a) is not more than 1 storey in building height;
- (b) has less than 40 per cent of the area of the building as 2 storeys for the purpose of,
 - (i) development of productions including preparation of scenery and costumes and rehearsal of performers,
 - (ii) organization of performers, scenery and sound equipment before and during a performance,
 - (iii) preparation by performers for a performance,
 - (iv) managerial functions of policy making and administration, or
 - (v) public facilities such as toilets and rest rooms;
- (c) has no occupancy above or below the auditorium other than one which serves or is dependent on it;
- (d) is not more than 6,000 sq ft in building area; and
- (e) is one in which the occupant load does not exceed 600 persons.

(2) The building shall be of heavy timber or noncombustible construction used either singly or in combination, and

- (a) basements and cellars shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation;
- (c) other floor assemblies shall be a $\frac{3}{4}$ -hr fire separation,
- (d) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
- (e) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP A, DIVISION 1, ANY HEIGHT, ANY AREA

3.2.2.11.(1) A building classified as Group A, Division 1 shall conform to Sentence (2) provided the building,

- (a) is not limited in building height; and
- (b) is not limited in building area.

(2) The building shall be of noncombustible construction, and

- (a) basements and cellars shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 10,000 sq ft or they are sprinklered;
- (d) other floor assemblies shall be a 2-hr fire separation;
- (e) balconies and mezzanines shall have a 1-hr fire resistance rating;
- (f) roof assemblies shall have a 1-hr fire-resistance rating, unless every part of a roof assembly is 20 ft or more above the main floor or balcony and carries no loads other than normal roof loads, including access walks and ventilating, sound or similar equipment;
- (g) the restriction in Clause (f) concerning minimum distance shall not apply to,
 - (i) an inclined and stepped floor ascending from the main floor, and which is used for seating purposes only,
 - (ii) a balcony used for seating purposes only, or
 - (iii) a walkway used only as a means of egress; and
- (h) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly, but not less than 1-hr.

GROUP A, DIVISION 2, 1 STOREY

3.2.2.12.(1) A building classified as Group A, Division 2 shall conform to Sentences (2) and (3) provided the building,

- (a) is not more than 1 storey in building height; and
- (b) if unsprinklered, is not greater in building area than,
 - (i) 4,000 sq ft if facing 1 street,
 - (ii) 5,000 sq ft if facing 2 streets, or
 - (iii) 6,000 sq ft if facing 3 streets; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation;
- (b) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly;

(3) In buildings without basements or cellars the limiting areas may be doubled provided a 1-hr fire separation is used to separate the building into fire compartments each one of which does not exceed the area limits of Clause 1 (b) or 1 (c).

GROUP A, DIVISION 2, 1 AND 2 STOREYS, SPRINKLERED

3.2.2.13.(1) A building classified as Group A, Division 2 shall conform to Sentence (2) provided the building,

- (a) is not more than 2 storeys in building height;
- (b) is sprinklered; and
- (c) is not greater in building area than,
 - (i) 4,000 sq ft if facing 1 street,
 - (ii) 5,000 sq ft if facing 2 streets, or
 - (iii) 6,000 sq ft if facing 3 streets.

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation; and
- (b) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP A, DIVISION 2, 1 AND 2 STOREYS

3.2.2.14.(1) A building classified as Group A, Division 2 shall conform to Sentence (2) provided the building,

- (a) is not more than 2 storeys in building height; and

- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.A.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.A.

Forming Part of Sentence 3.2.2.14.(1)

Unsprinklered Maximum Area, sq ft			
No. of Storeys	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	16,000	20,000	24,000
2	8,000	10,000	12,000
Column 1	2	3	4

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) basements shall be subdivided by a 1-hr. fire separation into areas not exceeding 5,000 sq. ft., or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating, unless the crawl spaces are subdivided by a $\frac{3}{4}$ -hr fire separation into areas not exceeding 8,000 sq ft, or they are sprinklered;
- (d) other floor assemblies shall be a fire separation and, if of combustible construction, shall have a $\frac{3}{4}$ -hr fire-resistance rating;
- (e) balconies and mezzanines shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating;
- (f) roof assemblies shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating except that in buildings not exceeding 1 storey in building height, the fire-resistance rating is not required provided that the roof assembly is constructed as a fire-retardant treated wood roof system conforming to Sentence 3.1.12.1.(2);
- (g) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
- (h) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP A, DIVISION 2, UP TO 5 STOREYS, ANY AREA

3.2.2.15.(1) A building classified as Group A, Division 2 shall conform to Sentences (2) or (3) provided the building,

- (a) is not more than 5 storeys in building height; and
- (b) is not limited in building area.

(2) Except as provided in Sentence (3), the building shall be of noncombustible construction, and

- (a)
 - (i) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered, and
 - (ii) all cellars shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating, unless the crawl spaces are subdivided by a 1-hr fire separation into areas not exceeding 10,000 sq ft, or they are sprinklered;
- (d) other floor assemblies shall be a 1-hr fire separation;
- (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
- (f) roof assemblies shall have a 1-hr fire-resistance rating unless every part of a roof assembly is 20 ft or more above the main floor or balcony and carries no loads other than normal roof loads, including access walks and ventilating, sound or similar equipment;
- (g) the restriction in Clause (f) concerning minimum distance shall not apply to,
 - (i) an inclined and stepped floor ascending from the main floor which is used for seating purposes only,
 - (ii) a balcony used for seating purposes only, or
 - (iii) a walkway used only as a means of egress; and
- (h) all loadbearing walls, all columns and arches shall have a fire-resistance rating at least equivalent to the supported assembly, but not less than 1-hr.

(3) A building classified as Group A, Division 2 occupancy that does not exceed 1 storey in building height and in which the building area is not greater than 32,000 sq ft if unsprinklered or 64,000 sq ft if sprinklered, shall conform to Sentence (2) except that where the fire-resistance rating is not required in Clause 2 (f), heavy timber construction may be used.

GROUP A, DIVISION 2, ANY HEIGHT, ANY AREA

3.2.2.16.(1) A building classified as Group A, Division 2 shall conform to Sentence(2) provided the building,

- (a) is not limited in building height; and
- (b) is not limited in building area.

(2) The building shall be of noncombustible construction, and

- (a)
 - (i) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered, and
 - (ii) all cellars shall be sprinklered;

- (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating, unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 10,000 sq ft, or they are sprinklered;
- (d) other floor assemblies shall be a 2-hr fire separation;
- (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
- (f) roof assemblies shall have a 1-hr fire-resistance rating, unless every part of a roof assembly is 20 ft or more above the main floor or balcony and carries no loads other than normal roof loads, including access walks and ventilating, and sound or similar equipment;
- (g) the restriction in Clause (f) concerning minimum distance shall not apply to,
 - (i) an inclined and stepped floor ascending from the main floor and which is used for seating purposes only,
 - (ii) a balcony used for seating purposes only, or
 - (iii) a walkway used only as a means of egress; and
- (h) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly, but not less than 1-hr.

GROUP A, DIVISION 3, 1 STOREY

3.2.2.17.(1) A building classified as Group A, Division 3 shall conform to Sentence (2) provided the building,

- (a) is not more than 1 storey in building height;
- (b) if unsprinklered, is not greater in building area than,
 - (i) 10,000 sq ft if facing 1 street,
 - (ii) 12,500 sq ft if facing 2 streets, or
 - (iii) 15,000 sq ft if facing 3 streets; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a)
 - (i) basements shall be subdivided by a 1-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered, and
 - (ii) all cellars shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating, unless the crawl spaces are subdivided by $\frac{3}{4}$ -hr fire separations into areas not exceeding 10,000 sq ft, or they are sprinklered;
- (d) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,

- (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (1) and (ii); and
- (e) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP A, DIVISION 3, 1 STOREY

3.2.2.18.(1) A building classified as Group A, Division 3 shall conform to Sentence(2) provided the building,

- (a) is not more than 1 storey in building height;
- (b) if unsprinklered, is not greater in building area than,
 - (i) 24,000 sq ft if facing 1 street,
 - (ii) 30,000 sq ft if facing 2 streets, or
 - (iii) 36,000 sq ft if facing 3 streets; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a)
 - (i) basements shall be subdivided by a 1-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered; and
 - (ii) all cellars shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a 1-hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating, unless the crawl spaces are subdivided by a $\frac{3}{4}$ -hr fire separation into areas not exceeding 10,000 sq ft, or they are sprinklered;
- (d) balconies and mezzanines shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating;
- (e) roof assemblies shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating, unless the roof assembly is constructed as a fire-retardant treated wood roof system conforming to Sentence 3.1.12.1.(2);
- (f) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
- (g) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP A, DIVISION 3, 1 AND 2 STOREYS

3.2.2.19.(1) A building classified as Group A, Division 3 shall conform to Sentence (2) provided the building,

- (a) is not more than 2 storeys in building height;
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.B.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.B.

Forming Part of Sentence 3.2.2.19.(1)

Unsprinklered Maximum Area, sq ft			
No. of Storeys	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	40,000	50,000	60,000
2	20,000	25,000	30,000
Column 1	2	3	4

(2) Except as provided in Clauses (f) and (g), the building shall be of noncombustible construction, and

- (a)
 - (i) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered, and
 - (ii) all cellars shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating, unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 10,000 sq ft, or they are sprinklered;
- (d) other floor assemblies shall be a 1-hr fire separation;
- (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
- (f) roof assemblies shall have a 1-hr fire-resistance rating, except that heavy timber construction, noncombustible construction without a fire-resistance rating, or combinations thereof may be used where every part of a roof assembly is 20 ft or more above the main floor or balcony and carries no loads other than normal roof loads, including access walks and ventilating, sound or similar equipment;
- (g) the restriction in Clause (f) concerning minimum distance shall not apply to,
 - (i) an inclined and stepped floor ascending from the main floor and which is used for seating purposes only,
 - (ii) a balcony used for seating purposes only, or
 - (iii) a walkway used only as a means of egress; and
- (h) all loadbearing walls and columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly, but not less than 1-hr, except that arches may be of heavy timber construction.

GROUP A, DIVISION 3, ANY HEIGHT, ANY AREA

3.2.2.20.(1) A building classified as Group A, Division 3 shall conform to Sentence (2) provided the building,

(a) is not limited in building height; and

(b) is not limited in building area.

(2) The building shall be of noncombustible construction, and

(a) (i) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered, and

(ii) all cellars shall be sprinklered;

(b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;

(c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating unless the crawl spaces are subdivided by 1-hr fire separation into areas not exceeding 10,000 sq ft or they are sprinklered;

(d) other floor assemblies shall be a 2-hr fire separation;

(e) balconies and mezzanines shall have a 1-hr fire-resistance rating;

(f) roof assemblies shall have a 1-hr fire-resistance rating unless every part of a roof assembly is 20 ft or more above the main floor or balcony and carries no loads other than normal roof loads, including access walks and ventilating, sound or similar equipment;

(g) the restriction in Clause (f) concerning minimum distance shall not apply to,

(i) an inclined and stepped floor ascending from the main floor and which is used for seating purposes only,

(ii) a balcony used for seating purposes only, or

(iii) a walkway used only as a means of egress; and

(h) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly, but not less than 1-hr.

GROUP A, DIVISION 4

3.2.2.21.(1) A building classified as Group A, Division 4 shall conform to Sentence (2).

(2) The building shall be of noncombustible construction, except that,

(a) the roof assemblies may be of heavy timber construction; and

(b) the building may be of combustible construction provided,

(i) the occupant load is less than 1,500 persons, and

(ii) the building has a limiting distance of at least 20 ft.

GROUP B—INSTITUTIONAL BUILDINGS**GROUP B, DIVISION 1**

3.2.2.22.(1) A building classified as Group B, Division 1 shall conform to Sentence (2).

- (2) The building shall be of noncombustible construction, and
 - (a) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
 - (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation,
 - (c) floor assemblies immediately above crawl spaces shall have a 2-hr fire-resistance rating unless the crawl spaces are subdivided by 2-hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;
 - (d) other floor assemblies shall be a 2-hr fire separation;
 - (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
 - (f) roof assemblies shall have a 1-hr fire-resistance rating; and
 - (g) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP B, DIVISION 2, 1 STOREY

3.2.2.23.(1) A building classified as Group B, Division 2 shall conform to Sentence (2) provided the building,

- (a) is not more than 1 storey in building height; and
- (b) if unsprinklered, is not greater in building area than 2,500 sq ft; or
- (c) if sprinklered, is not greater than 5,000 sq ft.

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation; and
- (b) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP B, DIVISION 2, 1 AND 2 STOREYS

3.2.2.24.(1) A building classified as Group B, Division 2 shall conform to Sentence (2) provided the building,

- (a) is not more than 2 storeys in building height; and
- (b) is not greater in building area than the value in Table 3.2.2.C.

TABLE 3.2.2.C.

Forming Part of Sentence 3.2.2.24.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft	Sprinklered Maximum Area, sq ft
1	10,000	24,000
2	5,000	16,000

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) floor assemblies immediately above basements or cellars shall be a 1-hr fire separation;
- (b) other floor assemblies except floors over crawl spaces shall be a $\frac{3}{4}$ -hr fire separation;
- (c) balconies and mezzanines shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating;
- (d) roof assemblies shall have, if of combustible construction a $\frac{3}{4}$ -hr fire-resistance rating; and
- (e) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly, but not less than $\frac{3}{4}$ -hr; and
- (f) all basements shall be subdivided by a 1-hr fire separation into areas not exceeding 2,500 sq ft or be sprinklered.

GROUP B, DIVISION 2, ANY HEIGHT, ANY AREA

3.2.2.25.(1) A building classified as Group B, Division 2 shall conform to Sentence (2) provided the building,

- (a) is not limited in building height; and
 - (b) is not limited in building area.
- (2) The building shall be of noncombustible construction, and
- (a) basements, cellars and crawl spaces shall be sprinklered;
 - (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
 - (c) other floor assemblies shall be a 2-hr fire separation;
 - (d) balconies and mezzanines shall have a 1-hr fire-resistance rating;
 - (e) roof assemblies shall have a 1-hr fire-resistance rating; and
 - (f) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP C—RESIDENTIAL BUILDINGS

GROUP C, UP TO 3 STOREYS

3.2.2.26.(1) A building classified as Group C shall conform to Sentences (2) and (3) provided the building,

- (a) is not more than 3 storeys in building height;
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.D.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.D.

Forming Part of Sentence 3.2.2.26.(1)

Unsprinklered Maximum Area, sq ft			
No. of Storeys	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	12,000	15,000	18,000
2	9,000	11,250	13,500
3	6,000	7,500	9,000
Column 1	2	3	4

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) basements and crawl spaces shall be subdivided by a $\frac{3}{4}$ -hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation;
- (c) other floor assemblies except floors over crawl spaces shall be a $\frac{3}{4}$ -hr fire separation;
- (d) balconies and mezzanines shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating; and
- (e) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

(3) When buildings contain dwelling units consisting of more than 1 storey, as provided in Article 3.3.4.2., the provisions of Sentences (1) and (2) shall apply except that subject to the provision of Sentence 3.3.4.2.(2) the floor assemblies, including floors over basements or cellars which are entirely contained within such dwelling units, shall have a $\frac{3}{4}$ -hr fire-resistance rating and need not be constructed as a fire separation; in buildings where there is no dwelling unit above another the fire-resistance rating for the floor assemblies within the dwelling unit is not required.

GROUP C, UP TO 6 STOREYS

3.2.2.27.(1) A building classified as Group C shall conform to Sentences (2) and (3) provided the building,

- (a) is not more than 6 storeys in building height; and
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.E.;
or
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.E.

Forming Part of Sentence 3.2.2.27.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	unlimited	unlimited	unlimited
2	60,000	unlimited	unlimited
3	40,000	50,000	60,000
4	30,000	37,500	45,000
5	24,000	30,000	36,000
6	20,000	25,000	30,000

(2) The building shall be of noncombustible construction, and

- (a) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;
- (d) other floor assemblies shall be a 1-hr fire separation;
- (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
- (f) roof assemblies shall have a 1-hr fire-resistance rating; and
- (g) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

(3) When buildings contain dwelling units consisting of more than 1 storey, as provided in Article 3.3.4.2., the provisions of Sentences (1) and (2) shall apply, except that subject to the provision of Sentence 3.3.4.2.(2), the floor assemblies, including floors over basements or cellars, which are entirely contained within such dwelling units, shall have a 1-hr fire-resistance rating and need not be constructed as a fire separation.

GROUP C, ANY HEIGHT, ANY AREA

3.2.2.28.(1) A building classified as Group C shall conform to Sentences (2) and (3) provided the building,

- (a) is not limited in building height; and
- (b) is not limited in building area.

(2) The building shall be of noncombustible construction, and

- (a) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;

- (d) other floor assemblies shall be a 2-hr fire separation;
- (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
- (f) roof assemblies shall have a 1-hr fire-resistance rating; and
- (g) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

(3) When buildings contain dwelling units consisting of more than 1 storey, as provided in Article 3.3.4.2., the provisions of Sentences (1) and (2) shall apply, except that subject to the provision of Sentence 3.3.4.2.(2), the floor assemblies, including floors over basements or cellars, which are entirely contained within such dwelling units, shall have a 1-hr fire-resistance rating and need not be constructed as a fire separation.

GROUP D—BUSINESS AND PERSONAL SERVICES BUILDINGS

GROUP D, 1 AND 2 STOREYS

3.2.2.29.(1) A building classified as Group D shall conform to Sentence (2) provided the building,

- (a) is not more than 2 storeys in building height;
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.F.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.F.

Forming Part of Sentence 3.2.2.29.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	10,000	12,500	15,000
2	8,000	10,000	12,000
Column 1	2	3	4

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) crawl spaces in a building of combustible construction, and basements in every building shall be subdivided by $\frac{3}{4}$ -hr fire separations into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation;
- (c) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and

- (d) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP D, UP TO 3 STOREYS

3.2.2.30.(1) A building classified as Group D shall conform to Sentence (2) provided the building,

- (a) is not more than 3 storeys in building height;
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.G.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.G.

Forming Part of Sentence 3.2.2.30.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	48,000	60,000	72,000
2	24,000	30,000	36,000
3	16,000	20,000	24,000
Column 1	2	3	4

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) basements shall be subdivided by a 1-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a 1-hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating, unless the crawl spaces are subdivided by $\frac{3}{4}$ -hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;
- (d) other floor assemblies shall be a fire separation and, if of combustible construction, shall have a $\frac{3}{4}$ -hr fire-resistance rating;
- (e) balconies and mezzanines shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating;
- (f) roof assemblies shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating, or in buildings not exceeding 1 storey in building height, the fire-resistance rating is not required provided that the roof assembly is constructed as a fire-retardant treated wood roof system conforming to Sentence 3.1.12.1.(2);
- (g) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,

- (ii) be of noncombustible construction, or
- (iii) be a combination of (i) and (ii); and
- (h) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP D, UP TO 6 STOREYS

3.2.2.31.(1) A building classified as Group D shall conform to Sentence (2) provided the building,

- (a) is not more than 6 storeys in building height;
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.H.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.H.

Forming Part of Sentence 3.2.2.31.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	unlimited	unlimited	unlimited
2	72,000	unlimited	unlimited
3	48,000	60,000	72,000
4	36,000	45,000	54,000
5	28,800	36,000	43,200
6	24,000	30,000	36,000
Column 1	2	3	4

(2) The building shall be of noncombustible construction, and

- (a) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;
- (d) other floor assemblies shall be a 1-hr fire separation;
- (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
- (f) roof assemblies shall have a 1-hr fire-resistance rating in buildings 2 storeys or more in building height; and
- (g) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP D, ANY HEIGHT, ANY AREA

3.2.2.32.(1) A building classified as Group D shall conform to Sentence (2) provided the building,

- (a) is not limited in building height; and
 - (b) is not limited in building area.
- (2) The building shall be of noncombustible construction, and
- (a) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
 - (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
 - (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;
 - (d) other floor assemblies shall be a 2-hr fire separation;
 - (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
 - (f) roof assemblies shall have a 1-hr fire resistance rating in buildings 2 storeys or more in building height; and
 - (g) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP E—MERCANTILE BUILDINGS

GROUP E, 1 AND 2 STOREYS

3.2.2.33.(1) A building classified as Group E shall conform to Sentence (2) provided the building,

- (a) is not more than 2 storeys in building height;
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.I.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.I.

Forming Part of Sentence 3.2.2.33.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	10,000	12,500	15,000
2	6,000	7,500	9,000
Column 1	2	3	4

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) crawl spaces in a building of combustible construction, and basements in every building shall be subdivided by $\frac{3}{4}$ -hr fire separations into areas not exceeding 3,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation;
- (c) other floor assemblies except floors over crawl spaces, shall be a $\frac{3}{4}$ -hr fire separation; and
- (d) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP E, UP TO 3 STOREYS

3.2.2.34.(1) A building classified as Group E shall conform to Sentence (2) provided the building,

- (a) is not more than 3 storeys in building height; and
- (b) is not greater in building area than the value in Table 3.2.2.J.

TABLE 3.2.2.J.

Forming Part of Sentence 3.2.2.34.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	15,000	15,000	15,000
2	12,000	15,000	15,000
3	8,000	10,000	12,000
No. of Storeys	Sprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	48,000	60,000	72,000
2	24,000	30,000	36,000
3	16,000	20,000	24,000

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) basements shall be subdivided by a 1-hr fire separation into areas not exceeding 3,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a 1-hr fire separation, except that where the basement or cellar is sprinklered, heavy timber construction may be used;
- (c) floor assemblies immediately above crawl spaces shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating, unless the crawl spaces are subdivided by a $\frac{3}{4}$ -hr fire separation into areas not exceeding 5,000 sq ft, or they are sprinklered;
- (d) other floor assemblies shall be a $\frac{3}{4}$ -hr fire separation;

- (e) balconies and mezzanines shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating;
- (f) roof assemblies shall have a $\frac{3}{4}$ -hr fire-resistance rating except that in buildings not exceeding 1 storey in building height, the fire-resistance rating is not required provided the roof assembly is of noncombustible construction, except that the roof assembly may be constructed as a fire-retardant treated wood roof system conforming to Sentence 3.1.12.1.(2);
- (g) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
- (h) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP E, UP TO 6 STOREYS

3.2.2.35.(1) A building classified as Group E shall conform to Sentence (2) provided the building,

- (a) if unsprinklered, is not more than 4 storeys in building height and is not greater in building area than 15,000 sq ft; and
- (b) if sprinklered, is not more than 6 storeys in building height and is not greater in building area than the value in Table 3.2.2.K.

TABLE 3.2.2.K.

Forming Part of Sentence 3.2.2.35.(1)

No of Storeys	Sprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	unlimited	unlimited	unlimited
2	75,000	unlimited	unlimited
3	50,000	62,500	75,000
4	37,500	46,875	56,250
5	30,000	37,500	45,000
6	25,000	31,250	37,500

- (2) The building shall be of noncombustible construction, and
 - (a) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 3,000 sq ft, or they shall be sprinklered;
 - (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
 - (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;
 - (d) other floor assemblies shall be a 2-hr fire separation;
 - (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;

- (f) roof assemblies shall have a 1-hr fire-resistance rating; and
- (g) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP E, ANY HEIGHT, ANY AREA, SPRINKLERED

- 3.2.2.36.(1) A building classified as Group E shall conform to Sentence (2) provided the building,
- (a) is not limited in building height;
 - (b) is sprinklered, except as provided in Clause (2) (b); and
 - (c) is not limited in building area.
- (2) The building shall be of noncombustible construction, and
- (a) floor assemblies immediately above basements or cellars shall be a 3-hr fire separation;
 - (b) sprinklers may be omitted in crawl spaces provided,
 - (i) floor assemblies immediately above crawl spaces have a 2-hr fire-resistance rating, or
 - (ii) the crawl spaces are subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft;
 - (c) other floor assemblies shall be a 3-hr fire separation;
 - (d) balconies and mezzanines shall have a 1½-hr fire-resistance rating;
 - (e) roof assemblies shall have a 1½-hr fire-resistance rating; and
 - (f) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP F—INDUSTRIAL BUILDINGS

GROUP F, DIVISION 1, 1 AND 2 STOREYS

- 3.2.2.37.(1) A building classified as Group F, Division 1 shall conform to Sentence (2) provided the building,
- (a) is not more than 2 storeys in building height;
 - (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.L.; and
 - (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.L.

Forming Part of Sentence 3.2.2.37.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	8,000	10,000	12,000
2	4,000	5,000	6,000
Column 1	2	3	4

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) basements shall be subdivided by a $\frac{3}{4}$ -hr fire separation into areas not exceeding 3,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall have a $\frac{3}{4}$ -hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating, unless the crawl spaces are subdivided by $\frac{3}{4}$ -hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;
- (d) other floor assemblies shall be a fire separation and if of combustible construction shall have a $\frac{3}{4}$ -hr fire-resistance rating;
- (e) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
- (f) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP F, DIVISION 1, UP TO 3 STOREYS, SPRINKLERED

3.2.2.38.(1) A building classified as Group F, Division 1 shall conform to Sentence (2) provided the building,

- (a) is not more than 3 storeys in building height;
- (b) is sprinklered, except as provided in Clause (2) (b); and
- (c) is not greater in building area than the value in Table 3.2.2.M.

TABLE 3.2.2.M.

Forming Part of Sentence 3.2.2.38.(1)

No. of Storeys	Sprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	24,000	30,000	36,000
2	12,000	15,000	18,000
3	8,000	10,000	12,000
Column 1	2	3	4

(2) The building shall be of heavy timber or noncombustible construction used either singly or in combination, and

- (a) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation of noncombustible construction;

- (b) sprinklers may be omitted in crawl spaces provided,
 - (i) floor assemblies immediately above crawl spaces have a $\frac{3}{4}$ -hr fire-resistance rating, or
 - (ii) the crawl spaces are subdivided by $\frac{3}{4}$ -hr fire separations into areas not exceeding 5,000 sq ft;
- (c) other floor assemblies shall be a $\frac{3}{4}$ -hr fire separation;
- (d) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
- (e) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP F, DIVISION 1, UP TO 4 STOREYS

3.2.2.39.(1) A building classified as Group F, Division 1 shall conform to Sentence (2) provided the building,

- (a) is not more than 4 storeys in building height;
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.N.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.N.

Forming Part of Sentence 3.2.2.39.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	24,000	30,000	36,000
2	12,000	15,000	18,000
3	8,000	10,000	12,000
4	6,000	7,500	9,000
Column 1	2	3	4

- (2) The building shall be of noncombustible construction, and
 - (a) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 3,000 sq ft, or they shall be sprinklered;
 - (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
 - (c) floor assemblies immediately above crawl spaces shall have a 2-hr fire-resistance rating unless the crawl spaces are subdivided by 2-hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;
 - (d) other floor assemblies shall be a 2-hr fire separation;

- (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
- (f) roof assemblies shall have a 1-hr fire-resistance rating; and
- (g) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP F, DIVISION 1, UP TO 4 STOREYS, SPRINKLERED

3.2.2.40.(1) A building classified as Group F, Division 1 shall conform to Sentence (2) provided the building,

- (a) is not more than 4 storeys in building height;
- (b) is sprinklered, except as provided in Clause (2) (b); and
- (c) is not greater in building area than the value in Table 3.2.2.O.

TABLE 3.2.2.O.

Forming Part of Sentence 3.2.2.40.(1)

No. of Storeys	Sprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	60,000	75,000	90,000
2	30,000	37,500	45,000
3	20,000	25,000	30,000
4	15,000	18,750	22,500
Column 1	2	3	4

- (2) The building shall be of noncombustible construction, and
 - (a) floor assemblies immediately above basements or cellars shall be a 3-hr fire separation;
 - (b) sprinklers may be omitted in crawl spaces provided,
 - (i) floor assemblies immediately above crawl spaces have 2-hr fire-resistance ratings, or
 - (ii) the crawl spaces are subdivided by 2-hr fire separations into areas not exceeding 5,000 sq ft;
 - (c) other floor assemblies shall be a 3-hr fire separation;
 - (d) balconies and mezzanines shall have a 1½-hr fire-resistance rating;
 - (e) roof assemblies shall have a 1½-hr fire-resistance rating; and
 - (f) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP F, DIVISION 2, 1 AND 2 STOREYS

3.2.2.41.(1) A building classified as Group F, Division 2 shall conform to Sentence (2) provided the building,

- (a) is not more than 2 storeys in building height; and
- (b) is not greater in building area than the value in Table 3.2.2.P.

TABLE 3.2.2.P.

Forming Part of Sentence 3.2.2.41.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	10,000	12,500	15,000
2	6,000	7,500	9,000
No. of Storeys	Sprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	30,000	37,500	45,000
2	12,000	15,000	18,000
Column 1	2	3	4

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) crawl spaces in a building of combustible construction, and basements in every building shall be subdivided by $\frac{3}{4}$ -hr fire separation into areas not exceeding 3,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation;
- (c) other floor assemblies, except floors over crawl spaces, shall be a fire separation and, if of combustible construction, shall have a $\frac{3}{4}$ -hr fire-resistance rating;
- (d) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
- (e) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP F, DIVISION 2, UP TO 4 STOREYS

3.2.2.42.(1) A building classified as Group F, Division 2 shall conform to Sentence (2) provided the building,

- (a) is not more than 4 storeys in building height;
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.Q.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.Q.

Forming Part of Sentence 3.2.2.42.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	32,000	40,000	48,000
2	16,000	20,000	24,000
3	10,700	13,400	16,000
4	8,000	10,000	12,000
Column 1	2	3	4

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) basements shall be subdivided by a 1-hr fire separation into areas not exceeding 3,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a 1-hr fire separation of noncombustible construction;
- (c) floor assemblies immediately above crawl spaces shall have a $\frac{3}{4}$ -hr fire-resistance rating unless the crawl spaces are subdivided by $\frac{3}{4}$ -hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;
- (d) other floor assemblies shall be a $\frac{3}{4}$ -hr fire separation;
- (e) balconies and mezzanines shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating;
- (f) roof assemblies shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating or in buildings not exceeding 1 storey in building height, the fire-resistance rating is not required provided that the roof assembly is constructed as a fire-retardant treated wood roof system conforming to Sentence 3.1.12.1.(2);
- (g) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
- (h) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP F, DIVISION 2, UP TO 4 STOREYS

3.2.2.43.(1) A building classified as Group F, Division 2 shall conform to Sentence (2) provided the building,

- (a) is not more than 4 storeys in building height;
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.R.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.R.
Forming Part of Sentence 3.2.2.43.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	60,000	75,000	90,000
2	30,000	37,500	45,000
3	20,000	25,000	30,000
4	15,000	18,750	22,500
Column 1	2	3	4

- (2) The building shall be of noncombustible construction, and
- (a) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 3,000 sq ft, or they shall be sprinklered;
 - (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
 - (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;
 - (d) other floor assemblies shall be a 1-hr fire separation;
 - (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
 - (f) roof assemblies shall have a 1-hr fire-resistance rating; and
 - (g) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP F, DIVISION 2, UP TO 6 STOREYS

3.2.2.44.(1) A building classified as Group F, Division 2 shall conform to Sentence (2) provided the building,

- (a) is not more than 6 storeys in building height;
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.S.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.S.
Forming Part of Sentence 3.2.2.44.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	90,000	112,500	135,000
2	45,000	56,250	67,500
3	30,000	37,500	45,000
4	22,500	28,125	33,750
5	18,000	22,500	27,000
6	15,000	18,750	22,500
Column 1	2	3	4

- (2) The building shall be of noncombustible construction, and
- (a) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 3,000 sq ft, or they shall be sprinklered;
 - (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
 - (c) floor assemblies immediately above crawl spaces shall have a 2-hr fire-resistance rating unless the crawl spaces are subdivided by 2-hr fire separations into areas not exceeding 5,000 sq ft, or they are sprinklered;
 - (d) other floor assemblies shall be a 2-hr fire separation;
 - (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
 - (f) roof assemblies shall have a 1-hr fire-resistance rating; and
 - (g) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP F, DIVISION 2, ANY HEIGHT, ANY AREA, SPRINKLERED

3.2.2.45.(1) A building classified as Group F, Division 2 shall conform to Sentence (2) provided the building,

- (a) is not limited in building height;
 - (b) is sprinklered, except as provided in Clause (2) (b); and
 - (c) is not limited in building area.
- (2) The building shall be of noncombustible construction, and
- (a) floor assemblies immediately above basements or cellars shall be a 3-hr fire separation;
 - (b) sprinklers may be omitted in crawl spaces provided,
 - (i) floor assemblies immediately above crawl spaces have a 2-hr fire-resistance rating; or
 - (ii) the crawl spaces are subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft;
 - (c) other floor assemblies shall be a 3-hr fire separation;
 - (d) balconies and mezzanines shall have a 1½-hr fire-resistance rating;
 - (e) roof assemblies shall have a 1½-hr fire-resistance rating; and
 - (f) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP F, DIVISION 3, 1 AND 2 STOREYS

3.2.2.46.(1) A building classified as Group F, Division 3 shall conform to Sentence (2) provided the building,

- (a) is not more than 2 storeys in building height; and
- (b) is not greater in building area than the value in Table 3.2.2.T.

TABLE 3.2.2.T.

Forming Part of Sentence 3.2.2.46.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	16,000	20,000	24,000
2	8,000	10,000	12,000
No. of Storeys	Sprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	48,000	60,000	72,000
2	16,000	20,000	24,000
Column 1	2	3	4

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) basements shall be subdivided by a $\frac{3}{4}$ -hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have, if of combustible construction a $\frac{3}{4}$ -hr fire-resistance rating, unless the crawl spaces are subdivided by $\frac{3}{4}$ -hr fire separations into areas not exceeding 10,000 sq ft, or they are sprinklered;
- (d) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
- (e) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

(3) Notwithstanding the requirements of Sentence (2) for fire separations, openings for vehicle ramps are permitted through floors in storage garages.

GROUP F, DIVISION 3, UP TO 4 STOREYS

3.2.2.47.(1) A building classified as Group F, Division 3 shall conform to Sentence (2) provided the building,

- (a) is not more than 4 storeys in building height;
- (b) if unsprinklered is not greater in building area than the value in Table 3.2.2.U.; and

- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.U.

Forming Part of Sentence 3.2.2.47.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	48,000	60,000	72,000
2	24,000	30,000	36,000
3	16,000	20,000	24,000
4	12,000	15,000	18,000
Column 1	2	3	4

(2) The building shall be of combustible or noncombustible construction used either singly or in combination, and

- (a) basements shall be subdivided by a 1-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a 1-hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating unless the crawl spaces are subdivided by a $\frac{3}{4}$ -hr fire separation into areas not exceeding 10,000 sq ft, or they are sprinklered;
- (d) other floor assemblies shall be a fire separation and, if of combustible construction, shall have a $\frac{3}{4}$ -hr fire-resistance rating;
- (e) balconies and mezzanines shall have, if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating;
- (f) roof assemblies shall have if of combustible construction, a $\frac{3}{4}$ -hr fire-resistance rating or in buildings not exceeding 1 storey in building height, the fire-resistance rating is not required provided that the roof assembly is constructed as a fire-retardant treated wood roof system conforming to Sentence 3.1.12.1.(2);
- (g) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
- (h) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

(3) Notwithstanding the requirements of Sentence (2) for fire separations, openings for vehicle ramps are permitted through floors in storage garages.

GROUP F, DIVISION 3, 1 STOREY

3.2.2.48.(1) A building classified as Group F, Division 3 shall conform to Sentence (2) provided the building,

- (a) is not more than 1 storey in building height; and
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.V.; and
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.V.

Forming Part of Sentence 3.2.2.48.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	56,000	70,000	84,000
Column 1	2	3	4

(2) The building shall be of heavy timber or noncombustible construction used either singly or in combination, and

- (a) basements shall be subdivided by a $\frac{3}{4}$ -hr fire separation into areas not exceeding 5,000 sq ft or they shall be sprinklered;
- (b) floor assemblies immediately above basements or cellars shall be a $\frac{3}{4}$ -hr fire separation;
- (c) all loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall,
 - (i) have a $\frac{3}{4}$ -hr fire-resistance rating,
 - (ii) be of noncombustible construction, or
 - (iii) be a combination of (i) and (ii); and
- (d) all loadbearing walls, columns and arches supporting a required fire separation shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

(3) Notwithstanding the requirements of Sentence (2) for fire separations, openings for vehicle ramps are permitted through floors in storage garages.

GROUP F, DIVISION 3, 1 STOREY, ANY AREA, LOW FIRE-LOAD OCCUPANCY

3.2.2.49.(1) A building classified as Group F, Division 3 shall conform to Sentence (2) provided the building,

- (a) is not more than 1 storey in building height;
 - (b) is used solely for low fire load occupancies such as,
 - (i) power generating plants, or
 - (ii) plants for the manufacture or storage of noncombustible materials as asbestos, brick, cement, concrete or steel, and
 - (c) is not limited in building area.
- (2) The building shall be of noncombustible construction, and
- (a) basements shall be subdivided by a 1-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;

- (b) floor assemblies immediately above basements or cellars shall be a 1-hr fire separation;
- (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating, unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 10,000 sq ft, or they are sprinklered; and
- (d) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.

GROUP F, DIVISION 3, STORAGE GARAGES UP TO 70 FT IN HEIGHT

3.2.2.50.(1) A building used as a storage garage and having no other occupancy above it may have its floor, wall, ceiling and roof assemblies constructed without a fire-resistance rating provided the building is,

- (a) an open air storage garage of noncombustible construction;
- (b) not more than 70 ft in height above grade;
- (c) not more than 100,000 sq ft in building area;
- (d) in conformance with Sentence 3.6.3.4.(6).; and
- (e) designed so that every portion of each floor area is within 200 ft of an exterior wall opening.

GROUP F, DIVISION 3, UP TO 6 STOREYS

3.2.2.51.(1) A building classified as Group F, Division 3 shall conform to Sentence (2) provided the building,

- (a) is not more than 6 storeys in building height; and
- (b) if unsprinklered, is not greater in building area than the value in Table 3.2.2.X.; or
- (c) if sprinklered, is not greater than twice the area limits of Clause (b).

TABLE 3.2.2.X.

Forming Part of Sentence 3.2.2.51.(1)

No. of Storeys	Unsprinklered Maximum Area, sq ft		
	Facing 1 Street	Facing 2 Streets	Facing 3 Streets
1	unlimited	unlimited	unlimited
2	72,000	90,000	108,000
3	48,000	60,000	72,000
4	36,000	45,000	54,000
5	28,800	36,000	43,200
6	24,000	30,000	36,000

- (2) The building shall be of noncombustible construction, and
 - (a) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
 - (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;

- (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating, unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 10,000 sq ft, or they are sprinklered;
 - (d) other floor assemblies shall be a 1-hr fire separation;
 - (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
 - (f) roof assemblies shall have a 1-hr fire-resistance rating; and
 - (g) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.
- (3) Notwithstanding the requirements of Sentence (2) for fire separations, openings for vehicle ramps are permitted through floors in storage garages.

GROUP F, DIVISION 3, ANY HEIGHT, ANY AREA

3.2.2.52.(1) A building classified as Group F, Division 3 shall conform to Sentence (2) provided the building,

- (a) is not limited in building height; and
 - (b) is not limited in building area.
- (2) The building shall be of noncombustible construction, and
- (a) basements shall be subdivided by a 2-hr fire separation into areas not exceeding 5,000 sq ft, or they shall be sprinklered;
 - (b) floor assemblies immediately above basements or cellars shall be a 2-hr fire separation;
 - (c) floor assemblies immediately above crawl spaces shall have a 1-hr fire-resistance rating, unless the crawl spaces are subdivided by 1-hr fire separations into areas not exceeding 10,000 sq ft, or they are sprinklered;
 - (d) all other floor assemblies shall be at least a 2-hr fire separation except that such floor assemblies may be reduced to 1-hr in a storage garage conforming to Sentence 3.6.3.4.(6).;
 - (e) balconies and mezzanines shall have a 1-hr fire-resistance rating;
 - (f) roof assemblies shall have a 1-hr fire-resistance rating; and
 - (g) all loadbearing walls, columns and arches shall have a fire-resistance rating at least equivalent to that required for the supported assembly.
- (3) Notwithstanding the requirements of Sentence (2) for fire separations, openings for vehicle ramps are permitted through floors in storage garages.

Subsection 3.2.3. Spatial Separation and Exposure Protection of Buildings

3.2.3.1.(1) Except as provided in Articles 3.2.3.2., 3.2.3.6. and 3.2.3.8., the area of unprotected openings shall not exceed that set forth in Tables 3.2.3.A. or 3.2.3.B. for the limiting distance applicable to the exposing building face under consideration.

(2) The area of the unprotected openings in an exposing building face shall be the aggregate area of unprotected openings. This is expressed as a percentage of the area of the exposing building face in Tables 3.2.3.A. and 3.2.3.B.

(3) Where the exterior wall of a building is an irregular shape, the limiting distance may be determined by measuring from a vertical plane located so that no portion of the exterior wall of the building is between such vertical plane and the line to which the

Limiting
distance

limiting distance is measured; in such cases the area of unprotected openings shall be determined from the projection onto this plane of the unprotected openings occurring in the exterior wall.

(4) Where firefighting services are not available within ten minutes of the alarm being received, the limiting distance required by this Article shall be doubled.

3.2.3.2. Methods other than that described in Article 3.2.3.1. for determining the maximum allowable area of unprotected openings in an exposing building face may be used provided the standard of safety is not reduced.

3.2.3.3.(1) The area of an exposing building face shall be calculated as the total area of exterior wall facing in one direction on any side of a building measured from the finished ground level to the uppermost ceiling except that where a building is divided by fire separation into fire compartments, the area of exposing building face may be calculated for each fire compartment provided such fire separations,

Area of
exposing
building face

(a) in Group A, B, C, D or F, Division 3 occupancy have a fire-resistance rating at least equal to that required for the floor assembly but shall not be less than $\frac{3}{4}$ -hr and need not be more than 1-hr; and

(b) in Group E or Group F, Division 1 or 2 occupancy have a fire-resistance rating of at least 2-hr.

3.2.3.4.(1) Every wall that is a party wall shall be constructed as a firewall except as permitted in Sentence 3.2.1.1.(2).

Walls with
limiting
distance less
than 4 ft.

(2) Openings in every wall that has a limiting distance of less than 4 ft shall be protected by closures as required for the grade of fire separation of the wall; wired glass and glass blocks shall not be used for such closures.

Construction of
exposing
building faces

3.2.3.5.(1) Except as permitted in Sentences (3) and (4), and Article 3.2.3.7., where a limiting distance shown in Table 3.2.3.A. for a Group A, B, C, D, or F, Division 3 occupancy classification is such as to permit an exposing building face to have unprotected openings of,

- (a) not more than 10 per cent of the exposing building face, the exposing building face shall be of noncombustible construction having a fire-resistance rating of at least 1-hr;
- (b) greater than 10 per cent but not greater than 25 per cent of the exposing building face, the exposing building face shall have a fire-resistance rating of at least 1-hr for the type of construction allowed and be clad with noncombustible cladding; and
- (c) greater than 25 per cent but less than 100 per cent of the exposing building face, the exposing building face shall have at least a $\frac{3}{4}$ -hr fire-resistance rating for the type of construction allowed.

(2) Except as permitted in Sentences (3) and (4) where a limiting distance shown in Table 3.2.3.B. for a Group E or Group F, Division 1 or 2 occupancy classification is such as to permit an exposing building face to have unprotected openings of,

- (a) not more than 10 per cent of the exposing building face, the exposing building face shall be of noncombustible construction having a fire-resistance rating of at least 2-hr;
- (b) greater than 10 per cent but not greater than 25 per cent of the exposing building face, the exposing building face shall have a fire-resistance rating of at least 2-hr for the type of construction allowed and be clad with noncombustible cladding; and
- (c) greater than 25 per cent but less than 100 per cent of the exposing building face, the exposing building face shall have at least a 1-hr fire-resistance rating for the type of construction allowed.

(3) Structural members, such as beams, columns and arches placed wholly or partly outside an exterior face of a building and which are 10 ft or more from the property line or centre line of a public thoroughfare need not be protected from exterior fires.

(4) Such structural members that are less than 10 ft from the property line or centre line of a public thoroughfare shall be protected from exterior fire by fire protection having a fire-resistance rating at least equal to that required for their protection from inside fires in conformance with Articles 3.2.2.9. to 3.2.2.52., or by fire protection having a 1-hr fire-resistance rating, whichever is the greater.

(5) Structural members of heavy timber construction such as beams, columns and arches placed wholly or partly outside an exterior face of a building and which are 10 ft or more from the property line or centre line of a public thoroughfare need not be covered with noncombustible cladding.

3.2.3.6.(1) An exposing face of a building is permitted to have unlimited unprotected openings,

- (a) in a storage garage conforming to Sentence 3.6.3.4.(6), having a limiting distance of at least 10 ft, or
- (b) in the first storey of a building that faces a street, and having a limiting distance of at least 30 ft.

One-storey
building with
low fire load

3.2.3.7.(1) For any building of Group F, Division 3 occupancy any non-loadbearing wall comprising an exposing building face may be of noncombustible construction without a required fire-resistance rating provided the building,

- (a) does not exceed 1 storey in building height;

- (b) is used for low fire load occupancies such as described in Sentence 3.2.2.49.(1); and
- (c) is located so that the limiting distance is not less than 10 ft.

3.2.3.8.(1) The area of unprotected openings in any exposing building face may be double the area permitted in Sentence 3.2.3.1.(1) where,

Increased
openings
permitted

- (a) the building is sprinklered; or
- (b) such openings are glazed with wired glass in steel frames conforming to the requirements of Article 3.1.7.3.

3.2.3.9.(1) Where the surface temperature on the unexposed surface of a wall assembly exceeds the maximum of a standard fire test as permitted in Sentence 3.1.5.1.(4), the limiting distance shall be increased to reduce possible fire damage from the hot unexposed wall surface to an adjacent building.

Increased
limiting
distance

(2) The increased limiting distance required in Sentence (1) shall be obtained by applying to Tables 3.2.3.A. or 3.2.3.B. a corrected area of unprotected openings obtained as follows:

$$A_c = A + (A_F \times F_{EO})$$

where A_c = corrected area of *unprotected openings* including actual and equivalent openings,

A = actual area of *unprotected openings*

A_F = area of exterior surface of the *exposing building face* exclusive of openings on which the temperature limitation of the standard test is exceeded,

F_{EO} = an "equivalent opening factor" derived from the following expression:

$$F_{EO} = \frac{(T_u + 460)^4}{(T_e + 460)^4}$$

where T_u = average temperature in degrees Fahrenheit of the unexposed wall surface at the time the required *fire-resistance rating* is reached under test conditions,

T_e = 1638°F for a ¼-hr *fire-resistance rating*,
1700°F for a 1-hr *fire-resistance rating*, and
1850°F for a 2-hr *fire-resistance rating*.

3.2.3.10. Where two external walls of two buildings meet at a firewall at an angle of 135 deg. or less, the least distance from an opening in an exposing building face to an opening in the other exposing building face measured horizontally in a straight line between their closest parts shall be that derived from the following formula, but in no case shall the distance be less than 3 ft

Least
distance
between
openings

$$L_o = 2L - \left(\frac{\theta}{90} \times L \right)$$

where L_o = the least distance between any opening in one *exposing building face* and any opening in another *exposing building face*,

L = the greater required *limiting distance* of the *exposing building faces* under consideration, and

θ = the external angle, deg., between two *exposing building faces*.

3.2.3.11. Except as provided in Sentence 3.2.3.15.(4), where a wall is exposed to a fire hazard from an adjoining roof of a separate fire compartment of the same building, and the construction of the adjoining roof assembly has a fire-resistance rating less than 1-hr, every opening in the exposed wall within 3 storeys vertically and 15 ft horizontally of such roof shall be protected with wired glass in steel frames in accordance with Article 3.1.7.3.

Walls exposed
to adjoining
roof

3.2.3.12. In order to reduce the hazard of fire spread from the roof of one building to another, every building shall have a Class A, B or C roof covering, as described in Subsection 3.1.13., except that such classes of roof coverings are not required for build-

ings of Group A, Division 2 occupancies not exceeding 2 storeys in building height and not exceeding 10,000 sq ft in building area provided the roof covering is underlaid with a noncombustible material.

SEPARATION OF BUILDINGS CONNECTED BY COVERED MALLS

3.2.3.13.(1) When part of a building is completely separated from the remainder of the building by a covered mall that provides a horizontal separation of not less than 30 ft, then each portion of the building so separated may be considered as a separate building provided that,

- (a) the covered mall is designed and used only as a pedestrian thoroughfare, except that ornamental and pedestrian oriented uses that do not create a hazard may be permitted;
- (b) the covered mall is sprinklered and provided with a standpipe and hose system if the abutting occupancies are not sprinklered;
- (c) the covered mall is separated from the remainder of the building by a 1-hr fire separation or the floor area not so separated is sprinklered;
- (d) the covered mall has no direct access to more than 1 storey of the building if the mall is below grade, and to not more than 2 storeys if the mall is above grade;
- (e) the covered mall is equipped with a fire alarm and detection system that will satisfy the requirements of each of the abutting occupancies;
- (f) the covered mall roof-ceiling assembly is of noncombustible construction having a fire-resistance rating of at least 1-hr except that any part of the mall roof that is more than 20 ft above the floor of the mall,
 - (i) need not have a fire-resistance rating, and
 - (ii) may be of exposed heavy timber construction if none of the portions of the building separated by the covered mall is required to be of noncombustible construction;
- (g) the interior finish of each covered mall has a flame spread rating conforming to the flame spread rating requirements of exits except,
 - (i) that roofs of exposed heavy timber construction may exceed these limits, and
 - (ii) for plastic sign facing materials as provided in Sentence 3.7.4.1.(3);
- (h) not more than 1 covered mall is located above another covered mall;
- (i) where 1 covered mall is located above another mall, the malls are separated by a fire separation of noncombustible construction having a fire-resistance rating of at least 2-hr; and
- (j) where the fire separation is omitted as provided in Clause (c) and a heating, ventilating or air-conditioning duct system serves more than 1 occupancy, a smoke detector shall be installed in the return air duct leaving each occupancy so connected and shall, upon actuation, shut down the fans and sound the alarm system as prescribed in Subsection 3.2.4.

SEPARATION OF BUILDINGS CONNECTED BY A COVERED VEHICULAR PASSAGEWAY

3.2.3.14.(1) When part of a building is completely separated from the remainder of the building by a covered vehicular passageway that provides a horizontal separation of not less than 30 ft then each portion of the building so separated may be considered as a separate building provided the covered vehicular passageway,

- (a) is separated from the remainder of the building by a 1½-hr fire separation;
 - (b) when constructed below grade is of noncombustible construction;
 - (c) when constructed above grade shall conform to Clauses 3.2.3.13.(1) (f) and (i); and
 - (d) has an interior finish having a flame spread rating not greater than 25 except that this requirement does not apply to roofs of exposed heavy timber construction.
- (2) RESERVED
- (3) RESERVED
- (4) RESERVED
- (5) RESERVED

SEPARATION OF BUILDINGS CONNECTED BY WALKWAYS

3.2.3.15.(1) Except as provided in Sentence 3.2.3.16.(2), where buildings are connected by a walkway, each building shall be separated from the walkway by at least a ¾-hr fire separation. Separation

(2) An enclosed walkway shall be of noncombustible construction where connected to a building required to be of noncombustible construction.

(3) A covered walkway shall be of noncombustible construction where connected to a building required to be of noncombustible construction, except that such a walkway at grade may be of heavy timber construction.

(4) The requirements of Article 3.2.3.11. shall not apply where walkways are of noncombustible construction. Roof exposure

UNDERGROUND WALKWAY

3.2.3.16.(1) An underground walkway shall not be designed or used for any purpose other than pedestrian travel unless,

- (a) such other purpose is permitted, and the entire walkway and the spaces used for other purposes are sprinklered; or
- (b) the zone between smoke barrier doors as prescribed in Sentence (4) and such spaces contained therein are sprinklered.

(2) Buildings connected by an underground walkway shall be separated from the walkway by a 1-hr fire separation. Separation

(3) An underground walkway shall be of noncombustible construction suitable for underground location.

(4) Smoke barrier doors shall be installed in underground walkways at intervals not exceeding 300 ft or the travel distance from the door of an adjacent room or space to the nearest exit shall not exceed 1½ times the least allowable travel distance for any of the adjacent occupancies as prescribed in Sentence 3.4.2.3.(1). Travel distance

(5) The interior finish of every underground walkway shall be of noncombustible materials having a flame-spread rating and a smoke developed classification not greater than 25. Interior finish

ENCLOSED COURT

3.2.3.17.(1) This Article applies to an enclosed court visually open to floor areas or parts thereof classified as,

- (a) Group A, Assembly Occupancy, Division 2;

- (b) Group C, Residential Occupancy;
- (c) Group D, Business and Personal Service Occupancy; or
- (d) Group E, Mercantile Occupancy.

(2) Every Group A, D and E occupancy adjacent to the enclosed court shall be sprinklered and the sprinkler system shall be equipped with a water flow and supervisory signal system that will,

- (a) transmit automatically a water-flow signal directly to the fire department or through an independent central station;
- (b) transmit automatically other supervisory signals to a proprietary control centre or to an independent central station; and
- (c) activate a signal at the central alarm and control facility when such facility is provided in accordance with Article 3.2.6.8.

(3) Every Group C occupancy adjacent to the enclosed court shall,

- (a)
 - (i) be sprinklered in accordance with Sentence (2), and
 - (ii) be provided with means of egress which does not pass through the enclosed court; or
- (b) be separated from the enclosed court by a fire separation having a fire-resistance rating of at least 1-hr and for purposes of this requirement,
 - (i) only wired glass or glass block conforming to Sentences 3.1.7.3.(2) and (3) may be used as a closure, and
 - (ii) the size limitations in Sentence 3.1.7.2.(1) for such closure need not be met.

(4) Except as permitted in Sentence (5), every building containing an enclosed court shall be,

- (a) designed to control smoke by a registered professional engineer;
- (b) designed so that during a period of 2-hr after the start of a fire all floor areas adjacent to the enclosed court, other than the fire floor, will not contain more than 1 per cent by volume of contaminated air from the fire floor, assuming an outdoor temperature equal to the January design temperature on a $2\frac{1}{2}$ per cent basis in Subsection 4.9.10.; and
- (c) checked and tested for control of smoke movement and venting by measuring pressure differences and direction of air flow around doors and through separating walls of fire compartments.

(5) Where the building is less than 60 ft in height measured between grade and the floor level of the top storey and contains an enclosed court, the enclosed court may be provided with vents at or near the level of the enclosed court roof in which,

- (a) the ratio of effective area of vent opening to the enclosed court floor area is not less than 1:40;
- (b) the minimum dimension of each vent opening is 4 feet;
- (c) the maximum spacing between vents is 100 feet; and
- (d) the vents open automatically on the operation of the building fire alarm system.

(6) A fire alarm system shall be provided for the enclosed court and the rest of the building connected to it and products of combustion detectors connected to the building

fire alarm system shall be installed within the enclosed court in accordance with Table 3.2.3.D. depending on the most restrictive of the adjoining occupancies.

TABLE 3.2.3.D.

Forming Part of Sentence 3.2.3.17.(6)

Occupancy Classification	Location of Products of Combustion Detectors on Enclosed Court Walls		Maximum Spacing of Products of Combustion Detectors on Enclosed Court Ceilings, ft centres
	Vertical Location	Maximum Horizontal Spacing, ft	
Group C	Near ceiling Near midheight Near floor	15	15
Group A, Div 2 and Group D	Near ceiling Near midheight Near floor	25	25
Group E	Near ceiling Near level of every adjoining floor	15	15

(7) In Group C occupancies all unsprinklered areas shall be provided with products of combustion detectors connected to the building fire alarm system.

(8) The increased travel distances to exits permitted by Clause 3.4.2.3.(1) (b) shall not apply to the floor areas open to the enclosed court.

(9) Notwithstanding the provisions of Sentence 3.4.5.1.(4), required exits from the building shall discharge directly to the exterior.

(10) The interior finish for every wall, partition, ceiling or floor of the enclosed court and any part of a floor area opening onto the enclosed court shall have a flame-spread rating not exceeding 25 and smoke developed classification not exceeding 50 except that trim, millwork and doors may have a flame-spread rating not exceeding 150 and a smoke developed classification not exceeding 300, provided they do not exceed 10 per cent of the area of the wall or ceiling.

(11) Every enclosed court roof assembly shall have a 1-hr fire-resistance rating except where every part of the enclosed court roof assembly is 20 ft or more above the enclosed court floor and the roof assembly is protected by automatic sprinklers, the enclosed court roof may be constructed of

- (a) noncombustible material if any of the adjoining buildings are required to be of noncombustible construction; or
- (b) heavy timber, fire-retardant treated wood in accordance with Subsection 3.1.12., or noncombustible construction if none of the adjoining buildings are required to be of noncombustible construction.

(12) Decorative material used in an enclosed court shall conform to the appropriate requirement in the municipal fire prevention by-law or, in the absence of such by-law, the National Fire Code of Canada 1963.

SUBSECTION 3.2.4. FIRE ALARM AND DETECTION SYSTEMS

Where required

3.2.4.1.(1) A fire alarm system shall be installed in all buildings containing 4 storeys or more, including storeys below grade, and as otherwise required in Table 3.2.4.A., Subsections 3.2.6. and 3.2.7.

(2) Manually operated, non-electrical alarm systems employing mechanical gongs may be used provided each gong is audible in every location,

(a) in buildings not more than 2 storeys in building height where not more than two manual fire alarm stations would be required in Part 6; and

(b) in schools not exceeding 6,000 sq ft in total floor area and 2 storeys in building height.

(3) Where a fire alarm system is required, an automatic fire detection system shall be installed in an occupancy intended to contain hazardous substances regulated by Article 3.3.1.1., when such occupancy is to be unoccupied at night time or during week-ends or during shutdowns for holidays unless the building is sprinklered and a water-flow switch incorporated in the sprinkler system is connected to the fire alarm system.

(4) When mixed occupancies are present in the same building, the most demanding requirements for fire alarm and detector systems for the occupancies contained therein shall apply.

(5) Except for the products of combustion detectors of the single station alarm type described in Sentence 3.3.4.9.(2) and in Sentence 3.2.4.1.(8), where a fire alarm system is required in any portion of a building, it shall be installed throughout the building.

TABLE 3.2.4.A.

Forming Part of Sentence 3.2.4.1.(1)

Major Occupancy Classification	Occupant Load Above ⁽¹⁾ Which a Fire Alarm System is Required	Type of Fire Alarm Systems Required
Group A, Division 1	300 persons	Types 4 or 5
Group A; Division 2 (except licensed beverage establishments, restaurants, schools and colleges)	300 persons	Any of Types 1 to 5
Group A, Division 2 (licensed beverage establishments and restaurants only)	150 persons	Any of Types 1 to 5
Group A, Division 2 (nonresidential schools, nonresidential colleges only)	40 persons	Any of Types 1 to 3
Group A, Division 3	500 persons	Any of Types 1 to 3
Group A, Division 4	500 persons below the seating area	Any of Types 1 to 3
Group B, Division 1	1 person	Any of Types 1 to 3
	10 persons detained (sleeping accommodation)	Types 4 or 5
Column 1	2	3

Major Occupancy Classification	Occupant Load Above Which a Fire Alarm System is Required	Type of Fire Alarm Systems Required
Group B, Division 2 (except children's custodial homes, convalescent homes, homes for the aged and orphanages)	10 persons (sleeping accommodation)	Types 4 or 5
Group B, Division 2 (children's custodial homes, convalescent homes, homes for the aged and orphanages)	10 persons	Any of Types 1 to 3 for buildings up to 3 storeys in building height: Types 4 or 5 over 3 storeys
Group C (apartments only)	Except for 3.2.4.1.(9), 10 persons (sleeping accommodation)	Any of Types 1 to 3
Group C (convents, dormitories, boarding houses, residential clubs, lodging houses, and monasteries only)	10 persons (sleeping accommodation)	Any of Types 1 to 3 for buildings up to 3 storeys in building height: Types 4 or 5 over 3 storeys
Group C (hotels and motels only)	Except for 3.2.4.1.(10), 10 persons sleeping accommodation)	Any of Types 1 to 3 for buildings up to 3 storeys in building height: Types 4 or 5 over 3 storeys
Group C (residential colleges and residential schools only)	10 persons (sleeping accommodation)	Any of Types 1 to 3
Group D	500 persons total or 150 persons above or below the first storey	Any of Types 1 to 3
Group E	300 persons total or 150 persons above or below the first storey or in buildings exceeding 2 storeys in building height	Types 1, 4 or 5
Group F, Division 1 and 2	Except for 3.2.4.1.(11), 100 persons total or where more than 25 persons are employed above or below the first storey	Any of Types 1 to 5
Group F, Division 3	Except for 3.2.4.1.(11), 500 persons total or where more than 75 persons are employed above or below the first storey	Any of Types 1 to 5
Column 1	2	3

Notes to Table 3.2.4.A.

(1) See Subsection 3.1.14.

(6) Where a fire alarm system is required by Sentence 3.2.4.1.(1), a smoke detector shall be installed in every recirculating air handling system which,

- (a) serves a Group A, Division 1 or a Group C major occupancy where the system supplies more than one storey except that where a hotel, motel, residential school or college exceeds three storeys in building height such detector shall be a products of combustion detector;
- (b) serves a Group A, Division 2, 3 or 4, or Groups D, E and F, Division 1 or 2 major occupancy where the system supplies more than one occupancy on the same floor or serves more than one storey;
- (c) serves a Group B major occupancy where the system supplies more than one smoke control zone or more than one storey; or
- (d) is installed in buildings of more than 4 storeys in building height of Group E or F major occupancy.

(7) Where a fire alarm system is required by Sentence 3.2.4.1.(1) an electrically supervised annunciator shall be provided inside the street entrance floor of every building,

- (a) which contains 4 storeys or more, including storeys below grade;
- (b) in which more than 12 manual fire alarm stations are required;
- (c) in which more than 1 automatic alarm-initiating circuit is required;
- (d) in which an automatic sprinkler system is required to be zoned; or
- (e) in which an automatic sprinkler system functions as a fire detection system.

(8) In buildings containing an institutional occupancy in which sleeping accommodation is provided for the retarded, aged or handicapped, and in which a fire alarm system is not otherwise required, a products of combustion detector or detectors of the single station alarm type audible within bedrooms when intervening doors are closed, shall be installed at or near the ceiling and between bedrooms or sleeping areas and the remainder of the building, such as a hallway or corridor serving such bedrooms or sleeping area.

(9) An alarm system is not required in an apartment building not exceeding 3 storeys in building height and containing only dwelling units provided,

- (a) not more than 4 dwelling units share a public corridor or exit; or
- (b) each dwelling unit has direct access to the outdoors by a door at ground level or a door providing direct access by a balcony to ground level.

(10) An alarm system is not required in a motel or hotel 3 storeys or less in building height and provided each suite, or sleeping room not within a suite has direct access to the outdoors by a door at ground level or door providing direct access by a balcony to ground level.

(11) No fire alarm system is required in a one storey Group F industrial occupancy building where the floor area is open.

3.2.4.2.(1) The Type 1 fire system required in Table 3.2.4.A. shall,

- (a) be designed as a single stage, non-coded, non-indicating, local, general fire alarm system;
- (b) upon the operation of any alarm initiating device, cause a general fire alarm on all audible signal appliances in the system; and
- (c) not be used in buildings required to have an annunciator.

- (2) The Type 2 fire alarm system required in Table 3.2.4.A. shall,
- (a) be designed as a single stage, zoned non-coded, indicating, local, general fire alarm system;
 - (b) upon the operation of any alarm initiating device cause a general fire alarm on all audible signal appliances in the system; and
 - (c) indicate on the annunciators the zone in which the alarm was initiated.
- (3) The Type 3 fire alarm system required in Table 3.2.4.A. shall,
- (a) be designed as a single stage, zone coded, indicating, local, general fire alarm system;
 - (b) upon the operation of any alarm initiating device, cause a coded signal indicating the zone in which the alarm was initiated to sound on all audible signal appliances in the system;
 - (c) repeat the coded signal in its entirety at least 4 times;
 - (d) cause a general fire alarm to sound upon the completion of the coded signal in Clause (c);
 - (e) indicate on the annunciator the zone in which each alarm is initiated in Clauses (c) and (f);
 - (f) when a second fire alarm is initiated in a zone other than that for which the first alarm was initiated, the coded signal for the first zone required in Clause (c) shall be completed before the coded signal for the second fire alarm is repeated 4 times, and
 - (g) upon completion of the coded signals in Clauses (c) and (f), cause a general fire alarm to sound.
- (4) The Type 4 fire alarm system required in Table 3.2.4.A. shall,
- (a) be designed as a 2 stage, zoned, non-coded, indicating, local fire alarm system;
 - (b) upon the operation of any alarm initiating device, cause a distinctive alert alarm sounding device to warn persons on duty that a fire emergency exists;
 - (c) indicate on the annunciator the zone in which the alarm was initiated; and
 - (d) have each manual alarm station equipped so that the use of a key or other similar device causes a general fire alarm to sound on all audible signaling appliances in those zones to be evacuated and continue to sound upon the removal of the key or special device from the manual alarm station.
- (5) The Type 5 fire alarm system required in Table 3.2.4.A. shall,
- (a) be designed as a 2 stage, zone-coded, indicating, local fire alarm system;
 - (b) operate in the same manner as required in Sentence (4) for a type 4 fire alarm system, except that the operation of any alarm initiating device shall also cause a coded signal to sound at least 4 times on the alert fire alarm warning devices indicating the zone in which the alarm was initiated; and
 - (c) where a second fire alarm is initiated in a zone other than that for which the first alarm was initiated, function in the same manner as required in Clause (3) (f) for a type 3 system.
- (6) Except as provided in Sentence (7), the alert alarm sounding devices required in fire alarm systems described in Sentences (4) and (5) shall sound for at least 1 min., after which they may be manually silenced at the alarm control panel.

(7) The alert alarm sounding devices in Sentence (6) may be automatically silenced after 1 min., where an auxiliary, remote or central station connection is provided.

(8) In the 2 stage fire alarm system described in Sentences (4) and (5), the same type of audible signal appliance may be used to sound both the alert fire alarm and general fire alarm.

(9) Except as otherwise provided in the building code, every general fire alarm shall be designed so that when activated will sound for at least 5 min.

3.2.4.3.(1) In a Group A, Division 1, or a Group B occupancy, or in a building regulated by the provisions of Subsection 3.2.6., a direct connection shall be provided to the fire department headquarters by way of the municipal fire alarm system, an independently owned system or by way of a central station or proprietary control centre with direct communication with the fire department where,

- (a) a fire alarm system is required to be installed; or
- (b) a sprinkler system functions as a fire detection system or part of a fire detection system.

(2) Except where otherwise required by the provisions of Subsection 3.2.6., a local fire alarm system shall,

- (a) release hold open devices that are permitted on certain doors in Sentence 3.1.7.2.(10);
- (b) close theatre fire curtains required by Article 3.3.2.14.; and
- (c) activate motorized devices to open smoke dampers.

Automatic fire
detection

3.2.4.4.(1) Except as provided in Sentence (3), where a fire alarm system is required to be installed, heat detectors or smoke detectors shall be installed,

- (a) in those portions of buildings intended to be used for storage such as storage locker rooms, service rooms including machinery rooms, heating rooms and incinerator rooms, elevator shafts, dumbwaiter shafts, stair shafts, janitors' closets and any room where hazardous products are intended to be used or stored;
- (b) in every corridor and room in addition to those required in Clause (a) in buildings classified as Group A, Division 1, or Group B major occupancy; and
- (c) in every corridor and room in addition to those required in Clause (a) in buildings classified as Group C residential schools or residential colleges, hotels and motels, except that where a hotel or motel exceeds 3 storeys in building height, public corridors shall be equipped with products of combustion detectors.

Exception for
sprinklers

(2) Except as otherwise required in Clause 3.2.4.4.(1)(c), where automatic sprinkler systems are installed and provided with water flow alarm signals that will fulfil the functions of automatic fire detection requirements in addition to their primary function of fire extinguishment, they may be used in lieu of automatic fire detection systems.

(3) When a sprinkler system functions as a fire detection system or part of a fire detection system, as provided in Sentence (2) or Sentence 3.2.4.1.(3), it shall be supervised electrically to indicate separately at the fire alarm annunciator each of the following faults,

- (a) movement of a valve that would interfere with the operation of the sprinkler system;
- (b) loss of required water or air pressure in the sprinkler system;
- (c) loss of electrical power supply to any automatic fire pumps, auxiliary booster or special service pumps required for the operation of the sprinkler system; and
- (d) significant change of water levels and, where there is a danger of freezing, water temperatures within any on-site water containers or pressure tanks required to supply and supplement the sprinkler water supply.

3.2.4.5.(1) An electrically supervised emergency power supply shall be provided for every local electrical fire alarm system when there are required to be,

- (a) annunciators;
- (b) more than 12 manual fire alarm stations; or
- (c) more than 12 automatic alarm-initiating devices.

3.2.4.6. Local fire alarm systems and protective signalling systems shall be installed in conformance with Subsection 6.7.2.

3.2.4.7.(1) Notwithstanding the requirements for a fire alarm system in Article 3.2.4.1., at least one listed products of combustion detector of the single station alarm type shall be installed in every dwelling unit in apartment buildings.

- (2) A products of combustion detector shall be,
 - (a) installed between each sleeping area and the remainder of the unit;
 - (b) on the ceiling or on the walls between 6 and 12 in. below the ceiling; and
 - (c) installed with permanent connections to an electrical circuit and have no disconnect switch between the overcurrent device and the detector.

Subsection 3.2.5. Provisions for Fire Fighting

3.2.5.1.(1) Except for the first storey or ground floor, in every building direct access for fire fighting shall be provided from the outdoors to every storey below the sixth storey or 90 ft above grade by at least 1 unobstructed window or access panel for each 50 lineal ft of wall in at least 1 wall facing on a street or a yard conforming to Article 3.2.2.4.

Access above
grade

(2) An opening for access required in Sentence (1) shall be not less than 42 in. high by 22 in. wide, with a sill height of not more than 36 in. above the inside floor.

(3) Access panels above the first storey shall be readily openable from both inside and outside, or the opening shall be glazed with plain glass.

(4) The requirements of Sentences (1) to (3) need not apply to any storey that is sprinklered.

(5) Access for fire department equipment shall be provided to each building by means of a street, private roadway or yard.

(6) Where access to a building as required in Sentence (5) is provided by means of a private roadway or yard, the design and location of such access shall take into account such features as,

- (a) connection with public thoroughfares;
- (b) weight of firefighting equipment;
- (c) width of roadway;
- (d) radius of curves;
- (e) overhead clearance;
- (f) location of fire hydrants;
- (g) location of fire department connections; and
- (h) vehicle parking.

(7) On buildings more than 3 storeys in building height where the slope of the roof is less than 3 in. in 12 in., all main roof areas shall be provided with direct access from the floor areas immediately below either by a stairway or by a hatchway at least 22 in. by 36 in. with a fixed ladder.

- (8) Clearance and access around roof signs or other obstructions shall provide,
- (a) a passage not less than 3 ft wide by 6 ft high clear of all obstructions except for necessary horizontal supports not more than 2 ft above the roof surface,
 - (i) around every roof sign, and
 - (ii) through every roof sign at locations not greater than 50 ft apart; and
 - (b) a clearance of at least 4 ft between any portion of a roof sign and any opening in the exterior wall face or roof of the building on which it is erected.

Access below
grade

3.2.5.2.(1) Direct access from at least 1 street shall be provided from the outdoors to each basement and cellar having a horizontal dimension exceeding 75 ft; such access may be provided by doors, windows or other means that provide an opening at least 42 in. high and 22 in. wide, the sill of which shall be not higher than 36 in. above the inside floor, or by an interior stairway immediately accessible from the outdoors.

(2) The requirements of Sentence (1) need not apply to any basement or cellar that is sprinklered.

3.2.5.3. A water supply for fire fighting shall be designed and installed in accordance with Subsections 6.7.3. and 6.7.4. for both interior and exterior fire fighting requirements.

Standpipes

3.2.5.4.(1) Except as permitted in Sentence (3) and as required in Article 3.2.3.13., a standpipe and hose system shall be installed in conformance with Subsection 6.7.3. in every building,

- (a) more than 3 storeys in building height or 45 ft above grade; or
- (b) greater in building area than that shown in Table 3.2.5.A.

(2) Where a standpipe and hose system is required, 2½ in. diam. hose connections shall be provided, except that 1½ in. diam. hose connections are permitted in buildings which,

- (a) neither exceed 6 storeys in building height nor 75 ft. above grade; and
- (b) do not exceed 40,000 sq. ft. in building area.

(3) A standpipe and hose system need not be installed in a storage garage conforming to Article 3.2.2.50.

TABLE 3.2.5.A.
Forming Part of Sentence 3.2.5.4.(1)

Occupancy Classification	Unsprinklered Maximum Building Area, sq ft			Sprinklered 3 storeys or less in building height or 45 ft or less in height above grade
	1 storey	2 storeys	3 storeys	
A	25,000	20,000	15,000	Not Required
B (except hospitals)	20,000	15,000	10,000	
Hospitals	5,000	5,000	5,000	
C	20,000	15,000	10,000	
D	40,000	30,000	20,000	
E ⁽¹⁾	Not Required	Not Required	Not Required	
F-1	10,000	10,000	10,000	
F-2	20,000	15,000	10,000	
F-3	30,000	20,000	10,000	

Note to Table 3.2.5.A.

(1) Group E occupancies over 15,000 sq. ft. in building area or over 3 storeys must be sprinklered as required in Subsection 3.2.2.

3.2.5.5. Where a building or part of a building is required to be sprinklered, the sprinkler system shall conform to Subsection 6.7.4.

Sprinkler
systems

3.2.5.6. Portable extinguishers shall be provided and installed in accordance with Article 6.7.3.10.

Portable
extinguishers

Subsection 3.2.6. Additional Requirements for High Buildings

3.2.6.1.(1) This Subsection applies to,

(a) every building of Group A, D, E or F major occupancy classification that is more than,

(i) 120 ft in height, measured between grade and the floor level of the top storey, or

(ii) 60 ft in height, measured between grade and the floor level of the top storey, and in which the cumulative or total occupant load in a building on or above any storey above grade, other than the first storey, divided by the number of 22-in. units of exit width in all exit stairs at that storey, exceeds 300 persons;

(b) every building containing a Group B major occupancy located more than 60 ft above grade;

(c) every building containing a floor area or part of a floor area, located above the third storey designed or intended as a Group B occupancy for patients in bed or infirm persons;

(d) every building which is a Group C major occupancy apartment building that is more than,

(i) 6 storeys in building height, or

(ii) 60 ft in height measured between the floor level of the top storey and grade; and

(e) every building containing any other Group C major occupancy located more than 60 ft above grade.

3.2.6.2.(1) Except as permitted otherwise in Sentence (10), every building shall be designed to limit the danger to occupants and firefighters from exposure to smoke in a building fire, as provided in Sentences (2) to (9).

(2) Except as provided in Sentences (5) to (8), every building shall be designed so that during a period of 2-hr after the start of a fire all floor areas that are above the lowest exit storey will not contain more than 1 per cent by volume of contaminated air from the fire floor, assuming an outdoor temperature equal to the January design temperature on a $2\frac{1}{2}$ per cent basis in Section 4.9.

(3) Except as provided in Sentences (6) and (8), every building shall be designed so that during a fire the limit described in Sentence (2) on the movement of contaminated air into other floor areas is not exceeded in,

(a) each exit stair serving storeys above the lowest exit level; and

(b) each exit stair serving storeys below the lowest exit level.

(4) Except as provided in Sentences (6) and (8), every building shall be designed so that during a fire the limit described in Sentence (2) on the movement of contaminated air into other floor areas is not exceeded in a shaft that contains a firefighters' elevator, as required by Article 3.2.6.4.

(5) The requirements of Sentence (2) need not be provided in a building of Group C major occupancy classification that is not more than 250 ft in height measured between

grade and the floor level of the top storey, and in any building of Group A, D, E or F major occupancy classification where occupants above the first storey can enter and be safely accommodated in floor areas or parts of floor areas that,

- (a) are designated as areas of refuge on the plans and are identified as such in the building;
 - (b) are located at least every fifth storey;
 - (c) provide not less than 5 sq ft of floor space per ambulatory occupant and 16 sq ft of floor space per non-ambulatory occupant;
 - (d) have access corridors and doors leading to each designated part of a floor area on the same storey sufficient to provide one 22-in. unit of width for every 150 persons who may have to use these passages to reach the designated part of a floor area;
 - (e) have access stairs from intervening storeys leading to each designated part of a floor area sufficient to provide one 22-in. unit of width for every 100 persons who may have to use these stairs to reach the designated part of a floor area; and
 - (f) during a period of 2-hr after the start of a fire do not contain more than 1 per cent by volume of contaminated air from the fire floor, assuming an outdoor temperature equal to the January design temperature on a $2\frac{1}{2}$ per cent basis in Section 4.9.
- (6) In any building, the requirements of Sentences (2) and (4) and Clause (3) (a) need not be provided when the building is sprinklered, and
- (a) the sprinkler system is equipped with a water flow and supervisory signal system that will,
 - (i) transmit automatically a water-flow signal directly to the fire department, or through an independent central station,
 - (ii) transmit automatically other supervisory signals to a proprietary control centre or to an independent central system, and
 - (iii) activate a signal at the central alarm and control facility described in Article 3.2.6.8.;
 - (b) each stairway that serves storeys above the lowest exit level is vented to the outdoors at or near the bottom of the shaft;
 - (c) measures are taken to limit movement of smoke from a fire in a floor area below the lowest exit storey into upper storeys; and
 - (d) except for exhaust fans in kitchens, washrooms and bathrooms in dwelling units, and except for fans used for smoke venting in Article 3.2.6.5., air moving fans are stopped in any system that serves more than 2 storeys.
- (7) The requirements of Sentence (2) need not be provided in a building of Group A, C, D, E or F major occupancy classification where,
- (a) the building is not more than 250 ft in height measured between grade and the floor level of the top storey; and
 - (b) the number of occupants of above grade storeys does not exceed $\frac{1}{3}$ of the total area in sq ft of treads (run times width) and landings in the exit stairs serving these storeys.
- (8) The requirements of Sentences (2) and (4) and Clause (3) (a) need not be provided in a building of Group C major occupancy classification,

- (a) that is not more than 120 ft in height, measured between grade and the floor level of the top storey;
 - (b) where each individually rented room, suite of rooms or dwelling unit above grade has direct access to an exterior balcony that,
 - (i) has a depth from the outside face of the exterior wall to the inside edge of the balcony of at least 5 ft, and
 - (ii) provides not less than 5 sq ft of balcony space for each occupant of the room, suite of rooms or dwelling unit;
 - (c) where each stairway that serves storeys above the lowest exit level is vented to the outdoors at or near the bottom of the stairshaft;
 - (d) where measures are taken to limit movement of smoke from a fire in a floor area below the lowest exit storey into upper storeys; and
 - (e) where, except for exhaust fans in kitchens, washrooms and bathrooms in dwelling units, air moving fans are stopped in any system that serves more than 2 storeys.
- (9) Where a building described in Sentence 3.2.6.1.(1) is connected to any other building, measures shall be taken to limit movement of contaminated air from one building into another during a fire.
- (10) The requirements of Sentences (2) and (3) need not be provided in a Group C major occupancy apartment building.

ELEVATORS

3.2.6.3.(1) Except at the street floor level on which the central alarm and control facility required in Article 3.2.6.8. is located, elevator door re-opening devices that may be affected by smoke or hot gases, such as photo-electric devices, shall be rendered inoperative after the doors have been held open by the device for 10 sec.

- (2) A key-operated switch shall be provided that,
- (a) is in a conspicuous location on the outside of the elevator shaft at or near the central alarm and control facility referred to in Article 3.2.6.8.;
 - (b) will cause the immediate return of all elevator cars in the building to the street floor or transfer lobby by cancelling all other calls after the car has stopped at the next floor at which it can make a normal stop; and
 - (c) will render inoperative the emergency stop switch in each elevator car upon operation of the key-operated switch.
- (3) In each elevator car a key-operated switch shall be provided to,
- (a) enable the elevator to operated independently of other elevators;
 - (b) allow operation of the elevator without interference from floor call buttons;
 - (c) render door protective devices inoperative; and
 - (d) control the opening of power-operated doors only by continuous pressure on the "open" buttons or switches, so that, if the "open" button or switch is released while the door is opening, the doors will automatically reclose.
- (4) Keys to operate the switches required by Sentence (2) and (3) shall be provided in a suitably identified box conspicuously located on the outside of an elevator shaft near the central alarm and control facility required by Article 3.2.6.8., and an additional key, or keys, shall be kept at the central alarm and control facility.

ELEVATOR FOR USE BY FIREFIGHTERS

3.2.6.4.(1) At least 1 elevator shall be provided for use by firefighters in conformance with Sentence (2) to (6).

(2) The elevator required in Sentence (1) shall have a platform area not less than 24 sq ft and shall be capable of carrying a load of 2,000 lb from a street floor landing to the top floor that it serves in 1 min.

(3) Measures shall be taken to ensure that the elevator required in Sentence (1) is operable under conditions of exposure to a fire from the outside of the shaft for a period of 1-hr.

(4) Except as provided in Sentence (5), an elevator required in Sentence (1) shall be capable of providing transportation from the street floor to every floor normally served by the elevator system that is above grade in the building.

(5) Where it is necessary to change elevators to reach any floor referred to in Sentence (4), the system shall be designed so that not more than 1 change of elevators is required when travelling from a street floor to any floor in the building.

(6) Elevators required in Sentence (1) shall be identified on the floor containing the central alarm and control facility described in Article 3.2.6.8., and at any interchange level described in Sentence (5), except where the elevators are not protected as required in Sentence (3).

(7) Electrical conductors for the operation of the elevator referred to in Sentence (1) shall be,

- (a) installed in service spaces conforming to Section 3.5 that do not contain other combustible material;
- (b) installed in the elevator shaft when permitted; or
- (c) protected against exposure to fire from the service entrance of the emergency power supply, or the normal service entrance of the normal power supply to the equipment served, to ensure operation for a period of 1-hr when subjected to the temperature conditions described in the appropriate fire-resistance test in Article 3.1.5.1.

3.2.6.5.(1) Means of venting each floor area to the outdoors shall be provided in accordance with Sentences (2) to (9).

(2) Where windows or wall panels are used for venting they shall,

- (a) be uniformly distributed along the exterior wall of each storey;
- (b) have a total area of at least 1 per cent of the exterior wall area of each storey;
- (c) be readily openable from the interior without use of wrenches or keys;
- (d) be readily identified from the interior, and from the exterior where they are accessible to firefighters; and
- (e) be designed so that when opened they will not endanger persons outside the building during a fire.

(3) Where one or more smoke shafts or vertical service spaces are used for venting they must,

- (a) have an opening or openings into each storey with an aggregate area of not less than that obtained from Table 3.2.6.A. for the height of the shaft, the area of the largest floor area served by the smoke shaft, and the leakage characteristics of shaft wall and dampers obtained from Tables 3.2.6.B. and 3.2.6.C.;
- (b) have an aggregate unobstructed cross-sectional area that is equal to that provided in Clause (a); and
- (c) be designed to comply with the requirements of Sentence (4).

TABLE 3.2.6.A.

Forming Part of Sentence 3.2.6.5.(3)

Minimum Size in Sq Ft of Vent Opening ⁽¹⁾ into Smoke Shaft Excluding Elevator Shafts from Each Floor Area

Floor Area Sq Ft	Leakage Area	Building Height, Ft								
		60	120	240	360	480	600	720	840	960
2,000	.0%	1.0	1.1	1.3	1.5	1.6	1.8	1.9	2.0	2.1
5,000		2.2	2.5	2.9	3.2	3.5	3.8	4.0	4.2	4.4
10,000		4.3	4.8	5.4	5.9	6.4	6.8	7.2	7.5	7.8
20,000		8.3	9.1	10.1	10.9	11.7	12.4	13.0	13.6	14.1
30,000		12.2	13.4	14.7	15.6	16.8	17.6	18.4	19.2	19.9
40,000		16.1	17.5	19.1	20.3	21.7	22.7	23.7	24.7	25.5
50,000		20.0	21.7	23.5	24.8	26.5	27.6	28.8	30.0	31.0
60,000		23.9	25.8	27.8	29.3	31.2	32.5	33.9	35.2	36.2
2,000	1%	1.0	1.2	1.5	1.9	2.3	2.8	3.5	4.4	5.7
5,000		2.3	2.7	3.4	4.1	4.9	5.8	7.0	8.5	10.6
10,000		4.4	5.1	6.2	7.3	8.7	10.2	12.1	14.5	17.6
20,000		8.5	9.8	11.6	13.5	15.8	18.3	21.3	25.2	30.0
30,000		12.6	14.3	16.8	19.3	22.5	25.8	30.0	35.1	41.4
40,000		16.7	18.8	21.9	25.1	29.0	33.2	38.3	44.5	52.3
50,000		20.7	23.2	27.0	30.7	35.4	40.3	46.4	53.8	62.9
60,000		24.8	27.7	32.0	36.2	41.7	47.4	54.3	62.8	73.2
2,000	2%	1.0	1.3	1.8	2.5	3.8	6.2	13.3	48.8	961.7
5,000		2.4	2.9	4.0	5.3	7.6	11.6	21.7	64.0	1,011.4
10,000		4.6	5.5	7.3	9.5	13.2	19.4	33.6	86.2	1,087.8
20,000		8.8	10.5	13.5	17.4	23.5	33.4	54.7	125.3	1,235.4
30,000		13.1	15.4	19.6	24.9	33.3	46.4	74.1	160.7	1,378.0
40,000		17.3	20.2	25.6	32.2	42.7	59.0	92.7	194.6	1,509.7
50,000		21.5	25.0	31.4	39.5	52.0	71.3	110.5	226.0	1,642.5
60,000		25.7	29.7	37.3	46.6	61.1	83.4	128.2	258.4	1,768.0
2,000	3%	1.1	1.4	2.2	3.8	9.1	72.8			
5,000		2.5	3.1	4.7	7.7	16.2	93.8			
10,000		4.7	5.9	8.7	13.5	26.6	124.8			
20,000		9.2	11.3	16.1	24.3	45.4	180.2			
30,000		13.6	16.5	23.3	34.6	63.0	230.9			
40,000		17.9	21.8	30.4	44.7	80.1	279.3			
50,000		22.3	26.9	37.3	54.6	96.6	326.5			
60,000		26.6	32.1	44.2	64.4	112.9	372.2			
2,000	4%	1.1	1.5	2.8	7.2	265.0				
5,000		2.5	3.4	5.9	13.6	309.7				
10,000		4.9	6.4	10.7	23.1	378.7				
20,000		9.5	12.2	19.8	40.4	504.7				
30,000		14.1	17.9	28.6	56.9	622.0				
40,000		18.6	23.5	37.2	72.9	732.8				
50,000		23.1	29.1	45.7	88.7	841.0				
60,000		27.6	34.7	54.2	104.2	944.6				
2,000	5%	1.1	1.6	3.7	35.0					
5,000		2.6	3.7	7.7	52.8					
10,000		5.1	6.9	13.9	79.0					
20,000		9.9	13.3	25.6	126.2					
30,000		14.6	19.5	36.8	170.5					
40,000		19.3	25.6	47.8	213.2					
50,000		24.0	31.7	58.7	254.8					
60,000		28.7	37.7	69.5	295.3					
Col. 1	2	3	4	5	6	7	8	9	10	11

Note to Table 3.2.6.A.

(¹)The minimum size of vent opening into a smoke shaft depends on the floor area and total leakage area of smoke shaft walls and dampers. This total leakage area may be estimated, where cross-sectional area of smoke shaft, opening into shaft and opening to the outdoors at the top of the shaft are equal, by adding the leakage areas for shaft wall obtained from Table 3.2.6.B. and for dampered openings obtained from Table 3.2.6.C.

TABLE 3.2.6.B.

Forming Part of Sentence 3.2.6.5.(3)

Leakage Area of Smoke Shaft Wall

Wall Construction	Leakage Area as a per cent of Damper Area
Monolithic concrete	0.5
Masonry wall unplastered	1.5
Masonry wall plastered	0.5
Gypsum wallboard on steel studs	1.0

TABLE 3.2.6.C.

Forming Part of Sentence 3.2.6.5.(3)

Leakage Area of Dampered Opening in Smoke Shafts

Type of Damper(²)	Leakage Area as a per cent of Damper Area (¹)
Single-blade fire damper	2.0
Multi-blade fire damper	2.5
Gasketed damper	1.0

Notes to Table 3.2.6.C.

(¹)Values include allowance for 0.5 per cent leakage between frame and wall construction.

(²)These leakage data contemplate clearances applicable to dampers which have been tested in accordance with ULC-S 112-1973, 'Fire Dampers', as revised to 1 May, 1975.

(4) Each smoke shaft or vertical service space described in (3) must,

(a) be separated from the remainder of the building by a fire separation that has a fire-resistance rating at least equal to that required for the floor assembly through which it passes, or be designed as a chimney conforming to Part 6 except that flue liners need not be provided;

- (b) have an opening to the outdoors at the top that has an area at least equal to the cross-sectional area of the shaft, and which may be protected against the weather, provided the closure can be opened from the outside, and will open automatically by a signal from a smoke detector in the shaft, by operation of the fire alarm system, and when a closure required in Sentence (5) opens;
 - (c) terminate at least 3 ft above the roof surface where it penetrates the roof; and
 - (d) contain no combustible material, fuel lines or services that are required for use in an emergency.
- (5) Each opening required by Clause (3) (a) must be located so that the top of the opening is not more than 10 in. below the ceiling, except that the opening may be above the ceiling, if the ceiling freely allows passage of air, and is provided with a closure that,
- (a) has a fire protection rating conforming to Sentence 3.1.7.1.(4);
 - (b) can be opened from a remote location such as a stairshaft or the storey immediately below, or will open automatically by means of a smoke detector located in the vicinity of each doorway to a required exit stairway; and
 - (c) must not open automatically on any floor, other than the fire floor, when smoke or hot gases pass through the shaft.
- (6) A smoke vent opening referred to in Sentence (2) or (3) that is less than 42 in. above the floor must be protected by a guard when required by Sentence 3.3.1.12.(1).
- (7) An elevator shaft, other than a shaft and associated machinery room that contains a firefighters' elevator and equipment, may be used for venting provided,
- (a) the building is sprinklered;
 - (b) the shaft conforms to Sentence (3);
 - (c) provision is made for the return of all elevator cars in the shaft to the street floor level on the activation of any fire alarm signal; and
 - (d) the cars in the shaft are rendered inoperative during a fire emergency.
- (8) In a sprinklered building the air handling system may be used for smoke venting provided,
- (a) the system can maintain an exhaust to the outdoors at the rate of six air changes per hour from any floor area; and
 - (b) emergency power to the fans required by Clause (a) is provided as described in Article 3.2.6.11.
- (9) Where a damper is required by Sentence (5), the leakage area between damper components and between damper and frame must not exceed 3 per cent of the openable area of the damper.

PROVISION OF SPRINKLERS

3.2.6.6.(1) The following spaces shall be sprinklered:

- (a) every storey, or part thereof, intended for a Group E or Group F, Division 1 or Division 2 occupancy;
- (b) every restaurant or licensed beverage establishment;
- (c) every storey or part thereof intended for the storage or handling of hazardous substances;

(d) every floor area exceeding 15,000 sq ft except,

- (i) when the floor area is divided into fire compartments not exceeding 15,000 sq ft in area and separated from the remainder of the floor area by fire separations having at least 1-hr fire-resistance rating, or
- (ii) when the floor area is intended for a Group C major occupancy apartment building.

INTERIOR FINISH

3.2.6.7.(1) Except as permitted in Sentences (2) and (4), the interior finish for every wall, partition, ceiling or floor of a room or space including service spaces and elevator cars shall have a flame-spread rating and a smoke developed classification conforming to Table 3.2.6.D.

TABLE 3.2.6.D.

Forming Part of Article 3.2.6.7.

Location	Maximum Flame-Spread Rating			Maximum Smoke Developed Classification		
	Wall Surface	Ceiling Surface	Floor Surface	Wall Surface	Ceiling Surface	Floor Surface
Exit stairways, vestibules to exit stairs and exit lobbies	25 except see Sent. 3.4.4.1.(1) and (2)		25	50 except see Sent. 3.2.6.7.(4).	50 except see Sent. 3.2.6.7.(4).	50
Corridors providing access to exit except within suites	See Sect. 3.3. and Subsect. 3.1.4. and 3.1.11.		300	100 except see Sent. 3.2.6.7.(4)	50 except see Sent. 3.2.6.7.(4).	500
Elevator cars and vestibules	25	25	300	100	100	300
Service spaces and service rooms	25	25	25	50	50	50
Other rooms or spaces	See Sect. 3.3. and Subsect. 3.1.4. and 3.1.11.		See Sent. 3.2.6.7.(3)	300	50 except see Art. 3.1.11.1.	See Sent. 3.2.6.7.(3)
Column 1	2	3	4	5	6	7

(2) Except for buildings of Group B major occupancy classification, the flame-spread ratings required elsewhere in this Part may be used in lieu of the requirements of Sentence (1) where a building is sprinklered and supervised, as provided in Sentence 3.2.6.2.(6).

(3) Floor coverings in rooms and spaces other than in service rooms, service spaces, floors and stairs in exits, elevator cars, vestibules adjacent to elevator cars and corridors providing access to exits not within suites, shall pass the test method for flame resistance in CGSB 4-GP 129 (1972) "Carpets, Commercial", as revised to 1 May, 1975.

(4) The smoke developed classification of the interior finish of the wall or ceiling may exceed the classification shown in Table 3.2.6.D. provided such finish has a classification of not more than 300 and does not exceed 10 per cent of the wall or ceiling areas in,

- (a) exit stairways, vestibules to exit stairs, exit lobbies; and
- (b) corridors providing access to exit except within suites.

CENTRAL ALARM AND CONTROL FACILITY

3.2.6.8.(1) A central alarm and control facility other than a proprietary control centre shall be provided on the street entrance floor that,

- (a) is in a location that is readily accessible to firefighters entering the building; and
 - (b) takes into account the effect of background noise likely to occur under fire emergency conditions, so that the facility can properly perform its required function under such conditions.
- (2) The central alarm and control facility shall include,
- (a) means to control the voice communication system required by Article 3.2.6.9.;
 - (b) means to give an audible and visual fire alarm signal when any fire alarm or detection device is actuated, and a switch to silence the audible signal causing a visual signal to indicate that the audible signal has been silenced;
 - (c) an annunciator panel,
 - (i) in Group C major occupancy apartment buildings, and
 - (ii) in all other buildings connected to indicate the type of signal and the floor or zone from which the fire alarm is received;
 - (d) means to transmit automatically alarm signals to the fire department, either directly or through an independent central station, or through a proprietary control centre;
 - (e) means to cause doors to vestibules, if these are normally held open, to close automatically on receipt of an alarm signal, as provided in Sentence 3.1.7.2.(11), unless this is effected automatically by proprietary system control equipment;
 - (f) means to manually actuate the fire alarm devices in the building, and to silence them after they have operated initially for not less than 1 min., and indicate by a visual signal that the fire alarm has been silenced;
 - (g) except in Group C major occupancy apartment buildings, means to actuate auxiliary equipment or means to communicate with a continually manned auxiliary equipment control centre, as appropriate to the measure for fire safety provided in the building; and
 - (h) except in Group C major occupancy apartment buildings, means to electrically supervise the system and components in Clauses (a) to (g).

VOICE COMMUNICATION SYSTEM

3.2.6.9.(1) Voice communication systems shall be provided in,

- (a) Group C major occupancy apartment buildings that are more than,
 - (i) 12 storeys in building height, or
 - (ii) 120 ft in height measured between the floor level of the top storey and grade;
 - (b) every building containing a floor area or part of a floor area located above the third storey designed or intended as a Group B occupancy for patients in bed or infirm persons; or
 - (c) all other buildings where the vertical distance exceeds the height in Subclause (a) (ii).
- (2) The systems shall include,
- (a) a 2-way communication system at locations on each floor area, with connections to the central alarm and control facility and to the mechanical control centre;

- (b) loudspeakers operated from the central alarm and control facility which are designed and located so as to be heard in all areas of the building; and
 - (c) except as permitted in Sentence (3), provision for silencing the fire alarm devices when the loudspeaker or 2-way communication system is in use, but only after the fire alarm devices have operated initially for not less than 1 min.
- (3) Silencing of the fire alarm devices when the 2-way communication system is in use need not be provided in Group C major occupancy apartment buildings.
- (4) Except for Group C major occupancy apartment buildings, such systems shall conform to Section 6.8.

FIRE PROTECTION OF ELECTRICAL CONDUCTORS

3.2.6.10.(1) Electrical conductors for emergency equipment shall be installed in service spaces that do not contain other combustible material in all buildings except Group C major occupancy apartment buildings, or shall be protected against exposure to fire, as provided in Subsections 3.5.3. and 3.5.4., to ensure continued operation for a period of 1-hr, from the source of power supply to the branch circuits supplying the equipment required by Articles 3.2.6.2., 3.2.6.3., 3.2.6.4. and 3.2.6.5.

EMERGENCY ELECTRICAL POWER SUPPLY

3.2.6.11.(1) An emergency power supply, capable of operating under a full load for at least 2-hr, shall be provided in the event of failure of the normal source of power supply, by a separate service not supplied from the same transformer as the primary source, or by a local emergency power supply for,

- (a) fire alarm and voice communication systems required in Articles 3.2.6.8. and 3.2.6.9.;
 - (b) every elevator in,
 - (i) a building that is Group C major occupancy apartment building that is more than 12 storeys in building height, or 120 ft in vertical height between grade and the floor of the top storey, assuming only 1 elevator will operate at a time, and
 - (ii) all other buildings that are more than 120 ft in vertical height between grade and the floor of the top storey, assuming only 1 elevator will operate at a time;
 - (c) fire pumps and ancillary equipment for fire fighting when dependent on electrical power supplied to the building; and
 - (d) except for Group C major occupancy apartment buildings, fans required for venting in Article 3.2.6.5.
- (2) Provision shall be made for automatic transfer to emergency power in the event of a power failure,
- (a) for the services described in Clause (1) (a) for Group C major occupancy apartment building;
 - (b) for the services described in Sentence (1) for all other buildings.

3.2.6.12.(1) The systems in all buildings for control of smoke movement in Article 3.2.6.2. and the systems in all buildings except Group C major occupancy apartment buildings for control of venting described in Article 3.2.6.5. shall be checked and tested by measuring pressure differences and direction of air flow around floors and through separating walls of compartments and shafts.

(2) Air shall flow from the spaces occupied during a fire emergency toward the space in which fire is occurring.

Subsection 3.2.7. RESERVED

Subsection 3.2.8. Lighting

3.2.8.1.(1) Every exit, public corridor, corridor providing access to exit for the public or serving patients' bedrooms or classrooms shall be equipped to provide illumination to an average level of at least 10 ft. candles at floor level and at all points such as angles and intersections at changes of level where there are stairs or ramps.

illumination levels

(2) The average level of illumination in rooms and spaces used by the public shall be in accordance with Table 3.2.8.A.

(3) For the purpose of establishing the average level of illumination, at least one measurement of intensity of illumination shall be made for every 100 sq. ft. of floor area at the floor level.

TABLE 3.2.8.A.

Forming Part of Sentence 3.2.8.1.(2)

Room or Space	Footcandles
Storage rooms	5
Service rooms and laundry areas	20
Storage garages	5
Public water closet rooms	10
Stairways	10
Service hallways	5
Recreation rooms	10
Column 1	2

3.2.8.2.(1) Emergency lighting shall be provided to average levels of at least 1 ft. candle at floor or tread level in,

Emergency lighting

- (a) exits and corridors used by the public where such exits and corridors are below grade or are windowless;
- (b) the following parts of buildings required by Subsection 3.2.4. to have a fire alarm system,
 - (i) exits,
 - (ii) corridors used by the public,
 - (iii) principal routes providing access to exit in an open floor area,
 - (iv) corridors serving patients' bedrooms, and
 - (v) corridors serving classrooms;
- (c) underground walkways;
- (d) covered malls; and
- (e) floor areas or parts thereof where the public may congregate in,
 - (i) Group A, Division 1 occupancies, and
 - (ii) Group A, Division 2 and 3 occupancies having an occupant load of 60 persons or more.

(2) An emergency power supply shall be provided to maintain the emergency lighting required by this Subsection from a power source such as batteries or generators that will continue to supply power in the event that the regular power supply to the building is interrupted and be so designed and installed that upon failure of the regular power it will assume the electrical load automatically for a period of,

Emergency power

- (a) 2-hr for all buildings within the scope of Subsection 3.2.6.;
 - (b) 1-hr for buildings of Group B major occupancy classification that are not within the scope of Subsection 3.2.6.; and
 - (c) ½-hr for buildings of all other occupancies.
- (3) Where an emergency power generator is supplied from an energy source outside of the building, provision shall be made to ensure its operation in the event of an emergency.

Subsection 3.2.9. Change of Occupancy

3.2.9.1.(1) Except as permitted in Sentence (2), where a change of major occupancy in an existing building or part thereof is made or intended to be made and affects the safety of the occupants, the change shall comply with the requirements of this Part.

(2) The requirements of this Subsection may be used in lieu of those contained in Subsection 3.2.2. when an existing building is to be changed to,

- (a) Group A, Division 1 and 2, Assembly;
- (b) Group B, Division 2, Institutional;
- (c) Group D, Business and Personal Services Occupancy; and
- (d) Group E, Mercantile Occupancies.

3.2.9.2.(1) A Group A, Division 1 occupancy having an occupant load not exceeding 300 persons in the auditorium floor is permitted in an existing building, provided that,

- (a) the building conforms to the requirements of Sentence 3.2.2.9.(2) except that,
 - (i) the occupancy may be in a building more than 1 storey in building height, but is limited to the first or second storey,
 - (ii) the floor assembly immediately above and all those below the A-1 occupancy are at least ¾-hr. fire separations;
- (b) notwithstanding Subsection 3.2.4., a fire alarm and fire detector system is provided;
- (c) notwithstanding Sentence 3.4.2.1.(2) there is a minimum of two exits;
- (d) the travel distance to an exit does not exceed one half of that required in Article 3.4.2.3.

(2) There may be other occupancies above or below the Group A, Division 1 occupancy..

3.2.9.3. A group A, Division 1 occupancy having an occupant load not exceeding 600 persons is permitted in an existing building, provided the building conforms to the requirements of Sentence 3.2.2.10.(2) as amended by Clauses 3.2.9.2.(1) (a) to (d) and Sentence 3.2.9.2.(2).

3.2.9.4.(1) A Group A, Division 2 occupancy is permitted in an existing building, provided that,

- (a) the building conforms to the requirements of Sentence 3.2.2.14.(2), except that,
 - (i) the occupancy does not occur above the 3rd storey,
 - (ii) if the occupancy is located on the 3rd storey, the 3rd storey and all floors below are sprinklered, and

- (iii) if the occupancy is located on the 1st or 2nd storey, the occupancy storey and all floors below are sprinklered where the area of the occupancy is greater than,

4,000 sq. ft. if facing 1 street,

5,000 sq. ft. if facing 2 streets, or

6,000 sq. ft. if facing 3 streets;

- (b) notwithstanding Subsection 3.2.4., a fire alarm and fire detector system is provided.

3.2.9.5.(1) A Group B, Division 2 ambulatory occupancy is permitted in an existing building provided that,

- (a) the building conforms to the requirements of Sentence 3.2.2.24.(2) except that,
 - (i) in a building exceeding 2 storeys in building height the building is sprinklered and the ambulatory occupancy is not located above the 3rd storey, or
 - (ii) in a building not greater than 3 storeys in building height and 2,500 sq. ft. in building area, sprinklering need not be provided;
- (b) a fire alarm system and automatic rate of rise or products of combustion detectors are installed in all occupied rooms in addition to the requirements of Sentence 3.2.4.4.(1) where the building,
 - (i) exceeds 2 storeys in building height, or
 - (ii) exceeds 2,500 sq. ft. in building area; and
- (c) where such occupancy is to be located in a building that does not satisfy the requirements of Subsection 3.2.3. for the amount of existing window openings facing a yard or space that does not have sufficient limiting distance, such existing openings are allowed provided,
 - (i) they are protected with wired glass in steel frames conforming with Article 3.1.7.3., or
 - (ii) the building is sprinklered.

3.2.9.6.(1) A Group B, Division 2 non-ambulatory occupancy is permitted in an existing building provided that,

- (a) the building conforms to the requirements of Sentence 3.2.2.24.(2) except that sprinklers are provided where,
 - (i) the building is more than 2 storeys in building height,
 - (ii) the building is more than 1 storey in building height and more than 2,500 sq. ft. in building area,
 - (iii) the building is more than 5,000 sq. ft. in building area, or
 - (iv) the services of a municipal fire department with a potential response of 5 minutes or less are not available;
- (b) products of combustion detectors are installed in all occupied rooms in addition to the requirements of Sentence 3.2.4.4.(1);
- (c) doors to sleeping rooms conform to Sentence 3.1.7.2(4) or are 1¾ in. solid core wood doors;

- (d) notwithstanding Article 3.3.3.4., the flame spread rating of walls or ceiling does not exceed 200 in other than corridors used by the public, corridors serving sleeping rooms and exits;
- (e) the non-ambulatory occupancy is not located above the 2nd storey; and
- (f) where such occupancy is to be located in a building that does not satisfy the requirements of Subsection 3.2.3. for the amount of existing window openings facing a yard or space that does not have sufficient limiting distance, such existing openings are allowed provided,
 - (i) they are protected with wired glass in steel frames conforming with Article 3.1.7.3., or
 - (ii) the building is sprinklered.

3.2.9.7.(1) A Group D occupancy is permitted in an existing building of combustible construction greater than 3 storeys in building height provided that the building conforms otherwise to Article 3.2.2.30.

3.2.9.8.(1) A Group E occupancy is permitted in an existing building greater than 3 storeys in building height provided that,

- (a) the building conforms otherwise to Sentence 3.2.2.34.(2); and
- (b) the Group E occupancy is limited to the first 3 storeys.

SECTION 3.3 REQUIREMENTS FOR FIRE SAFETY WITHIN FLOOR AREAS

Subsection 3.3.1. Requirements Applying to all Floor Areas

Hazardous
substances

3.3.1.1.(1) Where hazardous substances are used in connection with the activities of any occupancy other than as provided in Subsection 3.3.7. for a Group F, Division 1 occupancy, the storage, handling and use of such substances shall be in accordance with the appropriate requirement in the National Fire Code of Canada 1963, as revised to 1 May, 1975.

Vaults

(2) Every room or vault where hazardous substances are stored shall be separated from all other occupancies by a 3-hr fire separation which need not be supported as required in Sentence 3.1.6.2.(1).

Grease-laden
vapours in
kitchens

(3) In kitchens containing commercial cooking equipment used in processes producing grease-laden vapours, the equipment shall be designed and installed in conformance with Part 6.

Spray
painting
areas

(4) Spray painting areas shall be constructed in accordance with the requirements in the National Fire Code of Canada 1963, as revised to 1 May, 1975.

(5) The space above or below a mezzanine floor or both in a Group E, F-2 or F-3 occupancy may be enclosed provided,

- (a) the area of the enclosed portion does not exceed 1,500 sq. ft.;
- (b) the enclosure is a fire separation having a fire resistance rating equal to that required for other floors in Subsection 3.2.2. but shall not be less than $\frac{3}{4}$ -hr.;
- (c) the stairs from the mezzanine floor do not lead into the space immediately below when such area is enclosed; and
- (d) the enclosed space is not intended for the storage of hazardous materials.

ACCESS TO EXITS

3.3.1.2.(1) An access to exit shall be provided from every roof which is intended for occupancy, and from every podium, terrace, platform or contained open space.

(2) Access to exits within floor areas shall conform to Subsections 3.3.2. to 3.3.7. in addition to the requirements of this Subsection.

3.3.1.3.(1) Except as permitted in Sentence 3.3.4.3.(1), each individually rented room or suite of rooms in a floor area occupied by more than 1 tenancy and each dwelling unit shall have,

- (a) a doorway leading to the outdoors at or near ground level; or
- (b) a doorway leading to,
 - (i) an exterior passageway open to the outdoors, or
 - (ii) an interior public corridor or other corridor used by the public; and
- (c) from the point where such doorway in Clause (b) enters an exterior passageway, interior public corridor, or other corridor used by the public, it shall be possible to go in opposite directions to each of 2 separate exits, except as permitted in this Section.

(2) Public corridors shall be separated from the remainder of the building by a fire separation having a fire-resistance rating at least equal to 1-hr, except that

Fire
separation
of public
corridors

- (a) the fire-resistance rating need not exceed $\frac{3}{4}$ -hr when the fire-resistance rating of the floor assembly is not required to exceed $\frac{3}{4}$ -hr; and
- (b) no fire-resistance rating is required when the floor area is sprinklered and the corridor does not serve an institutional occupancy or a residential occupancy.

3.3.1.4.(1) Any room or suite of rooms occupied by a single tenancy shall have two egress doorways placed in such a manner that one doorway could provide egress from the room or suite of rooms as required in Article 3.3.1.3. if the other doorway becomes inaccessible to the occupants due to a fire which might originate in the room or suite of rooms,

Egress
doorways
from
rooms

- (a) where the occupancy is classified as Group F, Division 1;
- (b) which is intended for an occupant load of more than 60 persons;
- (c) where the distance measured in a straight line from any point within the room or suite of rooms to the nearest door opening directly onto a public corridor or to an exit at grade, is more than 75 ft.; or
- (d) where the hazardous areas in schools as specified in Sentence 3.3.2.2.(4) exceed 1,000 sq. ft.

(2) Where a roof is used or intended for an occupant load of more than 60 persons, at least 2 separate exits shall be provided from the roof to stairs designed in conformance with the requirements for exit stairs located so that the distance between such stairs conform to the requirements in Sentence 3.4.2.2. for exits.

Exits from
roofs

(3) Where a podium, terrace, platform or contained open space is provided, egress requirements shall conform to the appropriate requirements for rooms and suites of rooms in Sentence (1).

Egress from
podiums or
terraces

(4) Where two egress doorways are required in Sentence (1), each doorway shall have an exit sign in accordance with Subsection 3.4.6.

3.3.1.5. The total minimum number of doorways from any room containing a high occupant load shall be the same as the number of exits required for a floor area having the same occupant load as determined by Article 3.4.2.4. and such doorways shall be provided with exit signs as prescribed in Article 3.4.6.1.

Egress
doorways from
high occupant
load rooms

Corridors

3.3.1.6.(1) The minimum width of every public corridor shall be 44 in.

(2) The minimum headroom clearance of every public corridor and every doorway in such public corridor shall conform to Article 3.4.3.5.

(3) Facilities for the illumination of corridors and other principal access routes to exits shall conform to the appropriate requirements in Subsection 3.2.8.

Doors

3.3.1.7.(1) Except as provided in Sentence (5), every door that opens onto a corridor or other facility that provides access to exit from a room or suite of rooms shall swing on a vertical axis in the direction of exit travel where such room or suite of rooms is used or intended for an occupant load of more than 60 persons or for a Group F, Division (1) occupancy.

(2) Every door that divides a corridor where such corridor is required to be separated from the remainder of the floor area by a fire separation shall swing on a vertical axis in the direction of exit travel.

(3) Where sliding doors are provided in locations described in Sentence (1), they shall be designed and installed to swing on the vertical axis in the direction of exit travel when pressure of 20 lb is applied to the inside of the door at the leading edge and causes the door to swing wide open and such doors shall be identified as a swinging door by means of a sign or decal affixed to the door.

(4) Every door in an access to exit from a floor area containing a high occupant load of more than 60 persons, when equipped with a latch or other fastener, will unlatch or release when a pressure of 20 lb is applied.

(5) In Group B, Division 1 occupancy, a sliding door may be used as an access to exit from a room or suite of rooms where persons are under legal restraint provided locks are connected to releasing devices operated from a constantly supervised control station.

3.3.1.8.(1) Every door that opens onto or is located within a public corridor or other facility that provides access to exit from a room or suite of rooms occupied as a single tenancy shall,

- (a) be at least 32 in. in width where there is only 1 door leaf;
- (b) have no single leaf in any multiple leaf door less than 24 in. or more than 48 in. in width;
- (c) not open onto a step; and
- (d) be readily operable without the use of keys in the direction of travel to an exit, except that this requirement does not apply to doors of rooms where persons are under legal restraint.

3.3.1.9. Ramps, stairways, escalators and passageways used by the public as access to exits shall conform with the requirements in Subsection 3.4.8.

Capacity of
access to exits

3.3.1.10.(1) The capacity of any public access to exit shall be based on the occupant load of the floor area served and be computed on the basis of the following maximum number of persons per unit of width as determined by the method for computing units of exit width in Article 3.4.3.2.:

- (a) except as provided in Clause (c), doorways, corridors and passageways not involving stairs or ramps shall be assumed to accommodate not more than 90 persons per unit of exit width (22 in.);

- (b) except as provided in Clause (c), stairways, ramps, and escalators shall be assumed to accommodate not more than 60 persons per unit of exit width (22 in.); and
- (c) access to exit from a floor area intended for the treatment or care of infirm persons shall be assumed to accommodate not more than 30 persons per unit of exit width (22 in.).

3.3.1.11.(1) Except as required in Sentences (2) and (3), interior finish materials used on a wall or ceiling of a public corridor or corridor serving classrooms or patients' bedrooms shall have a flame-spread rating of not more than 150.

Flame-spread
rating in
corridors

(2) Except where the building is sprinklered, at least 90 per cent of the surface of the ceiling of any public corridor or corridor serving classrooms or patients' bedrooms shall have a flame-spread rating of not more than 25.

(3) Except where the building is sprinklered, at least 90 per cent of the surface of any wall, other than doors of any public corridor or corridor serving classrooms or patients' bedrooms, shall have a flame-spread rating of not more than 75, or at least 90 per cent of the surface of the upper half of such wall shall have a flame-spread rating of not more than 25.

3.3.1.12.(1) Unless permitted otherwise, a guard at least 42 in. in height shall be provided,

Guards

- (a) around each roof to which access is provided for other than maintenance;
- (b) at openings into smoke shafts described in Subsection 3.2.6, that are less than 42 in. above the floor; and
- (c) at each raised floor, mezzanine, balcony, gallery, window well, bridge, exterior passageway, and other locations where the difference in elevations is greater than 24 in.

(2) Except as provided in Sentence 3.3.2.10.(4) the size of any opening through every required guard serving a room or space to which the public is admitted or serving an exterior balcony shall be such a size as to prevent the passage of a spherical object having a diameter of 4 in. unless it can be shown that the location and size of openings that exceed this limit do not present a hazardous condition.

(3) Guards shall be designed so that no member, attachment or opening located between the floor and 36 in. above the floor will facilitate climbing.

3.3.1.13.(1) Every glass or transparent door accessible to the public shall be designed and constructed so that the existence and position of such door is readily apparent by attaching thereto non-transparent hardware, bars or other permanent fixtures, and when constructed of glass shall be constructed of wired glass or safety glass conforming to Subsection 9.6.5.

Transparent
doorways
and panels

(2) Transparent panels used in access to exits which because of their physical configuration or design could be mistaken for doors shall be made inaccessible to the occupants by a guard, barrier or railing at least 42 in. above the adjacent floor.

(3) Glass in doors and side lights that could be mistaken for doors within or at the entrances to dwelling units shall conform to Subsection 9.6.5.

Subsection 3.3.2. Assembly Occupancy**Scope**

3.3.2.1. This Subsection applies to floor areas or parts thereof used or intended for use as assembly occupancies.

Fire separations required

3.3.2.2.(1) Except as otherwise provided in this Subsection, different occupancies of the same occupancy classification, any one of which has an occupant load exceeding 200 persons, shall be separated from each other by a fire separation having a fire-resistance rating at least equal to that required in Subsection 3.2.2. for the floor assembly on which they are located except that such fire separation shall have a fire-resistance rating of at least $\frac{3}{4}$ -hr and need not have a fire-resistance rating greater than 1-hr.

(2) Where usable space exists under tiers of seats in arena-type buildings, a $\frac{3}{4}$ -hr fire separation shall be provided between such space and the seats or the space shall be sprinklered.

(3) An assembly occupancy shall be separated from a garage by a fire separation conforming to Article 3.3.7.7.

(4) Hazardous areas in schools, such as home economics rooms, art rooms involving hazardous processes, laboratories, laboratory storage rooms, any room which is supplied with gas for instructional or research purposes, and kitchens other than small domestic or pantry-type kitchens, shall be provided with an enclosure constructed as a fire separation and having a 1-hr fire-resistance rating.

(5) Two or more related hazardous teaching areas in Sentence (4) may be enclosed as one unit where permitted.

Flame-spread rating

3.3.2.3.(1) Except as provided in Sentences (2), (3) and (4), interior finish materials used on the wall or ceiling of a room or space intended for assembly purposes shall have a flame-spread rating of not more than 150.

(2) In Group A, Division 1 occupancies at least 90 per cent of the aggregate area of walls and ceilings shall have a flame-spread rating of not more than 25.

(3) Except where the floor area is sprinklered, Group A, Division 2 occupancies having a high occupant load shall have a flame-spread rating of not more than 75 over at least 90 per cent of the area of,

- (a) ceilings; and
- (b) walls where the occupant load exceeds 200 persons.

(4) The requirements of Sentences (2) and (3) shall not apply to doors or the exposed surfaces of heavy timber construction.

Fixed seats

3.3.2.4.(1) Except for bench-type seats as provided in Articles 3.3.2.6. and 3.3.2.8., in places of assembly with fixed seats such seats shall be,

- (a) attached or secured to the floor, platform or platform riser;
- (b) provided with arms and back; and
- (c) arranged in rows having an unobstructed passage of at least 16 in. measured horizontally between plumb lines from the backs of the seats in one row and the edges of the farthest forward projection of the seats in the next row in the unoccupied position.

(2) Aisles on the main floor and in balconies and galleries shall be located so that there are not more than 7 seats between any seat and the nearest aisle except where,

- (a) a door or doorway leading directly to an access to exit is provided for every three rows of seats, in which case such doors or doorways need not be provided with exit signs;
- (b) every third row of seats terminates at the side walls; and
- (c) the number of seats in a row does not exceed 100.

(3) Seating arrangements that do not conform to the requirements of Sentence (2) may be permitted provided the standard of safety is not reduced and the time required for egress is not increased.

3.3.2.5.(1) Except as required in Articles 3.3.2.6. and 3.3.2.8., aisles leading to exits shall be provided in places of assembly which contain fixed seats in conformance with Sentences (2) to (10).

Aisles

(2) The minimum clear width of aisles shall be not less than 44 in. except that the width may be reduced to not less than,

- (a) 30 in. when serving 60 seats or fewer; and
- (b) 36 in. when serving seats on 1 side only.

(3) Except in the case of bleacher seats, the minimum clear width of aisles referred to in Sentence (2) shall be measured at the point farthest from an exit, cross aisle or foyer and shall be increased in width $1\frac{1}{2}$ in. for each 5 ft length toward the exit, cross aisle or foyer.

(4) Aisles shall terminate in a cross aisle, foyer or exit and the width of such cross aisle, foyer or exit shall be at least the required width of the widest aisle plus 50 per cent of the total required width of the remaining aisles that it serves.

(5) Dead-end aisles shall be not more than 20 ft in length.

(6) The length of travel to an exit door by any aisle shall not be longer than 150 ft.

(7) Side aisles shall be at least 44 in. wide when seating is provided in conformance with Clauses 3.3.2.4.(2)(a) to (c).

(8) The floor of every aisle shall have a gradient of not more than 1 to 8.

(9) Steps shall not be placed in any aisle unless the gradient would exceed 1 to 8 and such steps shall conform to the following requirements,

- (a) the walkway between rows of seats shall be level at right angles to the line of travel;
- (b) the riser height shall be at least $4\frac{1}{2}$ in.
- (c) the riser height shall not exceed 8 in. where not more than one riser is used between adjacent seating platforms and shall not exceed $7\frac{3}{4}$ in. where more than one riser is issued;
- (d) where variations in riser height occur,

- (i) the heights of adjacent risers shall not vary more than $\frac{1}{4}$ in., and

- (ii) treads or any part of a platform shall extend at least 17 in. ;
 - (e) the width of stair treads between platforms shall conform to Article 3.4.8.9. ;
 - (f) aisle platforms where they extend at least 17 in. in the direction of exit travel may slope $\frac{1}{4}$ in. in 12 in. ;
 - (g) an unobstructed platform at least 32 in. square shall be provided adjacent to an aisle where a step is used at the entry to a row of seats ; and
 - (h) every step shall be marked with a permanent stripe of contrasting colour.
- (10) Aisles shall be provided with minimum lighting at all times.

3.3.2.6.(1) Corridors used by the public in assembly occupancies or serving classrooms as access to exits shall,

- (a) be separated from the remainder of the building by a fire separation having a fire-resistance rating of not less than 1-hr, except that,
 - (i) the fire-resistance rating need not be greater than $\frac{3}{4}$ -hr where the floor assembly is permitted to have a $\frac{3}{4}$ -hr fire-resistance rating, and
 - (ii) no fire-resistance rating is required if the floor area is sprinklered ;
- (b) be equipped with emergency lighting conforming to the requirements in Subsection 3.2.8. ; and
- (c) have surface finishes with a flame-spread rating conforming to the requirements in Articles 3.3.1.11. for public corridors.

3.3.2.7. A door between a corridor and adjacent classrooms providing access to exit from the classrooms need not be equipped with a self-closing device where the building does not fall within the scope of Subsection 3.2.6.

3.3.2.8. Access to exit from a room or suite of rooms of assembly occupancy shall not be through a dead end corridor unless that is a second and separate egress doorway from the room or suite of rooms not leading into the dead end corridor.

3.3.2.9.(1) Where fixed bench-type seats without arms are provided, the seat width per person shall be assumed to be 18 in.

(2) The centre-to-centre spacing between rows of bench-type seats shall be at least 30 in. where back rests are provided and at least 22 in. where back rests are not provided.

(3) There shall be a space of at least 12 in. between the back of each seat and the front of the seat immediately behind it.

(4) Aisles shall be located so that there are not more than 7 seats with backs or 20 seats without backs between every seat and the nearest aisle.

(5) Every aisle serving bench-type seats shall be at least 44 in. wide at the narrowest point and shall be uniformly increased in width as it approaches an exit in accordance with Articles 3.4.3.2. and 3.4.3.3.

(6) Steps shall not be placed in any aisle unless the gradient would exceed 1 to 8 and such steps need not have handrails when the adjacent seating is on the same level.

Fixed
bench-type
seats without
arms

(7) Seating arrangements that do not conform to the requirements in this Article may be permitted provided the standard of safety is not reduced and the time required for egress is not increased.

3.3.2.10.(1) Except as required in Sentences (2) and (4) for bleacher seats, guards shall be installed in outdoor and indoor places of assembly with fixed seats so that,

- (a) at the fascia of every box, balcony or gallery where the seats extend to the edge, the height of guards is at least 30 in. in front of the seats and at least 36 in. when located at the end of aisles or at the foot of steps;
- (b) the height of guards along every cross aisle other than those adjacent to the fascia of every box, balcony or gallery is at least 26 in. except that such guards need not be provided where the backs of the seats along the front side of the aisle are at least 24 in. above the floor of the aisle; and
- (c) where the seating is arranged in successive tiers and the height of rise between platforms exceeds 18 in., the height of guards is at least 26 in. along the entire row of seats at the edge of the platform.

(2) The back and ends of bleacher seats more than 4 ft above the ground or floor that are not adjacent to a wall shall be protected with a guard,

- (a) at least 42 in. in height above an adjacent aisle surface or foot rest; and
- (b) at least 36 in. in height above the centre of an adjacent seat board.

(3) If the front of a bleacher is more than 2 ft above the ground or floor, it shall be protected with a guard at least 33 in. in height above the front foot rest.

(4) The size of any opening in a guard required in Sentences (2) and (3) shall be such as to prevent the passage of a spherical object more than 12 in. in size.

3.3.2.11.(1) Any Group A, Division 4 occupancy and each tier or balcony thereof that has a capacity of more than,

Outdoor
places of
assembly

- (a) 1,000 persons shall have at least three separate exits; or
- (b) 4,000 persons shall have at least four separate exits.

(2) In every Group A, Division 4 occupancy, every seat shall be located so that the travel distance does not exceed 150 ft measured along the path of travel from the seat to,

- (a) the ground;
- (b) an exit;
- (c) an opening to a passageway leading from the seating area; or
- (d) an opening through the seating deck structure such as a portal or vomitory.

(3) Exits from outdoor stadia or grandstands shall be located not more than 75 ft apart.

(4) The capacity of means of egress for Group A, Division 4 occupancies shall be computed on the basis of one unit of exit width for each 100 persons except that where there is easy access to an open place of refuge, such as a playing field, the aggregate width may be determined on the basis of one unit of exit width for each 500 persons.

(5) Aisles in Group A, Division 4 occupancies,

- (a) shall be located so that there are not less than 20 seats between any seat and the nearest aisle;
- (b) shall be at least 44 in. in width except that an aisle serving fewer than 60 persons may be 30 in. in width; and
- (c) shall not have steps unless the gradient of the aisle would exceed 1 to 8.

(6) Except as provided in Sentences (7) and (8), where steps are provided in aisles, such steps shall,

- (a) extend the full width of the aisles;
- (b) have risers not exceeding 9 in. in height; and
- (c) have treads with a run of at least 10 in.

(7) Where steps are provided in aisles of bleachers of the telescopic type, such steps shall,

- (a) have risers not exceeding 10 in.; and
- (b) have treads with a run of at least 11 in.

(8) When the vertical distance between seating platforms in bleachers exceeds 11 in. an intermediate step shall be provided the full width of the aisle, and proportioned to provide 2 equal risers between platforms, and when the vertical distance between seating platforms exceeds 18 in. 2 intermediate steps shall be provided the full width of the aisle so that there are 3 equal risers between platforms.

(9) Where the passageway between rows of seats is not a closed deck, footboards shall be provided so that,

- (a) the total width of the foot boards shall be not less than $\frac{3}{4}$ of the centre-to-centre spacing between rows of seats; and
- (b) the spacing between footboard members shall not exceed 1 in.

Libraries

3.3.2.12.(1) Where a book storage room in a library exceeds 2,500 sq ft in area or where the book stacks exceed 30 ft in height or penetrate more than 1 storey,

- (a) the book storage room shall be separated from the remainder of the building by a 2-hr fire separation; or
- (b) the building shall be sprinklered.

(2) Open book shelves are permitted above and below a mezzanine floor in a library building provided the height of such book shelves is not more than 7 ft or 75 per cent of the floor to ceiling height of the space above or below the mezzanine floor assembly.

Bowling
alleys

3.3.2.13.(1) Any portion of a building in which three or more bowling lanes are located shall be separated from other occupancies by at least 1-hr fire separation.

(2) Subsidiary occupancies such as offices, cocktail lounges and lunch counters operated in connection with 3 or more bowling lanes shall be separated by at least 1-hr fire separation where the combined area of these subsidiary occupancies exceeds 1,500 sq ft.

3.3.2.14.(1) Structural members supporting the floor of any stage for theatrical performance shall be of noncombustible construction unless the building is permitted to be of combustible construction.

Stages for
theatrical
performances

(2) Stages for theatrical performance and ancillary spaces, such as workshops, dressing rooms and storage areas, shall be sprinklered.

(3) A 1-hr fire separation shall be provided between every stage for theatrical performances and ancillary space, such as workshops, dressing rooms and storage areas.

(4) Every stage for theatrical performances and ancillary spaces, such as work, storage and dressing rooms, shall be separated from the audience space by a 1-hr fire separation except for a proscenium opening which shall be protected with an,

- (a) unframed asbestos fire curtain when the opening does not exceed 60 ft in width; and
- (b) semi-rigid asbestos fire curtain when the opening is more than 60 ft in width.

(5) Every asbestos curtain as required by Sentence (4) shall be,

- (a) operated automatically by heat actuated devices and operated manually by remote control devices, one on the stage control panel and one on each side of the stage; and
- (b) designed to close automatically upon the actuation of the sprinkler system.

(6) At least two vents for the purpose of venting fire and smoke to the outside of a building shall be provided above every stage designed for theatrical performance and shall,

- (a) have an aggregate area of at least one eighth of the area of the stage behind the proscenium opening; and
- (b) be arranged to open automatically by means of,
 - (i) heat actuated devices, or
 - (ii) actuation of the sprinkler system.

(7) Where any requirement of Sentences (1) to (6) is incompatible with the function of a stage, other fire safety measures may be substituted provided the standard of safety is not reduced.

3.3.2.15.(1) This Article does not apply to portable motion pictures projectors.

Motion
picture
projection
rooms

(2) Except as provided in Sentence (1), every motion picture projector, together with all associated electrical devices, shall be operated within a projection room separated from the remainder of the building by a fire separation having a fire-resistance rating of at least 1-hr.

(3) A clear space of at least 30 in. shall be provided behind projection equipment in every projection room.

(4) Every projection room shall have at least two doorways with dimensions at least 30 in. in width and 6 ft 8 in. in height and such doorways shall be separated by at least one third of the perimeter of the room and shall lead to an access to exit.

(5) Doors installed in projection rooms shall be equipped with self-closing devices and shall open outward.

(6) Every projection room shall be equipped with exhaust ventilation of sufficient capacity to provide 20 air changes per hr. and shall be designed in conformance with Sentence 6.2.3.1.(2).

(7) Every shelf, fixture and major item of fixed equipment in a projection room shall be constructed of noncombustible materials.

3.3.2.16. Where an arena-type building intended for occasional use for trade shows and similar exhibition purposes exceeds 15,000 sq ft in building area, the building shall be sprinklered.

Subsection 3.3.3. Institutional Occupancy

Scope

3.3.3.1. This Subsection applies to floor areas or parts thereof used or intended for use as institutional occupancies.

3.3.3.2.(1) Except for sleeping rooms and patients' bedrooms within a suite, sleeping rooms and patients' bedrooms shall be separated from adjacent rooms or suites by a fire separation having a fire-resistance rating of at least 1-hr, except that the fire-resistance rating need not be greater than $\frac{3}{4}$ -hr where the floor assembly is not required to exceed a $\frac{3}{4}$ -hr fire-resistance rating.

(2) Except for corridors within a suite, corridors used by the public or serving patients' bedrooms or sleeping rooms shall,

- (a) be separated from the adjacent rooms or suites by a fire separation having a fire-resistance rating as required in Sentence(1);
- (b) be equipped with emergency lighting conforming to the requirements in Subsection 3.2.8.; and
- (c) have surface finishes with a flame-spread rating conforming to the requirements of Article 3.3.1.11. for public corridors.

(3) Special patient areas, such as intensive and coronary care units and operating areas shall be separated from the remainder of the building by a fire separation having a fire-resistance rating of at least 1-hr with closure assemblies having at least a $\frac{3}{4}$ -hr fire-resistance rating and such closures shall be weather-stripped or otherwise designed and installed to retard the passage of smoke.

(4) Access to exit from a room or suite may be by a dead end corridor provided the room or suite has a second and separate egress doorway not leading into the dead end corridor.

3.3.3.3. The fire separation required between an institutional occupancy and a repair garage shall have no openings.

Flame-spread
rating

3.3.3.4. Except for doors, at least 90 per cent of the aggregate area of the interior finish of walls or ceilings shall have a flame-spread rating of not more than 75, and in no case shall the interior finish of walls or ceilings have a flame-spread rating greater than 150.

Separated
zones in
floor areas

3.3.3.5.(1) Every floor area used or intended to be used for patients in bed or infirm persons shall be divided into two or more zones separated by a fire separation in such a manner that the occupants in every zone have access to two exits either directly or through adjacent zones.

(2) Fire separation between zones shall have a fire-resistance rating of at least 1-hr except that a $\frac{3}{4}$ -hr fire separation is permitted where the fire-resistance rating of the floor assembly is not required to exceed $\frac{3}{4}$ -hr.

(3) Doors acting as closures in fire separations between zones shall be weather-stripped or otherwise designed and installed to retard the passage of smoke.

(4) Every zone shall accommodate, in addition to its own occupants, the occupants of the largest adjacent zone in a floor area determined by the requirement for horizontal exits in Article 3.4.8.12.

(5) The travel distance from any point in a corridor described in 3.3.3.2.(2) to an adjacent zone shall not exceed 100 ft.

3.3.3.6. The requirements of Subsection 3.2.6. shall apply to a building containing a floor area located above the third storey used or intended to be used for patients in bed or infirm persons.

Special
requirements

3.3.3.7.(1) Every corridor in which it is necessary to turn beds shall be at least 96 in. wide.

Corridors

(2) Paired doors in corridors shall,

(a) swing in opposite directions, the right-hand door swinging in the direction of travel; and

(b) be at least 44 in. wide and 7ft high, to permit movement of beds.

(3) Where rooms are used or intended to be used for patients in bed who are non-ambulatory, the doors into corridors shall have a clear width of 44 in.

3.3.3.8. In addition to the requirements of this Subsection, hazardous conditions in hospital operating rooms shall be safeguarded in conformance with the requirements of Part. 6.

Operating
room
hazards

Subsection 3.3.4. Residential Occupancy

3.3.4.1. This Subsection applies to floor areas or parts thereof used or intended for use as residential occupancies.

Scope

3.3.4.2.(1) Except as provided in Sentence (2), sleeping rooms occupied separately and not as suites, and suites or dwelling units in hotels and other residential buildings, shall be separated from adjacent rooms, suites and public corridors by a fire separation having a fire-resistance rating of at least 1-hr, except that a $\frac{3}{4}$ -hr fire-resistance rating is permitted if the floor assembly is not required to exceed $\frac{3}{4}$ -hr fire-resistance rating.

(2) Floors need not be constructed as a fire separation in dwelling units containing more than 1 storey provided that each such dwelling unit is separated from the remainder of the building by,

(a) a 1-hr fire separation when contained within a building 3 storeys or less in building height; or

(b) a 2-hr fire separation when contained within a building exceeding 3 storeys in building height.

(3) Except as provided in Sentence (4), self-closing devices need not be installed on doors provided as closures in fire separations described in Sentences (1) and (2).

(4) Doors between public corridors and individually rented rooms or suites of rooms or dwelling units in buildings of Group C occupancy regulated by Subsection 3.2.6., and doors in dead end public corridors described in Article 3.3.4.5. shall be provided with self-closing devices and self-latching devices.

(5) A door opening onto a public corridor which provides access to exit from individually rented rooms, suites of rooms or dwelling units shall be designed not to lock automatically when such doors are equipped with automatic self-closing devices described in Sentence (4).

(6) Trunk rooms and storage rooms in residential occupancies not forming part of an individual dwelling unit or sleeping room occupied separately and not as a suite shall be sprinklered and separated from the remainder of the building by a 1-hr fire separation, except that a $\frac{3}{4}$ -hr fire separation is permitted where the fire-resistance rating of the floor assembly is not required to exceed $\frac{3}{4}$ -hr.

(7) RESERVED

(8) RESERVED

3.3.4.3.(1) In buildings of residential occupancy and not more than 3 storeys in building height, a doorway from a dwelling unit is permitted to open directly into an exit stairway provided such dwelling unit has a second and separate means of egress.

(2) A doorway from a dwelling unit may open onto an interior corridor served by a single exit, or an exterior balcony served by a single exit stairway, or an exterior passageway served by a single exit stairway provided that the dwelling unit has access to a second and separate exit.

Flame-spread
rating

3.3.4.4. Interior finish material used on the wall or ceiling of every room or space used or intended to be used for residential occupancy shall have a flame-spread rating of not more than 150.

3.3.4.5. Except for corridors served by a single exit as described in Sentence 3.3.4.3.(2), a dead-end public corridor is permitted only if it does not exceed 20 ft in length, measured from the end of the corridor to the nearest exit and such dead-end corridors shall contain no door openings except entrance doors to individually rented rooms, suites of rooms or dwelling units, located so that it is not necessary to pass more than 2 doors in travelling to the nearest exit.

Partitions
within
dwelling units

3.3.4.6.(1) Wood frame partitions covered on both sides with noncombustible material may be used within dwelling units in any building or part thereof classified as Group C occupancy which is required to be of noncombustible construction.

(2) In every building of Group C occupancy required to be of noncombustible construction, lockers of combustible construction within storage rooms or trunk rooms shared by more than one tenant are permitted provided,

- (a) the rooms are sprinklered;
- (b) the lockers are constructed of wood cladding not larger than 1 in. by 3 in. nominal alternatively spaced to provide a wall with 50% openings;
- (c) the lockers are not constructed in tiers, and
- (d) construction of the lockers from 18 in. below the sprinkler head upwards is to consist of wire mesh walls to prevent obstruction to the sprinklers by stored materials and within the locker, a ceiling of wire mesh shall be provided at least 18 in. below the sprinkler heads.

3.3.4.7. Walls and floors of sleeping rooms occupied separately and not as suites and suites or dwelling units shall be designed and constructed to restrict airborne sound transmission in conformance with Section 9.11.

3.3.4.8. RESERVED

Number of
egress
doorways

3.3.4.9.(1) Except as permitted in Sentence (2), an egress doorway conforming to Article 3.3.1.3. shall be provided on each storey of a dwelling unit.

(2) An egress doorway is not required from each storey of a dwelling unit,

- (a) having not more than one storey above the first storey of the building, and provided the exit is an exterior doorway located at or near ground level;

- (b) having not more than 2 storeys above the first storey of the building and provided,
 - (i) a products of combustion detector and alarm, which may be of the single station alarm type, is installed at the uppermost storey of the dwelling unit in conformance with Sentence (3), or
 - (ii) an egress doorway is provided from the uppermost storey and the lowest storey of the dwelling unit; or
 - (c) where a products of combustion detector and alarm is installed on each storey of the dwelling unit in conformance with Sentences (3) and (4), provided it is possible to reach an egress doorway within 60 ft from any point in the dwelling unit without travelling through more than one other storey.
- (3) Where products of combustion detectors and alarms referred to in Clauses (2) (b) and (c) are used, the alarms shall be audible within the bedrooms when intervening doors are closed, and the detectors installed on the ceiling in a location or locations,
- (a) outside of bedrooms or sleeping areas where located in a storey containing such rooms or areas; and
 - (b) in the living areas when located in a storey containing such areas.
- (4) The products of combustion detectors and alarms referred to in Clause (2) (b) and (c), shall be connected to the building electrical supply without a disconnect wall switch and be permanently mounted to a standard electrical outlet or junction box.

Subsection 3.3.5. Business and Personal Services Occupancy

3.3.5.1. The Subsection applies to floor areas or parts thereof used or intended for use as business and personal services occupancies. Scope

3.3.5.2.(1) In every building required to be of noncombustible construction, partitions of combustible construction as described in Sentence (2) may be used within floor areas used or intended to be used for a business and personal services occupancy, Partitions

- (a) where the floor area is sprinklered; or
 - (b) within spaces having an area not more than 5,000 sq ft where such spaces are separated from the remainder of the floor area by at least a 1-hr fire separation of noncombustible construction.
- (2) Partitions of combustible construction referred to in Sentence (1) shall be limited to,
- (a) wood studs covered on both sides by noncombustible cladding, or fire-retardant treated wood having a flame-spread rating of not more than 25;
 - (b) solid wood;
 - (c) glass; or
 - (d) a combination of construction described in Clauses (a), (b) and (c).

3.3.5.3. Interior finish material used on the wall or ceiling of every room or space used or intended to be used for business and personal services occupancy shall have a flame-spread rating of not more than 150. Flame-spread rating

3.3.5.4. Except as provided in Clause 3.3.5.5.(1) (c), a door between a public corridor and adjacent rooms of Group D occupancy need not be equipped with a self-closing device where the building does not fall within the scope of Subsection 3.2.6.

3.3.5.5.(1) Dead-end public corridors are permitted in Group D occupancies provided,

- (a) the occupant load served by the dead-end does not exceed 30 persons;
- (b) door openings other than entrance doors to individually rented rooms or suites are not located in the dead-end portion that serves as access to exit;
- (c) the travel distance from the most remote point of the dead-end portion to the nearest exit does not exceed 30 ft in length;
- (d) the doors in the dead-end portion are located so that it is not necessary to pass more than 2 doors in travelling to the nearest exit; and
- (e) the doors in the dead-end portion are equipped with self-closing devices, and designed not to lock automatically.

Subsection 3.3.6. Mercantile Occupancy

Scope 3.3.6.1. This Subsection applies to floor areas or parts thereof used or intended for use as mercantile occupancies.

Partitions 3.3.6.2.(1) In every building required to be of noncombustible construction, partitions of combustible construction as described in Sentence (2) may be used within floor areas intended for a mercantile occupancy,

- (a) where the floor area is sprinklered; or
- (b) where a floor area comprising a single tenancy does not exceed 5,000 sq ft and is enclosed by a 1-hr fire separation of noncombustible construction.

(2) Partitions of combustible construction referred to in Sentence (1) shall be limited to,

- (a) wood studs covered on both sides by noncombustible cladding or fire-retardant treated wood having a flame-spread rating of not more than 25;
- (b) solid wood;
- (c) glass; or
- (d) a combination of construction described in Clauses (a), (b) and (c).

Exterior wall openings 3.3.6.3. Where any storey of a building classified as a Group E major occupancy is required to be separated from the storey above or below by a fire separation, openings in an exterior wall located vertically one above the other shall be separated by an apron or spandrel wall at least 3 ft in height or by a canopy projecting at least 3 ft from the exterior wall for a length at least equal to the length of the openings at each floor level and such apron, spandrel or canopy shall have a fire-resistance rating equivalent to the construction required for the floor assembly and need not be greater than 1-hr except as required in Subsection 3.2.3.

Flame-spread rating 3.3.6.4. Interior finish material used on the wall or ceiling of every room or space used or intended to be used for mercantile occupancy shall have a flame-spread rating of not more than 150.

Subsection 3.3.7. Industrial Occupancy

Scope 3.3.7.1. This Subsection applies to floor areas or parts thereof used or intended for use as industrial occupancies.

Fire separations 3.3.7.2.(1) Except in Group F, Division 1 major occupancies, every process room where hazardous substances are used or intended to be used shall be separated from the remainder of the building by a 2-hr fire separation unless fire extinguishing equipment in accordance with the National Fire Code of Canada 1963, as revised to 1 May, 1975, is installed.

(2) A tenant occupied space of either Group F, Division 1 or Division 2 Occupancy shall be separated from other tenant occupied spaces of the same occupancy classification on the same floor area by a 1-hr fire separation except that a $\frac{3}{4}$ -hr fire separation is permitted where the fire-resistance rating of the floor assembly is not required to exceed $\frac{3}{4}$ -hr.

3.3.7.3. In a Group F, Division 1 major occupancy every floor area shall be equipped with fire extinguishing equipment in accordance with the National Fire Code of Canada, 1963, as revised to 1 May, 1975.

Fire
extinguishing
equipment
for Group F
Division 1

3.3.7.4.(1) Basements or cellars shall not be used for the storage, manufacture or handling of volatile solids, liquids or gases that generate explosive air-vapour mixtures or for purposes that involve explosive dusts.

Spaces below
grade

(2) Entrances and exits to basements, cellars and rooms containing building services in buildings involving the storage, manufacture or handling of volatile materials that generate explosive air-vapour mixtures or processes that produce explosive dusts shall be separated from the other parts of the building and such basements, cellars and rooms shall be separated from other parts of the building with a vapour-tight separation.

3.3.7.5. Where any storey of a building classified as a Group F, Division 1 or 2 major occupancy is required to be separated from the storey above or below by a fire separation, every opening in an exterior wall located vertically above another opening shall be separated by an apron or spandrel wall at least 3 ft in height or by a canopy projecting at least 3 ft from the exterior wall for a length of at least equal to the length of the openings at each floor level and such apron, spandrel or canopy shall have a fire-resistance rating equivalent to the construction required for the floor assembly and need not be greater than 1-hr except as required in Subsection 3.2.3.

Exterior wall
openings

3.3.7.6. Interior finish material used on the wall or ceiling of every room or space used or intended to be used for industrial occupancy shall have a flame-spread rating of not more than 150.

Flame-spread
rating

3.3.7.7.(1) Where access is provided from a storage garage to a stair tower or elevator lobby serving occupancies above the level of a storage garage, such access shall be through a vestibule conforming to Sentence (15).

Garages

(2) Stairways extending to the roof of a storage garage shall be protected from ice and snow.

(3) Mechanical storage garages of not more than 4 storeys in building height, where no persons other than parking attendants are permitted above the street floor level, need not have a fire separation between the exits and the remainder of the building.

(4) Every garage shall be provided with natural or mechanical ventilation in conformance with Subsection 3.6.3. to prevent excessive accumulation of carbon monoxide, exhaust fumes or flammable and toxic vapours.

(5) The clear storey height of every storage garage shall be at least 6 ft 6 in.

(6) A continuous curb at least 6 in. in height, and a guard at least 42 in. in height shall be provided at every garage floor opening and around the perimeter of every floor where the exterior walls are omitted.

(7) RESERVED

(8) RESERVED

(9) Only two exits located remote from each other need be provided in storage garages conforming to Article 3.2.2.50. provided persons other than parking attendants are not permitted above the street floor level.

(10) Except for a basement in which the floor level is not more than 3 ft below grade and in which 25% or more of the area of the perimeter is open to the outdoors, every storey of a storage garage or repair garage located below grade shall be sprinklered.

(11) A repair garage shall be separated from other occupancies by at least a 2-hr fire separation and in such fire separation,

- (a) openings shall not be permitted in the fire separation between a repair garage and a Group A, B or C occupancy; and
- (b) openings shall be permitted in the fire separation between a repair garage and a Group E occupancy only when both occupancies are sprinklered.

Storage
garages

(12) A storage garage shall be separated from other occupancies by at least a 1½-hr fire separation.

Vestibule
required

(13) Where access is provided through a fire separation between a storage garage and a Group A, Division 1 of Group B occupancy such access shall be through a vestibule conforming to Sentence (15).

(14) In buildings exceeding 3 storeys in building height where access is provided through a fire separation between a storage garage and a Group A, Division 2, 3, or 4, or a Group C occupancy, such access shall be through a vestibule conforming to Sentence (15).

Vestibule
requirements

(15) Where access is provided through a vestibule as required in Sentences (1), (13) and (14), the vestibule shall,

- (a) be at least 6 ft in length;
- (b) be naturally ventilated to outside air, mechanically ventilated at the rate required in Article 3.6.3.4., or pressurized to prevent noxious gases from the garage entering the adjoining occupancies; and
- (c) have the openings between the vestibule and an adjoining occupancy provided with self-closing doors having no hold-open devices.

3.3.7.8. RESERVED

Openings
permitted for
manufacturing
operations

3.3.7.9. Where unprotected openings are necessary in fire separations because of the nature of a manufacturing process, such as an unbroken flow of material from storey to storey, the omission of closures for such openings is permitted provided special precautions to offset the hazard of the unprotected opening are taken.

3.3.7.10. Rooms or spaces involving the use of explosive substances shall be ventilated in conformance with Article 3.6.3.3.

3.3.7.11.(1) Access to exit from a room or suite of rooms containing an industrial occupancy with an occupant load of more than 30 persons or a high hazard industrial occupancy shall not be through a dead-end corridor unless there is a second and separate egress doorway not leading into the dead-end corridor.

(2) Where access to exit from a room or suite of rooms is permitted in Sentence (1) to be by a dead-end corridor, the travel distance from the most remote point of the dead-end to the nearest exit shall not exceed 30 ft in length.

SECTION 3.4. REQUIREMENTS FOR EXITS

Subsection 3.4.1. General Requirements

Scope

3.4.1.1.(1) Exit facilities complying with this Section shall be provided to a public thoroughfare or to a suitable open space with access to a public thoroughfare from every floor area which is intended for occupancy.

(2) Where more than one exit is required from a floor area each exit shall be separate from every other exit leading from that floor area.

(3) Access to exits shall conform to Section 3.3.

(4) Doorways, passageways, ramps and stairways through which the public is normally admitted and which are in addition to required exits shall conform to the requirements of this Section.

3.4.1.2. RESERVED

3.4.1.3. Subject to the requirements of this Section, an exit from any floor area shall be one of the following used singly or in combination: Types of exits

escalator that is capable of moving only in the direction of exit travel,
exterior doorway,
exterior passageway,
exterior ramp,
exterior stairway,
fire escape,
horizontal exit,
interior passageway,
interior ramp,
interior stairway, or
moving walkway that is capable of moving only in the direction of exit travel.

3.4.1.4.(1) A horizontal exit shall not be permitted as a required exit from a room or floor area having a high occupant load. Restricted
use of exits

(2) Horizontal exits shall not comprise more than one half of the required number of exits from any floor area.

(3) A fire escape shall not be erected on any new building.

(4) A fire escape shall not be erected on an existing building unless it can be demonstrated that it is impractical to provide one or more of the exit facilities required by Article 3.4.1.3. and provided that such fire escapes serve floor areas not more than,

(a) 2 storeys above the finished ground level in Group B occupancies; and

(b) 5 storeys above the finished ground level in all other occupancies.

(5) A slide escape shall not be erected on any building as a required exit, but may be provided as an additional egress facility where unusual hazards may exist.

(6) No open exterior stairway shall serve as a means of egress for residents above the second floor of a nursing home.

Subsection 3.4.2. Number and Location of Exits from Floor Areas

3.4.2.1.(1) Except as provided in Sentence (2), every floor area and other space as regulated in Sentence 3.4.1.1.(1) shall be served by not fewer than two exits. Minimum
number
required

(2) Floor areas in buildings not exceeding 2 storeys in building height may be served by one exit,

(a) where they are intended for Group A occupancy provided,

(i) the floor area is not intended for more than 60 persons,

(ii) the floor area does not exceed 2,000 sq ft; or

(iii) the travel distance from any point in the floor area, whether subdivided or not to the exit, does not exceed 50 ft; and

(b) where they are intended for Groups C, D, E and F, Division 2 and 3 occupancies provided they conform to Articles 9.9.7.6. and 9.9.9.1.

(3) For the purposes of this Subsection, travel distance means the distance from any point in the floor area to an exit measured along the path of exit travel, except that when a floor area is subdivided into suites of rooms or rooms not within suites and served by a corridor required to provide a fire separation from such adjacent rooms or suites of rooms or by an exterior passageway, the travel distance shall be measured from the door of such rooms or suites to the nearest exit.

Distance
between exits

3.4.2.2.(1) Except where a floor area is divided by a fire separation so that it is necessary to pass through it to travel from one exit to another exit, the least distance between 2 required exits from a floor area shall be,

- (a) one half the maximum diagonal dimension of the floor area, but need not be more than 30 ft for a floor area having a public corridor serving more than 1 tenant; or
- (b) one half the maximum diagonal dimension of the floor area, but not less than 30 ft for all other floor areas.

(2) The minimum distance between exits referred to in Sentence (1) shall be the shortest distance that smoke would have to travel between the required exits, assuming that the smoke will not penetrate an intervening fire separation.

Location
of exits

3.4.2.3.(1) Except as provided in Sentences (2) and (6) and elsewhere in the building code, where more than one exit is required from a floor area, such exits shall be located so that the travel distance to at least one exit shall be not more than,

- (a) 75 ft in any Group F, Division 1 occupancy;
- (b) 150 ft in any sprinklered floor area that contains an occupancy other than Group F, Division 1;
- (c) 125 ft in any Group D occupancy; and
- (d) 100 ft in any other occupancy.

(2) Except for a Group F, Division 1 occupancy, Sentence (1) need not apply if exits are placed along the perimeter of the floor area and are not more than 200 ft apart, measured along the perimeter, provided each main aisle in the floor area leads directly to an exit.

(3) Where more than one exit is required, every exit shall be considered as contributing not more than one half the required units of exit width.

(4) Exits shall be located and arranged so that they are clearly visible or their locations are clearly indicated and they are accessible at all times.

(5) Where an assembly hall or theatre has more than one balcony or gallery, every exit or ramp leading from a balcony or gallery above the first balcony shall be separate from any other stairway and in a separate enclosure.

(6) Contiguous stairs, such as scissor stairs, are deemed to meet the requirements for two separate exits provided,

- (a) each stair is separated from the other by a 2-hr fire separation without openings for doorways, ducts, piping, or other breaches through the separation;
- (b) the requirements of Article 3.4.2.2. are met; and
- (c) the travel distance does not exceed 100 ft.

3.4.2.4. Except as provided in Article 3.3.2.11. for outdoor places of assembly, the number of exits from each floor area in which there is a high occupant load shall conform to Table 3.4.2.A.

TABLE 3.4.2.A.

Forming Part of Article 3.4.2.4.

Total Number of Persons	Minimum Number of Exits Required
61 - 600	2
601 - 1,000	3
over 1,000	4

3.4.2.5.(1) Where a covered mall is designed in conformance with Sentence 3.2.3.13.(1) for the purpose of considering a building to be subdivided into separate buildings, every covered mall shall,

Exits for
covered
malls

- (a) be served by at least two exits located remote from each other so that the travel distance from any point within the covered mall to a mall exit does not exceed 200 ft; and
- (b) have an unobstructed pedestrian travel space at least 12 ft wide, parallel and adjacent to each connected building, and extending to each mall exit.

(2) Exits leading into a covered mall from floor areas of portions of buildings considered separate buildings as described in Sentence 3.2.3.13.(1) shall not comprise more than one half of the required units of exit width from that floor area.

(3) Every required exit from a storey above a floor area adjoining a covered mall shall lead directly to the outdoor where the covered mall is designed in conformance with Sentence 3.2.3.13.(1) for the purpose of considering a building to be subdivided into separate buildings.

(4) Required exits from a covered mall designed in conformance with Sentence 3.2.3.13.(1) for the purpose of considering a building to be subdivided into separate buildings shall not empty into another such covered mall.

Subsection 3.4.3. Width and Height of Exits

3.4.3.1.(1) The aggregate width of required exits shall be at least the value computed in accordance with Articles 3.4.3.2. and 3.4.3.3.

Exit
width

(2) Except as provided in Sentences (3) to (8) and Article 3.4.3.4. and Sentence 3.4.8.16.(7), the clear width of every exit shall be at least 36 in.

(3) The clear width of any corridor used as an exit shall be at least 44 in.

(4) The clear width of any exit serving patients in bed shall be at least 44 in.

(5) The clear width of an exit stair shall be at least 44 in. where the stair serves one or more floor areas having a combined occupant load greater than 100 persons.

(6) Every door leaf in an exit doorway shall be,

- (a) not more than 48 in. in width;
- (b) not less than 24 in. in width where there is more than 1 leaf provided in the width of a doorway; and
- (c) not less than 32 in. in width if there is only 1 leaf provided in the doorway.

(7) The aggregate width of doorways to exit stairways, exit ramps and doorways providing direct access to the outside from a floor area shall be sufficient to provide the number of units of exit width required to serve the floor area from which they lead.

(8) Every doorway leading from exit stairways and exit ramps in the direction of exit travel shall provide at least the number of units of exit width required for exit purposes but shall be not less in width than three quarters of the width of the stairway or ramp it serves.

(9) Except as permitted in Sentence 3.4.3.2.(6), no exit shall decrease in width in the direction of exit travel.

Width based
on occupant
load

3.4.3.2.(1) For the purpose of determining aggregate width of required exits, the occupant load of every room or floor area of the building to be considered shall be determined in conformance with Subsection 3.1.14.

(2) The aggregate width of exits from a room or floor area expressed as units of exit width (22 in.) shall be determined by dividing the occupant load of the room or floor area by the allowable number of persons per unit of exit width specified in Article 3.4.3.3.

(3) In determining the width in units of an individual exit, width of an exit in inches shall be divided by 22; and

(i) where the remainder is less than 12 in. it shall not be considered as contributing to the number of units; or

(ii) where the remainder is 12 in. or more, it shall be considered as contributing $\frac{1}{4}$ unit of exit width in the case of stairs and $\frac{1}{2}$ unit of exit width in the case of other exit facilities.

(4) Except as provided in Sentences (5) and (6), the required units of exit width shall be cumulative where 2 or more exits converge.

(5) Except as provided in Sentence (6), where an exit stair serves 2 or more floor areas one above the other, the required units of exit width are not cumulative.

(6) The required units of exit width for exit stairs that serve 1 or more floor areas containing a high occupant load shall be increased by an amount required for the high occupant load, except that such increase need not extend to more than 5 storeys beneath the storeys with the high occupant load in all buildings except Group C major occupancy apartment buildings within the scope of Subsection 3.2.6., provided that there is free access to those 5 storeys below the high occupant load.

Capacity per
unit of exit
width

3.4.3.3.(1) The aggregate width of required exits shall be computed on the basis of the maximum number of persons per unit of exit width as specified in Sentences (2) to (5).

(2) The number of persons per unit of exit width that shall be assumed in determining exit requirements from floor areas in which people sleep or which are intended for the care of infirm persons is 30.

(3) Except as permitted in Sentences (2) and (4), the number of persons per unit of exit width shall be 90 for exits at ground level.

(4) The number of persons per unit of exit width for outdoor places of assembly shall conform to Sentence 3.3.2.11.(4).

(5) Except as provided in Sentences (2) to (4), the number of persons per unit of exit width shall be 60.

Reduction of
exit width

3.4.3.4.(1) No fixture, turnstile or construction shall project into or be fixed within the required width of any exit except as permitted in Sentences (2) to (5).

(2) Exit doors shall be so hung and arranged that when open they shall neither diminish nor obstruct the required width of the exit by more than 2 in. for each full unit of exit width.

(3) Swinging doors in their swing shall not reduce the clear width of exit stairs or landings to less than 30 in. or reduce the effective width of an exit passageway to less than the minimum required width.

(4) No handrail or stair stringer shall project more than $3\frac{1}{2}$ in. into the required width of an exit.

(5) In places having high occupant load where persons are admitted to the building and allowed to wait until seats become available, special waiting areas shall be provided which shall,

- (a) not encroach on the required exit width;
- (b) be separated from the required means of egress by partitions or guards not less than 42 in. in height; and
- (c) be provided with an aggregate width of exit determined on the basis of Subsection 3.1.14. and Article 3.4.3.3.

3.4.3.5.(1) Except as provided in Sentences (2) to (4), every means of egress shall have a headroom clearance of at least 7 ft.

Headroom
clearance

(2) The headroom clearance for stairways measured vertically above any landing or the nosing of any stair tread shall be at least 6 ft 9 in.

(3) The headroom clearance for doorways shall be at least 6 ft 8 in.

(4) No device such as a door closer shall be installed so as to reduce the headroom clearance of a doorway to less than 6 ft 6 in.

Subsection 3.4.4. Flame-spread Rating for Exits

3.4.4.1.(1) Except as permitted in Sentences (2) and (3), the flame-spread rating of a wall or ceiling in an exit shall not exceed 25.

(2) The flame-spread rating of interior finish for doors, door frames and trim in exits may exceed 25 provided such finish has a flame-spread rating of not more than 150 and does not exceed 10 per cent of the wall or ceiling areas.

(3) The flame-spread rating of the wall finish of a lobby used as an exit as permitted in Sentence 3.4.5.1.(4) may exceed 25 provided such finish has a flame-spread rating of not more than 150 and does not exceed 25 per cent of the wall area.

Subsection 3.4.5. Required Fire Separation for Exits

3.4.5.1.(1) Except as provided in Sentences (2) to (5) and in Sentence 3.3.7.7.(3), every exit shall be separated from the remainder of the building it serves by a fire separation having a fire-resistance rating conforming to Table 3.4.5.A. for the grade of fire separation required for the floor assemblies of the storeys through which it penetrates or which it serves. This requirement shall not be deemed to prohibit unprotected openings in walls of an exit enclosure that are not fire separations.

Grade of
separations

(2) Except for an exterior passageway leading to exit stairs at opposite end of the passageway, where an exit has sides or faces that may be exposed to the hazards of a fire from openings in the exterior wall of the floor area, openings in either the exposed face of the exit or the exterior wall of the floor area shall be protected with wired glass or glass block conforming to Article 3.1.7.3. when the openings in the exterior wall of the floor area are,

- (a) within 10 ft horizontally or;
- (b) less than 3 storeys or 35 ft below; or
- (c) less than 6 ft above any of the exit openings in the exposed face.

TABLE 3.4.5.A.

Forming Part of Sentence 3.4.5.1.(1)

Grade of Fire Separation, Required for Floor Assembly, hr	Minimum Fire-Resistance Rating for Fire Separation of Exit, hr
less than 3/4	3/4
3/4	3/4
1	3/4
1 1/2	1
2	1 1/2
3	2
4	3
Column 1	2

(3) In buildings not exceeding 3 storeys in building height, where the fire separation for exits is permitted to be 3/4-hr. not more than 1 exit shaft may include wired glass or glass block conforming to Article 3.1.7.3. including doors between such shaft and a public corridor or vestibule located within a floor area.

(4) Except as provided in Article 3.4.2.5., and Sentence 3.2.3.17.(11), not more than 1 required exit from any floor area above or below the first floor may lead through a lobby including the foyer or entrance hall of another floor area at ground level when,

- (a) the floor of the lobby, foyer or entrance hall is not more than 15 ft above grade;
- (b) the path of travel through a lobby, foyer or entrance hall does not exceed 50 ft;
- (c) rooms or premises adjacent to the lobby, other than those used for the sole purpose of control or supervision in Group B or C occupancies, are enclosed within a fire separation in conformance with Subsection 3.1.3. except that where the lobby, foyer or entrance hall and the adjacent occupancies are sprinklered, the fire separation between such occupancies and the lobby, foyer or entrance hall need not have a fire-resistance rating;
- (d) the occupancies in the adjacent rooms or premises are not more hazardous than any which could be classified as Group D or Group E occupancies; and
- (e) the lobby, foyer or entrance hall conforms in all respects with the requirements for exits except for Sentences 3.4.5.2.(5) and (6), but in no case shall a garbage room, furnace room, boiler room, incinerator room or janitor's storage closet open directly onto such lobby.

(5) The requirements in Sentence (1) do not apply to an exterior passageway that is designed as an exit facility provided the passageway is open to the outdoors and is served by an exit stair at each end of the passageway.

Integrity of exits

3.4.5.2.(1) Except as may be required by the provisions of Subsection 3.2.6., there shall be no openings in any fire separation separating exits except exit doorways and openings for standpipes.

- (2) RESERVED
- (3) RESERVED

(4) An exit shall not be used as a plenum for heating, ventilating or air-conditioning system.

(5) An exit shall be designed for no purpose other than for exiting, except that an exit may also be designed to serve as an access to a floor area.

(6) Ancillary rooms such as storage rooms, washrooms, toilet rooms, garbage rooms and laundry rooms shall not open directly into an exit.

Subsection 3.4.6. Marking and Signs

3.4.6.1.(1) Every exit door other than the main entrance to a room or building shall have an exit sign placed over it when the exit serves,

- (a) a building exceeding 2 storeys in building height;
- (b) a building having an occupant load greater than 150;
- (c) a room with a high occupant load of more than 60 except as provided in Clause 3.3.2.4.(2)(a);
- (d) a room or floor area that has a fire escape as part of a required means of egress; or
- (e) a corridor exceeding 75 ft in length and serving patients' or inmates' bedrooms in Group B, Division 2 occupancies.

(2) Every exit sign required in Sentence (1) shall,

- (a) be visible from the exit approach;
- (b) have the word EXIT displayed in plain legible letters as described in Sentence (3);
- (c) be designed to be illuminated continuously while the building is occupied;
- (d) be connected to an electrical circuit separate from other electrical circuits; and
- (e) be designed to be illuminated by an emergency power supply as described in Sentence 3.2.8.2.(2) where emergency lighting is required in Sentence 3.2.8.2.(1).

(3) Lettering on exit signs shall be,

- (a) red letters on a contrasting background or white letters on a red background, at least 4½ in. high with ¾-in. stroke spelling EXIT, when the sign is internally illuminated;
- (b) white letters on a red background or red letters on a white background at least 6 in. in height with ¾-in. stroke spelling EXIT, when the sign is externally illuminated; and
- (c) placed on an opaque field.

(4) Where necessary, signs shall be provided to indicate the direction of egress in public corridors and passageways, and shall have the word EXIT with a suitable arrow or pointer indicating the direction of egress, and the size of lettering shall conform to Sentence (3).

(5) No mirrors shall be placed in or adjacent to any exit in such a manner as to confuse the direction of exit.

(6) Every glass or transparent exit door accessible to the public shall be designed and constructed so that the existence and position of such door is readily apparent by attaching thereto non-transparent hardware, bars or other permanent fixtures and when constructed of glass shall be constructed of safety glass of the laminated or tempered type conforming to CGSB 12-GP-1c (1973), "Glass, Safety, Tempered or Laminated, for Building Construction," as revised to 1 May, 1975, or shall be wired glass.

(7) Transparent panels, sidelights or windows used in exits which, because of their physical configuration or design, could be mistaken for doors, shall be made inaccessible to the occupants by barriers or railings.

(8) Glass in doors and sidelights greater than 18 in. in width that could be mistaken for doors within or at the entrances to dwelling units and which extend to less than 12 in. from the floor shall be safety glass or wired glass conforming to Sentence (6).

Subsection 3.4.7. Lighting for Exits

3.4.7.1. Lighting for exits shall conform to Subsection 3.2.8.

Subsection 3.4.8. Types of Exit Facility

3.4.8.1. Except when stated otherwise, these requirements apply to both interior and exterior exits.

3.4.8.2. The finish for treads and landings of interior and exterior stairs and ramps accessible to the public shall have non-skid finish or be provided with non-skid strips.

3.4.8.3. Every flight of interior stairs shall have at least 3 risers.

3.4.8.4.(1) No flight of stairs shall have a vertical rise of more than 12 ft between floors or landings, except that flights of stairs serving as exits from rooms intended for infirm persons or having a high occupant load shall have a vertical rise of not more than 8 ft between floors or landings.

(2) The length and width of landings shall be at least the width of stairways in which they occur, except that in a straight run the length of a landing need not exceed 44 in.

3.4.8.5.(1) Every exit ramp or stairway shall have a handrail on at least one side and where 44 in. or more in width shall have handrails on both sides.

(2) Where the required width of a ramp or flight of stairs exceeds 88 in., one or more intermediate handrails continuous between landings shall be provided and the number and position of these intermediate handrails shall be such that there will be not more than 66 in. between handrails.

(3) Handrails shall be constructed so that there will be no obstruction on or above them which will break a hand hold.

(4) Handrails on stairs and ramps shall be not less than 32 in. and not more than 36 in. in height, measured vertically from a line drawn through the outside edges of the stair nosing, except that handrails not meeting these requirements are permitted provided they are installed in addition to the required handrails.

(5) A clearance of at least 1½ in. shall be provided between every handrail and any wall to which it is fastened.

(6) RESERVED

Guards

3.4.8.6.(1) Every exit such as a ramp, stairway or passageway shall have a wall or a well-secured guard on each side.

(2) The height of guards on exit stairs shall be not less than 36 in. measured vertically to the top of the guard from a line drawn through the outside edges of the stair nosings and 42 in. around landings.

(3) The least dimension of any opening through a guard on exit stairs and stairs used by the public shall be not greater than 4 in.

(4) Windows in exit stairways that extend to less than 42 in. above the landing shall be protected by a guard not less than 42 in. in height.

Sign for basement stair

3.4.8.7. In buildings over 2 storeys in building height, any part of an exit ramp or stair that continues past the exit door at ground level to a basement or cellar shall be clearly marked by a sign indicating that it does not lead to an exit.

3.4.8.8.(1) The maximum gradient of ramps shall be,

Ramp gradient
and landings

- (a) 1 in 10 in any Group A, B or C occupancy;
- (b) 1 in 6 in rooms or floor areas classified as Group E or Group F occupancy;
- (c) 1 in 8 from any other floor area; and
- (d) 1 in 10 for every exterior ramp.

(2) Where a doorway or stairway empties onto a ramp through a side wall, there shall be a level area extending across the full width of the rampway, and for a distance of 12 in. on either side of the wall opening, excepting one side when it abuts on an end wall.

(3) Where a door or stairway empties through an end wall onto a ramp, there shall be a level area across the full width of the ramp and along its length for at least 36 in.

3.4.8.9.(1) Except as permitted in Sentences 3.4.8.10.(2) and 3.4.8.16.(4), treads and risers in every exit stair shall be designed so that,

Stair treads and
risers

- (a) the product of the rise and run in inches shall be not less than 70 and not more than 75;
- (b) the risers have a maximum rise of $7\frac{3}{4}$ in. and a minimum rise of 5 in.; and
- (c) the treads have a minimum run of 9 in. exclusive of the nosing.

(2) Treads and risers in every exit stair except a fire escape stair shall have uniform run and rise in any one flight and shall not alter significantly in run and rise in successive flights in any stair system.

(3) Where the run of any tread in an exit stair is less than 10 in. a nosing of at least 1 in. shall be provided beyond the face of the riser or an equivalent back slope on the riser shall be provided.

(4) The front edge of stair treads in exits and public access to exits shall be at right angles to the direction of exit travel.

3.4.8.10.(1) Except as provided in Sentence (2), no winders shall be used in any exit stairway.

Curved stairs

(2) Where a curved stair is used as an exit, it shall,

- (a) conform to Article 3.4.8.9. at a distance measured 12 in. away from the handrail at the narrow end of the tread; and
- (b) have a handrail on both sides.

(3) Where a curved stair is not required as an exit, it shall have,

- (a) treads with a minimum width of 7 in.;
- (b) treads with an average minimum width of 9 in.; and
- (c) a maximum stair width of 44 in. between handrails.

3.4.8.11.(1) Any escalator of the horizontal tread-type enclosed in accordance with the requirements of this Part, and any moving walks enclosed in accordance with this Part and designed in accordance with the provisions for ramps in this Part may be considered as an exit provided it conforms to this Article.

Escalators and
moving walks

(2) An escalator or moving walk that pierces a required fire separation and serves as a required exit shall be enclosed in the same manner as exit stairs.

(3) Where any escalator serves as a required exit, the width of tread shall be at least 35 in., the rise shall not exceed $8\frac{1}{2}$ in. and the run shall be at least $15\frac{3}{4}$ in.; there shall be a clear width of at least 44 in. at the handrails, and the escalator may be considered to have 2 units of exit width.

(4) No escalator or inclined moving walk shall have a vertical travel of more than 1 storey.

(5) Every escalator or inclined moving walk shall have top and bottom landings, as required herein for stairs.

(6) No escalator or moving walkway capable of being operated in the direction contrary to the normal exit travel shall be used as a required exit.

Horizontal exits

3.4.8.12.(1) The floor area on each side of a horizontal exit shall be sufficient to accommodate the occupants of both floor areas, allowing not less than 5 sq ft of clear floor space per person, except that 16 sq ft shall be provided for persons in wheelchairs and 24 sq ft for bedridden patients.

(2) Where vestibules, enclosed balconies or bridges are used as parts of any horizontal exit, their clear width shall be at least that of the exit doorways opening into them except that handrails may not project into this clear width more than $3\frac{1}{2}$ in.

(3) In any horizontal exit, where there is a difference in level between the connected floor areas, gradients not exceeding those specified for ramps in Article 3.4.8.8. may be used.

(4) No stairs or steps shall be used in a horizontal exit.

(5) Every opening used as a horizontal exit shall be protected by a closure consisting of a self-closing door or doors that swing on a vertical axis.

(6) Where two doors are provided in a horizontal exit they shall,

(a) be mounted adjacent to each other;

(b) be mounted in separate openings or mounted in one opening and meet on a mullion provided the size of such opening shall not exceed that specified for firewalls in Subsection 3.1.8.; and

(c) swing in opposite directions and have signs on each side of the wall to indicate as the exit the door that swings in the direction of travel from that side.

(7) Where horizontal exits utilize bridges between buildings or outside balconies, such bridges or balconies shall conform to Article 3.2.3.15.

(8) Guards shall be designed in accordance with Article 3.3.1.12. except that the height of such guards shall be not less than 4 ft.

(9) Every opening in the exterior walls of buildings to which such bridges or balconies are attached shall be protected, as required for openings adjacent to fire escapes in Sentence 3.4.8.16(3), except that where bridges have solid sides not less than 6 ft in height, such protection of wall openings may be omitted.

3.4.8.13. RESERVED

3.4.8.14.(1) Access to exterior passageways from a floor area shall be through exit doors at the floor level.

(2) RESERVED

Doors

3.4.8.15.(1) No exit door shall open immediately onto a flight of stairs, but shall open onto a landing at least 1 ft wider and longer than the width of such door.

(2) No riser of any flight of stairs shall be located within 1 ft of an exit door.

(3) Exit doors shall be clearly identifiable and no hangings or draperies shall be placed over exit doors to conceal or obscure any exit.

(4) No mirrors shall be placed on exit doors.

(5) No exit door shall open directly onto a step except that, where there is danger of blockage from ice or snow, an exit door may open onto not more than 1 step which shall not exceed 6 in. in height.

(6) Every exit door shall open in the direction of exit travel except for doors serving a single dwelling unit, and shall swing on its vertical axis.

(7) Every exit door that is normally required to be kept closed shall be provided with a reliable self-closing mechanism, and shall not at any time be secured in an open position except as specified in Sentence 3.1.7.2.(10).

(8) Exit doors leading directly to outdoors at ground level may be sliding doors provided they conform to Sentence 3.3.1.7.(3).

Sliding doors

(9) Where revolving doors are used, they shall,

Revolving
doors

(a) be collapsible revolving doors;

(b) have hinged doors providing equivalent units of exit width located adjacent to them;

(c) be used as an exit from the ground floor level only;

(d) not be less than 10 ft from the foot of any stairway; and

(e) not be used as an exit for floor areas containing a high occupant load or Group B or Group F, Division 1 occupancies.

(10) A revolving door may be considered to provide not more than $\frac{1}{2}$ unit of exit width.

(11) Every door that serves as an exit from any floor area or part of a floor area containing a high occupant load of more than 60 persons shall be equipped with panic-type hardware that will unlatch when a pressure of 20 lb is applied.

(12) Every exit door shall be designed and installed so that when the latch is released the door will open in the direction of exit travel under a force of not more than 20 lb, applied at the knob or other latch releasing device.

(13) Fastenings on any required exit door shall be such that the door may be readily opened from the inside without the use of keys, except that this requirement shall not apply to the doors of rooms where persons are under legal restraint.

(14) In buildings that are regulated by the provisions of Subsection 3.2.6.,

Emergency
access to floor
areas

(a) doors providing access to floor areas into which occupants have to enter in an emergency shall not have locking devices to prevent such entry; and

(b) it shall be possible at all times at intervals of 5 storeys or less in an exit stair to pass through an unlocked door from the exit stairway into the floor area, and each such door shall be suitably identified by a sign on the stairway side.

3.4.8.16.(1) Fire escapes shall be installed in conformance with Sentences 3.4.1.4.(3) and (4), and shall be of metal or concrete, of the stair type extending to ground level, constructed throughout in a strong substantial manner and securely fixed to the building, except that wooden fire escapes may be used on buildings of combustible construction if all posts and brackets are at least 4 in. in their least nominal dimension and all other woodwork is at least 2 in. in its least nominal dimension.

Fire escapes

(2) Access to fire escapes shall be from corridors through doors at floor level, except that access from a dwelling unit may be through a casement window having an unobstructed opening of not less than 42 in. high, by 22 in. wide with a sill height of not more than 36 in. above the inside floor.

(3) Where a fire escape serves any storey above the second, openings, including access doorways in the exterior walls of the building to which the fire escape is attached, shall be protected by closures conforming to Subsection 3.1.7. where they are located 10 ft horizontally, 3 storeys or 35 ft below, and 6 ft above any balcony, platform or stairway of a fire escape.

(4) Stairs shall be inclined at an angle of not more than 45 deg. with the horizontal and shall have risers of not more than 8¾ in. in height and treads of not less than 8¾ in. in width exclusive of nosing.

(5) Stairway headroom shall be not less than 6 ft 9 in. measured vertically above the nosing of any tread or platform.

(6) Where doors open onto fire escape balconies such balconies shall have a clear area of not less than 12 sq ft.

(7) The width of a fire escape shall conform to Sentence 3.4.3.1.(1) except that the width of a fire escape shall be at least 22 in. when serving,

(a) not more than 3 storeys; and

(b) not more than 15 persons.

(8) The open sides of every platform, balcony and stairway shall be protected by guards at least 3 ft in height measured vertically above the nosing of any tread or platform.

(9) Two equally spaced rails not more than 18 in. apart, parallel to stair stringers and to platform edges, shall be the minimum protection provided and the top rail may serve as a handrail if free from obstructions which could break a hand-hold.

(10) A wall handrail shall be installed where the fire escape is more than 22 in. in width.

(11) The flight of stairs leading to the ground at the foot of a fire escape shall be,

(a) fixed in position; or

(b) if not fixed in position,

(i) held in the 'up' position without a latch or locking device, and

(ii) fitted with a counterbalancing device that will permit it to be easily and quickly brought into position for use.

SECTION 3.5 SERVICE ROOMS AND SPACES

Subsection 3.5.1. General

Scope 3.5.1.1. The provisions of this Section apply to attic, duct, crawl and shaft spaces and service rooms, mechanical penthouses and facilities contained therein.

Installation of service facilities 3.5.1.2. All service facilities including ductwork, piping and associated coverings, insulation and linings shall conform to the installation requirements in Part 6 in addition to the requirements of this Section.

Integrity of fire separations 3.5.1.3. All service facilities passing through required fire separations shall conform to Subsections 3.1.6., 3.1.7., 3.5.3. and 3.5.4. to ensure that the integrity of the fire separation is maintained.

3.5.1.4. Service spaces provided to contain service facilities shall not be designed to facilitate subsequent use as storage space.

Storage use
prohibited

3.5.1.5. RESERVED

3.5.1.6.(1) A fuel-fired appliance may be installed on the roof of a building provided,

- (a) the appliance is suitable for outdoor rooftop installation; and
- (b) the appliance is installed not closer than 4 ft measured horizontally from the property line.

(2) Where a rooftop appliance is installed within 10 ft of an adjacent wall of the same building, every opening in such wall within 3 storeys above and 15 ft horizontally shall be protected by wired glass as specified in Article 3.1.7.3.

Subsection 3.5.2. Service Rooms

3.5.2.1.(1) Fuel-fired appliances shall not be installed in any exit or any corridor serving as access to exit.

Fire
separations

(2) Except as provided in Sentences (3) and (4), fuel-fired appliances shall be located in a service room or service space separated from the remainder of the building by a fire separation having a fire-resistance rating of not less than,

- (a) 2-hr in buildings classified as Group B or Group F, Division 1 occupancy where such buildings exceed 2 storeys in building height or 4,000 sq ft in building area;
- (b) that required for portable classrooms in Article 3.9.5.3.; and
- (c) 1-hr in all other buildings.

(3) No fire separation is required for fireplaces or for roof-top appliances.

(4) Except for buildings classified as Group B or Group F, Division 1 major occupancy the fire separations required in Sentence (2) need not be provided for fuel-fired appliances provided the appliance,

- (a) is located within and serves a single room, space or suite of rooms; or
- (b) serves a building with a building area of not more than 4,000 sq. ft. and a building height of not more than 2 storeys.

(5) The fire separation required in Sentence (2) need not be supported in accordance with Sentence 3.1.6.2.(1).

3.5.2.2. Service rooms containing service equipment subject to possible explosion, such as boilers operating in excess of 15 psig, some types of refrigerating machinery and transformers, shall not be located directly under required exits.

Service rooms
prohibited
under exits

3.5.2.3. Service rooms containing space heating, space cooling and service water heating appliances may contain other service equipment such as electrical service equipment.

Service
equipment

3.5.2.4.(1) Except as provided in Sentence (3), service rooms used for purposes other than those described in Articles 3.5.2.1., 3.5.2.5., 3.5.2.6., and 3.5.2.8. shall be separated from the remainder of the building by a fire separation having a fire-resistance rating of at least 1-hr when the floor area containing such service rooms is not sprinklered and the service rooms are not intended to contain hazardous substances.

(2) Where the service room is intended to contain a hazardous substance the requirements in Article 3.5.2.1. shall apply.

(3) Where a room contains a limited quantity of service equipment, and the service equipment does not constitute a fire hazard, the requirements for a fire separation or sprinklering in Sentence (1) shall not apply.

Incinerator
rooms

3.5.2.5.(1) Every service room containing an incinerator shall be separated from the remainder of the building by at least a 2-hr fire separation.

(2) When permitted, every service room containing an incinerator may contain other fuel-fired appliances.

(3) Every service room containing an incinerator may contain building service machinery.

Combustible
refuse

3.5.2.6. Except as provided in Sentence 3.5.3.2.(5), rooms for the temporary storage of combustible refuse such as garbage or waste paper shall be separated from the remainder of the building by a 1-hr fire separation and be sprinklered.

Doors to
service rooms

3.5.2.7.(1) A door from a service room such as a boiler, furnace or incinerator room,

- (a) shall swing outward from such rooms, except that the door shall swing inward or be horizontal-sliding when the door opens on a corridor or any room used for assembly purposes; and
- (b) shall not lead directly into an exit.

3.5.2.8.(1) A transformer vault shall be separated from the remainder of the building by a fire separation of noncombustible construction having a fire-resistance rating of not less than 3-hr if the vault is not sprinklered or provided with any other automatic fire extinguishing system and not less than 2-hr if the vault is so protected.

(2) Where a building is required to be sprinklered, the transformer vault described in Sentence (1) need not be sprinklered provided,

- (a) the vault is designed for no purpose other than to contain the transformer and its associated equipment; and
- (b) a products of combustion detector is provided in the vault which will actuate the building alarm system in the event of a fire in the vault.

Subsection 3.5.3. Vertical Service Spaces and Service Facilities

Fire
separations

3.5.3.1.(1) Where vertical service facilities are enclosed in shafts the vertical service space shall be separated from the remainder of the building it serves by a fire separation having a fire-resistance rating conforming to Table 3.5.3.A. for the grade of fire separation required for the floor assemblies of the storeys which it penetrates and to the requirements of this Subsection.

TABLE 3.5.3.A.

Forming Part of Sentence 3.5.3.1.(1)

Grade of Fire Separation Required for Floor Assembly, hr	Minimum Fire-Resistance Rating for Fire Separation of Vertical Service Space, hr	Minimum Fire-Resistance Rating for Fire Separation of Elevator Shaft and Stair Shaft other than Required Exit, hr
less than $\frac{3}{4}$	0	$\frac{3}{4}$
$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
1	$\frac{3}{4}$	$\frac{3}{4}$
$1\frac{1}{2}$	1	1
2	1	$1\frac{1}{2}$
3	$1\frac{1}{2}$	2
4	2	3

(2) Every vertical service space that does not extend through the roof of a building shall be enclosed at the top with construction of the same fire-resistance rating as the shaft enclosing walls.

(3) Every vertical service space that does not extend to the bottom of a building shall be enclosed at the lowest level with construction having a fire-resistance rating not less than that required for the shaft enclosing walls.

(4) Vents from shafts not extending to the roof shall be enclosed within the building with construction having a fire-resistance rating at least equal to that required for the shafts.

(5) Only openings that are necessary for the purposes of the shaft-way shall be permitted in shaft enclosures.

3.5.3.2.(1) Every refuse chute shall be enclosed in a shaft.

Refuse chutes

(2) Every shaft containing a refuse chute shall conform to the requirements of Article 3.5.3.1. and shall be constructed of noncombustible materials having a fire-resistance rating not less than that required by Table 3.5.3.A. for the grade of fire separation through which it passes but not less than,

(a) 1-hr where the chute outlet for the discharge room is protected by an automatic, self-latching closure held open by a fusible link; or

(b) 2-hr where no closure is provided at the chute outlet into the discharge room.

(3) Every refuse chute shall be constructed to permit the escape of the products of combustion to the outdoors in conformance with Article 6.6.2.4.

(4) Intake openings for refuse chutes shall be located in rooms or compartments that,

(a) have no dimension less than 30 in.; and

(b) are separated from the remainder of the building by at least a $\frac{3}{4}$ -hr fire separation; and

(c) are designed for no other purpose.

(5) A refuse chute shall discharge only into a room or bin separated from the remainder of the building by at least a 2-hr fire separation.

(6) When permitted, rooms into which refuse chutes discharge may contain other service equipment.

(7) Every refuse chute shall be equipped at the top with spray equipment for washing-down purposes.

(8) Automatic sprinklers shall be installed at the top of a refuse chute, at alternate floor levels and in the room or bin into which the chute discharges.

3.5.3.3.(1) Every linen chute shall be enclosed in a shaft and shall conform to Sentences 3.5.3.2.(1) to (4) and Sentence 3.5.3.2.(8).

Linen chutes

(2) The room into which a linen chute discharges shall be separated from the remainder of the building by at least a 1-hr fire separation.

Subsection 3.5.4. Horizontal Service Spaces and Service Facilities

3.5.4.1. RESERVED

3.5.4.2. A horizontal service space that penetrates a required vertical fire separation shall be separated from the remainder of the building it serves by a fire separation having a fire-resistance rating conforming to Table 3.5.4.A. for the grade of fire separation it penetrates where a closure is not provided at the vertical fire separation.

Fire
separations

TABLE 3.5.4.A.
Forming Part of Article 3.5.4.2.

Grade of Fire Separation Required for Wall Assembly, hr	Minimum Fire-Resistance Rating for Fire Separation of Horizontal Service Space, hr
less than $\frac{3}{4}$	0 $\frac{3}{4}$
$\frac{3}{4}$	$\frac{3}{4}$
1	1
$1\frac{1}{2}$	1
2	$1\frac{1}{2}$
3	2
4	
Column 1	2

Access

3.5.4.3.(1) On buildings more than 3 storeys in building height where the slope of the roof is less than 3 in. in 12 in. all main roof areas shall be provided with direct access from the floor areas immediately below either by a stairway or by a hatchway at least 22 in. by 36 in. with a fixed ladder.

(2) Every attic space more than 2 ft in height shall be provided with access from the floor immediately below by a hatchway at least 22 in. by 36 in. or by a stairway.

(3) Horizontal service spaces consisting of ceiling and duct spaces which are more than 4 ft in height and 2 ft in width shall have access doors at least 2 ft in both horizontal and vertical dimensions, or shall have inspection doors at least 1 ft in both horizontal and vertical dimensions placed so that the entire interior of the duct or space can be viewed.

(4) Every crawl space shall have at least one access opening at least 22 in. by 36 in.

(5) Small elevated or depressed areas used for machinery, equipment or storage not considered as floor areas, shall be provided with adequate steps, ramps or fixed ladders.

Ventilation
of horizontal
service spaces

3.5.4.4. Every unheated crawl space, attic or roof space shall be ventilated by natural or mechanical means in accordance with Subsections 9.18.3. and 9.19.1.

SECTION 3.6 HEALTH REQUIREMENTS
Subsection 3.6.1. Height and Area of Rooms

3.6.1.1.(1) The height of every room and space shall be such that adequate light and air may be provided for the intended occupancy, and that no obstruction to movement or activities below is caused by the ceiling or ceiling fixtures.

(2) The unobstructed height in sleeping rooms occupied separately and not as suites, suites or dwelling units in Group C occupancies shall conform to Subsection 9.5.2.

(3) The clear height above or below a mezzanine floor assembly shall be at least 7 ft unless otherwise permitted.

3.6.1.2. The areas and widths of rooms in dwelling units shall conform to Subsections 9.5.3. to 9.5.8.

3.6.1.3.(1) A sleeping area in a Group B occupancy shall provide at least 50 sq ft per person in a room having,

- (a) an area not less than 75 sq ft;
- (b) a horizontal dimension not less than 6 ft 6 in.; and
- (c) a ceiling height not less than 7 ft 6 in.

(2) Day care centres shall provide sleeping accommodation having not less than 10 sq ft of floor area for each child with not less than 7 ft 6 in. ceiling height over the entire room area.

Subsection 3.6.2. Windows

3.6.2.1. Unless otherwise permitted, every room used for sleeping in any building and every principal room such as living room, dining room or combination thereof in dwelling units, shall be provided with windows in conformance with Section 9.7.

3.6.2.2.(1) Except as provided in Sentence (2), in Group C occupancies any window located more than 6 ft above the adjacent finished ground level and that extends to within 30-in. of the adjacent floor of each storey shall have fixed glazing unless any part of the window than opens below that height is protected by a guard.

(2) In a Group C major occupancy apartment building all opening windows in dwelling units shall comply with the requirements of Sentence (3) for,

- (a) latching or automatic engaging devices to control the window opening, and
- (b) screens.

(3) The latching or automatic engaging devices and screens required in Sentence (2) shall comply with the requirements of one of the following, all revised to 1 May, 1975:

- (a) CGSB 63-GP-2b (1974), "Windows, Extruded Aluminum, Vertical and Horizontal Sliding, Medium Duty";
- (b) CGSB 63-GP-3b (1974), "Windows, Extruded Aluminum, Vertical and Horizontal Sliding, Standard Duty";
- (c) CGSB 63-GP-4a (1971), Amendment No. 1, Jan. 1975, "Windows, Sashless, Horizontal Sliding";
- (d) CGSB 63-GP-5a (1970), Amendment No. 2, Jan. 1975, "Windows, Steel, Vertical and Horizontal Sliding, Standard Duty"; or
- (e) CGSB 63-GP-6 (1970), Amendment No. 2, Jan. 1975, "Windows, Steel, Vertical and Horizontal Sliding, Medium Duty".

(4) Alternative devices which do not reduce the degree of safety provided by Sentences (2) and (3) may be permitted.

Subsection 3.6.3. Ventilation

3.6.3.1. Air contaminants released within buildings shall be removed insofar as possible at their points of origin and shall not be permitted to accumulate in unsafe concentrations.

Air
contaminants

3.6.3.2.(1) All rooms and spaces shall be ventilated in conformance with Sentences (2) to (4).

Room
ventilation

(2) The ventilation of rooms or spaces by natural methods in Group C occupancies shall conform to Subsection 9.33.3.

(3) The ventilation of rooms or spaces by mechanical methods shall conform to the requirements of Section 6.2.

(4) The ventilation of rooms and spaces in occupancies other than residential occupancies by natural methods shall be permitted in lieu of mechanical ventilation when such ventilation supplies sufficient air change to provide healthful conditions in those occupancies.

3.6.3.3.(1) Every building or part of a building in which there may be or may develop by reason of use or occupancy, dust, fumes, gases, vapour or other various impurities or contaminants that may create a fire or explosion hazard shall be provided with an exhaust ventilation system designed in accordance with Section 6.2.

Ventilation
for explosive
substances

(2) When substances or conditions that may create an explosion hazard are present as the result of the principal use of a building space, such space shall be provided with explosion relief devices and vents, or other protective measures shall be taken which conform to appropriate CSA or NFPA standards.

(3) All explosion relief devices shall be constructed of lightweight, noncombustible and corrosion-resistant materials arranged to blow out under relatively low pressure and shall be protected with screens of not more than $\frac{3}{4}$ -in. mesh installed on the discharge end.

(4) In building spaces in which an explosion hazard may exist, the combined area of openable windows, pivoted sash, windows glazed with non-reinforced glass which have been scored diagonally in two directions on the exterior surfaces or wall panels arranged to open under internal pressure shall be at least 10 per cent of the area of the enclosing walls with at least 50 per cent of the opening arranged for automatic release.

Ventilation
for storage
garages

3.6.3.4.(1) Except as provided in Sentences (4), (5) and (6), an enclosed storage garage and repair areas in a garage shall have a mechanical ventilation system designed to limit the average concentration of carbon monoxide to not more than 50 parts per million parts of air for an 8-hr period.

(2) The requirement in Sentence (1) is considered to be met by a system designed to provide a continuous supply of fresh air at a rate equal to at least 500 cu ft air per minute for each vehicle.

(3) Mechanical ventilation systems provided in accordance with Sentences (1) and (2) shall ventilate continuously or include automatic ventilating fan control by means of carbon monoxide monitoring devices or other suitable means.

(4) In garages where motor vehicles are parked by mechanical means the ventilation requirements of Sentence (2) may be reduced to one half.

(5) Storage garages with a total capacity of less than 20 motor vehicles need not have mechanical ventilating systems if the downward slope of floor to the outside door is 1 in. for each 10 ft and the garage floor is above outside ground level.

(6) The requirements of Sentences (1) to (5) shall not apply to any storage garage provided,

- (a) at least 25 per cent of the total area of the perimeter walls on each storey is open to the outdoors and distributed to provide cross ventilation.
- (b) no portion of any floor of the garage is more than 3 ft below the adjacent ground level; and
- (c) no tarpaulins, glass or other materials are used to close the required exterior openings at any time.

Subsection 3.6.4. Plumbing Facilities

Systems
required

3.6.4.1.(1) Except as permitted by Sentence (4), each building situated on property that abuts on a street in which a public or municipal water main is located shall be provided with or have accessible to its occupants a plumbing system including a potable water supply, a sanitary drainage system and toilet fixtures.

(2) When the installation of a sanitary drainage system is not possible because of the absence of a water supply, sanitary privies, chemical closets or other means for the disposal of human waste shall be provided.

(3) RESERVED

(4) Plumbing facilities need not be provided in a building which is not normally occupied by persons where such installations are impractical and other facilities are available in nearby buildings when the subject building is in use.

Minimum
number of
fixtures

3.6.4.2.(1) Except as provided in Sentence 3.6.4.2.(15), water closets and other plumbing facilities shall be provided for each sex in accordance with the anticipated proportion of each sex in the occupancy when this can be determined with reasonable accuracy, except that when such a determination cannot be made with reasonable accuracy, it may be assumed that the occupancy is equally divided between the sexes.

Urinals
substituted
for water
closets

(2) Except as provided in Sentences (9) and (10), where more than 2 water closets are required in this Subsection, urinals may be substituted for $\frac{2}{3}$ of the required number of water closets and may be counted as water closets.

Washbasins
required

(3) Except as provided in Sentences (4), (9), (10), (12) and (14), at least 1 lavatory shall be provided in a room containing 1 or 2 water closets or urinals, and at least 1 additional lavatory shall be provided for each additional 2 such fixtures.

Circular
washbasins

(4) Wash fountains in circular form may be provided in lieu of lavatories required in Sentence (3) provided each 20 in. of its circumference is considered to be the equivalent of 1 lavatory.

(5) Except as provided in Sentence (6), the minimum number of water closets shall be determined from Table 3.6.4.A. for the occupant load of the occupancy calculated from

Table 3.1.14.A. except that for Group D occupancies the occupant load shall be calculated by assuming a net area of 150 sq ft per person.

(6) Where mobile homes do not have individual sanitary facilities connected to a central water supply and drainage system, a service building shall be provided for public use and shall contain at least one water closet for each sex where the facilities serve not more than 10 mobile homes, and where the facilities serve more than 10 mobile homes, an additional water closet for each sex shall be provided for each additional 10 mobile homes.

TABLE 3.6.4.A.
Forming Part of Sentence 3.6.4.2.(5)

Type of Use of Floor Area or Room	Maximum Number of Persons per Water Closet or Reference Article	
	Male	Female
Group A Assembly Occupancies		
1) space with fixed seats	3.6.4.2.(9)	
2) space with non-fixed seats	300	150
3) space with non-fixed seats and tables	300	150
4) dance halls and recreational establishments	100	75
5) classrooms, primary and secondary	30	26
6) college buildings, non-residential	100	75
7) dining rooms and restaurants not used primarily for the consumption of alcoholic beverages	3.6.4.2.(10)	
8) establishments used primarily for the consumption of alcoholic beverages	3.6.4.2.(14)	
9) drive-in theatres	3.6.4.2.(10)	
10) day care centres	3.6.4.2.(12)	
11) all other assembly occupancies	3.6.4.2.(8)	
Group B Institutional Occupancies		
1) Division 1	3.6.4.2.(11)	
2) Division 2	8	8
Group C Residential Occupancies		
1) dwelling units	9.32.4	
2) all other residential occupancies	3.6.4.2.(8)	
Group D Business and Personal Service Occupancies	3.6.4.2.(8)	
Group E Mercantile Occupancies	3.6.4.2.(13)	
Group F Industrial Occupancies	3.6.4.2.(13)	
Column 1	2	3

- (7) Where a service building is required by Sentence (6), it shall contain lavatories as required in Sentence (3) and at least,
- (a) 1 laundry tray or similar facility; and
 - (b) 1 bathtub or shower for each sex.
- (8) The minimum number of water closets shall conform to Table 3.6.4.B. for,
- (a) Group A occupancies not shown in Tables 3.6.4.A., 3.6.4.C., 3.6.4.D., 3.6.4.E. and 3.6.4.F.;
 - (b) Group C occupancies, except for dwelling units;
 - (c) Group D occupancies;
 - (d) Group E occupancies, as determined by the number of employees; and
 - (e) Group F occupancies, as determined by occupant load.

TABLE 3.6.4.B.
Forming Part of Sentence 3.6.4.2.(8)

Number of persons of each sex	Minimum number of water closets
up to 9	1
10 to 24	2
25 to 49	3
50 to 74	4
75 to 100	5
over 100	5 plus one for each additional 30 persons over 100
Column 1	2

- (9) For places of assembly with fixed seating, the number of water closets, urinals and lavatories shall be as provided in Table 3.6.4.C. based on the seating capacity of the space.

TABLE 3.6.4.C.
Forming Part of Sentence 3.6.4.2.(9)

Seating capacity	Minimum number of fixtures	
	Males	Females
Less than 300	1 urinal 1 water closet 1 lavatory	1 water closet 1 lavatory
300 to 499	2 urinals 1 water closet 1 lavatory	2 water closets 1 lavatory
500 to 749	3 urinals 2 water closets 1 lavatory	3 water closets 1 lavatory
750 to 1,000	3 urinals 3 water closets 2 lavatories, or 4 urinals 2 water closets 2 lavatories	4 water closets 2 lavatories
Every 300, or fraction thereof, in excess of 1,000	1 urinal 1 water closet 1 lavatory	1 water closet 1 lavatory
Column 1	Column 2	Column 3

3.6.4.2.(10) The minimum number of water closets and lavatories shall conform to Table 3.6.4.D. for,

- (a) the number of seats in dining rooms and restaurants not used primarily for the consumption of alcoholic beverages; and
- (b) the number of parking spaces in drive-in theatres.

TABLE 3.6.4.D.

Forming Part of Sentence 3.6.4.2.(10)

Number of Seats in Restaurants or Parking spaces in Drive-in Theatres	Minimum Number of Water Closets For Each Sex	Minimum Number of Lavatories For Each Sex
Up to 40	1	1
41 to 140	2	1
141 to 210	3	1
211 to 270	4	2
271 to 330	5	2
331 to 390	6	3
391 to 450	7	3
451 to 550	8	4
551 to 650	9	4
651 to 750	10	5
751 to 850	11	6
Over 850	11 plus 1 for each additional 100 seats or fraction thereof	6 plus 1 for each additional 200 seats or fraction thereof
Column 1	2	3

(11) In a Group B, Division 1 occupancy the maximum number of persons per water closet shall be determined by the appropriate authority having jurisdiction.

(12) In a day care centre, the maximum number of children per water closet and wash basin shall conform to Table 3.6.4.E. except that plumbing fixtures for children over the age of 9 years shall conform to the requirements for classrooms in Table 3.6.4.A.

TABLE 3.6.4.E.

Forming Part of Sentence 3.6.4.2.(12)

Age of Children	Maximum Number of Children per Water Closet and Lavatory
Under 2	10 without regard to number of each sex
2 to 5	15 without regard to number of each sex
6 to 9	15 for males 15 for females
Column 1	Column 2

(13) For the public in Group E occupancies the maximum number of persons per water closet shall be 300 males or 150 females except that,

- (a) facilities provided for employees may be counted as part of those required for the occupancy when such facilities are made accessible to the public; and
- (b) where the sum of floor areas, excluding basements and cellars, is less than 6,000 sq. ft., not more than one water closet for each sex need be provided.

(14) In an establishment used primarily for the consumption of alcoholic beverages, the minimum number of water closets and lavatories shall conform to Table 3.6.4.F.

TABLE 3.6.4.F.

Forming Part of Sentence 3.6.4.2.(14)

Number of Seats	Minimum Number of Water Closets For Each Sex	Minimum Number of Lavatories For Each Sex
Up to 100	2	1
101 to 140	3	1
141 to 180	4	2
181 to 220	5	2
221 to 280	6	3
281 to 360	7	3
361 to 440	8	4
441 to 520	9	4
Over 520	9+1 for each addi- tional 80 seats or fraction thereof	4+1 for each addi- tional 160 seats or fraction thereof
Column 1	2	3

- (15) Not more than 1 water closet to serve both sexes need be provided in,
- (a) a Group D occupancy having an occupant load not exceeding 5 persons;
 - (b) a Group E or F occupancy,
 - (i) having an occupant load not exceeding 9 persons, or
 - (ii) where the sum of the floor areas excluding basements and cellars does not exceed 3,000 sq. ft.

Privacy

3.6.4.3.(1) Every room containing sanitary facilities serving one sex only shall be enclosed by a full height door which shall be clearly marked to indicate the sex served.

(2) Rooms providing separate water closets for more than one male or female shall be designed so that the water closets and urinals are not visible when the doors to such rooms open onto a place where persons of the other sex work or pass.

3.6.4.4. Glass, other than safety glass, shall not be used for a shower or bathtub enclosure.

3.6.4.5. RESERVED

SECTION 3.7 SIGNS

Subsection 3.7.1 Scope

3.7.1.1. Except as provided otherwise in Article 3.7.1.2. this Section shall apply to the erection of all signs.

- 3.7.1.2.(1) The following signs shall not be subject to the provisions of this Section,
- (a) Signs for regulating traffic or similar devices, legal notices, or warnings at railroad crossings;
 - (b) Signs in display windows including writing, representation, painting or lettering directly on the surface of any window or door, or other signs not affixed to the building interior;

- (c) Small signs displayed for the direction of the public including signs which identify rest rooms, freight entrances, and such other similar directional signs;
- (d) Signs painted directly on a building; and
- (e) Incidental signs or other signs subject to municipal approval.

Subsection 3.7.2. Alterations

3.7.2.1. The changing of movable parts of signs that are designed for changes, or the repainting of display matter shall not be deemed to be alterations.

Subsection 3.7.3. Structural Requirements

3.7.3.1. Except as provided herein, all sign structures shall be designed in accordance with Part 4.

3.7.3.2.(1) A sign structure shall be designed by an architect or professional engineer where it is,

- (a) a ground sign which exceeds 25 ft in height above the adjacent finished ground;
- (b) a projecting sign which weighs more than 250 lb; or
- (c) any one face of a roof sign which exceeds 100 sq ft.

(2) A projecting sign shall not be attached or fastened in any manner to a parapet wall unless designed by an architect or professional engineer.

3.7.3.3. No sign shall be supported by an existing building, parapet wall, or other structure, or any part thereof, unless said building or structure is adequate to support, without reducing the safety factors provided, all loads to which it may be subjected, including those loads resultant from or caused by the erection of the sign such as wind and snow loads, and is fully capable of safely transferring said loads through its structural members to soil having adequate load-carrying or load-resisting capacity.

3.7.3.4. Materials subjected to wind forces used in the construction of signs shall be of sufficient strength and shall be installed to withstand a design external pressure or suction due to wind.

3.7.3.5. Materials subjected to thermal forces shall be installed so that their expansion and contraction over the temperature ranges to which the materials are likely to be subjected will not dislodge the materials from their assigned positions.

3.7.3.6. A sign shall be constructed and erected so that all structural design assumptions used or applicable in its design are valid after the completion of the construction and the erection of the sign.

Subsection 3.7.4. Plastic Sign Facing Materials

3.7.4.1.(1) Plastic materials used in the construction of sign faces shall,

- (a) burn no faster than $2\frac{1}{2}$ in. per min. in sheets 0.060 in. thick when tested in accordance with ASTM D635-74, "Method of Test for Flammability of Rigid Plastics Over 0.050 in. Thick," as revised to 1 May, 1975; and
- (b) burn no faster than 2 min. when tested in accordance with ASTM D568-74, "Method of Test for Flammability of Flexible Plastics where the Thickness of the Plastic Material is less than 0.050 in.," as revised to 1 May, 1975, and measurement of material thickness shall be according to Method B of ASTM D374-74 "Methods of Test for Thickness of Solid Electrical Insulation," as revised to 1 May, 1975.

(2) Except as provided in Sentence (3), the plastic portion of exterior sign faces placed over or forming part of noncombustible exterior wall surfaces shall,

- (a) not exceed 30 per cent of the wall area of the storey on which it is installed;
 - (b) not have single or contiguous sign faces areas exceeding 160 sq. ft. at each storey above the first storey nor greater than 4 ft. in height; and
 - (c) when located above the first storey, be vertically separated by 4 ft. of noncombustible construction unless separated by a horizontal building projection such as a canopy, extending the full width of, and projecting at least 36 in. beyond, the exterior sign face.
- (3) Where the plastic portion of an exterior sign is the face of a metal sign box that is at least 8 in. in depth, the requirements of Sentence (2) need not apply provided the sign is mounted on a noncombustible exterior wall.
- (4) Notwithstanding the requirements of Sentence (5) and Clause 3.2.3.13.(1) (g) the plastic portion of an interior sign placed over or forming part of an interior wall surface in corridors, covered or enclosed walkways at or above grade in buildings or enclosed malls shall,
- (a) not exceed 15 per cent of the wall area in, or over which it may be installed;
 - (b) be supported by a device that will not detrimentally affect the fire-resistance rating of the interior wall to which it is attached or of which it may form a part, and encase the edges of the plastic sign face in metal;
 - (c) not be positioned or sized in such a manner that it is less than 2 ft. from the vertical line separating two adjacent premises;
 - (d) be placed so that there is at least 2 ft. vertical separation of noncombustible material between the top of the plastic sign surface and the ceiling surface;
 - (e) be permitted to have an increase of 100 per cent in area required in Clause (a) and a decrease of 50 per cent of the separation distances required in Clauses (c) and (d) if the area is sprinklered; and
 - (f) not have a flame-spreading rating above 250.
- (5) Signs in exits and underground walkways shall comply with the appropriate flame-spread requirements of Sentences 3.4.4.1.(1) and 3.2.3.16.(5).

Subsection 3.7.5. Location Restrictions

3.7.5.1. No sign shall be located so as to obstruct openings required for light and ventilation, any required means of egress or required access for fire fighting in accordance with Sentence 3.2.5.1.(8).

3.7.5.2.(1) No exterior sign shall be erected overhanging a sidewalk or other pedestrian walkway unless the vertical distance, measured from the bottom of the overhanging portion of the sign to the surface of the sidewalk, is at least 8 ft.

(2) Except as provided hereinafter, no sign face shall be erected within 2 ft of the vehicular travelled portion of private lane or roadway, or of a motor vehicle parking area unless the minimum vertical distance between grade and the bottom of the overhanging sign face is at least 14 ft.

(3) Where the height of all vehicles using any private road or parking area is permanently restricted, the vertical distance mentioned in Sentence (2) may be reduced to the amount of the actual height restriction, for as long as the said height restriction is in existence on the premises.

SECTION 3.8 PORTABLE CLASSROOMS

Subsection 3.8.1. General

3.8.1.1. A single portable classroom shall not exceed 1,000 sq ft in building area, or 1 storey in building height.

3.8.1.2. Where the horizontal distance between portable classrooms is less than 20 feet, they shall be considered as a single building of a size equal to the aggregate area of the portable classrooms and the requirements of Subsection 3.2.2. for a building of such size shall apply.

Subsection 3.8.2. Means of Egress

3.8.2.1. Each portable classroom shall be provided with not less than two exit doors placed as remote from each other as practicable, and which open directly to the outdoors.

3.8.2.2.(1) All exit doors shall open in the direction of exit travel, and,

(a) shall not be equipped with hardware that will,

(i) permit the door to be locked against egress, or

(ii) prevent the door from being opened with one hand; and

(b) shall not be equipped with night latches, flush bolts, draw bolts, or similar locking devices.

Subsection 3.8.3. Interior Finish

3.8.3.1. No interior finish material used on a wall, ceiling or floor of a portable classroom shall have a flame-spread rating greater than 150.

Subsection 3.8.4. Heating

3.8.4.1. Heating systems and equipment shall be designed and installed in accordance with Section 6.2.

3.8.4.2.(1) A fuel-fired appliance is permitted without fire separations in a portable classroom provided,

(a) there is not more than one appliance per classroom; and

(b) the appliance is at least 15 ft from an exit.

3.8.4.3.(1) Notwithstanding the provisions of Article 3.8.4.2., fuel-fired appliances shall be enclosed by a fire separation having,

(a) $\frac{3}{4}$ -hr fire-resistance rating where the horizontal distance between portable classrooms is less than 20 ft, but greater than 5 ft; and

(b) $1\frac{1}{2}$ -hr fire-resistance rating where the horizontal distance between portable classrooms is 5 ft or less.

Subsection 3.8.5. Provisions for Fire Fighting

3.8.5.1. A fire extinguisher in accordance with Article 6.7.3.10. shall be installed in a portable classroom.

Subsection 3.8.6. Fire Alarm System

3.8.6.1. Where the horizontal distance between a portable classroom and a main school building on the site is less than 40 ft, the fire alarm system in the main school building shall be extended into the portable classroom.

3.8.6.2.(1) A fire alarm system installed in accordance with the requirements of Subsection 3.2.4. shall be provided where,

(a) there are four or more portable classrooms in a group and the horizontal distance between portable classrooms is less than 20 feet; or

(b) there are fewer than four portable classrooms in a group and the horizontal distance between portable classrooms is less than 6 feet, whether or not there is a main school building on the site.

(2) For the purposes of determining the fire alarm requirements, the group of portable classrooms shall be considered a single building.

Subsection 3.8.7. Separation from Main Buildings

3.8.7.1.(1) Where the horizontal distance between a portable classroom and a main school building on the site is less than 40 ft, but greater than 10 ft, there shall be a $\frac{3}{4}$ -hr fire separation constructed between the portable classroom and the main building.

(2) Where the horizontal distance between a portable classroom and a main school building on the site is 10 ft or less, there shall be a $1\frac{1}{2}$ -hr fire separation constructed between the portable classroom and the main building.

(3) Where a fire separation is required by Sentences (1) and (2), it may be formed by a wall of the main school building or a wall of the portable classroom, or combination thereof, provided such walls have the required fire-resistance rating and all openings, such as doors and windows, are protected in accordance with Subsection 3.1.7.

3.8.7.2. Spatial separation as shown in Subsection 3.2.3. may be used in lieu of the requirements of Articles 3.8.7.1.

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SECTION 4.1 STRUCTURAL LOADS AND PROCEDURES**Subsection 4.1.1. General****APPLICATION**

4.1.1.1.(1) This Section applies to the design of all structural members and their assemblies used in the following:

- (a) all buildings used or intended for the following occupancies:
 - (i) Group A, Assembly Occupancies,
 - (ii) Group B, Institutional Occupancies,
 - (iii) Group F, Division 1, High Hazard Industrial Occupancies;

- (b) all buildings exceeding 3 storeys in building height or 6,000 sq ft in building area and which are used or intended to be used for the following occupancies:
 - (i) Group C, Residential Occupancies,
 - (ii) Group D, Business and Personal Services Occupancies,
 - (iii) Group E, Mercantile Occupancies,
 - (iv) Group F, Divisions 2 and 3, Medium and Low Hazard Industrial Occupancies;
- (c) retaining walls;
- (d) signs;
- (e) communication towers exceeding 50 ft in height;
- (f) pedestrian bridges;
- (g) permanent crane runways that impose loads on buildings;
- (h) fire escapes;
- (i) exterior storage tanks.
- (2) RESERVED

4.1.1.2.(1) Farm buildings other than those used as residences shall be designed and constructed in conformance with Section 1.1, Design, of the Canadian Farm Building Code 1975.

N.B.: For buildings not listed in Sentence 4.1.1.1.(1), requirements for design will be found in Part 9.

DESIGN REQUIREMENTS

Minimum
safety and
performance

4.1.1.3.(1) Buildings and their structural members including formwork and falsework shall be designed to have sufficient structural capacity to resist safely and effectively all loads and effects of loads and influences that may reasonably be expected having regard to the expected service life of buildings, and shall in any case satisfy the requirements of this Section.

Loads during
construction

(2) All permanent and temporary structural members, including formwork and falsework of a building, shall be protected against loads exceeding the design loads during the construction period except when, as verified by analysis or test, temporary overloading of a structural member would result in no impairment of that member or any other member, and

- (a) the constructor shall take all necessary precautions during all stages of construction to ensure that the building is not damaged or distorted due to loads applied during construction.

Design basis

4.1.1.4.(1) Buildings and their structural members shall be designed by one of the following methods:

- (a) standard design procedures and practices provided by Sections 4.2 to 4.9 inclusive and any standards and specifications referred to therein except in cases of conflict the provisions of the building code shall govern;
- (b) one of the following three bases of design,
 - (i) analysis based on generally 'established' theory,

- (ii) evaluation of a given full-scale structure or a prototype by a loading test,
- (iii) studies of model analogues,

provided the design is carried out by a person qualified in the specific method applied and provided the design ensures a level of safety and performance at least equivalent to that provided for or implicit in design carried out by the methods referred to in Clause 4.1.1.4.(1) (a).

(2) Communication towers exceeding 50 ft in height shall be designed according to CSA S-37-1965, "Antenna Towers and Antenna Supporting Structures", as revised to 1 May, 1975.

(3) Air supported structures shall be designed so that,

- (a) the fabric strength and structural anchorage of the structure will be capable of withstanding an internal pressure of 8 psf and an external wind velocity of 70 mph simultaneously;
- (b) all exit doors are structurally independent of such air supported structure.

(4) Every fire escape, where permitted in Part 3 shall,

- (a) be in accordance with the requirements of Sentences 3.4.8.16.1.(1) to (11) and this Part; and
- (b) be designed in a manner so that the allowable stresses on any wall, column, beam or other supporting member to which it is attached does not exceed the stresses permitted in this Part.

4.1.1.5.(1) Structural members shall be designed so that their deflections under expected service loads will be acceptable with regard to, Deflections

- (a) the intended use of the building or member;
- (b) possible damage to nonstructural members and materials;
- (c) possible damage to the structure itself.

(2) Deflections listed in Sentence (1) shall be taken into account in all structures and structural members made of material susceptible to deflections, deformations, or changes in load distribution due to creep, shrinkage or other effects in the materials of which they are composed.

(3) The lateral deflection of buildings due to design wind and gravity loads shall be checked to ensure that nonstructural elements, whose nature is known at the time the structural design is carried out, will not be damaged. Except as provided in Sentence (4) the total drift per storey under design wind and gravity loads shall not exceed 1/500 of the storey height. Lateral deflection of buildings due to wind

(4) The deflection limits required in Sentence (3) do not apply to industrial buildings or sheds if it is known by experience that greater movement is acceptable.

4.1.1.6.(1) Special considerations shall be given to floor systems susceptible to vibration to ensure that such vibration is acceptable for the intended occupancy of the building. Vibrations of floors

(2) Unusually flexible buildings and buildings whose ratio of height to minimum effective width exceeds 4 to 1 shall be investigated for lateral vibrations under dynamic wind load and lateral accelerations of the building shall be checked to ensure that such accelerations are acceptable to the intended occupancy of the building. Lateral vibrations of buildings

4.1.1.7. Provision shall be made to ensure adequate stability of the structure as a whole and adequate lateral, torsional and local stability of all structural parts which may be subjected to compressive stress. Stability under compressive stress

Structural
integrity

4.1.1.8. Buildings and structural systems shall provide such structural integrity, strength and other defenses that the hazards associated with progressive collapse due to local failure are reduced to a minimum.

4.1.1.9. RESERVED

4.1.1.10. RESERVED

Subsection 4.1.2. Design Loads and Effects

Loads

4.1.2.1.(1) Except as provided for in Article 4.1.2.2. the following loads, forces and effects shall be considered in the design of a building and its structural members and connections:

D—dead loads as provided for in Subsection 4.1.5.

L—live load due to intended use and occupancy (includes loads due to movable partitions and vertical loads due to cranes); snow, ice and rain; earth and hydrostatic pressure; horizontal components of static or inertia forces.

Q—wind or earthquake, whichever produces the more unfavorable effect.

T—contraction or expansion due to temperature changes, shrinkage, moisture changes, creep in component materials, movement due to differential settlement or combination thereof.

(2) Minimum design values of these loads as set forth in Subsections 4.1.5. to 4.1.10., shall be increased to account for dynamic effects where applicable.

Loads not
listed

4.1.2.2.(1) Where a building or structural member can be expected to be subjected to loads, forces or other effects not listed in Article 4.1.2.1., such effects shall be taken into account in the design, based on the most appropriate information available.

(2) If it can be shown by engineering principles, or if it is known from experience, that neglect of some or all of the effects due to **T** do not affect the structural safety and serviceability, they need not be considered in the calculations.

Structural
design

4.1.2.3. Structural design shall be carried out in accordance with Subsection 4.1.3., "Working Stress Design" or Subsection 4.1.4., "Limit States Design".

Subsection 4.1.3. Working Stress Design

Load
combinations

4.1.3.1. In designing buildings and their structural members, all of the loads listed in Article 4.1.2.1. shall be considered to act in the following combinations and buildings and their structural members shall be designed for whichever combination produces the most unfavourable effects in the building, foundation or structural member concerned, when reduced, as appropriate, according to Article 4.1.3.2.:

(i) **D**

(ii) **D+L**

(iii) **D+Q**

(iv) **D+T**

(v) **D+L+Q**

(vi) **D+L+T**

(vii) **D+Q+T**

(viii) **D+L+Q+T**

4.1.3.2.(1) The total of the combined load effects may be multiplied by the following load combination probability factors:

Probability
factors

- (a) 1.0 for combinations (i) to (iv);
- (b) 0.75 for combinations (v) to (vii);
- (c) 0.66 for combination (viii).

4.1.3.3. When loads other than **D** counteract **D** in a structural member or joint, special caution shall be exercised by the designer to ensure adequate safety for possible stress reversal.

Stress
reversal

4.1.3.4. A building shall be proportioned to resist an overturning moment and sliding force of not less than twice that due to the loads acting on the structure when the structure is considered as an entire unit acting on or anchored to its bearing stratum or supporting structure and in making such determination, the resistance to overturning shall be calculated as the sum of the stabilizing moment of the dead load only, plus the ultimate resistance of any anchoring devices.

Overturning
and sliding

4.1.3.5. RESERVED

Subsection 4.1.4. Limit States Design

4.1.4.1.(1) In this Subsection, the term,

- (a) (i) "limit states" means those conditions of a building structure in which the building ceases to fulfil the function for which it was designed,
- (ii) "ultimate limit states" are those states concerning safety and include exceeding the load carrying capacity, overturning, sliding, fracture and fatigue,
- (iii) "serviceability limit states" are those limit states which restrict the intended use and occupancy of the building and include deflection, vibration, permanent deformation and cracking;
- (b) specified loads (**D**, **L**, **Q** and **T**) means those loads defined in Article 4.1.2.1. and given in this Section;
- (c) load factor, α , means a factor in Sentence 4.1.4.2.(3) applied to a specified load which, for the limit states under consideration, takes into account the variability of the loads and load patterns and analysis of their effects;
- (d) load combination factor, ψ , means a factor in Sentence 4.1.4.2.(4) applied to loads other than dead load to take into account the reduced probability of a number of loads from different sources acting simultaneously;
- (e) importance factor, γ , means a factor in Sentence 4.1.4.2.(5) applied to the loads to take into account the consequences of collapse as related to the use and occupancy of the building;
- (f) factored load means the product of a specified load and its load factor;
- (g) resistance, **R**, of a member, connection or structure is based on the specified properties of the structural materials;
- (h) performance factor, ϕ , means a factor applied to specified material property or to resistance of a member, connection or structure which for the limit state under consideration takes into account the variability of material properties and dimensions, workmanship, type of failure and uncertainty in the prediction of resistance; and
- (i) factored resistance of a member, connection or structure means the product of its resistance or specified material property and the applicable performance factor.

Terms

Safety check
for strength
and stability

4.1.4.2.(1) A building and its structural components shall be designed to have sufficient strength and stability so that the factored resistance is greater than or equal to the effect of factored loads, as required in Sentence (2). In cases of overturning and uplift, anchorage is required if the effect of loads tending to cause overturning or uplift multiplied by load factors greater than 1.0 given in Sentence (3) is greater than the stabilizing effect of dead load multiplied by a load factor of 0.85 as given in Sentence (3).

Effect of
factored loads

(2) Except as provided in Sentence (6), effect of factored loads is the structural effects due to the specified loads multiplied by load factors, α , in Sentence (3), a load combination factor, ψ , in Sentence (4) and an importance factor, γ , in Sentence (5). The factored load combinations shall be equal to

$$\gamma(\alpha_D D + \psi[\alpha_L L + \alpha_Q Q + \alpha_T T])$$

Load factors

(3) The load factors, α , shall be equal to,

- (a) $\alpha_D = 1.25$ or, in cases of overturning, uplift and stress reversal 0.85;
- (b) $\alpha_L = 1.5$;
- (c) $\alpha_Q = 1.5$; and
- (d) $\alpha_T = 1.25$.

Load combina-
tion factor

(4) The load combination factor, ψ , shall be equal to,

- (a) 1.0 when only 1 of the loads **L**, **Q** and **T** in Sentence 4.1.2.1.(1) acts;
- (b) 0.70 when 2 of the loads **L**, **Q** and **T** in Sentence 4.1.2.1.(1) act;
- (c) 0.60 when all of the loads **L**, **Q** and **T** in Sentence 4.1.2.1.(1) act and the most unfavourable effect shall be determined by considering the loads **L**, **Q** and **T** in Sentence 4.1.2.1.(1) acting alone with $\psi = 1.0$ or in combination with $\psi = 0.70$ or 0.60.

Importance
factor

(5) The importance factor, γ , shall be,

- (a) equal to 1.0 for all buildings, except as provided in Clause (b); and
- (b) not less than 0.8 for,
 - (i) farm buildings having an occupant load not greater than 1 person per 500 sq ft (46.5 m²) of floor area during normal periods of use of 4 hr or longer, and
 - (ii) buildings where it can be shown that collapse is not likely to cause injury.

Concrete
buildings

(6) For concrete buildings, the effect of factored loads shall be determined in accordance with CSA A23.3-1973, "Code for the Design of Concrete Structures for Buildings", as revised to 1 May, 1975.

Serviceability
and fatigue

4.1.4.3.(1) A building and its structural components shall be checked for serviceability limit states as defined in Clause 4.1.4.1.(1) (a) and fatigue under the effect of the specified loads as required in the standards described in Sections 4.3, 4.4, 4.5, 4.6 and 4.7.

(2) Where more than 1 load contributes to the stress in a member, the combination of loads shall be assumed to be

$$D + \psi [L + Q + T]$$

where ψ is in conformance with Sentence 4.1.4.2.(4).

Subsection 4.1.5. Dead Loads

4.1.5.1.(1) The design dead load for a structural member consists of:

Dead loads

- (a) the weight of the member itself;
- (b) the weight of all materials of construction incorporated into the building to be supported permanently by the member, including permanent partitions;
- (c) the weight of permanent equipment; and
- (d) forces due to prestressing.

(2) Except as provided in Sentence (3) in areas of a building where partitions other than permanent partitions are shown on the drawings or where partitions might be added in the future, allowance shall be made for the weight of such partitions; this allowance shall be determined from the actual or anticipated weight of the partitions placed in any probable position, but shall be not less than 20 psf over the area of floor being considered and the partition loads used in design shall be shown on the drawings.

Non-permanent
partitions

(3) In cases, where the dead load is counteractive, the load allowance as provided in Sentence (2) shall not be included in the design calculations.

Subsection 4.1.6. Live Loads Due to Use and Occupancy

4.1.6.1.(1) The design load on an area of floor or roof depends on the intended use and occupancy and shall not be less than the effects of uniformly distributed load patterns in Article 4.1.6.3., the loads resulting from the intended use, or the concentrated loads in Article 4.1.6.4., whichever produces the most critical effect.

Loads due to
use of floors
and roofs

(2) Live load intensities for the purpose of structural design for live stock buildings shall be in accordance with Tables I & II of the Canadian Code for Farm Buildings (Farm Building Standards) 1970, as revised to 1 May, 1975.

4.1.6.2.(1) Where the use of an area of floor is not provided for in Article 4.1.6.3., the design loads due to the use and occupancy of the area shall be determined from an analysis of the loads resulting from,

Uses not
stipulated

- (a) the weight of the probable assembly of persons;
- (b) the weight of the probable accumulation of equipment and furnishing; and
- (c) the weight of the probable storage of materials.

4.1.6.3.(1) The uniformly distributed load shall be not less than the values listed in Table 4.1.6.A., reduced as may be provided for in Sentence (4) or (5), applied,

Full and
partial
loading

- (a) uniformly over the entire area; or
- (b) on any portions of the area,

whichever produces the most critical effects in the members concerned.

TABLE 4.1.6.A.
Forming Part of Sentence 4.1.6.3.(1)

Use of Area of Floor or Roof	Minimum Design Load psf
Assembly areas, with fixed seats covering at least 80% of the assembly area and including: Auditoria Churches Classrooms (also without fixed seats) Courtrooms Lecture Halls Theatres and other areas with similar uses	50
Assembly areas other than those listed above, including: Arenas Balconies Churches Dance Floors Dining Areas and Restaurants Foyers and Entrance Halls Grandstands, reviewing stands and bleachers Gymnasia Museums Passenger Stations Promenades Rinks Stadia Stages Theatres and other areas with similar uses	100
Attics having limited accessibility so that there is no storage of equipment or material	10
Balconies, exterior and interior, and mezzanines	100
Corridors and Lobbies All lobbies Corridors serving schools, colleges and hospitals First floor corridors Corridors serving assembly areas and recreational areas Other corridors	100 not less than the design load required for the occupancies they serve
Equipment areas and service rooms including: Generator rooms Mechanical equipment exclusive of elevators Machine rooms Pump rooms Transformer vaults Ventilating, air conditioning	75 ⁽¹⁾
Exits and Fire Escapes	100
Factories	125 ⁽¹⁾
Column 1	2

Use of Area of Floor or Roof	Minimum Design Load psf	
Garages		
Passenger cars	50	
Unloaded buses and light trucks	125	
Loaded buses and trucks and all other trucking spaces	250	
Kitchens (other than residential)	100	
Libraries		
Stack rooms	150	
Reading and study rooms	60	
Manufacturing & Repair areas	100	
Office areas in office buildings and other buildings (not including record storage and computer rooms) located in		
Basement and first floor	100	
Floors above first floor	50	
Operating rooms, laboratories	75	
Projection rooms	100	
Recreation areas that cannot be used for assembly purposes in- cluding:		
Billiard rooms	75	
Bowling alleys	75	
Swimming pools	75 ⁽¹⁾	
Residential areas in		
Apartments	}	40
Dormitories		
Hospital wards		
Hotels		
Motels		
Penal institutions		
Retail and wholesale areas	100	
Roofs (for roof snow loads see Article 4.1.7.1.)	20 ⁽²⁾	
Sidewalks and driveways over areaways and basements	250	
Storage areas		
General storage	100 ⁽¹⁾	
Locker rooms in residential occupancies	50	
Toilet areas other than residential	50	
Underground structures with earth cover	⁽¹⁾	
Warehouses (see Storage areas)	100 ⁽¹⁾	
Column 1	2	

Notes to Table 4.1.6.A.

⁽¹⁾ Loads due to the intended use must be calculated and allowed for in the design.
⁽²⁾ To cover occasional short term loads such as workmen.

More than one occupancy

(2) Where an area of floor or roof is intended for two or more occupancies at different times, the value to be used from Table 4.1.6.A. shall be the greatest value for any of the occupancies concerned.

Change in occupancy

(3) When the occupancy of a building is changed, loading requirements for the new occupancy as stipulated in this Part shall be complied with.

Variation with tributary area

(4) Where a structural member supports a tributary area of floor, roof or combination of these greater than 900 sq ft used for storage, manufacturing, retail stores, garage or assembly, the design live load due to use and occupancy, excluding snow, is the load provided for in Sentence (1) multiplied by

$$0.5 + 15/\sqrt{A}$$

where A is the tributary area in square feet for this type of use and occupancy.

(5) Where a structural member supports a tributary area of floor, roof or combination of these greater than 200 sq ft for any use or occupancy other than those indicated in Sentence (4), the design live load due to use and occupancy, excluding snow, is the load provided for in Sentence (1) multiplied by

$$0.3 + 10/\sqrt{B}$$

where B is the tributary area in square feet for this type of use and occupancy.

(6) RESERVED

(7) RESERVED

Concentrated loads

4.1.6.4.(1) The design load due to possible concentrations of load resulting from use of an area of floor or roof shall not be less than listed in Table 4.1.6.B. applied over an area of 2½ ft by 2½ ft located so as to cause maximum effects.

(2) For those occupancies not listed in Table 4.1.6.B., the design concentrated load shall be determined in accordance with Sentence 4.1.6.2.(1).

TABLE 4.1.6.B.

Forming Part of Article 4.1.6.4.

Area of Floor or Roof	Minimum Concentrated Load, lb
Roof surfaces	300
Classrooms	1,000
Floors of offices, manufacturing buildings, hospital wards, stages and pedestrian bridges	2,000
Floors and areas used by passenger cars	2,500
Floors and areas used by vehicles not exceeding 8,000 lb gross weight	4,000
Floors and areas used by vehicle exceeding 8,000 lb but not exceeding 20,000 lb gross weight	8,000
Floors and areas used by vehicles exceeding 20,000 lb gross weight	(¹)
Driveways and sidewalks over areaways and basements	12,000(¹)
Column 1	Column 2

Note to Table 4.1.6.B.

(¹) Requires special study and where appropriate the designer should refer to CSA S6-1974, "Design of Highway Bridges", as revised to 1 May, 1975.

4.1.6.5. RESERVED

Subsection 4.1.7. Live Loads Due to Snow and Rain

4.1.7.1. The design load due to the accumulation of snow on a surface shall not be less than the ground snow load specified in Section 4.9 decreased or increased as provided for in Articles 4.1.7.2. to 4.1.7.4., but in no case shall the roof load be less than 20 psf for roofs with a slope of 30° or less.

Ground
snow load

4.1.7.2.(1) The design snow load on a roof or other building surface subject to snow accumulation shall be determined by multiplying the ground snow load given in Article 4.1.7.1. by appropriate snow load coefficient C_s given in Articles 4.1.7.3. and 4.1.7.4.

Roof snow
load

(2) A roof or other building surface and its structural members subject to loads due to snow accumulation shall be designed for the following snow load distributions:

Full and
partial
loading

- (a) full load distributed over the entire area; or
- (b) full load distributed on any one portion of the area and half load on the remainder of the area;

whichever produces the greatest effects on the member concerned, and

- (c) where appropriate, more severe load imbalances than given in Clause (b) which may result from such effects as snow removal or melting of snow due to roof fans or uninsulated roof areas in heated buildings.

4.1.7.3.(1) The basic snow load coefficient C_s is 0.8, except for roofs exposed to wind as provided for in Article 4.1.7.4. The basic snow load coefficient shall be further increased or decreased to account for the following influences:

Snow load
coefficients

- (a) the decrease of snow load because of the effect of slope for roof slopes exceeding 30 deg.;
- (b) the accumulation of nonuniform snow load on gable and hip roofs;
- (c) the accumulation of nonuniform snow load on arched and curved roofs;
- (d) the accumulation of increased snow loads in valleys of butterfly as well as multispans curved or sloped roofs;
- (e) the accumulation of increased nonuniform snow loads due to drifting snow on the lower of two-level or multi-level roofs, such as a canopy, marquee or porch roof provided the upper roof is part of the same building or of an adjacent building not more than 15 ft away;
- (f) the accumulation of increased nonuniform snow loads on areas adjacent to roof projections such as penthouses, large chimneys, ventilating equipment;
- (g) the accumulation of increased snow or ice loads on areas due to snow sliding or melt water draining onto these areas from an adjacent roof sloping towards this area in which case the magnitude and distribution of the increase shall be appropriate to the relative portions and sizes of the surfaces.

4.1.7.4.(1) The basic snow load coefficient of 0.8 may be reduced to 0.6 provided the designer has demonstrated that the following conditions are fulfilled:

- (a) the building is located in an exposed location such as open level terrain with only scattered buildings, trees or other obstructions, so that the roof is exposed to the winds on all sides and is not likely to become shielded in the future by obstructions higher than the roof within a distance from the building equal to ten times the height of the obstruction above the roof level, and
- (b) the roof does not have any significant projection such as parapet walls exceeding a height of $g/30$ in feet where g is the ground snow load in psf, which may prevent snow from being blown off the roof.

Rain loads

4.1.7.5.(1) The design load, due to the accumulation of rain water on a surface whose position and shape, and deflection under load, is such as to make such an accumulation possible, is that resulting from the 24-hr rainfall specified in Section 4.9. over the horizontal projection of the surface and all tributary surfaces. This provision applies whether or not the surface is provided with drainage, such as rain water leaders.

(2) Loads due to rain need not be considered to act simultaneously with loads due to snow.

Subsection 4.1.8. Effects of Wind

External
pressure
or suction

4.1.8.1.(1) The design external pressure or suction due to wind on a building as a whole or on cladding shall be calculated from:

$p = qC_eC_gC_p$
 where p = the design external pressure acting statically and in a direction normal to the surface either as a pressure (directed towards the surface) or as a suction (directed away from the surface),
 q = the reference velocity pressure as provided for in Sentence (3),
 C_e = the exposure factor as provided for in Sentence (4),
 C_g = the gust effect factor as provided for in Sentence (5),
 C_p = the external pressure coefficient for the cladding location considered or the shape factor for the *building* as a whole. The shape factor is equal to the algebraic difference of the external pressure coefficients for the windward and leeward sides of the *building*.

Internal
pressure
or suction
on cladding

(2) The net design pressure due to wind on cladding shall be the algebraic difference of the external pressure or suction as provided for in Sentence (1) and the design internal pressure or suction due to wind calculated from either,

(a) $p_i = qC_eC_{pi}$
 or
 (b) $p_i = qC_eC_gC_{pi}$
 where p_i = the design internal pressure acting statically and in a direction normal to the cladding either as a pressure (directed outwards) or as a suction (directed inwards),
 q, C_e, C_g are as provided for in Sentences (3), (4) and (5) respectively, except that C_e shall be evaluated at the *building* mid-height instead of the height of the element considered, and
 C_{pi} = the internal pressure coefficient.

(2A) Formula (b) shall be used if the building has large openings such that the effects of wind gusts are transmitted to the internal air space of the building. In the design of cladding adequate allowance shall be made for regions of high local external pressures or suctions.

Reference
velocity
pressure

(3) The reference velocity pressure q is the appropriate value specified in Section 4.9. for the conditions listed in Clauses (a), (b), (c) and (d),

Cladding

(a) the reference velocity pressure q for the design of cladding shall be based on a probability of being exceeded in any one year of 1 in 10;

Deflection
of structural
members

(b) the reference velocity pressure q for the design of structural members for deflection and vibration shall be based on a probability of being exceeded in any one year of 1 in 10;

Strength of
structural
members

(c) for all buildings except those listed in Clause (d) the reference velocity pressure q for the design of structural members for strength shall be based on a probability of being exceeded in any one year of 1 in 30;

Buildings for
post-disaster
services

(d) the reference velocity pressure q for the design of structural members for strength for buildings essential for post-disaster services shall be based on a probability of being exceeded in any one year of 1 in 100.

- (4) The exposure factor C_e shall be,
- Exposure factor
- (a) the value shown in Table 4.1.8.A. for the appropriate height of the surface or part of the surface; or

(b) the value of the function: $(h/30)^{1/8}$ but not less than 1.0 where h is the height above grade in feet of the surface or part of the surface; or

(c) if a dynamic approach to the action of wind gusts is used, an appropriate value depending on both height and shielding.

TABLE 4.1.8.A.
Forming Part of Sentence 4.1.8.1.(4)

Height, ft	Exposure Factor C_e
0 to 40	1.0
Over 40 to 60	1.1
" 60 to 90	1.2
" 90 to 130	1.3
" 130 to 190	1.4
" 190 to 270	1.5
" 270 to 420	1.6
" 420 to 740	1.8
" 740 to 1200	2.0
Column 1	Column 2

- (5) The gust effect factor C_g is one of the following values,
- Gust effect factor
- (a) 2.0 for structural members;

(b) 2.5 for small elements including cladding;

(c) if a dynamic approach to the action of wind gusts is used, an appropriate value depending on the turbulence of the wind and the size and natural frequency of the structure.

4.1.8.2.(1) Buildings whose height is greater than four times their minimum effective width or greater than 400 ft and other buildings whose light weight, low frequency and low damping properties make them susceptible to vibration shall be,

Dynamic effects of wind

- (a) designed by experimental methods for the danger of dynamic overloading and vibration and the effects of fatigue, or

(b) designed using a dynamic approach to the action of wind gusts.

4.1.8.3.(1) Buildings and structural members shall be capable of withstanding the effects of,

Full and partial loading

- (a) the full wind load over the entire area; or

(b) 0.75 times the full wind load acting over any portion of the area and full load on the rest of the area,

whichever produces the greatest effect on the building or member concerned.

4.1.8.4.(1) In the design of interior walls and partitions due consideration shall be given to differences in air pressure on opposite sides of the wall or partition which may result from,

Interior walls and partitions

- (a) pressure differences between the windward and leeward sides of a building;

- (b) stack effects due to a difference in air temperature between the exterior and interior of the building; and
- (c) air pressurization by the mechanical services of the building.

Subsection 4.1.9. Effects of Earthquakes

4.1.9.1.(1) The design loading due to earthquake motion shall be determined,

- (a) by the analysis given in this Subsection; or
- (b) by a dynamic analysis provided that the associated horizontal ground acceleration is not less than that given in Section 4.9.

Nomenclature

(2) In this Subsection,

- A = assigned horizontal design ground acceleration.
- D = the dimension of the *building* in feet in a direction parallel to the applied forces.
- D_n = plan dimension of the *building* in the direction of the computed eccentricity.
- D_x = the dimension of the lateral force-resisting system in feet in a direction parallel to the applied forces.
- e = computed eccentricity between the centre of mass and centre of rigidity at the level being considered.
- e_x = Design eccentricity at level x.
- F = Foundation factor as given in Sentence 4.1.9.1.(9).
- F_t = Portion of V to be concentrated at the top of the structure as defined in Sentence 4.1.9.1.(11).
- F_x = Lateral force applied to level x.
- h_i, h_n, h_x = The height in feet above the base ($i=0$) to level "i", "n" or "x", respectively.
- I = Importance factor of the structure as described in Sentence 4.1.9.1.(8).
- J = Numerical reduction coefficient for base overturning moment as defined in Sentence 4.1.9.1.(14).
- J_x = Numerical reduction coefficient for moment at level "x" as defined in Sentence 4.1.9.1.(15).
- K = Numerical coefficient that reflects the material and type of construction, damping, ductility and/or energy-absorptive capacity of the structure as given in Sentence 4.1.9.1.(7).
- Level i = Any level in the *building*, $i=1$ first level above the base.
- Level n = That level which is uppermost in the main portion of the structure.
- Level x = That level which is under design consideration.
- M_{ix} = Torsional moment at level x.
- N = The total number of *storeys* above exterior *grade* to level "n". (N is usually numerically equal to n.)
- S = Seismic response factor for the structure as defined in Sentence 4.1.9.1.(5).
- S_p = Horizontal force factor for part or portion of a structure, as given in Table 4.1.9.C.
- T = Fundamental period of vibration of the *building* or structure in seconds in the direction under consideration.
- V = Minimum lateral seismic force at the base of the structure.
- V_p = Lateral force on a part of the structure.
- W = *Dead load* including the following:
25 per cent of the design snow load specified in Subsection 4.1.7.; for areas used for storage, the full design live load modified according to Sentence 4.1.6.3.(4); the full contents of any tanks.
- W_i, W_x = That portion of W which is located at or is assigned to level "i" or "x", respectively.
- W_p = The weight of a part or portion of a structure, e.g. cladding, *partitions* and appendages.

(3) Earthquake forces shall be assumed to act in any horizontal direction and independent design about each of the principal axes shall be considered to provide adequate resistance in the structure for earthquake forces applied in any direction.

(4) The minimum lateral seismic force, V , assumed to act nonconcurrently in any direction on the building shall be equal to the product of

$$A \cdot S \cdot K \cdot I \cdot F \cdot W$$

where A is the assigned horizontal design ground acceleration, given in Section 4.9, and the value of this ground acceleration is assumed constant within each seismic zone.

(5) The seismic response factor, S , shall be equal to $0.5/(T^{1/3})$ but need not exceed 1.00.

(6) Except where technical data proves otherwise, the fundamental period, T , in Sentence (5) shall be equal to $0.05h_n/\sqrt{D}$, except that where the lateral force-resisting system consists of a moment-resisting space frame which resists 100% of the required lateral forces and the frame is not enclosed by or adjoined by more rigid elements that would tend to prevent the frame from resisting lateral forces, the fundamental period, T , shall equal 0.1 N.

(7) Values of the numerical coefficient, K , shall conform to Table 4.1.9.A.

TABLE 4.1.9.A.

Forming Part of Sentence 4.1.9.1.(7)

Case	Type or Arrangement of Resisting Elements	Value of K
(1)	Buildings with a ductile moment resisting space frame with the capacity to resist the total required force.	0.7
(2)	Buildings with a dual structural system consisting of a complete ductile moment resisting space frame and ductile flexural walls designed in accordance with the following criteria: The frames and ductile flexural walls shall resist the total lateral force in accordance with their relative rigidities considering the interaction of the flexural walls and frames. In this analysis the maximum shear in the frame must be at least 25% of the total base shear.	0.7
(3)	Buildings with a dual structural system consisting of a complete ductile moment resisting space frame and shear walls ⁽¹⁾ or steel bracing designed in accordance with the following criteria: 1. The shear walls or steel bracing acting independently of the ductile moment resisting space frame shall resist the total required lateral force. 2. The ductile moment resisting space frame shall have the capacity to resist not less than 25% of the required lateral force, but in no case shall the ductile moment resisting space frame have a lower capacity than that required in accordance with the relative rigidities.	0.8
(4)	Buildings with ductile flexural walls and all ductile building framing systems except as otherwise classified in this Table as Cases 1, 2, 3, or 5.	1.0
Col. 1	2	3

Case	Type of Arrangement of Resisting Elements	Value of K
(5)	Buildings with a dual structural system consisting of a complete ductile moment resisting space frame with masonry infilling designed in accordance with the following criteria: <ol style="list-style-type: none"> 1. The wall system comprising the infilling and the confining elements acting independently of the ductile moment resisting space frame shall resist the total required lateral force. 2. The ductile moment resisting space frame shall have the capacity to resist not less than 25 per cent of the required lateral force. 	1.3
(6)	Buildings (other than cases 1, 2, 3, 4 and 5) with continuously reinforced concrete, structural steel buildings and reinforced masonry shear wall structures.	1.3
(7)	Buildings of unreinforced masonry and all other structural systems, except Cases 1 to 6 inclusive.	2.0
(8)	Elevated tanks plus full contents, on four or more cross-braced legs and not supported by a building, designed in accordance with the following criteria: <ol style="list-style-type: none"> 1. The minimum and maximum value of the product SKI shall be taken as 1.2 and 2.5, respectively. 2. For overturning the factor J as set forth in Clause 4.1.9.1.(14) shall be 1.0. 3. The torsional requirements of Sentence 4.1.9.1.(15) shall apply. 	3.0
Col. 1	2	3

Note to Table 4.1.9.A.

(¹) Shear walls may be either flexural walls or shear walls as defined under CSA A23.3-1973, "Code for the Design of Concrete Structures for Buildings, Chapter 19, Special Provisions for Seismic Design", as revised to 1 May, 1975.

Importance factor

(8) The importance factor, I, shall equal 1.3 for all buildings designed for post-disaster services and schools, and 1.0 for all other buildings.

Foundation factor

(9) The foundation factor, F, shall conform to Table 4.1.9.B.

(9A) Soil depth shall be measured from foundation or pile cap level.

TABLE 4.1.9.B.

Forming Part of Sentence 4.1.9.1.(9) & (9A)

Type and Depth of Soil. See Sentence 4.1.9.1.(9A)	F
Rock, dense and very dense coarse-grained soils, very stiff and hard fine-grained soils; compact coarse-grained soils and firm and stiff fine-grained soils with a depth of less than 50 ft	1.0
Compact coarse-grained soils, firm and stiff fine-grained soils with a depth greater than 50 ft; very loose and loose coarse-grained soils and very soft and soft fine-grained soils from 0 to 50 ft deep	1.3
Very loose and loose coarse-grained soils, very soft and soft fine-grained soils with depths greater than 50 ft	1.5(¹)
Column 1	2

Note to Table 4.1.9.B.

(¹) Where soil deposits are deeper than 300ft, amplification factors greater than those given in the table may arise in the case of tall buildings.

(10) The weight, W , of the structure shall be calculate in accordance with the following formula:

Weight of structure

$$W = \sum_{i = 1}^n W_i$$

(11) The total lateral seismic force, V , shall be distributed as follows:

Distribution of lateral seismic force

(a) a portion F_t shall be assumed to be concentrated at the top of the structure and equal to $0.004V(h_n/D_s)^2$, except that F_t need not exceed $0.15V$ and may be considered as zero for $(h_n/D_s) \leq 3$.

(b) the remainder, $V - F_t$, shall be distributed along the height of the building including the top level in accordance with the following formula:

$$F_x = (V - F_t) W_x h_x / (\sum_{i = 1}^n W_i h_i), \text{ and}$$

(c) the total shear in any horizontal plane shall be distributed to the various elements of the lateral force resisting system in proportion to their rigidities with due regard to the capacities and stiffnesses of the nonstructural elements.

(12) Parts of buildings and their anchorage shall be designed for a lateral force, V_p , equal to $AS_p W_p$, distributed according to the distribution of mass of the element under consideration.

(13) The values of S_p in Sentence (12) shall conform to Table 4.1.9.C.

(13A) The value of S_p shall be increased 50% for pipes and containers for toxic or explosive materials, for materials having a flash point below 100°F, or for firefighting fluids.

(13B) Floors and roofs acting as diaphragms shall be designed for a minimum force corresponding to a value of $S_p = 1$ applied to loads tributary from that storey, unless a greater force F_x is assigned to the level under consideration as per Clause 4.1.9.1.(5).

TABLE 4.1.9.C.

Forming Part of Sentence 4.1.9.1.(13), (13A) & (13B)

Category	Part or Portion of Building	Direction of Force	Value of S_p
1	All exterior and interior walls except those of category 2 & 3	Normal to flat surface	2
2	Cantilever parapet and other cantilever walls except retaining walls	Normal to flat surface	10
3	Exterior and interior ornamentations and appendages	Any direction	10
4	Towers, chimneys, smokestacks, all when less than 10 ft high above the building, machinery, fixtures and equipment, pipes, tanks plus contents and pent-houses—all when connected to or forming part of a building	Any direction	2 ⁽¹⁾
5	Towers, chimneys and smokestacks more than 10 ft high above the building	Any direction	3 ⁽²⁾
Col. 1	2	3	4

Category	Part or Portion of Building	Direction of Force	Value of S_p
6	Tanks plus contents when resisting on the ground	Any direction	1
7	Floors and roofs acting as diaphragms	Any direction	1
8	Connections for exterior and interior walls and elements except those forming part of the main structural system	Any direction	25
Col. 1	2	3	4

Notes to Table 4.1.9.C.

(¹) When h/D of any building is equal to or greater than 5 to 1, increase value by 50%.

(²) Unless a lower factor can be proven by analysis.

Overturning

(14) The overturning moment, M , at the base of the structure shall be multiplied by a reduction coefficient, J , where,

(a) $J=1$ where T is less than 0.5;

(b) $J=1.1-0.2T$ where T is at least 0.5, but not more than 1.5; and

(c) $J=0.8$ where T is greater than 1.5T.

(15) The overturning moment M_x at any level x shall be multiplied by J_x where

$$J_x = J + (1-J) (h_x/h_n)^3,$$

(a) the incremental changes in the design overturning moments, in the storey under consideration, shall be distributed to the various resisting elements in the same proportion as the distribution of shears in the resisting system;

(b) where other vertical members are provided which are capable of partially resisting the overturning moments a redistribution may be made to these members if framing members of sufficient strength and stiffness to transmit the required loads are provided; and

(c) where a vertical-resisting element is discontinuous, the overturning moment carried by the lowest storey of that element shall be carried down as loads to the foundation.

Torsional moments

(16) Torsional moments in the horizontal plane of the building shall be computed in each storey using the following formula:

$$M_{ix} = \left(V - \sum_{i=1}^x F_i \right) e_x$$

Design eccentricity

(17) The design eccentricity, e_x , in Sentence (16) shall be computed by one of the following equations, whichever provides the greater stresses,

(a) $e_x = 1.5e + 0.05D_n$, or

(b) $e_x = 0.5e - 0.05D_n$.

(18) When the maximum design eccentricity exceeds $0.25D_n$,

(a) a dynamic analysis shall be made; or

(b) the adverse effects of torsion as computed in Sentence 4.1.9.1.(16) shall be doubled.

(19) The building design shall take full account of the possible effects of setbacks.

Setbacks

4.1.9.2.(1) Lateral deflections of a storey relative to its adjacent storeys shall be included in the design.

General provisions

(2) Lateral deflections of a storey relative to its adjacent storeys obtained from an elastic analysis using the loads given in Sentence 4.1.9.1.(11) shall be multiplied by three to give realistic values of anticipated deflections.

(3) All portions of the structure shall be designed to act as an integral unit in resisting horizontal forces, unless separated by adequate clearances which permit horizontal deflections of the structure consistent with values of deflections calculated in accordance with Sentence 4.1.9.2.(2).

(4) The nonstructural components shall be designed not to transfer to the structural system any forces unaccounted for in the design, and any interaction of rigid elements such as walls and the structural system shall be designed so that the capacity of the structural system is not impaired by the action or failure of the rigid elements.

(5) To prevent collision of buildings in an earthquake, adjacent structures shall either be separated by twice the sum of their individual deflections obtained from an elastic analysis using the loads given in Sentence 4.1.9.1.(11) or shall be connected to each other.

(6) The method of connection in Sentence (5) shall take into account the mass, stiffness, strength, ductility and anticipated motion of the connected buildings and the character of the connection.

(7) The connected buildings in Sentence (5) shall be assumed to have a K value equal to that of the least ductile of the buildings connected, unless a lower value can be justified by rational analysis.

(8) Except in seismic Zone 0, pile footings of every building or structure shall be interconnected continuously by ties in at least 2 directions, designed to carry by tension or compression a horizontal force equal to 10% of the larger pile cap loading, unless it can be demonstrated that equivalent restraints can be provided by other means.

4.1.9.3.(1) Buildings more than 3 storeys in height in seismic Zones 2 and 3 shall have a structural system as described in Cases 1, 2, 3, 4, 5 and 6 of Table 4.1.9.A. and in addition, for buildings in seismic Zone 3 more than 200 ft in height and with a structural system of Case 6 the value of K shall be increased to 2.0.

Special Provisions

(2) The design for any structural system which has an assigned value of K of 1 or less, shall ensure that when any member yields the remaining members of the structure shall be capable of resisting 25% of the design seismic force including the effects of torsion.

(3) For buildings in Zones 2 and 3 in which discontinuities in columns or shear walls occur, special design provisions shall be made to ensure that failure at the point of discontinuity will not occur before the capacity of the remaining portion of the structure has been realized.

(4) In seismic Zones 2 and 3, reinforcement conforming to Article 4.4.3.10. shall be provided for masonry construction in,

(a) loadbearing and lateral load-resisting masonry;

(b) masonry enclosing elevator shafts and stairways, or used as exterior cladding;

(c) masonry partitions except for partitions which,

(i) do not exceed 40 lb/sq ft in weight, and

(ii) do not exceed 10 ft in height and are not laterally supported at the top.

Subsection 4.1.10. Other Effects

Loads on
railings

4.1.10.1(1) The minimum design load, applied horizontally at the top of a railing which guards a drop of more than 18 in. shall be,

- (a) 40 lb/lin. ft for exterior balconies of individual residential units and a concentrated load of 200 lbs applied concurrently;
- (b) 100 lb/lin. ft for exits and stairs;
- (c) 150 lb/lin. ft for assembly occupancies except for grandstands and stadia;
- (d) 250 lb/lin. ft for grandstands and stadia including ramps;
- (e) 300 lb/lin. ft for vehicle guard rails for parking garages 21 in. above the roadway and minimum total load of 2,500 lbs uniformly distributed over each vehicle space 21 in. above roadway;
- (f) a 125 lb concentrated load applied at any point for industrial catwalks and other areas where crowding by many people is very improbable.

(2) The minimum design load applied horizontally to panels under railings which guard a drop of more than 18 in. shall be 20 psf.

(3) The minimum design load applied vertically at the top of the railing which guards a drop of more than 18 in. shall be 100lb/lin. ft acting separately from the horizontal load provided for in Sentences (1) and (2).

Inertia
sway
forces

4.1.10.2.(1) Grandstands and any building used for assembly purposes to accommodate large numbers of people at one time shall be designed to resist all inertia sway forces produced by the use and occupancy of the building or structure.

(2) In making the determination under Sentence (1), the inertia force shall be not less than 20 lb per lin. ft of seat parallel to each row of seats or 10 lb per lin. ft of seat perpendicular to each row of seats.

Impact and
vibrations

4.1.10.3.(1) The minimum design load due to equipment, machinery, or other objects or persons that may produce impact, is the total of the weight of the equipment or machinery plus its maximum lifting capacity, or the appropriate live load, multiplied by an appropriate factor listed in Table 4.1.10.A.

(2) Where dynamic effects such as resonance and fatigue are likely to be important as a result of vibration of equipment or machinery, a dynamic analysis shall be carried out.

TABLE 4.1.10.A.
Forming Part of Articles 4.1.10.3. & 4.1.10.5.

Impact Due to	Factor
Operation of motor driven cranes	1.25
Operation of hand driven cranes	1.10
Live loads on hanger supported floors and stairs	1.33
Operation of elevators	See CSA Standard B44, 1971, Item 2.6.2.
Operation of helicopters	1.33
Supports for light machinery, shaft or motor driven	1.20
Supports for reciprocating machinery or power driven units	1.50
Column 1	Column 2

4.1.10.4.(1) The minimum horizontal design loads on crane runway rails are,

Horizontal
crane loads

(a) the lateral force which shall be,

(i) for power-operated crane trolleys, 20 per cent, and for hand operated trolleys, 10 per cent, of the sum of the weights of the lifted loads and of the crane trolley excluding other parts of the crane,

(ii) applied at the top of the rail, one-half on each side of the runway, and

(iii) considered as acting in either direction normal to the runway rail;

(b) the longitudinal force which shall be,

(i) 10 per cent of the maximum wheel loads of the crane, and

(ii) applied at the top of the rail.

4.1.10.5.(1) The minimum design loads for heliports on landing and taxiing areas are,

Helicopter
loads

(a) a single concentrated load equal to 75% of the gross weight of the helicopter acting on an area of 1 sq ft; or

(b) concentrated loads representing the gross wheel reactions of the helicopter acting simultaneously and multiplied with the factor given in Table 4.1.10.A., whichever produces the most unfavourable effect on the building and its structural members.

(2) The landing and taxiing areas shall be designed for uniformly distributed live load of 50 psf acting non-concurrently with the concentrated loads or snowload.

SECTION 4.2 FOUNDATIONS

Subsection 4.2.1. General

APPLICATION

4.2.1.1.(1) This Section applies to the design of foundation systems for the following:

(a) all buildings used or intended for the following occupancies,

(i) Group A, Assembly Occupancies,

(ii) Group B, Institutional Occupancies,

(iii) Group F, Division 1, High Hazard Industrial Occupancies;

(b) all buildings exceeding 3 storeys in building height or 6,000 sq ft in building area and which are used or intended to be used for the following occupancies:

(i) Group C, Residential Occupancies,

(ii) Group D, Business and Personal Services Occupancies,

(iii) Group E, Mercantile Occupancies,

(iv) Group F, Divisions 2 and 3, Medium and Low Hazard Industrial Occupancies; and

(c) all buildings of smaller size than in (b),

(i) whose foundations are erected in fill, very loose sand, very loose sand and gravel, soft till, very soft clay, soft clay and clay shale,

- (ii) whose superstructures are of metal frame, or reinforced concrete construction,
- (iii) where unusual loading or thermal conditions exist, or
- (iv) supported on piles;
- (d) retaining walls;
- (e) signs;
- (f) communication towers exceeding 50 ft in height;
- (g) pedestrian bridges;
- (h) permanent crane runways that impose loads on buildings;
- (i) fire escapes;
- (j) exterior storage tanks.

(2) RESERVED

(3) Requirements for the control of groundwater around spaces formed below grade are given in the appropriate articles set forth in Part 9.

4.2.1.2. RESERVED

SOILS AND ROCKS

4.2.1.3. RESERVED

N.B. For buildings not listed in Sentence 4.2.1.1.(1) requirements for design will be found in Part 9.

Cohesionless
soil, gravel
and sand

4.2.1.4.(1) A cohesionless soil identified as,

- (a) "gravel" is a soil consisting of particles smaller than 3 in. (76 mm), but retained on a No. 4 sieve; and
- (b) "sand" is a soil consisting of particles passing a No. 4 sieve but retained on a No. 200 sieve.

(2) "Sands" are further subdivided as follows:

- (a) "coarse sand" is a soil consisting of particles passing a No. 4 sieve but retained on a No. 10 sieve;
- (b) "medium sand" is a soil consisting of particles passing a No. 10 sieve but retained on a No. 40 sieve; and
- (c) "fine sand" is a soil consisting of particles passing a No. 40 sieve but retained on a No. 200 sieve.

Cobbles and
boulders

(3) Particles identified as,

- (a) "cobbles" are rock fragments whose greatest dimensions are between 3 and 8 in.; and
- (b) "boulders" are rock fragments whose greatest dimensions exceed 8 in.

Density of
cohesionless
soil

4.2.1.5.(1) A cohesionless soil is,

- (a) "dense" when it requires 30 or more blows per foot in a penetration test;

- (b) "compact" when it requires between 10 and 30 blows per foot in a penetration test;
 - (c) "loose" when it requires between 4 and 10 blows per foot in a penetration test; and
 - (d) "very loose" when it requires fewer than 4 blows per foot in a penetration test where the test is carried out in accordance with CSA A119.1-1960, "Code for Split-Barrel Sampling of Soils", as revised 1 May, 1975.
- (2) Where it is not possible to conduct a penetration test, a cohesionless soil may be described as,
- (a) "dense" if it is not possible for a man of average weight to push a wooden picket more than 1 ½ in. into the soil; and
 - (b) "loose" if it is possible for a man of average weight to push a wooden picket 8 in. or more into the soil.
- (3) The picket referred to in Sentence (2) is 2 in. by 2 in. dimensions, bevelled at 45° on all sides at one end to form a point.

4.2.1.6. A cohesive soil identified as,

Cohesive
soil, silt
and clay

- (a) "silt" is a soil,
 - (i) the particles of which are not visible to the naked eye,
 - (ii) dry lumps of which are easily powdered by the fingers,
 - (iii) that, after shaking a small saturated pat vigorously in the hand, exhibits a wet shiny surface that disappears rapidly when the pat is subsequently squeezed, and
 - (iv) that does not shine when moist and stroked with a knife;
- (b) "clay" is a soil,
 - (i) the particles of which are not visible to the naked eye,
 - (ii) dry lumps of which are not easily powdered by the fingers,
 - (iii) that, after shaking a small saturated pat vigorously in the hand, does not exhibit a wet shiny surface, and
 - (iv) that shines when moist and stroked with a knife.

4.2.1.7. The consistencies of cohesive soils can be identified according to the description given in Table 4.2.1.A. and may be related to the approximate undrained shear strengths as indicated.

Consistencies
of cohesive
soils

TABLE 4.2.1.A.

Forming Part of Article 4.2.1.7.

Consistency	Description	Approximate undrained shear strength
"very stiff"	impossible to indent with the thumb but readily indented with the thumbnail,	Over 2,000 psf
"stiff"	difficult to indent with the thumb; with difficulty it can be remoulded by hand,	1,000 to 2,000 psf
"firm"	can be indented by moderate thumb pressure,	500 to 1,000 psf
"soft"	can be penetrated several inches with the thumb	250 to 500 psf
"very soft"	can easily be penetrated several inches by the fist	less than 250 psf
Column 1	Column 2	Column 3

Other soils

4.2.1.8. Organic soils and soils other than those identified in Articles 4.2.1.4. to 4.2.1.7. shall require investigations to determine suitable design properties.

Clay-shale

4.2.1.9. In this Section a soil or rock identified as,

- (a) "clay-shale" is fine-grained, finely laminated, will swell on wetting, and will disintegrate on its first drying and wetting cycle;

Till

- (b) "till" is of glacial origin, unsorted and heterogeneous and can contain a range of particle sizes including boulders, cobbles, gravel, sands, silts and clays and can exist at any relative density or consistency; and

Cemented sand and gravel

- (c) "cemented sand and gravel" is a mixture of sand and gravel or boulders thoroughly cemented together as a hard layer which will not soften in its natural bed when wet.

4.2.1.10.(1) RESERVED

Approximate compressive strength of rock

- (2) Rocks vary from "hard" through "medium hard" to "soft",

- (a) "hard" means rock comparable to concrete with a compressive strength greater than 6,000 psi;
- (b) "medium hard" means rock comparable to concrete with a compressive strength greater than 2,500 psi; and
- (c) "soft" rock is comparable to brick masonry with a compressive strength greater than 500 psi.

Classification of rock

- (3) Rocks are classified as,

- (a) igneous, such as granite, diorite, basalt;
- (b) sedimentary, such as sandstones, shales, limestones; and
- (c) metamorphic, such as quartzites, slates, marbles, schists.

Altered
conditions

4.2.1.17.(1) Where during construction the soil or rock to which a foundation is to transfer loads is found not to be of the type or in the condition used for purposes of design, the foundation shall be redesigned and constructed for the existing type or conditions.

Foundations
incorrectly
located

(2) Where a foundation has not been placed or located as indicated on the plans, the error shall be corrected or the design capacity of the foundation recalculated for the altered conditions.

Damaged
foundation

(3) Where a foundation is damaged, it shall be repaired or the design capacity of the foundation recalculated for the damaged condition.

(4) Where a foundation bears on a soil whose properties may be adversely changed by climatic or construction conditions which occur before construction is complete, the design capacity of the foundation shall be reassessed by a special investigation.

(5) Where filled ground or organic materials are encountered,

Filled
ground
organic
material

(a) the design capacity of the foundation shall be determined on the basis of exploration and testing in accordance with Clause 4.2.3.1.(1) (a); or

(b) such material shall be removed so that the foundation will rest on stable soil or rock.

Subsection 4.2.2. Materials Used in Foundations

TIMBER

Preservative
treatment

4.2.2.1.(1) Where timber is exposed to soil or air above the permanent water table it shall be treated with preservative in accordance with CSA 080.1-1974, "Preservative Treatment by Pressure Process— All Timber Products", as revised to 1 May, 1975, and also in accordance with the following Standards, as revised to 1 May, 1975:

(a) CSA 080.2-1974, "Preservative Treatment of Lumber, Timbers, Bridge Ties and Mine Ties by Pressure Processes";

(b) CSA 080.3-1974, "Preservative Treatment of Piles by Pressure Processes" and CSA 080.12-1974, "Preservative Treatment of Timber Foundation Piles by Pressure Processes"; or

(c) CSA 080.15-1974, "Preservative Treatment of Wood for Building Foundation Systems, Basements and Crawl Spaces by Pressure Processes".

(2) Where timber has been treated as set forth in Sentence (1) it shall be cared for as provided for in CSA 080-M4-1962, "Instructions for the Care of Pressure-Treated Wood After Treatment", as revised to 1 May, 1975.

CONCRETE

Reinforced
concrete

4.2.2.3. Where reinforced concrete foundation members except piles, are to be in contact with the soil, all steel reinforcement shall be protected by a thickness of concrete cover conforming with the appropriate requirements of Section 4.5.

4.2.2.4. Where reinforced concrete piles are to be in contact with the soil, the steel spirals or ties shall be protected by a thickness of concrete cover, cast monolithically with the core, not less than:

(a) the diameter of the longitudinal bars; nor

(b) $1\frac{1}{2}$ times the maximum size of the coarse aggregate; nor

- (c) 3 in. where the concrete is cast-in-place without forming; nor
- (d) 2 in. for bars larger than No. 8 bars or 1½ in. for No. 8 bars or smaller, for concrete cast-in-place within forms; nor
- (e) 1½ in. for precast concrete of 28-day strength under 7,000 psi; nor
- (f) 1 in. for precast concrete 28-day strength of 7,000 psi or greater.

4.2.2.5. The concrete cover for steel ties and prestressed tendons in prestressed concrete piles shall comply with the cover requirements for steel reinforcement in Article 4.2.2.4. Prestressed concrete

4.2.2.6. Where concrete in foundations may be subject to attack by sulphates in the soil or groundwater, the selection of the cement type, the proportions of the concrete, the placing procedure and the method of compaction of the concrete shall be treated as a special engineering problem and shall be in accordance with CSA A23.1-1975, "Concrete Materials and Methods of Concrete Construction" and CSA A5-1971, "Portland Cements", as revised to 1 May, 1975. Sulphate attack

4.2.2.7. Where concrete is placed against a soil containing sulphates and exposed to the atmosphere at the opposite surface, precautions shall be taken to protect the concrete from deterioration by the resulting accelerated movements of sulphates through it in accordance with CSA A23.1-1973, "Concrete Materials and Methods of Concrete Construction" and CSA A5-1971, "Portland Cements", as revised to 1 May, 1975.

4.2.2.8. Where concrete in foundations is placed in contact with highly acid soils it shall be made with a normal cement and thoroughly compacted to reduce permeability to a minimum. Acid attack on concrete

STEEL

4.2.2.9. Where steel is used in foundations, it shall be in accordance with requirements of Section 4.5 or 4.6, and Steel pipe and tube piles

- (a) where steel pipes or tubes are used as piles or as shells to form cast-in-place concrete piles and act as permanent load-carrying members, the steel shall be in accordance with one of the following standards, as revised to 1 May, 1975,

- (i) CSA G40. 21-1973, "Structural Quality Steels",
- (ii) ASTM A252-71, "Welded and Seamless Steel Pipe Piles",
- (iii) ASTM A283-70a, Low and Intermediate Tensile Strength Carbon Steel Plates of Structural Quality",
- (iv) ASTM A570-72, "Hot-Rolled Carbon Steel Sheets and Strip, Structural Quality", or
- (v) ASTM A611-72, "Steel, Cold-Rolled Sheet, Carbon Structural".

4.2.2.10.(1) Steel is not considered to be exposed to soil where it is encased in dense concrete and separated from the soil by the thicknesses and types of concrete described in Articles 4.2.2.3., 4.2.2.4. and 4.2.2.5. Corrosion of steel

(2) Where conditions are corrosive, adequate protection of exposed steel shall be provided.

4.2.2.11. Where a foundation is to be in contact with soil, water, or air that is in a condition conducive to the deterioration of the materials of the foundation, adequate measures shall be taken to protect the material and prevent detrimental deterioration. Deterioration of materials

Subsection 4.2.3. Design Considerations

- Basis of design

4.2.3.1.(1) The properties of the soil and rock, the design capacity of the foundation, and where required in Article 4.2.3.8., an estimate of the settlement of the structure shall be determined on the basis of,
- (a) exploration, testing and the application of generally accepted soil mechanics principles by a person competent in this field of work; or

(b) well-established local practice where such practice includes successful experience both with soils and rocks of similar type and condition and with a foundation of similar type.
- (2) The soil exploration shall be carried to that depth to which the proposed structure will significantly increase the stress in the soil.
- Consideration of weaker underlying soils

(3) Where a soil or rock below the bearing surface has a lower design bearing pressure than that at the bearing surface as may be indicated by the bearing values in Article 4.2.4.2., the design capacity of the foundation shall not be greater than would cause the weakest soil or rock to be stressed beyond its design bearing pressure.
- Frost action and adfreezing

4.2.3.2.(1) The bearing surface of a foundation shall be below the level of potential damage from frost except as provided in Sentence (2), and the foundation shall be designed to prevent damage resulting from adfreezing.

(2) The bearing surface of a foundation need not be below the level of potential damage from frost where the foundation,

(a) is designed to counteract or eliminate frost action; or

(b) bears directly on material not susceptible to frost action.
- Sloping ground

4.2.3.3.(1) Where a foundation is to rest on sloping ground, existing stresses within the soil or rock shall be considered in the design.

(2) The soil under any footing shall have sufficient lateral support, to prevent its displacement under all conditions.

(3) In the absence of a soil report, such lateral support shall be deemed to be sufficient when from the edge of the bottom of the footing a plane sloping downward at the slope given in Table 4.2.3.A. remains within natural soil or other material denser than the soil on which the footing rests.

(4) If the plane described in (3) emerges from the soil, the earth shall be restrained by a structure designed to withstand lateral earth pressure produced by the footing.

TABLE 4.2.3.A.

Forming Part of Sentence 4.2.3.3.(2).

Soil Type	Design Bearing Pressure psf	Slope Horizontal: Vertical
Cohesive soil	4000 or more	1:1
Cohesive soil	2000 or less	2:1
Non-cohesive soil	4000 or more	1.5:1
Non-cohesive soil (wet)	4000 or more	3:1

(5) Where a building is erected in the vicinity of the bank of a ravine or watercourse, the horizontal distance between the building and the toe of the bank shall be at least twice the difference in elevation between the toe of the bank and maximum grade elevation at the

building, plus 20 feet unless the application to build is accompanied by a Professional Engineer's report, in support of a lesser requirement.

4.2.3.4. Eccentricity of loading in foundation units shall be fully investigated, and	Eccentric loads
(a) the maximum pressure on the basis of a straight-line pressure distribution shall not exceed the maximum safe bearing pressure; and	
(b) unless special safe-guards are incorporated in the design, the resultant force shall fall within the middle third of the foundation unit.	
4.2.3.5. Where dynamic loading conditions apply, bearing pressures of the particular conditions shall be assessed by a Professional Engineer.	Dynamic loading
4.2.3.6. Where a foundation is subject to hydrostatic uplift, this effect shall be provided for in the design.	Hydrostatic uplift
4.2.3.7. Where a foundation bears on gravel, sand or silt and where the water table is within a distance below the bearing surface equal to the width of the foundation unit, the design bearing pressure shall be 50 per cent of that determined in Article 4.2.4.2.	High ground water level
4.2.3.8. Except as provided in Article 4.2.4.3. the magnitude and rate of settlement of a structure shall be determined by exploration and analysis as provided for in Article 4.2.3.1. for the following conditions,	Cases requiring determination of settlement
(a) where a foundation or a surcharge adjacent to a building is to be placed,	
(i) above very soft clay or very loose sand, or weak organic soils, or	
(ii) above soft clay where the load transferred will cause a net increase of pressure on the clay of 250 psf or more, or,	
(iii) above firm clay where the load transferred will cause a net increase of pressure on the clay of 500 psf or more; or	
(b) where dynamic loads are to be transferred by the foundation to cohesionless soils in the very loose or loose condition.	
4.2.3.9. RESERVED	
4.2.3.10. Where swelling or shrinking soils in which movements resulting from moisture content changes may be sufficient to cause damage to a structure are encountered or known to exist, the foundation conditions shall be assessed by,	Swelling and shrinking soils
(a) a special investigation; or	
(b) reference to recorded information in the form of successful local experience in the construction of buildings with similar structural requirements, design bearing pressures and subsoil conditions.	

Subsection 4.2.4. Footings, Rafts and Foundation Walls

FOOTINGS AND RAFTS

4.2.4.1. The design capacity of footings and rafts shall be determined in accordance with the appropriate requirements of Subsection 4.2.3., and also with the following requirements.	Design capacity
4.2.4.2.(1) For buildings three storeys or fewer in height and having a building area of 6,000 sq ft or less, the design properties of the soil and the bearing capacity of the foundation may be determined on the basis of clauses (a) or (b) provided the type and	

condition of the soils or rock below the bearing surface has been identified to a depth of at least twice the width of the foundation unit below the bearing surface of the foundation unit,

Plate
load test

- (a) a plate load test, where the footing is 3 ft wide or less, carried out in accordance with ASTM D1194-72. "Bearing Capacity of Soil for Static Load on Spread Footings," as revised to 1 May, 1975 except that the bearing plate shall be 12 in. by 12 in. and the design bearing pressure of the soil is,
 - (i) $\frac{1}{3}$ the ultimate bearing capacity of the soil or,
 - (ii) $\frac{1}{3}$ the pressure that would cause the bearing plate to settle 1 in. whichever is the lesser; or
- (b) the design bearing pressures appearing in Table 4.2.4.A., column 2, where the type and condition of the soil or rock listed in column 1 can be identified and described as set forth in Articles 4.2.1.3. to 4.2.1.7., 4.2.1.9. and 4.2.1.10., and adjusted as may be required by the design considerations described in Subsection 4.2.3.

TABLE 4.2.4.A.

Forming Part of Clause 4.2.4.2.(1) (b)

Type and Condition of Soil or Rock	Design Bearing (1), (3), (4) Pressure, psf
Cohesionless soils (see Articles 4.2.1.4. and 4.2.1.5.)	
Dense sand, dense sand and gravel	6,000
Compact sand, compact sand and gravel	3,000
Loose sand, loose sand and gravel	1,000
Very loose sand, very loose sand and gravel	See Sentences 4.2.3.1.(1) & (2)
Cohesive soils (see Articles 4.2.1.6. and 4.2.1.7.)	
Dense silt	3,000
Compact silt	2,000
Loose silt	See Sentences 4.2.3.1.(1) & (2)
Very stiff clay	6,000
Stiff clay	3,000
Firm clay	1,500
Soft clay	750
Very soft clay	See Sentences 4.2.3.1.(1) & (2)
Miscellaneous soils and rock (see Article 4.2.1.9.)	
Till, dense or hard	8,000
Till, compact or firm	3,000
Till, soft	See Sentences 4.2.3.1.(1) & (2)
Cemented sand and gravel	10,000
Clay shale	See Sentences 4.2.3.1.(1) & (2)
Filled Ground	See Sentences 4.2.3.1.(1) & (2)
Rock (see Article 4.2.1.10.)	
Without defects	Up to 20,000
With defects	See Sentences 4.2.3.1.(1) & (2)
Column 1	Column 2

(2) Values above those shown in Table 4.2.4.A may be used when it can be shown that on the basis of past experience such values are justified.

(3) Where load test values or the values given in Table 4.2.4.A are used as provided for in Article 4.2.4.1., the design capacity of the foundation unit is the bearing surface area times the design bearing pressure of the soil or rock.

(4) When using Table 4.2.4.A for purposes of determining the vertical stress in soils or rock below the bearing surface the load from the foundation unit shall be assumed to be distributed uniformly over the area of any horizontal plane within a frustum extending downward from the foundation unit perimeter at 60° to the horizontal, but the area considered as supporting the load shall not extend beyond the intersection of 60° planes to adjacent foundation units.

4.2.4.3. The settlement of footings shall be determined as described in Subsection 4.2.3. except that for a building of the size provided for in Article 4.2.4.2. the settlement may be determined in accordance with Article 4.2.4.4.

Settlement
of footings

4.2.4.4. Where a load test has been carried out as provided for in Clause 4.2.4.2.(a) the settlement of footings not exceeding 3 ft in width may be calculated using the formulae,

Estimate of
settlement

$$(a) S = S_1 \times \frac{(2B)^2}{(B + 1)^2} \text{ where the supporting soil is cohesionless, or}$$

$$(b) S = S_1 B \text{ where the supporting soil is cohesive,}$$

where S = the calculated settlement of the footings, in inches,

S_1 = the measured settlement of the test plate at the design bearing pressures,

B = the width of the footing, in feet.

FOUNDATION WALLS

4.2.4.5.(1) A foundation wall shall have sufficient thickness to support the loads bearing on it and against it.

Wall
construction

(2) A foundation wall built of,

(a) masonry shall be in accordance with the requirements of Section 4.4;

(b) plain concrete shall be in accordance with the requirements of Section 4.5.; or

(c) reinforced concrete shall be in accordance with the requirements of Section 4.5.; and

(d) preservative treated wood shall be in accordance with the requirements of Section 4.3.

4.2.4.6.(1) The lateral pressure against foundation walls and other types of retaining walls shall be determined by a recognized method of analysis.

Stresses on
retaining
walls

(2) To ensure stability against overturning, sliding, excessive foundation pressure, and water uplift, walls shall be designed to resist the pressure of the retained material, including both dead and live load surcharges to which they may be subjected.

(3) Unless a drainage system is provided which effectively drains the backfill under all conditions, walls shall be designed to resist a hydrostatic pressure due to a head of water equal to the depth of water plus the pressure caused by the submerged weight of the soil.

(4) Particular attention shall be paid to the type of backfill, to restraints and to forces resulting from freezing, to surcharge or other effects that may cause substantially larger earth pressure.

Subsection 4.2.5. Piles**GENERAL****Pile
capacity**

4.2.5.1. Piles shall be designed according to the requirements of this Subsection together with those appropriate design requirements in Subsection 4.2.3.

DESIGN CAPACITY OF PILES

4.2.5.2.(1) The maximum design capacity of the pile shall be determined on the basis of,

- (a) a load test carried out in accordance with Article 4.2.5.3.; or
- (b) the provisions for end-bearing piles in Sentences 4.2.5.4.(1) and Article 4.2.5.5.; or
- (c) the provisions for friction piles in Sentence 4.2.5.4.(2) and Article 4.2.5.5.;
- (d) local experience as described in Article 4.2.5.5.

(2) Piles subjected to lateral loads shall be provided with lateral support where the strength of soil is found to be inadequate.

**Pile load
test**

4.2.5.3.(1) Except as provided in Sentence (3), the maximum design capacity of a pile may be determined on the basis of a load test carried out in accordance with ASTM D1143-69, "Load Settlement Relationship for Individual Vertical Piles Under Static Axial Load," as revised to 1 May, 1975.

(2) Where a load test is carried out as provided for in Sentence (1) to twice the proposed design capacity of the pile, the pile shall be deemed acceptable provided its performance falls within all of the following limits,

- (a) the rate of settlement under full test load is not more than 0.01 in. /hr;
- (b) the gross settlement under full test load is not more than 1.5 in.;
- (c) the gross settlement under working load is not more than 0.75 in.;
- (d) the net settlement after final rebound is not more than 0.75 in. except that these values may be increased where it can be shown that such values are appropriate.

**Special
load tests**

(3) Where, on the basis of a soils investigation, a test carried out in accordance with Sentence (1) for the types of buildings described in Clauses 4.2.1.1.(1)(a), (b) & (d) would fail to provide sufficient data to determine adequately the long-term distribution of stress in the soil, the maximum design capacity of the pile shall be determined by a test or tests designed for the appropriate soil and loading conditions conducted and interpreted by a person competent in this field of work.

(4) The maximum design capacity of a pile determined as provided for in Sentences (1), (2) and (3) may be assigned to other piles where these piles are,

- (a) of the same type and design;
- (b) placed in the same type and condition of soil;
- (c) driven or placed using the same driving equipment or placing methods; and
- (d) driven to meet the same criteria as the tested pile.

**End bearing
resistance**

4.2.5.4.(1) The design capacity of an end-bearing pile may be taken as the design bearing pressure of the soil or rock times the area of the end of the pile,

(2) The design capacity of a friction pile may be determined on the basis of frictional resistance between its surface and the ground with which it is in permanent contact.

Frictional
resistance

4.2.5.5. The design bearing pressure and the frictional resistance of the soil shall be determined from,

- (a) the properties of the soil by investigation, or
- (b) the records of successful local experience provided the piles are,
 - (i) of the same type and design,
 - (ii) placed in the same type and condition of soil,
 - (iii) driven or placed using the same type of driving equipment or placing methods; and
 - (iv) driven to approximately the same final resistance; or
- (c) the results of load tests on the same type and design of piles at the site.

4.2.5.6. The total design capacity of a group of piles shall be determined by an analysis but shall not,

Design
capacity of
pile groups

- (a) exceed the design capacity of a single pile times the number of piles in the group; nor
- (b) exceed the design bearing pressure of the supporting soil times the area under the group plus the allowable unit shear stress times the bounding length around the group times the thickness of the soil in which the piles are embedded; nor
- (c) cause settlements exceeding those described in Article 4.2.1.12.

4.2.5.7. Where a pile or a group of piles is placed in subsiding fill or soil, no frictional resistance from the subsiding strata shall be considered to contribute to support of the load, but the frictional drag shall be considered.

Piles in
subsiding
strata

STRUCTURAL DETAILS OF PILES

4.2.5.8.(1) A pile shall be considered to act as a column and where necessary shall be designed to withstand tensile stresses due to uplift or other causes.

Piles as
columns

(2) The portion of a pile permanently in contact with soil providing adequate lateral support shall be considered to be in simple compression and the full allowable stresses in Article 4.2.5.15. may be used.

(3) Reinforcement need not be provided in a cast-in-place pile unless it is subjected to tensile stresses.

(4) The portion of a pile in contact with air, water, peat, very soft clay, or soils that do not provide adequate lateral support shall be considered to be laterally unsupported and shall be designed in accordance with the appropriate requirements in Sections 4.3., 4.5. or 4.6. using the allowable stresses in Article 4.2.5.15. and also taking into account the effects of slenderness.

4.2.5.9. Where it is necessary to join together two parts of a pile the connection between the two parts shall be so constructed as to prevent their separation, to maintain their alignment, to support the load and, where necessary, to be watertight.

Pile
connections

4.2.5.10.(1) When round timber piles are used they shall meet the requirements specified and be in accordance with CSA 056-1962, "Round Timber Piles," as revised to 1 May, 1975.

Timber
piles

(2) For an end-bearing pile the stress shall be calculated by applying the maximum load to the minimum cross-section.

(3) For a friction pile the maximum load may be applied to the cross-sectional area at a point one-third of the length of the embedded portion of the pile up from the tip.

Structural
steel piles

4.2.5.11. Where a pile is of structural steel,

- (a) the minimum thickness of material shall be $\frac{3}{8}$ in.
- (b) the minimum over-all section dimension shall be 6 in.;
- (c) the projection of any flange or leg shall not be greater than 14 times its thickness; and
- (d) the ratio of the section modulus in the strongest direction to that in the weakest direction shall not be greater than 8.

Precast
concrete
piles

4.2.5.12. Where precast concrete piles are used, they shall,

- (a) have adequate end protection when driven to rock or through soils containing stones or boulders; and
- (b) have sufficient strength to withstand all stresses resulting from handling, driving and loading.

Precast
prestressed
concrete
piles

4.2.5.13. Where precast prestressed concrete piles are used,

- (a) the concrete shall have a minimum compressive cylinder strength of 5,000 psi at the time of driving;
- (b) the unit prestress after losses shall be chosen to ensure safe and crack free performance under all conditions of handling, driving and loading; and
- (c) the ends of prestressing wires or strands shall be cut flush with the ends of the pile.

Composite
piles

4.2.5.14. A composite pile shall fulfil the requirements for the appropriate pile type as described in this Section and in addition the following requirements,

Connections

- (a) The connections between the parts shall be so constructed as to prevent their separation, to maintain their alignment, to support the load and to be watertight where concrete must be placed subsequent to driving.

Spacing

- (b) The centre-to-centre spacing of the piles shall be governed by the largest of the spacings for the pile types composing the composite pile;

Design
capacity

- (c) The design capacity of a composite pile shall be that allowed by the weakest member of the combination and the connections shall be at least as strong as the weakest member.

Stresses in
pile materials

4.2.5.15.(1) The allowable compressive stresses in pile materials shall not exceed the values in Table 4.2.5.A,

- (a) The pile capacities arrived at by calculation from the stresses given in Table 4.2.5.A. may be exceeded where higher values can be substantiated on the basis of reliable demonstrated test data;
- (b) Metal thinner than 0.18 in. shall not be considered as contributing to the structural strength of the pile section;
- (c) The outer $1\frac{1}{2}$ -in. of concrete shall not be considered to be a structural part of the pile unless the concrete is placed in small batches within the protection of a forming tube and is compacted prior to attaining an initial set.

TABLE 4.2.5.A.

Forming Part of Article 4.2.5.15.(1)

Material	Type of Pile	Maximum allowable stress in compression
Timber	Unsawn	
	(a) Douglas fir or other woods of comparable strength ⁽²⁾	1200 psi parallel to grain
	(b) Jack pine, lodgepole pine, or other woods of comparable strength ⁽²⁾	1000 psi parallel to grain
	(c) Red pine or other woods of comparable strength ⁽²⁾	750 psi parallel to grain
Steel	(a) Sections	} 0.3 times yield stress
	(b) Pipe or tubing	
	(c) Reinforcing	
Concrete	(a) Precast	} 0.2 times specified compressive strength
	(b) Precast prestressed ⁽¹⁾	
	(c) Cast in-situ in steel pipe left in place	
	(d) Cast in-situ against the soil	
Column 1	Column 2	Column 3

Notes to Table 4.2.5.A.

(1) Exclusive of the prestress.

(2) CSA Standard O86-1970, "Code of Recommended Practice for Engineering Design in Timber", as revised to 1 May, 1975, provides information on woods of comparable strength as well as other properties.

ARRANGEMENT OF PILES

4.2.5.16. Where a column supported by a pile foundation does not have adequate lateral structural support, it shall be supported by,

Piles supporting columns

- (a) a single pile embedded in a soil that has adequate lateral support; or
- (b) a group of at least three piles.

4.2.5.17.(1) Where a strip footing or a wall that does not have adequate lateral structural support is supported by a pile foundation, the foundation shall be either,

Piles supporting strip footings or walls

- (a) one row of piles embedded in a soil that has adequate lateral support; or
- (b) at least two rows of piles.

(2) Where a wall that does have adequate lateral support is supported by a pile foundation, the foundation may be a single row of piles.

4.2.5.18. Where piles are end-bearing the distance centre-to-centre of two piles shall not be less than 1-ft plus the average butt diameter or diagonal of the two piles.

Spacing of piles

4.2.5.19.(1) Except as provided for in Sentence (2), where piles are not end bearing, the distance centre-to-centre of two piles shall not be less than 2½ times the average butt diameter or diagonal of the two piles.

(2) Where piles are of unencased cast-in-place concrete and are placed using a driven forming tube, the distance centre-to-centre of two piles shall not be less than 2½ times the greater shaft diameter of the piles.

**Driving and
placing
of piles**

4.2.5.20. A pile shall be placed in such a manner as to minimize impairment of the strength of the pile and the properties of the soil in which it is placed.

**Pile driving
records**

4.2.5.21.(1) Where a pile is driven into position in the ground, a record shall be kept for each pile of hammer weight and drop, or energy per blow, type of head and packing, and number of blows per foot or inch as appropriate during the driving process and these records shall be used to compare the behaviour of one pile with another, and in particular with a pile that has been test-loaded.

(2) The ability of a driven pile to develop its design capacity may be checked on the basis of its driving resistance where,

- (a) the pile design capacity is less than 60 tons; and
- (b) it is impractical to determine the capacity as provided for in Articles 4.2.5.3. and 4.2.5.4.; and
- (c) the penetration per blow after a period of at least 24 hr after driving does not exceed that immediately after driving.

**Damaged
piles**

(3) Where a pile is known to be damaged or the driving records for any pile indicates that the pile has been damaged, the load-carrying capacity shall be assessed by a Professional Engineer.

**Protection
of piles
during driving**

4.2.5.22.(1) Where a pile is driven into place and the tip or head of the pile is likely to be damaged during driving, the tip or head shall be protected.

(2) Where the head of a pile is damaged during driving, the pile shall be cut back to sound material.

(3) For prestressed concrete piles the driving cap or helmet shall be sufficiently large and shallow so as not to bind the pile head if it twists during driving, and thick cushion blocks of soft compressible wood or other suitable material shall be used to protect the pile heads from direct impact in driving.

**Movement
of adjacent
piles during
driving**

4.2.5.23.(1) Where a group of piles is to be placed in silt or clay, measures shall be taken to indicate any movement of each pile during the installation of adjacent piles.

(2) Except as provided in Sentence (4), piles shall not be redriven.

(3) Notification of the condition shall be given to the Chief Building Official who may require that the condition of the foundation be assessed by a Professional Engineer.

(4) Where other than cast-in-place piles are used they shall be redriven providing the pile movement is upward and without lateral displacement.

**Jetting
or pre-
excavation**

4.2.5.24. When jetting, predrilling or other pre-excavation methods have been used during pile installation, the pile tip shall be driven below the depth of pre-excavation to the required,

- (a) resistance; or
- (b) penetration; or
- (c) resistance and penetration.

**Tolerance of
alignment**

4.2.5.25.(1) A pile shall be placed,

- (a) not more than 2 per cent of its length out of plumb for vertical piles; and
- (b) not more than 3 in. off centre at the top.

**Misaligned
piles**

(2) Where piles deviate from required axial alignment or plan location by more than permitted in Sentence (1), the condition of the foundation shall be assessed by a Professional

Engineer and, where required, correction made by the installation of additional piles, by strengthening the piles, by reduction in capacity, by lateral bracing or other means.

4.2.5.26. Where a concrete pile is cast-in-place measures shall be taken,

Cast-in-place
concrete

- (a) to ensure a pile of full cross-section throughout its length;
- (b) to exclude soil from the concrete;
- (c) to control the water and the strength of the concrete;
- (d) to ensure that the fresh concrete in one pile is not disturbed by the construction of adjacent piles; and
- (e) to ensure that the concrete at the base of the pile is in contact with undisturbed soil and to ensure that the concrete along the shaft is in contact with the soil where such contact is assumed in the design.

Subsection 4.2.6. Piers and Caissons

4.2.6.1. Piers and caissons shall be constructed in accordance with the requirements of this Subsection and those appropriate design consideration described in Subsection 4.2.3.

4.2.6.2. The provisions of Articles 4.2.2.9., 4.2.5.2. to 4.2.5.7. inclusive, 4.2.5.14. and 4.2.5.18. relating to pile foundations shall also govern the design, installation, inspection and testing of pier and caisson foundations.

4.2.6.3. After the excavation for a pier or caisson has been completed, the ground at the bottom of the excavation shall be inspected immediately and the excavation shall be filled with concrete or other material forthwith.

Inspection
of piers or
caissons

4.2.6.4. Where a pier or caisson is of concrete the appropriate requirements of Articles 4.2.2.2. to 4.2.2.4. inclusive shall apply, except that,

Piers or
caissons of
concrete

- (a) the maximum allowable compressive stress in the concrete shall be 0.25 times the specified compressive strength; and
- (b) the outer 1½ in. of concrete shall not be considered to be a structural part of the pier or caisson unless the concrete is placed in small batches within the protection of a forming tube and is compacted prior to attaining an initial set.

4.2.6.5. Where a pier or caisson is of concrete and may be subject to tensile stresses caused by uplift or other causes, it shall be reinforced to withstand such stresses.

Tensile
stresses

4.2.6.6. Where a pier or caisson is of unreinforced concrete and has sloped sides or a belled-out bottom, the slope of the sides shall not be greater than 1 in 2 from the vertical.

Maximum
slope of bell

4.2.6.7. Outer shells of steel pipe or steel tubing thinner than 0.18 in. shall not be considered as contributing to the structural strength of a pier or caisson.

Subsection 4.2.7. Special Foundations

4.2.7.1. New or special systems of design of foundation units not covered by this Section may be used where such systems are based on analytical and engineering principles, and where reliable test data demonstrates the safety of the foundation for the purpose intended.

Subsection 4.2.8. Excavating, Placing and Filling

EXCAVATING

4.2.8.1. Where during excavations or placing of the foundation any condition described in Article 4.2.1.17. is encountered, the foundation design shall be reassessed.

Altered
conditions

Protection
of adjacent
property

4.2.8.2.(1) Every excavation shall be undertaken in such a manner as to prevent movement of adjacent property, prevent damage to existing structures, utilities, roads and sidewalks, and prevent personal injury.

(2) RESERVED

(3) RESERVED

PLACING OF FOUNDATIONS

Sensitive
soils

4.2.8.3.(1) Where soil that loses strength when remoulded is intended to support a foundation, precautions shall be taken to ensure that the soil is not disturbed.

(2) Where cohesive soils which exhibit excessive tendencies to swell and shrink are encountered, precautions shall be taken to limit moisture content changes in the supporting soil so that detrimental effects will not occur.

(3) Where such precautions are not successful, the requirements of Sentence 4.2.1.17.(4) shall apply.

Freezing of
supporting
soil

4.2.8.4.(1) A foundation shall not be placed in or above any soil that is frozen and may subsequently thaw.

(2) Where a foundation is placed on frost-susceptible soil during freezing weather, the soil shall be kept from freezing.

Bearing
surface
on rock

4.2.8.5. Where a foundation is to be placed on rock,

(a) the bearing surface of the rock shall not have a slope greater than 1 in 6, or the foundation shall be adequately keyed, and

(b) the bearing surface of the rock shall be cleaned of loose and decomposed material before the foundation is placed.

FILLING

Backfilling

4.2.8.6.(1) Where an excavation is being backfilled, the backfill shall be placed so as to,

(a) provide lateral support to the soil adjacent to the excavation, and

(b) prevent detrimental settlement.

Slag as fill

(2) Where a slag is to be used as fill to support a foundation or a floor on grade, it shall be of a type that is not subject to detrimental movement with changes in moisture content and temperature.

Compaction
of fill

4.2.8.7. A fill consisting of natural inorganic soil, slag or other material demonstrated to be suitable may be used for the support of the foundation of a building provided it is compacted.

Preloading

4.2.8.8. A fill of natural soil of highly compressible material other than a refuse disposal area may be used for the support of the foundation of a building provided it is preloaded for a sufficient length of time.

SECTION 4.3 WOOD

Subsection 4.3.1. General

APPLICATION

4.3.1.1.(1) This Section applies to the following buildings and their structural members made from wood with respect to structurally graded lumber, lumber not structurally graded, glued-laminated timber, plywood, piling, pole construction and major fastenings:

- (a) all buildings used or intended for the following occupancies,
 - (i) Group A, Assembly Occupancies,
 - (ii) Group B, Institutional Occupancies,
 - (iii) Group F, Division 1, High Hazard Industrial Occupancies;
- (b) all buildings exceeding 3 storeys in building height or 6,000 sq ft in building area and which are used or intended to be used for the following occupancies,
 - (i) Group C, Residential Occupancies,
 - (ii) Group D, Business and Personal Services Occupancies,
 - (iii) Group E, Mercantile Occupancies,
 - (iv) Group F, Divisions 2 and 3, Medium and Low Hazard Industrial Occupancies;
- (c) retaining walls;
- (d) signs;
- (e) communication towers exceeding 50 ft in height;
- (f) pedestrian bridges;
- (g) permanent crane runways that impose loads on buildings;
- (h) fire escapes;
- (i) exterior storage tanks.

N.B.: For buildings not listed in Sentence 4.3.1.1.(1), requirements for design will be found in Part 9.

(2) RESERVED

4.3.1.2. RESERVED

4.3.1.3. RESERVED

MINIMUM SAFETY AND PERFORMANCE

4.3.1.4. Buildings and their structural members shall be designed to resist all effects of loads and influences that may be expected and shall satisfy the requirements of Section 4.1.

4.3.1.5. For protection against termites the requirements of Part 9 shall be complied with.

Subsection 4.3.2. Design Requirements

4.3.2.1. Except as set forth in Article 4.1.1.4., buildings and their structural members made of wood shall conform to CSA Standard O86-1970, "Code of Recommended Practice for Engineering Design in Timber," as revised to 1 May, 1975.

Subsection 4.3.3. Certification

SAWN LUMBER

4.3.3.1. Sawn lumber for use in conformity with the requirements of CSA Standard O86-1970, "Code of Recommended Practice for Engineered Design in Timber", as

revised to 1 May, 1975, shall be identified by the grade stamp of an association or independent grading agency approved to grade lumber.

4.3.3.2. RESERVED

SECTION 4.4 PLAIN AND REINFORCED MASONRY

Subsection 4.4.1. General

APPLICATION

4.4.1.1.(1) This Section applies to the following buildings and their structural members made from plain or reinforced masonry:

- (a) all buildings used or intended for the following occupancies,
 - (i) Group A, Assembly Occupancies,
 - (ii) Group B, Institutional Occupancies,
 - (iii) Group F, Division 1, High Hazard Industrial Occupancies;
- (b) all buildings exceeding 3 storeys in building height or 6,000 sq ft in building area and which are used or intended to be used for the following occupancies,
 - (i) Group C, Residential Occupancies,
 - (ii) Group D, Business and Personal Services Occupancies,
 - (iii) Group E, Mercantile Occupancies,
 - (iv) Group F, Divisions 2 and 3, Medium and Low Hazard Industrial Occupancies;
- (c) retaining walls;
- (d) signs;
- (e) communication towers exceeding 50 ft in height;
- (f) pedestrian bridges;
- (g) permanent crane runways that impose loads on buildings;
- (h) fire escapes;
- (i) exterior storage tanks.

N.B.: For buildings not listed in Sentence 4.1.1.1.(1), requirements for design will be found in Part 9.

(2) RESERVED

4.4.1.2. RESERVED

4.4.1.3. RESERVED

DESIGN REQUIREMENTS

4.4.1.4. Buildings and their structural members shall be designed to resist all effects of loads and influences that may be expected, and shall satisfy the requirements of Section 4.1.

4.4.1.5. Materials used in masonry shall conform to Subsection 4.4.2.

4.4.1.6.(1) Masonry shall be designed to resist all loads prescribed in Section 4.1 except as provided in Article 4.4.3.33. .

(2) The structural design and dimensioning of plain masonry shall be based on,

- (a) an engineering analysis conforming to Subsection 4.4.3. ; or
- (b) the conventional methods conforming to Subsection 4.4.4. in non-seismic areas and in zone 1 seismic areas.

(3) The structural design and dimensioning of reinforced masonry shall be based on an engineering analysis conforming to Subsection 4.4.3.

4.4.1.7.(1) The construction of masonry shall conform to the appropriate requirements in Subsections 4.4.3. to 4.4.8.

(2) Where necessary control joints shall be provided in masonry when necessary to relieve excessive temperature and shrinkage stress.

4.4.1.8. The maximum thickness of a mortar joint in loadbearing masonry shall be 1/2 in.

4.4.1.9. RESERVED

Subsection 4.4.2. Materials

MASONRY UNITS

4.4.2.1.(1) Masonry units of concrete shall conform to the following standards, as revised to 1 May, 1975:

- CSA A165.1-1972, "Concrete Masonry Units,"
- CSA A165.2-1972, "Concrete Brick Masonry Units,"
- CSA A165.3-1973, "Prefaced Concrete Masonry Units,"
- CSA A165.4-1973, "Coreless Autoclaved Cellular Concrete Masonry Units for Loadbearing and Non-Loadbearing Use."

(2) Cast stone shall conform to Table 4.4.2.A. provided,

- (a) the test specimens are 2 inch cubes or 2 inch by 2 inch cylinders;
- (b) the compressive strength is the minimum value of 3 tests; and
- (c) the absorption is the maximum value of 3 tests.

TABLE 4.4.2.A.

Forming Part of Sentence 4.4.2.1.(2)

ABSORPTION AND STRENGTH REQUIREMENTS	
Maximum Absorption After 48 Hr Submersion in Water of 28-Day-Old Specimens, Per Cent of Dry Weight	Minimum Compressive Strength After 28 Days, psi
6	6500
Column 1	2

4.4.2.2. Masonry units of clay or shale shall conform to the following standards, as revised to 1 May, 1975:

CSA A82.1-1965, "Burned Clay Brick,"
CSA A82.2-1967, "Methods of Sampling and Testing Brick,"
CSA A82.4-1954, "Structural Clay Loadbearing Wall Tile,"
CSA A82.5-1954, "Structural Clay Non-Loadbearing Tile,"
ASTM C126-71, "Ceramic Glazed Structural Clay Facing Tile, Facing Brick and Solid Masonry Units."

4.4.2.3.(1) Sand-lime (calcium-silicate) masonry units shall conform to,

- (a) CSA A82.3-1973, "Calcium Silicate (Sand-Lime) Building Brick," as revised to 1 May, 1975; and
- (b) the specifications for concrete masonry units as provided for in Article 4.4.2.1. except for ingredients, as revised to 1 May, 1975.

4.4.2.4.(1) Masonry units of granite shall conform to ASTM C615-68 (1972), "Structural Granite," as revised to 1 May, 1975.

(2) Masonry units of natural stone other than granite shall conform to ASTM C170-50 (1970), "Compressive Strength of Natural Building Stone," and ASTM C99-52 (1970), "Modulus of Rupture of Natural Building Stone," both as revised to 1 May, 1975.

4.4.2.5.(1) Masonry units of gypsum shall conform to CSA A82.25-1950, "Gypsum Partition Tile or Blocks," as revised to 1 May, 1975.

(2) Gypsum units shall not be exposed to soil, dampness or the weather.

(3) Unreinforced masonry of gypsum units shall not be used for loadbearing elements.

(4) Gypsum units shall not be plastered with other than gypsum plaster.

4.4.2.6.(1) Units of glass shall conform to BSI Standard BS1207-1961, "Hollow Glass Block," as revised to 1 May, 1975.

(2) Masonry of glass units shall be used only in a partition or a non-loadbearing panel set into an opening in a wall.

4.4.2.7.(1) Masonry units, other than those provided for in Articles 4.4.2.1. to 4.4.2.6., may be used provided they are,

- (a) tested to show they are suitable for their proposed use; and
- (b) manufactured so that their quality is uniform.

MORTAR

4.4.2.8. Portland cement used in mortar shall conform to CSA A5-1971, "Portland Cements," as revised to 1 May, 1975.

4.4.2.9. Where lime putty is used in preparing mortar, it shall be made by slaking quicklime in water for at least 24-hrs or by soaking hydrated lime in water for at least 12-hrs.

4.4.2.10. Gypsum used in mortar shall conform to CSA A82.21-1950, "Gypsum," as revised to 1 May, 1975.

4.4.2.11. Masonry cement used in mortar shall conform to CSA A8-1970, "Masonry Cement," as revised to 1 May, 1975.

4.4.2.12.(1) Aggregate used in mortar shall conform to CSA A82.56-1950. "Aggregate for Masonry Mortar," as revised to 1 May, 1975.

(2) Where mortar is proportioned by volume, the aggregate shall be measured in a damp, loose condition.

4.4.2.13. Water used in mortar shall be in accordance with the appropriate requirements of CSA Standard A23.1-1973, "Concrete Materials and Methods of Concrete Construction" and CSA A23.2-1973, "Methods of Test for Concrete", both Standards as revised to 1 May, 1975.

4.4.2.14. Admixtures may be used provided they do not decrease the strength of the mortar.

4.4.2.15.(1) Mortar types referred to in this Section shall,

(a) be proportioned as set forth in Table 4.4.2.B; or

(b) have a compressive strength conforming to Table 4.4.2.B. determined in accordance with CSA A179-1967, "Mortar for Unit Masonry," as revised to 1 May, 1975.

(2) Type O or Type K mortar shall not be used where masonry is to be,

(a) directly in contact with soil such as in a foundation wall; or

(b) exposed to the weather on all sides such as in a parapet wall, a balustrade, a chimney, steps and landings.

(3) The volume of damp sand aggregate shall be adjusted to compensate for bulking in accordance with CSA Standard A179-1967, "Mortar for Unit Masonry," as revised to 1 May, 1975.

TABLE 4.4.2.B

Forming Part of Sentence 4.4.2.15.(1)

Type of Mortar	Minimum Average Compressive Strength at 28 psi Days,	Compositions in Parts by Volume			
		Portland Cement	Masonry Cement	Lime	Aggregate
M	2500	1	1 (type H)	none	Not less than $2\frac{1}{4}$ and not more than 3 times the sum of the volumes of the cement and lime used
		1	none	$\frac{1}{4}$	
S	1800	$\frac{1}{2}$	1 (type H)	none	
		1	none	over $\frac{1}{4}$ to $\frac{1}{2}$	
N	750	none	1 (type H)	none	
		1	none	over $\frac{1}{2}$ to $1\frac{1}{4}$	
O	350	none	1 (type H or L)	none	
		1	none	over $1\frac{1}{4}$ to $2\frac{1}{2}$	
K	75	none	none	1	
		1	none	over $2\frac{1}{2}$ to 4	
Col. 1	2	3	4	5	6

4.4.2.16. Where units of glass are used, they shall be laid up with a mortar consisting of 1 part portland cement, 1 part high-calcium lime and not more than 4 parts aggregate by volume.

4.4.2.17. Where units of gypsum are used, they shall be laid up with a mortar consisting of 1 part gypsum and not more than 3 parts aggregate by weight.

4.4.2.18. Grout for masonry shall conform to Table 4.4.2.C.

TABLE 4.4.2.C

Forming Part of Article 4.4.2.18.

Description	Cement	Lime	Parts by Volume	
			Aggregate Measured in Damp, Loose State	
			Fine	Coarse
Fine Grout	1	0 to 1/10	2¼ to 3 times the sum of the cementitious materials	0
Coarse Grout	1	0 to 1/10	2¼ to 3 times the sum of the cementitious materials	1 to 2 times the sum of the cementitious materials

METAL TIES

4.4.2.19.(1) Steel structural members, anchors, ties or other supports for masonry required to be corrosion resistant shall be galvanized in accordance with the following Standards, as revised to 1 May, 1975,

- (a) ASTM A153-73, "Zinc Coating (Hot Dip) on Iron and Steel Hardware," (Class B.3 coating), for bonding or anchoring stone facing and for all bolts and hardware;
- (b) ASTM A116-71, "Zinc-Coated (Galvanized) Iron or Steel Farm-Field and Railroad Right-of-Way Wire Fencing," (Class 3 coating), for masonry ties other than provided for in (a); or
- (c) ASTM A123-73, "Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip," for structural supports including shelf angles.

(2) Copper-coated metal tie wire shall conform to ASTM B227-70, "Hard-Drawn Copper-Clad Steel Wire, (Grade 30HS)," as revised to 1 May, 1975.

4.4.2.20. Insulation used between wythes in cavity walls shall be water repellent or water resistant type.

Subsection 4.4.3. Design of Plain and Reinforced Masonry Based on Engineering Analysis

4.4.3.1. In this Subsection

- A_g = gross cross-sectional area,
- A_n = net cross-sectional area,
- A_v = effective cross-sectional area of reinforcement,
- A_w = cross-sectional area of web reinforcement,
- α = angle between inclined web bars and axis of beam,
- b = width of rectangular beam or column or width of flange of T beam,
- b' = width of web of a T beam,
- C_b = bending coefficient,
- C_e = eccentricity coefficient,
- C_s = slenderness coefficient,
- d = effective depth of flexural members,

- E_m = modulus of elasticity of masonry in compression,
 E_s = modulus of elasticity of steel,
 E_v = modulus of rigidity of masonry,
 e = virtual eccentricity,
 e_1 = the smaller virtual eccentricity occurring at the top or bottom of a vertical member at lateral supports,
 e_2 = the larger virtual eccentricity occurring at the top or bottom of a vertical member at lateral supports,
 e_h = virtual eccentricity about the principal axis which is normal to the width, b , of the member,
 e_t = virtual eccentricity about the principal axis which is normal to the effective thickness, t , of the member,
 f_m = compressive stress in masonry,
 f_h = bearing stress on masonry,
 f_{cd} = compressive stress due to dead loads,
 f_t = tensile stress in masonry,
 f'_m = ultimate compressive strength of masonry at 28 days,
 f_s = stress in reinforcement,
 f_w = stress in web reinforcement,
 f_y = yield strength of reinforcement,
 h = effective height of a wall or column,
 j = ratio of distance between centroid of compression and centroid of tension to the effective depth, d ,
 P = allowable vertical load,
 p_n = ratio of the area of tensile reinforcement to the net cross-sectional area, A_n , of the masonry,
 p = ratio of the area of tensile reinforcement to effective masonry area, bd ,
 p_g = ratio of effective cross-sectional area of reinforcement, A_s , to the gross cross-sectional area, A_g ,
 r = radius of gyration,
 r_h = ratio of area of bars cut off to the total area of bars at the section,
 s = spacing of stirrups parallel to direction of main reinforcement,
 t = effective thickness of a wall or column,
 u = bond stress per unit of surface area of bar,
 V = total shear,
 v = shear stress in masonry having shear reinforcement,
 v_m = shear stress in masonry having no shear reinforcement,
 v_{sw} = shear stress in a shear wall,
 Σo = sum of perimeters of bars.

GENERAL REQUIREMENTS

4.4.3.2.(1) This Subsection applies to the design and construction of plain masonry and reinforced masonry where the design is based on engineering analysis of the structural effects of the loads and forces acting on the structure.

(2) Engineering inspection of masonry construction shall be carried out to ensure that the construction is consistent with the design by the person responsible for its design or by another person qualified in the inspection of masonry construction.

4.4.3.3. Mortar shall be of type M, S or N conforming to Sentence 4.4.2.15.(1).

4.4.3.4. The allowable stresses in masonry shall be based on its compressive strength, f'_m , as established in Article 4.4.3.6.

4.4.3.5. The actual dimensions of masonry shall be used in stress calculations.

DETERMINATION OF f'_m FOR THE PURPOSE OF DESIGN

4.4.3.6.(1) Except as provided in Sentence (4), the compressive strength, f'_m , shall be established in advance of design by tests of specimens which,

- (a) are built of the same type of materials under the same conditions, and insofar as possible, of the same thickness and bonding arrangements as for the structure;

- (b) if of hollow masonry have unfilled cores and if of solid filled construction have solid filled cores;
- (c) are constructed so that the moisture content of the units, mortar consistency, mortar joint thickness and workmanship are the same as will be used in the structure;
- (d) if of brick masonry, are not less than 12 in. in height and have a height-to-thickness ratio (h/t) not less than 2 nor more than 5;
- (e) if of concrete block or structural clay tile, are not less than 16 in. in height and have a height-to-thickness ratio, h/t, not less than 1.5 nor more than 3; and
- (f) are stored in air at a temperature not less than 68°F and are tested after 28 days in conformance with CSA A23.2.13-1973, "Test for Compressive Strength of Moulded Concrete Cylinders," as revised to 1 May, 1975.

(2) The compressive strength of each specimen in Sentence (1) shall be calculated by dividing its ultimate test load by its net cross-section area and the result multiplied by the appropriate correction factor in Table 4.4.3.A.

TABLE 4.4.3.A

Forming Part of Sentence 4.4.3.6.(2)

Ratio of Height-to-Thickness h/t	Correction Factor ⁽¹⁾	
	Brick Masonry	Concrete Block or Structural Clay Tile
1.5	NA	0.86
2.0	0.73	1.00
2.5	0.80	1.11
3.0	0.86	1.20
3.5	0.91	NA
4.0	0.95	NA
4.5	0.98	NA
5.0	1.00	NA
Column 1	2	3

Note to Table 4.4.3.A.

(¹) Correction factors for values of h/t not listed may be interpolated from the values shown.

(3) At least 5 specimens described in Sentence (1) shall be tested and the compressive strength, f'_m , shall be obtained by multiplying the average compressive strength determined in conformance with Sentence (2) by

$$1 - \frac{1.5}{\bar{x}} \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$$

where x = an individual test result,
 \bar{x} = average of individual test results,
 n = number of specimens.

(4) Where the value of the compressive strength of masonry, f'_m , is not determined in accordance with Sentences (1) to (3), it shall be based on tests of the masonry units and mortar in conformance with Sentences (5) to (11).

(5) Compressive strength test of clay or shale brick shall be conducted in conformance with CSA A82.2-1967, "Methods of Sampling and Testing Brick," and for concrete brick in conformance with CSA A165.2-1972, "Concrete Brick Masonry Units," both Standards as revised to 1 May, 1975.

(6) Compressive strength tests shall be made in conformance with the following Standards, as revised to 1 May, 1975,

- (a) CSA A165.1-1972, "Concrete Masonry Units;" and
- (b) CSA A82.6-1954, "Standard Methods for Sampling and Testing Structural Clay Tile," for structural clay tile.

(7) At least 5 units shall be tested as described in Sentence (5) or (6) and the compressive strength shall be obtained by multiplying the average compressive strength of the specimens by

$$1 + \frac{1.5}{\bar{x}} \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$$

where x = an individual test result,
 \bar{x} = average of individual test result,
 n = number of specimens.

(8) At least six 2 in. mortar cubes shall be prepared from the same materials and in the same proportions as those to be used in the masonry, cured and tested in accordance with CSA A179-1967, "Mortar for Unit Masonry," as revised to 1 May, 1975, and the average strength determined from these tests shall conform to Article 4.4.3.3. for the type of mortar specified.

(9) The value of the compressive strength, f'_m , to be used in design of brick masonry shall conform to Table 4.4.3.B.

TABLE 4.4.3.B

Forming Part of Sentence 4.4.3.6.(9)

Compressive Strength of Units, psi	Ultimate Compressive Strength of Brick Masonry (f'_m), psi ⁽¹⁾		
	Type M Mortar	Type S Mortar	Type N Mortar
14,000 plus	4,600	3,900	3,200
12,000	4,000	3,400	2,800
10,000	3,400	2,900	2,400
8,000	2,800	2,400	2,000
6,000	2,200	1,900	1,600
4,000	1,600	1,400	1,200
2,000	1,000	800	800
Column 1	2	3	4

Note to Table 4.4.3.B.

(¹) Linear interpolation is permitted.

(10) The value of compressive strength, f'_m , to be used in the design of masonry constructed with solid concrete units, hollow concrete or structural clay tile units, or hollow units filled with concrete or grout having a compressive strength at least equal to that of the units, shall conform to Table 4.4.3.C, based on gross cross-sectional area for units without voids and filled hollow units, and net cross-sectional area for units with voids.

TABLE 4.4.3.C

Forming Part of Sentence 4.4.3.6.(10)

Compressive Strength of Units, ⁽¹⁾ psi	Ultimate Compressive Strength of Concrete Block Masonry or Structural Clay Tile Masonry (f'_m), psi	
	Types M and S Mortar	Type N Mortar
6,000 plus	2,400	1,250
4,000	2,000	1,250
2,500	1,550	1,050
2,000	1,350	950
1,500	1,150	800
Column 1	2	3

Note to Table 4.4.3.C.

⁽¹⁾ Linear interpolation is permitted.

(11) In composite faced walls, cavity walls or other structural members constructed of different kinds or grades of units or mortars, the value of f'_m used in design shall correspond to the weakest combination of units and mortars of which the member is constructed, except that in a cavity wall where only 1 wythe supports the vertical load, the value of f'_m shall be appropriate for the materials in the loaded wythe.

FIELD CONTROL TESTS

4.4.3.7.(1) Where the value of f'_m used in design is determined in accordance with Sentences 4.4.3.6.(1) to (3),

- (a) at least 3 test specimens shall be made on site for each 5,000 sq ft or portion thereof of wall constructed, but not less than 3 test specimens per storey;
- (b) at least 5 such test specimens shall be made for each type and strength of masonry used in any building;
- (c) the field control test specimens shall be constructed on the site without using a jig near the walls being built, and using the materials and workmanship as the site work and of a size conforming to clause 4.4.3.6.(1) (d) or 4.4.3.6.(1) (e);
- (d) field control test specimens shall be wrapped in polyethylene and stored at the site for 24-hrs and stored in air temperatures not less than 68°F thereafter;
- (e) except as provided in (f), the test specimens shall be tested 28 days after being constructed;
- (f) field control test specimens may be tested at 7 days provided that the relationship between 7 and 28-day strengths of the masonry has been established by previous tests, or the compression strength obtained from 7-day test results shall be assumed to be 90 per cent of the 28-day value; and
- (g) the compressive strength of every test specimen shall be calculated in conformance with Sentence 4.4.3.6.(2), and the average compression strength from any 5 consecutive 28-day field control tests or from the 28-day strength predicted from 7-day tests in accordance with Clause (f) shall exceed the value of f'_m used in the design, and no individual test result shall have a value less than $0.80 f'_m$

(2) If the requirements in Clause (1) (g) are not met, the Chief Building Official shall be notified and proof shall be required that the strength of the structure is adequate.

4.4.3.8.(1) Where the value of f'_m used in design is determined in accordance with Sentences 4.4.3.6.(4) to (11), at least 5 masonry units and six 2 in. mortar cube specimens (3 from each of 2 different locations) shall be made for each 5,000 sq ft of wall or for each storey height, whichever requires the greatest number of tests.

(2) For tests of units referred to in Sentence (1), units shall be selected and tested in conformance with the following Standards, as revised to 1 May, 1975,

- (a) CSA A82.2-1967, "Methods of Sampling and Testing Brick," for clay or shale brick units;
- (b) CSA A165.2-1972, "Concrete Brick Masonry Units;"
- (c) CSA A165.1-1972, "Concrete Masonry Units;" and
- (d) CSA A82.6-1954, "Methods for Sampling and Testing Structural Clay Tile," for tile units.

(3) The average of any 5 consecutive compressive test results for units referred to in Sentence (1) shall exceed the compressive strength of the units used in the selection of f'_m as provided in Sentence 4.4.3.6.(9) or (10), and no individual test result shall be less than 0.80 of that compressive strength.

(4) For tests of mortar cubes referred to in Sentence (1),

- (a) the mortar shall be taken at random from the mortar boards currently in use, but care shall be taken that no old mortar from the edges of the boards is included;
- (b) mortar test cubes shall be made, cured and tested in accordance with CSA A179-1967, "Mortar for Unit Masonry," as revised to 1 May, 1975;
- (c) except as provided in (d), compression strength tests of mortar cubes shall be made at an age of 28 days; and
- (d) tests may be made after 7 days on mortar test cubes provided that the relationship between 7- and 28-day strength of the mortar has been established by previous tests, or the compression strengths obtained from 7-day test results may be assumed to be 90 per cent of the 28-day value.

(5) The average compression strength of 3 mortar cubes obtained from any 3 consecutive 28-day field control tests or from the 28-day strength predicted from 7-day tests in accordance with Clause (d) referred to in Sentence (4) shall be at least 0.80 of the compressive strength determined in accordance with Article 4.4.3.3 for the type of mortar used, and no individual test result shall have a value less than 0.67 of that strength.

(6) If the requirements in Sentences (3) or (5) are not met, the Chief Building Official shall be notified and proof shall be required that the strength of the structure is adequate.

4.4.3.9. Loads and associated reduction factors shall conform to Section 4.1 except as provided in Article 4.4.3.33.

4.4.3.10.(1) Except as permitted in Sentences (2), (3) and (4), all masonry in buildings shall be reinforced to resist the effects of seismic forces, but such reinforcement shall not be less than that required in Articles 4.4.3.30. and 4.4.3.32.

(2) Reinforcement need not be provided in seismic zone 1 provided the masonry is designed to resist seismic forces without such reinforcement.

(3) Reinforcement need not be provided in seismic zone 2 provided it can be shown that the masonry can resist seismic forces without such reinforcement and the masonry does not enclose an elevator shaft or stairway.

(4) Reinforcement to resist seismic forces need not be provided in masonry partitions provided the partitions,

- (a) do not exceed 40 lb/sq ft in weight;
- (b) do not exceed 10 ft in height and are laterally supported at the top; and
- (c) do not enclose elevator shafts or stairwells in seismic zones 2 and 3.

ALLOWABLE STRESSES

4.4.3.11.(1) The allowable stresses in plain masonry brick shall conform to Table 4.4.3.D provided that,

- (a) direction of stress is normal to bed joints;
- (b) tensile stresses parallel to bed joints are not permitted in stack bond masonry;
- (c) where a vertical load is supported on a masonry surface and the ratio of the loaded surface to the total surface is not more than 1:3, f_b may be increased to $0.375 f'_m$ provided the least distance between the edges of the loaded and unloaded surfaces is at least $\frac{1}{4}$ of the length of the edge of the loaded area perpendicular to such least distance, and the allowable bearing stress on a reasonably concentric area greater than one third the full area may be interpolated between the values given;
- (d) for computing flexural stresses, the section modulus of a cavity wall shall be assumed to be equal to the sum of the section module of the wythes;
- (e) allowance shall be made for unusual vibration and impact forces;
- (f) conform to Article 4.4.3.33. for shear walls.

TABLE 4.4.3.D
Forming Part of Article 4.4.3.11.(1)

MAXIMUM ALLOWABLE STRESSES IN PLAIN BRICK MASONRY		
Type of Stress or Modulus	Designation	Maximum Allowable Stress or Modulus, psi
Compressive, axial		
Walls	f_m	$0.25 f'_m$
Columns	f_m	$0.20 f'_m$
Compressive, flexural		
Walls	f_m	$0.32 f'_m$
Columns	f_m	$0.26 f'_m$
Tensile, flexural		
Normal to bed joints		
M or S mortar	f_t	36
N mortar	f_t	28
Parallel to bed joints		
M or S mortar	f_t	72
N mortar	f_t	56
Shear		
M or S mortar	v_m	$\sqrt{f'_m}$ but not to exceed 50
N mortar	v_m	$\sqrt{f'_m}$ but not to exceed 35
Bearing on masonry	f_b	$0.25 f'_m$
Modulus of elasticity	E_m	1,000 f'_m but not to exceed 3,000,000 psi
Modulus of rigidity	E_v	400 f'_m but not to exceed 1,200,000 psi
Column 1	2	3

4.4.3.12.(1) The allowable stresses in plain masonry of concrete block or structural clay tile shall conform to Table 4.4.3.E provided that,

- (a) shear and flexural calculations shall be based on net mortar bedded area;
- (b) direction of stresses normal to bed joints;
- (c) direction of stress parallel to bed joints. Tensile stresses in the horizontal planes are not permitted in stack bond masonry;
- (d) where a vertical load is supported on a masonry surface and the ratio of the loaded surface to the total surface is not more than 1:3, f_b may be increased to $0.375 f'_m$ provided the least distance between the edges of the loaded and unloaded surfaces is at least $\frac{1}{4}$ of the length of the edge of the loaded area perpendicular to such least distance, and the allowable bearing stress on a reasonably concentric area greater than one-third the full area may be interpolated between the values given;
- (e) for computing flexural stresses, the section modulus of a cavity wall shall be assumed to be equal to the sum of the section moduli of the wythes;
- (f) allowance shall be made for unusual vibration and impact forces;
- (g) for filled-hollow units the strength of the concrete or grout fill shall be at least equal to that of the units;
- (h) conform to Article 4.4.3.33. for shear walls.

TABLE 4.4.3.E

Forming Part of Article 4.4.3.12.(1)

MAXIMUM ALLOWABLE STRESSES AND MODULI FOR PLAIN CONCRETE BLOCK MASONRY AND STRUCTURAL CLAY TILE MASONRY			
Type of Stress or Modulus	Designation	Maximum Allowable Stress or Modulus, psi	
		Units Without Voids or Filled Hollow Units Based on Gross Cross- Sectional Area	Units with Voids Based on Net Cross- Sectional Area
Compressive, axial			
Walls	f_m	$0.20 f'_m$	$0.225 f'_m$
Columns	f_m	$0.18 f'_m$	$0.20 f'_m$
Compressive, flexural			
Walls	f_m	$0.30 f'_m$	$0.30 f'_m$
Columns	f_m	$0.24 f'_m$	$0.24 f'_m$
Tensile, flexural			
Normal to bed joints			
M or S mortar	f_t	36	23
N mortar	f_t	28	16
Parallel to bed joints			
M or S Mortar	f_t	72	46
N mortar	f_t	56	32
Shear			
M or S mortar	v_m	34	34
N mortar	v_m	23	23
Bearing on masonry	f_b	$0.25 f'_m$	$0.25 f'_m$
Modulus of elasticity	E_m	1000 f'_m but not to exceed 3,000,000 psi	1000 f'_m but not to exceed 3,000,000 psi
Modulus of rigidity	E_v	400 f'_m but not to exceed 1,200,000 psi	400 f'_m but not to exceed 1,200,000 psi
Column 1	2	3	4

4.4.3.13.(1) The allowable stresses in reinforced masonry of brick shall conform to Table 4.4.3.F, and to Article 4.4.3.31. for columns and to Article 4.4.3.33. for shear walls.

(2) Where a vertical load is supported on a masonry surface and the ratio of the loaded surface to the total surface is not more than 1:3, f_b may be increased to $0.375 f'_m$ provided the least distance between the edges of the loaded and unloaded surfaces is at least $\frac{1}{4}$ of the length of the edge of the loaded area perpendicular to such least distance, and the allowable bearing stress on a reasonably concentric area greater than one-third the full area may be interpolated between the values given in Table 4.4.3.F.

TABLE 4.4.3.F

Forming Part of Article 4.4.3.13.(1) (2)

MAXIMUM ALLOWABLE STRESSES IN REINFORCED BRICK MASONRY		
Type of Stress or Modulus	Designation	Maximum Allowable Stress or Modulus, psi
Compressive, axial		
Walls	f_m	$0.25 f'_m$
Columns	f_m	$0.20 f'_m$
Compressive, flexural		
Walls and beams	f_m	$0.40 f'_m$
Columns	f_m	$0.32 f'_m$
Shear		
No shear reinforcement		
Flexural members	v_m	$0.7 \sqrt{f'_m}$ but not to exceed 50
Shear walls	v_m	$0.5 \sqrt{f'_m}$ but not to exceed 100
With shear reinforcement taking entire shear		
Flexural members	v	$2.0 \sqrt{f'_m}$ but not to exceed 120
Shear walls	v	$1.5 \sqrt{f'_m}$ but not to exceed 150
Bond		
Plain bars	u	80
Deformed bars	u	160
Bearing	f_b	$0.25 f'_m$
Modulus of elasticity	E_m	$1000 f'_m$ but not to exceed 3,000,000 psi
Modulus of rigidity	E_v	$400 f'_m$ but not to exceed 1,200,000 psi
Column 1	2	3

4.4.3.14.(1) The allowable stresses in reinforced masonry of concrete block or structural clay tile shall conform to Table 4.4.3.G, and to Article 4.4.3.31. for columns and to Article 4.4.3.33. for shear walls.

(2) Where a vertical load is supported on a masonry surface and the ratio of the loaded surface to the total surface is not more than 1:3, f_b may be increased to $0.375 f'_m$ provided the least distance between the edges of the loaded and unloaded surfaces is at least $\frac{1}{4}$ of the length of the edge of the loaded area perpendicular to such least distance, and the allowable bearing stress on a reasonably concentric area greater than one-third the full area may be interpolated between the values given in Table 4.4.3.G.

TABLE 4.4.3.G

Forming Part of Article 4.4.3.14.(1) (2)

MAXIMUM ALLOWABLE STRESSES IN REINFORCED CONCRETE BLOCK AND STRUCTURAL CLAY TILE MASONRY		
Type of Stress or Modulus	Designation	Maximum Allowable Stress or Modulus, psi
Compressive, axial		
Walls	f_m	$0.225 f'_m$
Columns	f_m	$0.20 f'_m$
Compressive, flexural		
Walls and beams	f_m	$0.33 f'_m$
Columns	f_m	$0.28 f'_m$
Shear		
No shear reinforcement		
Flexural members	v_m	$0.02 f'_m$ but not to exceed 50
Shear walls	v_m	$0.015 f'_m$ but not to exceed 50
With shear reinforcement taking entire shear		
Flexural members	v	$0.05 f'_m$ but not to exceed 150
Shear walls	v	$0.04 f'_m$ but not to exceed 75
Bond		
Plain bars	u	80
Deformed bars	u	160
Bearing on masonry	f_b	$0.25 f'_m$
Modulus of elasticity	E_m	$1000 f'_m$ but not to exceed 3,000,000 psi
Modulus of rigidity	E_v	$400 f'_m$ but not to exceed 1,200,000 psi
Column 1	2	3

4.4.3.15.(1) The allowable tensile stress in reinforcement shall not exceed,

- (a) 18,000 psi for billet-steel or axle-steel reinforcing bars of structural grade;
- (b) 24,000 psi for deformed bars with a yield strength of at least 60,000 psi and not exceeding #11 size; and
- (c) 20,000 psi for all other reinforcement.

(2) The allowable compressive stress in vertical column reinforcement shall not exceed 40 per cent of the yield strength of the steel and shall be not greater than 24,000 psi.

(3) The allowable compressive stress for compression reinforcement in flexural members shall be not greater than the allowable tensile stress shown in Sentence (1).

4.4.3.16. The modulus of elasticity of steel reinforcement shall be assumed as 29,000,000 psi.

4.4.3.17.(1) The allowable shear on steel bolts and anchors shall conform to Table 4.4.3.H, provided that,

- (a) in determining the stress in masonry, the eccentricity due to loaded bolts and anchors shall be considered;

(b) bolts and anchors shall be solidly embedded in mortar or grout to develop adequate resistance to the design shear forces except that the embedment shall not be less than given in Table 4.4.3.H.

TABLE 4.4.3.H

Forming Part of Article 4.4.3.17.(1)

MAXIMUM ALLOWABLE SHEAR ON BOLTS AND ANCHORS		
Diameter of Bolt or Anchor, in.	Minimum Embedment, in.	Maximum Allowable Shear, lb
1/4	4	270
3/8	4	410
1/2	4	550
5/8	4	750
3/4	5	1,100
7/8	6	1,500
1	7	1,850
1 1/8	8	2,250
Column 1	2	3

DESIGN OF MASONRY WALLS AND COLUMNS

4.4.3.18.(1) The slenderness ratio of a loadbearing masonry wall (the ratio of its effective height, h, to the effective thickness, t) shall not exceed

$$10(3 - (e_1)/(e_2))$$

(2) The value e_1/e_2 in Sentence (1) shall be assumed to be positive where the wall is bent in single curvature and negative where the wall is bent in double curvature.

4.4.3.19.(1) The slenderness ratio of a loadbearing masonry column (the greatest value obtained by dividing the effective height, h, by the effective thickness, t) shall not exceed

$$5(4 - (e_1)/(e_2))$$

(2) The value e_1/e_2 in Sentence (1) shall be assumed to be positive where the column is bent in single curvature and negative where the column is bent in double curvature.

4.4.3.20. The slenderness coefficient, C_s , shall conform to Table 4.4.3.I.

TABLE 4.4.3.1
Forming Part of Sentence 4.4.3.20.

Slenderness Coefficients (C _s) ⁽¹⁾											
h/t	e ₁ /e ₂										
	-1.0	-0.8	-0.6	-0.4	-0.2	0	+0.2	+0.4	+0.6	+0.8	+1.0
5 or less	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.97	0.97	0.96	0.96
7	0.97	0.96	0.96	0.96	0.96	0.95	0.94	0.94	0.93	0.93	0.92
8	0.95	0.95	0.94	0.94	0.93	0.92	0.92	0.91	0.90	0.89	0.88
9	0.94	0.93	0.92	0.92	0.91	0.90	0.89	0.88	0.87	0.85	0.84
10	0.92	0.91	0.91	0.90	0.89	0.88	0.86	0.85	0.83	0.82	0.80
11	0.90	0.90	0.89	0.88	0.86	0.85	0.84	0.82	0.80	0.78	0.76
12	0.89	0.88	0.87	0.86	0.84	0.82	0.81	0.79	0.77	0.74	0.72
13	0.87	0.86	0.85	0.84	0.82	0.80	0.78	0.76	0.73	0.71	0.68
14	0.86	0.84	0.83	0.81	0.80	0.78	0.75	0.73	0.70	0.67	0.64
15	0.84	0.83	0.81	0.79	0.77	0.75	0.72	0.70	0.67	0.64	0.60
16	0.82	0.81	0.79	0.77	0.75	0.72	0.70	0.67	0.63	0.60	0.56
17	0.81	0.79	0.77	0.75	0.73	0.70	0.67	0.64	0.60	0.56	0.52
18	0.79	0.77	0.75	0.73	0.70	0.68	0.64	0.61	0.57	0.52	0.48
19	0.78	0.76	0.74	0.71	0.68	0.65	0.62	0.58	0.53	0.49	0.44
20	0.76	0.74	0.72	0.69	0.66	0.62	0.59	0.55	0.50	0.45	0.40
21	0.74	0.72	0.70	0.67	0.64	0.60	0.56	0.52	0.47	0.42	
22	0.73	0.71	0.68	0.65	0.61	0.58	0.53	0.48	0.43	0.38	
23	0.71	0.69	0.66	0.62	0.59	0.55	0.50	0.46	0.40		
24	0.70	0.67	0.64	0.61	0.57	0.52	0.48	0.42	0.37		
25	0.68	0.65	0.62	0.59	0.55	0.50	0.45	0.39			
26	0.66	0.64	0.60	0.57	0.52	0.48	0.42	0.36			
27	0.65	0.62	0.58	0.54	0.50	0.45	0.40				
28	0.63	0.60	0.57	0.52	0.48	0.42	0.37				
29	0.62	0.58	0.55	0.50	0.46	0.40					
30	0.60	0.57	0.53	0.48	0.43	0.38					
31	0.58	0.55	0.51	0.46	0.41						
32	0.57	0.53	0.49	0.44	0.39						
33	0.55	0.52	0.47	0.42							
34	0.54	0.50	0.45	0.40							
35	0.52	0.48	0.43								
36	0.50	0.46	0.42								
37	0.49	0.45									
38	0.47	0.43									
39	0.46										
40	0.44										
Col. 1	2	3	4	5	6	7	8	9	10	11	12

Note to Table 4.4.3.1.:

⁽¹⁾ $C_s = 1 - C_b \left(\frac{h}{i} - 5 \right)$

Where $C_b = 0.003 \left((e_1)/(e_2) \right)^2 + 0.012 \left((e_1)/(e_2) \right) + 0.025$

4.4.3.21.(1) Where a wall is laterally supported at more than 1 level, the effective height, h, between supports shall be assumed as the clear height between such supports.

(2) Where a wall is not laterally supported at the top, its effective height, h, shall be assumed as twice the height of the wall above the lateral support.

4.4.3.22.(1) Where a column is laterally supported at more than 1 level in the directions of both principal axes, the effective height, h , in relation to any axis shall be assumed as the clear distance between such supports.

(2) Where a column is provided with lateral support in the directions of both principal axes at the bottom and 1 principal axis at the top, its effective height in relation to the axis about which the column has support top and bottom shall be assumed as the distance between such supports and its effective height at right angles to this axis shall be assumed as twice this distance.

(3) Where a column is not provided with lateral support at the top, its effective height relative to 2 principal axes shall be assumed as twice its height above the lower support.

4.4.3.23.(1) Except as provided in Article 4.4.3.25., for all solid masonry walls the effective thickness, t , shall be assumed as the actual thickness.

(2) Except as provided in Article 4.4.3.25., for cavity walls loaded on not more than 1 wythe, the effective thickness shall be assumed as the actual thickness of the loaded wythe.

(3) Except as provided in Article 4.4.3.25., for cavity walls loaded on both wythes, each wythe shall be considered to act independently and the effective thickness of each wythe shall be assumed as its actual thickness.

4.4.3.24.(1) Except as provided in Article 4.4.3.25. for rectangular columns, the effective thickness in the direction of each principal axis shall be assumed as the actual thickness in that direction.

(2) Except as provided in Article 4.4.3.25. for non-rectangular columns, the effective thickness, t , in relation to each principal axis shall be assumed as 3.5 times its radius of gyration about the axis considered.

4.4.3.25. Where raked mortar joints are used, the effective thickness shall be assumed as the effective thickness in Articles 4.4.3.23. and 4.4.3.24. reduced by the depth of the raking.

4.4.3.26.(1) Lateral movements due to loads, thermal effects and other causes shall be taken into account in calculating the virtual eccentricity of loads on walls or columns.

(2) Where members are constructed of different kinds or grades of units or mortar, the variation in the moduli of elasticity shall be taken into account and the eccentricity of the load shall be measured from the centroid of the transformed section of the member.

(3) Where a cavity wall is loaded on 1 wythe, the eccentricity of the load shall be measured from the centroid of the loaded wythe.

(4) Where a cavity wall is loaded on both wythes, the load shall be distributed to each wythe according to the eccentricity of the load from the centroidal axis of the wall.

(5) For walls or columns of solid masonry subject to bending about not more than 1 principal axis,

(a) the eccentricity of any load shall be measured from the centroid of the member; and

(b) the eccentricity coefficient, C_e , shall be computed by,

(i) $C_e = \frac{1}{1 + 6e/t}$ where the virtual eccentricity, e , does not exceed $t/6$,

(ii) $C_e = \frac{1}{t/3}$ or $C_e = \frac{1}{3} \left(1 - \frac{2e}{t} \right)$ where the virtual eccentricity exceeds $t/6$ but does not exceed $t/3$, or

(iii) $C_e = \frac{1}{6 \frac{e}{t} - 1}$ where the virtual eccentricity exceeds $t/3$ (see Clause 4.4.3.28.(2)).

(6) Where walls and columns are subject to bending about both principal axes, the eccentricity coefficient, C_e , shall be computed by,

$$(a) C_e = \frac{1}{1 + 6e_b/b + 6e_t/t} \text{ where } (e_b + e_t) \text{ does not exceed } bt/6, \text{ or}$$

$$(b) C_e = \frac{1}{4} \left(1 - \frac{2e_b}{b} - \frac{2e_t}{t} \right) \text{ where } (e_b + e_t) \text{ exceeds } bt/6 \text{ but does not exceed } bt/3.$$

4.4.3.27.(1) Except as provided in Sentence (2), for cavity walls loaded on both wythes A_g shall be assumed as the gross cross-sectional area of the wythe under consideration.

(2) Where raked mortar joints are used, the thickness used in determining A_g shall be the actual thickness of the member reduced by the depth of the raking.

4.4.3.28.(1) Except as provided in Sentence (2), the allowable vertical load, P , on a plain masonry wall or column subject to bending about not more than 1 principal axis shall be computed by,

(a) $P = C_s f_m A_n$ where the virtual eccentricity is less than $t/20$ and f_m is the allowable axial compressive stress, or

(b) $P = C_e C_s f_m A_n$ where the virtual eccentricity is at least $t/20$ but does not exceed $t/3$ and f_m is the allowable axial compressive stress.

(2) Where the virtual eccentricity exceeds $t/3$, P in Sentence (1) shall be computed in accordance with Clause (1) (b), except that the allowable flexural tensile stress, f_t , in Articles 4.4.3.11. and 4.4.3.12. shall be substituted for f_m .

(3) Except as provided in Sentence (4), the allowable vertical loads on rectangular plain masonry walls and columns subject to bending about both principal axes shall be calculated in conformance with,

(a) Clause (1)(a) where $(e_b + e_t)$ is less than $bt/20$, or

(b) Clause (1)(b) where $(e_b + e_t)$ is at least equal to $bt/20$ but does not exceed $bt/3$.

(4) Where $(e_b + e_t)$ exceeds $bt/3$, walls and columns subject to bending about 2 principal axes shall be reinforced and designed in accordance with Articles 4.4.3.29. and 4.4.3.31.

4.4.3.29.(1) Except as permitted in Sentences (2) and (4), the allowable load, P , on a reinforced masonry wall subject to bending about not more than 1 principal axis shall be,

(a) $P = C_s f_m A_n$ where the virtual eccentricity is less than $t/10$ and f_m is the allowable axial compressive stress, or

(b) $P = C_e C_s f_m A_n$ where the virtual eccentricity is at least $t/10$ but does not exceed $t/3$ or a value which would produce tension in the reinforcement and f_m is the allowable axial compressive stress.

(2) Where the virtual eccentricity exceeds $t/3$ or a value which would produce tension in the reinforcement, P in Sentence (1) shall be determined on the basis of a transformed section and linear stress distribution. Reinforcement in compression shall be neglected except as provided in Sentence (4). The compressive stress in the masonry shall not exceed the allowable flexural compressive stress, f_m , and the tensile stress in the reinforcement shall conform to Article 4.4.3.15. The vertical load determined in accordance with this Sentence shall be modified by the slenderness coefficient in Article 4.4.3.20.

(3) Except as provided in Sentence (4), the allowable vertical load, P , on a reinforced masonry wall subject to bending about both principal axes shall be calculated in conformance with,

(a) Clause (1) (a) where $(e_b + e_t)$ is less than $bt/10$;

- (b) Clause (1) (b) where $(e_t b + e_b t)$ is at least equal to $bt/10$ but does not exceed $bt/3$ or a value which would produce tension in the reinforcement; or
- (c) Sentence (2) where $(e_t b + e_b t)$ exceeds $bt/3$ or a value which would produce tension in the reinforcement.

(4) When the reinforcement in bearing walls is designed, placed and tied in position as for columns, the walls may be designed as columns in accordance with Article 4.4.3.31. provided the length of the wall considered as a column does not exceed the centre-to-centre distance between concentrated loads nor exceed the width of the bearing plus 4 times the wall thickness.

4.4.3.30.(1) Reinforced masonry walls shall be reinforced horizontally and vertically with steel having a total cross-sectional area not less than 0.002 times the gross cross-sectional area of the wall so that not less than $\frac{1}{3}$ of the required steel is either vertical or horizontal.

(2) The principal reinforcing bars shall be spaced not more than 6 times the wall thickness nor more than 48 in. apart.

(3) Horizontal reinforcement shall be provided in the wall immediately above every footing, at the bottom and top of every wall opening, at roof and floor level and at the top of every parapet wall.

(4) All required wall reinforcement in Sentences (1) to (3) shall be continuous or shall be spliced in accordance with Sentence 4.4.3.51.(4).

(5) In addition to the minimum reinforcement or that required by the structural design, there shall be not less than the equivalent of 1 No. 4 bar around all window and door openings extending at least 24 in. beyond the corners of the openings.

4.4.3.31.(1) Except as provided in Sentence (2), the allowable vertical load, P , on a reinforced masonry column subject to bending about not more than 1 principal axis, shall be,

- (a) $P = C_s(f_m + 0.80 p_n f_s) A_n$ where the virtual eccentricity is less than $t/10$ and f_m is the allowable axial compressive stress, or
- (b) $P = C_s C_e(f_m + 0.80 p_n f_s) A_n$ where the virtual eccentricity is at least $t/10$ but does not exceed $t/3$ or a value which would produce tension in the reinforcement and f_m is the allowable flexural compressive stress.

(2) Where the virtual eccentricity exceeds $t/3$ or a value which would produce tension in the reinforcement, P in Sentence (1) shall be determined on the basis of a transformed section and linear stress distribution. The compressive stress in the masonry shall not exceed the allowable flexural compressive stress and the stresses in the reinforcement, f_s , shall conform to Article 4.4.3.15. The vertical load determined in accordance with this Sentence shall be modified by the slenderness coefficient in Article 4.4.3.20.

(3) Allowable vertical loads on rectangular reinforced masonry columns subject to bending about both principal axes shall be calculated in conformance with,

- (a) Clause (1) (a) where $(e_t b + e_b t)$ is less than $bt/10$;
- (b) Clause (1) (b) where $(e_t b + e_b t)$ is at least equal to $bt/10$ but does not exceed $bt/3$ or a value which would produce tension in the reinforcement; or
- (c) Sentence (2) where $(e_t b + e_b t)$ exceeds $bt/3$ or a value which would produce tension in the reinforcement.

4.4.3.32.(1) The cross-sectional area of vertical reinforcement in columns shall be at least 0.5 per cent and not more than 4 per cent of the gross cross-sectional area of the column, except that a column stressed to less than $\frac{1}{2}$ of its allowable stress may have its reinforcement reduced to not less than 0.27 per cent.

(2) Lateral ties shall be not less than No. 9 ASWG wire (0.1483 in. diameter) and the spacing shall not exceed 16-bar diameters, 48-tie diameters, nor the least dimension of the column whichever gives the smallest spacing. Ties may be placed in horizontal mortar joints or in contact with the vertical steel.

(3) The ties shall be so arranged that every corner bar and intermediate bar is laterally supported by a tie forming an included angle of not more than 135 deg. at the bar, except that an intermediate bar that is not more than 6 in. from a laterally supported bar need not be supported, and where the bars are located around the periphery of a circle tie may be used.

SHEAR WALLS

4.4.3.33.(1) A plain masonry wall shall be designed so that no part of the wall is in tension.

(2) Reinforced masonry shear walls shall be designed in conformance with Article 4.4.3.29.

(3) The maximum horizontal shear stress in a shear wall, v_{sw} , shall not exceed the value

$$(v \text{ or } v_m) + 0.3f_{cs}$$

where v or v_m = the allowable applicable shear stress.

(4) In computing the shear resistance of a shear wall, flanges or projections formed by intersecting walls shall be neglected.

(5) In calculations of shear stresses in masonry shear walls subjected to earthquake forces, the load probability combination factor in Section 4.1, shall not apply.

4.4.3.34.(1) Except as provided in Sentence (3), where masonry shear walls intersect a masonry wall or walls to form symmetrical T or I sections, the effective width shall not exceed 1/6 of the total wall height above the level being analyzed and its overhanging width on either side of the shear wall shall not exceed 6 times the thickness of the intersected wall.

(2) Except as provided in Sentence (3), where masonry shear walls intersect a masonry wall or walls to form L or C sections, the effective overhanging flange width shall not exceed 1/16 of the total wall height above the level being analyzed nor 6 times the thickness of the intersected wall.

(3) Limits on effective flange width in Sentences (1) and (2) may be increased where it can be shown that such increases are justified.

(4) The vertical shear stress at the intersection of masonry walls shall not exceed the allowable shear stress in Articles 4.4.3.11. to 4.4.3.14. for shear walls if the intersection is laid up in true masonry bond conforming to Clause 4.4.5.18.(1) (a) or shall not exceed the allowable shear values in Article 4.4.3.17. where metal bolts or anchors are provided. Metal anchors shall be embedded to the depth required to develop the tensile strength of the anchors.

4.4.3.35.(1) When floors or roofs are designed to transmit horizontal forces to walls, the anchorage of the floor or roof to the wall shall be designed to resist the horizontal force.

(2) Steel anchors to resist shear force shall be designed in conformance with Article 4.4.3.17.

FLEXURAL MEMBERS

4.4.3.36.(1) The design of flexural members of reinforced masonry shall be in accordance with the following assumptions,

(a) a section that is plane before bending remains plane after bending;

- (b) moduli of elasticity of the masonry and of the reinforcement remain constant;
- (c) tensile forces are resisted only by the tensile reinforcement; and
- (d) reinforcement is completely surrounded by and bonded to masonry material.

4.4.3.37.(1) All members shall be designed to resist at all sections the maximum bending moment and shears as determined by the principle of continuity and relative rigidity.

(2) The clear distance between lateral supports of a beam shall not exceed 32 times the least width of the compression flange or face.

(3) Where compression steel is required in beams, it shall be anchored by ties or stirrups not less than $\frac{1}{4}$ in. in diameter, spaced not more than 16-bar diameters or 48-tie diameters apart, whichever is less.

(4) In computing flexural stresses in walls where reinforcement occurs, the effective width shall be not greater than 4 times the wall thickness.

4.4.3.38. Where tensile reinforcement at any section of a flexural member is required, the ratio, p , of the area of tensile reinforcement to effective masonry area shall be at least $80/f_y$, unless the tensile reinforcement at every section, positive or negative, is at least $\frac{1}{3}$ greater than that required by analysis.

4.4.3.39.(1) The shearing stress, v , as a measure of diagonal tension in reinforced masonry flexural members shall be calculated by

$$v = \frac{V}{bd}$$

except for members of I or T section where b' shall be substituted for b .

(2) Except for corbels, brackets and other short cantilevers, the maximum shear in a flexural member shall be assumed as that occurring at a distance equal to the effective depth, d , of the member, from the face of the support.

(3) The effects of flexural compression in variable-depth members and the significant effects of torsion shall be included in calculating the shear stress.

(4) Where the value of the calculated shearing stress exceeds the allowable shearing stress permitted on masonry without web reinforcement, web reinforcement shall be provided to carry the entire shearing stress, and such reinforcement shall be continued for a distance equal to the depth, d , of the member beyond the point theoretically required.

4.4.3.40.(1) Web reinforcement shall consist of,

- (a) bars or stirrups perpendicular to or at an angle of at least 45 deg. with the longitudinal tension reinforcement;
- (b) longitudinal bars bent so that the axis of the inclined portion of the bar makes an angle of at least 30 deg. with the axis of the longitudinal portion of the bar; or
- (c) combination of (a) and (b).

4.4.3.41.(1) The area of steel, A_v , required in stirrups placed perpendicular to the longitudinal reinforcement shall be calculated by

$$A_v = \frac{V_s}{f_y d}$$

4.4.3.42.(1) The required area, A_v , of inclined stirrups or parallel bars bent up at different distances from the support shall be calculated by

$$A_v = \frac{V_s}{f_y d (\sin a + \cos a)}$$

(2) When the web reinforcement consists of a single bent bar or of a single group of parallel bars all bent up at the same distance from the support, the required area, A_v , of such bar or bars shall be calculated by

$$A_v = \frac{V}{f_s \sin a}$$

(3) Only the centre $\frac{1}{4}$ of the inclined portion of a bent bar shall be considered effective as web reinforcement.

4.4.3.43. Where web reinforcement is required, it shall be spaced so that every 45-deg. line, representing a potential diagonal crack, extending from the mid-depth, $d/2$, of the beam to the longitudinal tension bars shall be crossed by at least 1 line of effective web reinforcement.

4.4.3.44.(1) In flexural members in which tensile reinforcement is parallel to the compressive face, the bond stress, u , shall be calculated by

$$u = \frac{V}{\sum ojd}$$

(2) The tension or compression in any bar at any section shall be developed on each side of that section by adequate embedment length, end anchorage or hooks. A tension bar may be anchored by bending it across the web at an angle of not less than 15 deg. with the longitudinal portion of the bar and making it continuous with the reinforcement on the opposite side of the member.

(3) Except at supports, every reinforcing bar shall be continued beyond the point at which it is no longer needed to resist flexural stress, for a distance of not less than the effective depth of the member but not less than 12 bar diameters.

(4) Tension bars shall not be terminated in a tension zone except where,

(a) the shear is not over $\frac{1}{2}$ that permitted;

(b) additional stirrups in excess of those required are provided each way from the termination point, a distance equal to the depth of the beam. The stirrup shall not exceed $\frac{d}{8r_b}$ where r_b is the ratio of the area of bars terminated to the total area of bars at the section; or

(c) the continuing bars provide double the area required for moment resistance at the termination point or double the perimeter required for bond.

(5) Tensile reinforcement for negative moment in any span of a continuous, restrained or cantilever beam, or in any member of a rigid frame shall be adequately anchored by bond, hooks or mechanical anchors in or through the supporting member.

(6) At least $\frac{1}{3}$ of the total reinforcement required for negative moment at a support shall be extended beyond the extreme position of the point of inflection a distance at least $1/16$ of the clear span but not less than the effective depth of the member.

(7) At least $\frac{1}{3}$ of the total reinforcement required for positive moment in simple beams or at the simply supported end of continuous beams shall extend along the same face of the beam at least 6 in. past the edge of the support. At least $\frac{1}{4}$ of the total reinforcing required for positive moment in a continuous beam shall extend along the same face of the beam past the face of intermediate supports at least 6 in.

(8) Plain bars in tension shall terminate in standard hooks, except that hooks shall not be required on the positive reinforcement at interior supports of continuous members.

4.4.3.45.(1) Single separate bars used as web reinforcement shall be anchored at each end by,

(a) welding to longitudinal reinforcement;

- (b) hooking tightly around the longitudinal reinforcement through 180 deg.
 - (c) embedment above or below the mid-depth of the beam on the compression side a distance sufficient to develop by bond the stress in the bar; or
 - (d) standard hook as specified in Article 4.4.3.46. developing 7,500 psi, plus embedment sufficient to develop by bond the remainder of the stress in the bar; the effective embedded length shall be assumed not to exceed the distance between the mid-depth of the beam and the tangent of the hook.
- (2) The ends of bars forming single U-stirrups or multiple U-stirrups shall be anchored by one of the methods of Sentence (1) or shall be bent through an angle of at least 90 deg. tightly around longitudinal reinforcing bars not less in diameter than the stirrup bar, and shall project beyond the bend at least 12 diam. of the stirrup bar.
- (3) The loops or closed ends of single U-stirrups or multiple U-stirrups shall be anchored by bending around the longitudinal reinforcement through an angle of at least 90 deg., or by being welded or otherwise rigidly attached to such reinforcement.
- (4) Hooking or bending stirrups or separate web reinforcing bars around the longitudinal reinforcement shall be considered effective only when these bars are perpendicular to the longitudinal reinforcement.
- (5) Longitudinal bars bent to act as web reinforcement in tension zones shall be continuous with the longitudinal reinforcement. The tensile stress in each bar shall be fully developed in both the upper and lower half of the beam by anchorage through bond or hooks.

4.4.3.46.(1) A hook used for anchoring reinforcement shall have,

- (a) a complete semicircular bend with a radius on the axis of the bar of at least 3 and not more than 6 bar diameters, plus an extension at the free end of the bar equal to at least 4 bar diameters;
 - (b) a 90-deg. bend having a radius of at least 4 bar diameters plus an extension beyond the bend equal to at least 12 bar diameters; or
 - (c) for stirrup anchorage only, a 135-deg. turn with a radius on the axis of the bar of 3 diameters plus an extension at the free end of the bar of at least 6 bar diameters.
- (2) Hooks having a radius of bend of more than 6 bar diameters shall be considered merely as extensions to the bars.
- (3) Hooks shall not be assumed to carry a load which would produce a tensile stress in the bar greater than 7,500 psi.
- (4) Hooks shall not be considered effective in anchoring bars in compression.
- (5) Any mechanical device capable of developing the strength of the bar without damage to the masonry may be used in lieu of a hook provided test evidence is submitted to show the adequacy of such device.

GROUTED REINFORCED MASONRY

4.4.3.47.(1) Grouted reinforced masonry shall be constructed so that,

- (a) at the time of laying, all masonry units are free of excessive dust or dirt;
- (b) Type S mortar is used;
- (c) the proportions of materials in fine or coarse grout conform to Article 4.4.2.18.;
- (d) fine grout is used in grout spaces, except that coarse grout may be used in grout spaces 2 in. or more in least horizontal dimension;

- (c) the grout completely fills all spaces intended to receive grout;
- (f) grout is used before it has begun to set but not more than $1\frac{1}{2}$ hr after initial mixing; and
- (g) the units in all wythes are laid with full head and bed mortar joints.

4.4.3.48.(1) Where grouted masonry is grouted in low lifts,

- (a) masonry headers shall not project into the grout space;
- (b) all spaces to be grouted shall be not less than $\frac{3}{4}$ in. in width;
- (c) grout shall be puddled immediately after pouring;
- (d) wythes shall be carried up to a height not greater than that required to accommodate 1 grout lift, except that 1 wythe may be carried to a height of not more than 16 in. before grouting;
- (e) grout shall be placed in lifts of not more than 8 in. but not more than 6 times the width of the grout space; and
- (f) the grout shall be stopped 1 in. below the top of the lowest wythe where the work may be stopped for 1 hr or longer.

4.4.3.49.(1) Where grouted masonry is grouted in high lifts, the wythes may be constructed to the full wall height and grouting carried out in conformance with Sentences (2) to (6) after the mortar has set.

(2) The outer wythes of grouted masonry in Sentence (1) shall be bonded together with wall ties of not less than No. 9 ASWG (0.1483 in. diameter) corrosion-resistant wire bent into rectangles 4 in. wide and 2 in. less in length than the over-all wall thickness, or other ties providing equivalent strength, stiffness and bond,

- (a) kinks or other deformations in the ties shall not be permitted;
- (b) one wythe of the wall shall be built up not higher than 16 in. above the other wythe; and
- (c) ties shall be laid not more than 24 in. o. c. horizontally and 16 in. o. c. vertically for running bond, and not more than 24 in. o. c. horizontally and 12 in. o. c. vertically for stack bond.

(3) Cleanouts shall be provided for each lift in grouted masonry in Sentence (1) by omitting every second unit in the bottom course of the section being placed,

- (a) mortar fins and other foreign matter shall be removed from the grout space by a high pressure jet of water or air; and
- (b) such cleanouts shall be sealed after inspection and before grouting.

(4) The grout space in grouted masonry in Sentence (1) shall be not less than 3 in. in width, and vertical grout barriers of solid masonry not more than 25 ft apart shall be built across the grout space the entire height of the wall.

(5) Grout used in grouted masonry in Sentence (1) shall be mixed thoroughly to a consistency suitable for pumping without segregation, and placed by pumping or other approved method.

(6) Grouting of and grouted masonry in Sentence (1) shall be done in a continuous pour in lifts of not more than 4 ft and it shall be consolidated by puddling or vibrating during pouring and again after excess moisture has been absorbed and while the grout is plastic and the grouting of any section between vertical grout barriers shall be completed in 1 day with no interruptions greater than 1 hr.

REINFORCED MASONRY OF HOLLOW UNITS

4.4.3.50.(1) Reinforced masonry of hollow unit construction shall be constructed of hollow masonry units in which certain cells contain reinforcement and are filled with concrete or grout.

(2) All reinforced masonry of hollow units shall be built so that walls and cross webs forming cells to be filled shall be fully bedded in mortar to prevent leakage of grout,

(a) all head joints shall be filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the face shells; and

(b) bond shall be provided by lapping units in successive vertical courses or by equivalent mechanical anchorage.

(3) Vertical cells of hollow units to be filled in Sentence (1) shall have vertical alignment sufficient to maintain an unobstructed continuous cell of at least 2 in. by 3 in., except that where the total grout pour exceeds 8 ft such cells shall be at least 3 in. by 3 in.

(4) Cleanout openings shall be provided at the bottoms of all cells to be filled at each lift or pour of grout where such lift or pour of grout exceeds 4 ft in height,

(a) any overhanging mortar or other obstruction or debris shall be removed from the inside of such walls; and

(b) the cleanouts shall be inspected before being sealed.

(5) Vertical reinforcement shall be held in position at top and bottom and at intervals not exceeding 192 diam. of the reinforcement.

(6) All cells containing reinforcement shall be completely filled with grout in lifts not exceeding 8 ft, except that where the total grout pour exceeds 8 ft in height the grout shall be placed in lifts not exceeding 4 ft,

(a) grout shall be consolidated at the time of pouring by puddling or vibrating during pouring and again after excess moisture has been absorbed and while the grout is plastic.

(7) When the grouting is stopped for more than 1 hr, horizontal construction joints shall be formed by stopping the pour of grout 1½ in. below the top unit.

(8) The proportions of materials in fine or coarse grout shall conform to Article 4.4.2.18.

(9) All grout shall be used within 1½ hr of initial mixing but before it has begun to set.

PLACING REINFORCEMENT

4.4.3.51.(1) The thickness of grout or mortar between masonry units and reinforcement shall be not less than ¼ in., except that ¼ in. bars may be laid in not less than ⅜ in. horizontal joints. Spaces containing both horizontal and vertical reinforcement shall be not less than ½ in. larger than the sum of the diameters of such horizontal and vertical reinforcement.

(2) Except in columns the clear distance between parallel bars shall be at least equal to the diameter of the bar.

(3) Reinforcement shall be accurately placed and fixed rigidly in position during grouting, except that horizontal reinforcement may be placed as the work progresses.

(4) Splices shall be made so that the structural strength of the member is not reduced,

(a) lapped splices shall provide sufficient lap to develop by bond the working stress of the reinforcement;

- (b) mechanical connections shall develop the strength of the reinforcement; and
- (c) welded connections shall conform to CSA W186-1970, "Welding of Reinforcing Bars in Reinforced Concrete Construction", as revised to 1 May, 1975.

4.4.3.52.(1) Except as provided in Sentence (2), all reinforcing bars shall be completely embedded in mortar or grout and have a coverage of masonry not less than,

- (a) 3 in. at the tops and bottoms of footings and masonry in contact with soil;
- (b) 2 in. over bars in masonry exposed to the weather, except that $1\frac{1}{2}$ in. shall be permitted over bars $\frac{5}{8}$ -in. or less and not located in the upper face of the masonry;
- (c) $1\frac{1}{2}$ in. over reinforcement in columns not exposed to weather or soil;
- (d) $1\frac{1}{2}$ in. on the bottom and sides of beams or girders not exposed to weather or soil;
- (e) $\frac{3}{4}$ in. from the face of all walls not exposed to weather or soil;
- (f) $\frac{3}{4}$ in. at the upper face of any member not exposed to weather or soil; and
- (g) one bar diameter over all bars.

(2) Reinforcement consisting of bars or wire $\frac{1}{4}$ in. or less in diameter embedded in the horizontal mortar joints shall have not less than $\frac{5}{8}$ -in. mortar coverage from the exposed face.

Subsection 4.4.4. Conventional Design of Plain Masonry

GENERAL

4.4.4.1. This Subsection applies to the design and construction of plain masonry except for plain masonry designed in accordance with Subsection 4.4.3.

4.4.4.2.(1) Dimensions of masonry units or masonry in this Subsection are nominal except when otherwise noted.

(2) Minimum actual dimensions of masonry units or masonry shall be determined in accordance with CSA A31-1959, "Modular Co-ordination in Buildings", as revised to 1 May, 1975.

4.4.4.3.(1) The compressive stresses in plain masonry shall conform to Table 4.4.4.A.

(2) The maximum stress shall be based on the gross cross-sectional area.

(3) Mortar joints shall not exceed $\frac{1}{2}$ in. in thickness.

(4) Where a type of masonry unit or type of mortar is not provided for in Sentence (1), the maximum allowable compressive stress of the masonry shall be 15 per cent of the ultimate compressive strength of the masonry as determined by tests performed in accordance with ASTM E72-68, "Conducting Strength Tests of Panels for Building Construction", as revised to 1 May, 1975.

TABLE 4.4.4.A.

Forming Part of Sentence 4.4.4.3.(1)

Type of Masonry	Type of Masonry Units	Max. Allowable Compressive Stress, psi				
		Type of Mortar ⁽¹⁾				
		M	S	N	O	K
Solid Masonry	Rubble stone	140	120	100	80	—
	Ashlar granite	800	720	640	500	—
	Ashlar limestone and marble	500	450	400	325	—
	Ashlar sandstone and cast-stone	400	360	320	250	—
	Solid units, except concrete block, with an ultimate compressive strength of over 10,000 psi	500	450	350	250	100
		8,000 psi to 10,000 psi	400	350	300	250
		4,500 psi to 8,000 psi	250	225	200	150
		2,500 psi to 4,500 psi	175	160	140	110
		1,500 psi to 2,500 psi	125	115	100	75
	Solid concrete block over 2,750 psi to 4,000 psi	250	225	200	150	—
		1,800 psi to 2,750 psi	175	160	140	100
		1,200 psi to 1,800 psi	125	115	100	75
	Hollow load bearing units over 1,000 psi to 1,399 psi	100	90	85	—	—
		700 psi to 999 psi	85	75	70	—
Cavity walls	Solid units, except concrete block, with an ultimate compressive strength of over 2,500 psi	140	130	110	—	—
		1,500 psi to 2,500 psi	100	90	80	—
	Solid concrete block over 1,800 psi	140	130	110	—	—
		1,200 psi to 1,800 psi	100	90	80	—
	Hollow load bearing units	70	60	55	—	—
Col. 1	2	3	4	5	6	7

Notes to Table 4.4.4.A

⁽¹⁾ See Article 4.4.2.15. for type of mortar.

4.4.4.4.(1) Where a masonry unit of natural stone directly supports a concentrated load, the maximum allowable compressive stress for that unit shall be 10 per cent of its compressive strength.

(2) The maximum allowable flexural stress for natural stone shall be 1/6 its modulus of rupture.

4.4.4.5. The thickness of every masonry wall shall conform to the appropriate requirements in Articles 4.4.4.10. to 4.4.4.18., and shall have a bearing capacity conforming to Article 4.4.4.7.

4.4.4.6. Every masonry partition or wall, including panel walls and curtain walls, shall be laterally supported in conformance with the appropriate requirements in Articles 4.4.4.8., 4.4.4.9., 4.4.4.23., 4.4.5.8. and 4.4.5.10.

BEARING CAPACITY

4.4.4.7.(1) The maximum allowable bearing capacity of masonry shall be the product of its maximum allowable stress provided for in Article 4.4.4.3. and,

- (a) its gross cross-sectional area when it is solid masonry; or
- (b) its gross cross-sectional area minus the area of space between the wythes when it is a cavity wall.

(2) For the purpose of calculating the areas of masonry the actual dimensions of the cross-section of the masonry shall be used.

(3) Where masonry is constructed of more than 1 type of masonry unit, its maximum allowable bearing capacity shall be determined on the basis of the weakest unit.

LATERAL SUPPORT

4.4.4.8.(1) Except as provided in Sentence (2), a wall of masonry shall have lateral supports at either horizontal or vertical intervals spaced not more than,

- (a) 20 times the thickness of the wall where the wall is of solid masonry of solid units; or
- (b) 18 times the thickness of the wall where the wall is of solid masonry of hollow units or a cavity wall.

(2) Every partition shall be supported laterally at either horizontal or vertical intervals of not more than 36 times the thickness of the wall.

4.4.4.9.(1) Except as provided in Sentence (2), where a wall of masonry does not have lateral support along its top, and if its height exceeds 4 times its thickness, it shall have vertical lateral supports at horizontal intervals spaced in accordance with Sentence 4.4.4.21.(1).

(2) The portion of a wall extending from the sill of a window to the floor immediately below shall be laterally supported along its top or have vertical lateral supports at horizontal intervals spaced in accordance with Sentence 4.4.4.8.(1) where,

- (a) its height exceeds 3 times its thickness; and
- (b) the length of the wall below the window exceeds the limits in Sentence 4.4.4.8.(1).

HEIGHT AND THICKNESS OF SOLID MASONRY

4.4.4.10.(1) Where a solid masonry wall is made up of 2 or more wythes, the thickness of the wall shall not include any wythe less than 4 in. nominal thickness for loadbearing masonry walls or 3 in. actual thickness for panel walls or curtain walls.

(2) Veneer shall not be considered part of the wall when computing the required thickness of the wall.

4.4.4.11.(1) Except as provided in Sentences (3) and (4) and Articles 4.4.4.14. and 4.4.4.18., the thickness of a loadbearing wall of solid masonry above the top of a foundation wall, and not including basement and cellar walls, shall be at least 12 in.,

- (a) for walls up to 36 ft in height if constructed of hollow units; and
- (b) for walls up to 48 ft in height if constructed of solid units.

(2) Where a solid masonry wall exceeds the height limits in Sentence (1), the thickness requirements for the top 36 ft of walls made with hollow units or the top 48 ft of walls made with solid units shall conform to Sentence (1), and the wall thickness below these heights shall be increased in increments of at least 4 in. for each increment of 36 ft of height or part thereof measured down from the top.

(3) Where a loadbearing wall of solid masonry is not over 36 ft in height above the top of the foundation wall, and where the design on any floor above the first storey does not exceed 50 psf, the minimum wall thickness shall be 8 in., except that for rubble stone the minimum thickness shall be 12 in.

(4) Loadbearing walls of solid units 6 in. in thickness may be built to a height not exceeding 9 ft at the eave and 15 ft at the peak of a gable,

(a) in 1-storey buildings; and

(b) for the top storey of 2-storey buildings where the wall of the first storey is permitted to be 8 in. in Sentence (3).

(5) Masonry foundation walls shall be designed in accordance with Section 4.4.3.

(6) When a change in thickness due to minimum thickness requirements occurs between floor levels, the greater thickness shall be carried up to the next higher floor level.

(7) Where a change in thickness of a masonry wall occurs, the top 8 in. of the thicker portion shall be of solid units.

4.4.4.12.(1) Except as provided in Sentence (2) and Article 4.4.4.14., the thickness of a solid masonry panel wall shall be not less than 7 in. in actual thickness.

(2) Panel walls of solid masonry of solid units not less than 6 in. in thickness may be built to a height not exceeding 10 ft provided Type S mortar is used.

4.4.4.13.(1) The thickness of every solid masonry curtain walls shall be at least 7 in. in actual thickness for walls up to 36 ft in height above its bearing support.

(2) Where a solid masonry curtain wall exceeds 36 ft in height, the top 36 ft of the wall shall be at least 7 in. actual thickness, and the wall thickness below this height shall be increased in increments of at least 4 in. for each increment of 36 ft of height or part thereof measured down from the top.

4.4.4.14.(1) Where a solid masonry wall is stiffened by pilasters of plain masonry, the wall thickness required in Articles 4.4.4.11. and 4.4.4.12. may be reduced between pilasters by $\frac{1}{2}$ of the thickness added by the pilaster to the wall thickness required without pilasters provided,

(a) no part of the wall after reduction is less than 8 in. in thickness;

(b) the centre-to-centre spacing of pilasters is not more than 25 times the reduced thickness of the stiffened wall; and

(c) the width of the pilasters is not less than $\frac{1}{8}$ of their centre-to-centre spacing.

HEIGHT AND THICKNESS OF CAVITY WALLS

4.4.4.15.(1) A cavity wall shall not be built to a height greater than 36 ft above its bearing support.

(2) The minimum thickness of a wythe in a cavity wall shall be 4 in.

(3) The width of a cavity in a cavity wall shall be not less than 2 in. and not more than 3 in. when tied with metal ties.

(4) The width of a cavity in a cavity wall shall be not less than 3 in. and not more than 4 in. when tied with masonry bonding units.

4.4.4.16.(1) Where a cavity wall is loadbearing the total thicknesses of wythes and cavities shall be at least,

(a) 10 in. for the top 12 ft;

(b) 12 in. for that portion more than 12 ft, but not more than 24 ft from the top; and

(c) 14 in. for that portion more than 24 ft from the top.

(2) Where a cavity wall is non-loadbearing the total thickness of wythes and cavities shall be at least 10 in.

HEIGHT AND THICKNESS OF PARTITIONS

4.4.4.17.(1) Except as provided in Sentence (2), the height of any masonry partition between horizontal lateral supports shall not exceed 36 times the partition thickness.

(2) Where lateral support of a partition is provided by walls or columns spaced at horizontal intervals not exceeding 36 times the partition thickness, the height of a partition shall not exceed 72 times its thickness.

HEIGHT AND THICKNESS OF SHAFT AND PENTHOUSE WALLS

4.4.4.18.(1) Except as provided in Sentence (4), every interior loadbearing wall that encloses a stair shaft, elevator shaft or other vertical shaft and does not exceed 20 ft between vertical lateral supports shall be at least 8 in. thick for walls up to 2 storeys in height.

(2) Except as provided in Sentence (4), where interior loadbearing walls in Sentence (1) exceeds 2 storeys in height, the top 2 storeys shall be at least 8 in. in thickness and the minimum thickness below this height shall be increased in increments of at least 4 in. for each increment of 3 storeys measured downward from the top.

(3) Loadbearing masonry walls not more than 12 ft in height above the main roof level that enclose mechanical rooms or elevator or stairway penthouses having an aggregate area not exceeding 15 per cent of the roof area, but not exceeding 5,000 sq ft shall be not less than 8 in. in thickness, except that where such exterior walls support beams carrying elevator loads the wall thickness shall be at least 12 in. up to the underside of such beams.

(4) Where penthouse walls described in Sentence (3) are supported on interior masonry walls described in Sentences (1) and (2), they need not be considered in computing the allowable height and thickness of such interior walls except as provided in Article 4.4.4.19.

CHANGE IN THICKNESS

4.4.4.19. The thickness of a wall of masonry at any height shall not be greater than the thickness of the wall immediately below, except as provided in Article 4.4.5.8.

CHASES AND RECESSES

4.4.4.20.(1) Chases and recesses shall not be made in walls 8 in. or less in thickness.

(2) Chases or recesses shall not be closer than 2 ft to any structural member that provides lateral support for any wall.

(3) Except as provided in Article 4.4.4.22., the depth of any chase or recess in any wall shall not exceed $\frac{1}{3}$ the thickness of the wall.

(4) The clear distance between chases in a wall shall be not less than 4 times the wall thickness.

4.4.4.21.(1) Except as provided in Sentence (2), every chase or recess or bearing in masonry walls of hollow units shall be built in as construction proceeds.

(2) Where necessary to cut a chase, dry pack concrete shall be used to form a chase of required size in a wall of hollow masonry after the wall has been constructed.

4.4.4.22.(1) Every chase or recess having a width exceeding 20 in. or a depth exceeding $\frac{1}{3}$ the thickness of the wall shall be considered as an opening, and any masonry above such chase or recess shall be supported on a lintel or arch.

(2) The width of any sloping or horizontal chase or recess shall be assumed to be the horizontal distance between the vertical lines through its extremities.

ALLOWABLE OPENINGS

4.4.4.23. Evidence shall be provided to show that openings do not cause stresses in the wall greater than the values given in Article 4.4.4.3.

COLUMNS

4.4.4.24.(1) Every masonry column shall be constructed of solid masonry of solid units or hollow units filled with grout or concrete.

(2) Every masonry column shall have lateral supports spaced so that the vertical distance between supports is not greater than 10 times the least dimension of the column.

Subsection 4.4.5. Construction Practice

4.4.5.1.(1) The bearing support for any masonry shall have lateral stability and shall provide,

- (a) a level bearing surface or surfaces; and
- (b) be of noncombustible material except for support of minor masonry decorative features.

4.4.5.2.(1) The projection of a wall beyond the edge of a supporting member such as a shelf angle or edge of a beam shall not exceed $1\frac{1}{4}$ in. except that this projection may be increased to,

- (a) $1\frac{5}{8}$ in. where ashlar facing not less than $3\frac{5}{8}$ in. in thickness with continuous horizontal joints is supported;
- (b) $4\frac{1}{2}$ in. in any masonry panel wall bonded by masonry units where such projection does not exceed $\frac{2}{3}$ of the distance between the outer face of the wall and the centre of gravity of the wall and the first course of masonry above the supporting member is a full header course projecting at least $3\frac{3}{8}$ in. over the supporting member; or
- (c) 2 in. where beams are fireproofed in concrete or masonry units so that the space between the web of the beam and the face of the fireproofing is completely filled or where there is at least 5 in. of solid masonry not less than 8 in. in width directly above the beams provided such projection does not exceed $\frac{2}{3}$ the distance between the outer face of the masonry and the centre of gravity of the supported masonry.

(2) Where the projecting wall in Sentence (1) is of hollow units the first course on the bearing support shall be of solid units.

4.4.5.3. Masonry shall be tied or bonded to the lateral support so as to provide support in both the inward and outward directions in accordance with Sentence 4.4.5.10.(1).

SUPPORT ON MASONRY

4.4.5.4.(1) Where masonry supports a concentrated load so that the resultant vertical component of the applied loads passes through the axis of the width of the masonry, the maximum allowable bearing capacity of the support shall conform to Articles 4.4.4.6., 4.4.4.7. or Subsection 4.4.3.

(2) Where applied loads in Sentence (1) have a horizontal thrust this thrust shall be resisted by construction designed for that purpose.

(3) Where walls are laid in stack bond no concentrated loads shall be distributed beyond the vertical joints bounding the stack.

4.4.5.5.(1) Except as provided in Article 4.4.5.6., where a wall of masonry supports a continuous load such as a slab, a deck or wood joists spaced not more than 30 in. o.c.,

- (a) the support shall be continuous and of solid units to a depth at least $2\frac{1}{2}$ in. measured down from the bearing surface, or a course of hollow units filled solidly with concrete having a compressive strength of at least 2,000 psi; and
- (b) the width of bearing shall be at least 4 in. measured horizontally in from the face of the wall.

4.4.5.6. Where a wooden plank deck is supported directly by a wall of masonry, the support may be a corbelled ledge projecting 4 in. from the face of the wall.

4.4.5.7. Where masonry supports a load applied other than as provided in Articles 4.4.5.5. and 4.4.5.6., the support shall be of solid brick units or other solid units with voids filled with concrete having a compressive strength of at least 2,000 psi to a depth of at least 8 in. measured down from the bearing surface.

4.4.5.8. Where anchor bolts are to be placed in the top of a column, the column shall be capped with concrete having a compressive strength of at least 3,000 psi or 12-in. thick reinforced masonry.

4.4.5.9.(1) Where wooden structural member is supported on masonry, the support shall be constructed so that in the event of a fire the member can collapse without dislodging the masonry in exterior walls.

(2) Where the end of a wooden structural member is built into an exterior masonry wall, a $\frac{1}{2}$ -in. air space shall be provided at the sides, top and end of such member, and a moisture-proof barrier shall be installed on the bearing surface, or the wood shall be treated in accordance with CSA O80-1974, "Wood Preservation," as revised to 1 May, 1975.

ANCHORAGE OF MASONRY

4.4.5.10.(1) Masonry shall be anchored to its lateral supports by,

- (a) corrosion-resistant metal anchors spaced not more than 1 ft 4 in. o.c. vertically and not more than 6 ft 8 in. o. c. horizontally where the lateral support is other than masonry;
- (b) appropriate bonding as provided in Article 4.4.5.18. where the lateral support in masonry.

(2) Except as provided in Sentence (3), metal anchors in Clauses (1) (a) shall,

- (a) be steel straps at least $1\frac{1}{2}$ in. wide and $\frac{1}{4}$ in. thick;
- (b) have 2 in. at the end completely embedded in mortar and bent up or down at 90 deg. into the masonry; and
- (c) be of a length at least twice the thickness of the masonry.

(3) Metal anchors other than as described in Sentence (2) may be used where such anchors provide equivalent strength or stiffness and bond.

(4) Wedges may be used to anchor the top of a masonry partition to its top horizontal support.

4.4.5.11.(1) Where a cornice, belt course or sill depends entirely upon masonry for its support, it shall have at least 65 per cent of its mass within the masonry and shall have a bearing area at least 4 in. deep measured inwards from the face of the masonry.

(2) All cornices shall be adequately doweled or anchored with noncorrosive anchors.

BONDING

4.4.5.12. Except as required in Articles 4.4.5.16. and 4.4.5.17., where masonry walls have 2 or more wythes, the wythes shall be bonded with masonry bonding units in conformance with Article 4.4.5.13. or with corrosion-resistant metal ties in conformance with Article 4.4.5.14.

4.4.5.13.(1) Where masonry bonding units are used as provided in Article 4.4.5.12., they shall,

- (a) in the case of solid masonry walls,
 - (i) extend through 2 wythes as continuous units, or
 - (ii) overlap both wythes at least 4 in.;
- (b) in the case of cavity walls and faced walls, be continuous, extending at least 4 in. into the backing and facing wythes;
- (c) constitute not less than 4 per cent of the exposed face area; and
- (d) be spaced vertically and horizontally not greater than,
 - (i) 24 in. o. c. when brick masonry is used, and
 - (ii) 36 in. o. c. when block or tile is used.

4.4.5.14.(1) Where metal ties are used as provided in Article 4.4.5.12., they shall,

- (a) extend from within 1 in. of the outer face of the wall to within 1 in. of the inner face of the wall;
- (b) be spaced not greater than 18 o. c. vertically and 36 in. o. c. horizontally;
- (c) be staggered from course to course where individual ties are used; and
- (d) be placed on webs where hollow units are used and completely embedded in mortar, or be anchored into a bedding surface containing not more than 25 per cent voids.

(2) Metal ties in Sentence (1) shall be at least 3/16-in. diam. corrosion-resistant steel rods of continuous weld connected type or of individual type with 2 in. at each end bent at 90 deg. or of other metal or shape providing equivalent strength, stiffness, bond and corrosion resistance.

(3) Where the space between metal-tied wythes is filled with mortar or grout, the allowable stresses and other provisions for masonry bonded walls shall apply, and, where the space is not filled, such walls shall conform to the requirements for cavity walls.

4.4.5.15. Where there is an opening in a masonry wall of 2 or more wythes, the wythes shall be bonded together with masonry bonding units or metal ties located within 12 in. of and spaced not more than 36 in. o. c. around such openings.

4.4.5.16.(1) Solid masonry walls of rubble masonry shall be bonded with masonry bonding units that,

- (a) extend from face to face of the wall either as continuous units or by overlapping at least 6 in.;
- (b) constitute not less than 1/7 the face area of the wall; and
- (c) are uniformly spaced.

ASHLAR MASONRY

4.4.5.17.(1) The actual thickness of any ashlar facing unit shall be not less than $3\frac{5}{8}$ in. but not less than 1/20 of the height of the unit.

(2) All ashlar facing shall be backed with masonry that provides solid bearing for bond stones and anchors bedded in joints that have solid planes at bearing. Where anchors are required in addition to bond stones such backing shall be at least 8 in. thick.

(3) Ashlar facing units shall be bonded by bonding units extending at least $3\frac{1}{8}$ in. into the backing.

(4) Bonding units in Sentence (3) shall be uniformly distributed throughout the wall, and the area of the bond stones shall be not less than 10 per cent of the area of the facing.

(5) Every ashlar unit exceeding 1 ft in height, other than a bond stone, shall be anchored to the backing by corrosion-resistant metal anchors, except that where each alternate course consists entirely of bond stones having an area of not less than $\frac{1}{3}$ the total area of the facing, the anchors may be omitted.

(6) Every anchor in Sentence (5) shall be at least 0.187 sq in. ($\frac{3}{16}$ in. by 1 in.) in cross-sectional area, shall be completely embedded in mortar and shall have at least a 1-in. bent portion at each end embedded in the facing and backing.

(7) Every anchored stone shall have not less than 1 anchor for every $4\frac{1}{2}$ sq ft of surface area or portion thereof. At least 1 anchor shall be provided for every 2 ft in length or portion thereof along the top of every ashlar unit, and if such stone exceeds 30 in. in height, it shall be provided with an equal number of anchors at or near the bottom.

(8) For piers and buttresses, each alternate course of ashlar facing having an area not less than the total surface area of the facing shall extend not less than $3\frac{1}{8}$ in. into the backing.

(9) Continuous vertical joints shall not be used in ashlar facing, except where,

- (a) the joints are not more than 4 in. in depth;
- (b) bond stones have an area not less than $\frac{1}{3}$ the surface area of the wall;
- (c) bond stones are located so that in any tier of stones there are not more than 2 stones between bond stones; and
- (d) bond stones are distributed so that each bond stone is in contact with four 4-in. stones, unless alternate courses are continuous bonding courses and each bond stone is recessed at each side for its height so that it laps the 2 adjacent stones.

INTERSECTING WALLS

4.4.5.18.(1) Where 2 load bearing walls of plain masonry intersect or where a shear wall intersects a wall, the joint at the intersection shall be,

- (a) bonded in true masonry bond so that at least 50 per cent of the units of 1 wall are embedded in the other wall; or
- (b) regularly toothed or blocked with 8-in. maximum offsets and the joints provided with metal anchors conforming to Sentence (2) spaced at vertical intervals not exceeding 9 ft; or
- (c) provided with metal anchors conforming to the requirements of Sentence (2) spaced at vertical intervals not exceeding 1 ft 4 in.

(2) Where metal anchors are used to connect intersecting walls,

- (a) the anchors shall be of corrosion-resistant steel at least 0.375 sq in. ($\frac{1}{4}$ by $1\frac{1}{2}$ in.) in cross-section or bolts of equivalent area;
- (b) the anchor shall extend into the masonry at least 18 in. on each side of the joint where possible and have a 2-in. 90-deg. bend at the ends or shall be provided with cross-pins at the ends for anchorage; and

- (c) where there is not sufficient thickness of masonry to embed the anchors 18 in. into the masonry, equivalent anchorage shall be provided by cross-pins or other means.

GLASS BLOCK

4.4.5.19.(1) Where a masonry wall is constructed of glass blocks,

- (a) reinforcement shall be provided to resist all stresses due to wind, temperature and shrinkage;
- (b) reinforcement shall be placed in the horizontal joints and the vertical spacing between such reinforcement shall not exceed 24 in. where the blocks are not greater than 8 in. in height; and
- (c) where the blocks are greater in height than 8 in., reinforcement shall be placed in every horizontal joint.

(2) The reinforcement in Sentence (1) shall be of corrosion-resistant 20-gauge expanded metal strips not less than 3 in. wide or 2 parallel corrosion-resistant steel wires not less than No. 9 ASWG (0.1483 in. diameter) spaced at least 3 in. apart.

(3) The reinforcement in Sentence (1) shall be continuous or lapped at least 6 in. at splices.

BALUSTRADES

4.4.5.20. Masonry balustrades shall be anchored to withstand the loads prescribed in Article 4.1.10.1.

CORBELLING

4.4.5.21.(1) Where a wall of masonry is corbelled,

- (a) the corbel shall not project more than $\frac{1}{3}$ the thickness of the wall;
- (b) the corbel shall bear on at least an 8-in. depth of solid masonry of solid units or of hollow units in which all voids are filled solidly with concrete to a depth of at least 8 in. in measured down from the bearing surface;
- (c) the corbel shall be of solid units;
- (d) the projection of each course shall not exceed 1 in.; and
- (e) the courses shall be laid up using alternate courses of headers and stretchers so that the top course is a header course.

STACK BOND

4.4.5.22.(1) Where stack bond is used in which vertical mortar joints between units in masonry are continuous between courses, each wythe shall be reinforced longitudinally at vertical intervals not exceeding 18 in. with,

- (a) a fabricated mesh of 2 No. 9 ASWG (0.1483 in. diameter) corrosion-resistant rods spaced not more than 1 in. from each face of the stack bonded wythe and lapped at least 6 in. at each splice; or
- (b) other metal reinforcement providing equivalent stiffness, bond and corrosion resistance.

(2) Wythes of stack bonded walls shall be bonded together in accordance with Article 4.4.5.12.

WOOD BUILT INTO MASONRY

4.4.5.23.(1) Except as provided in Article 4.4.5.9., wood shall not be built into masonry construction except as plugs, blocks or strips for fastening strapping, flashing, conduits and other light covering and service equipment.

(2) Where wooden blocks or strips are used, they shall not exceed 8 in. in length and shall not be placed less than 32 in. o. c. horizontally and vertically.

PARAPET WALL

4.4.5.24.(1) Every parapet wall shall be constructed of solid masonry of solid units or of hollow units in which all voids are filled with concrete or mortar.

(2) Every parapet wall and masonry balustrade shall be capped with an impervious coping of metal, vitrified tile, stone or other equivalent material, except that coping of concrete, stone or permeable masonry may be used provided such copings are flashed on the top and back with corrosion-resistant metal, or through flashing shall be provided under such coping for the full thickness of the wall.

(3) Every parapet wall less than 12 in. in thickness shall be protected on the back by a noncorrosive flashing extending from the roof to the underside of the coping or to a line at least 3 ft above the adjacent roof level.

DRAINAGE OF WALLS

4.4.5.25. Weep holes at least $\frac{3}{8}$ in. in diameter shall be provided immediately above the base flashing in veneered walls having bearing support, and in cavity walls at horizontal spacing not exceeding 24 in. o. c.

Subsection 4.4.6. Masonry Veneer

4.4.6.1.(1) Masonry veneer shall not be considered to be part of a wall when computing its strength or thickness.

(2) Masonry veneer shall be anchored or tied to resist all lateral forces.

(3) Masonry veneer shall not be considered as loadbearing.

VENEER OF MASONRY UNITS

4.4.6.2.(1) Unit masonry veneer shall be of solid units not less than 3 in. actual thickness laid with full mortar joints.

(2) Raked mortar joints shall not be used in unit masonry veneer except when the veneer is at least 4 in. thick.

(3) Unit masonry veneer more than 36 ft above the top of the foundation wall shall bear on masonry, concrete or other noncombustible bearing supports spaced not more than 12 ft vertically.

(4) Veneer attached to wood-frame construction shall not extend more than 36 ft above the top of the foundation wall.

4.4.6.3. Veneer above openings shall be supported on lintels of noncombustible material.

4.4.6.4. Masonry veneer 3 in. or more in thickness and resting on a bearing support shall be tied to masonry back-up or to wood framing members with not less than 28-gauge $\frac{7}{8}$ -in.-wide corrosion-resistant straps spaced in accordance with Table 4.4.6.A. and shaped to provide a key with the mortar.

TABLE 4.4.6.A.
Forming Part of Article 4.4.6.4.

Maximum Vertical Spacing, in.	Maximum Horizontal Spacing, in.
16	32
20	24
24	16
Column 1	2

THIN MASONRY VENEER INDIVIDUALLY SECURED BY METAL ANCHORS

4.4.6.5.(1) The minimum thickness of masonry units for veneers of limestone, marble, granite, precast stone, travertine and terrazzo shall be 1¼ in.

(2) Veneer units in Sentence (1) shall not exceed 25 sq ft in face area and shall have no dimension greater than 6 ft.

(3) Individual masonry veneer units in Sentence (1) shall not support any other veneer unit.

(4) Back-up for masonry veneer in Sentence (1) shall be solid masonry of solid units.

(5) Each masonry veneer unit in Sentence (1) shall be anchored with,

- (a) at least 2 anchors at the top and 2 anchors at the bottom, spaced not more than 2 ft o. c.;
- (b) anchors at the sides where the units are greater than 30 in. in height; and
- (c) at least 1 anchor for every 2 sq ft of surface area.

(6) Anchors in Sentence (5) shall be at least equivalent to ⅛-in. by 1¼-in. clip angles, secured to the back-up with ¼-in. by 2½-in. expansion bolts in lead shields and secured to the veneer units with ¼-in. by 2-in-long steel dowels passing through the anchors and extending 1 in. into each stone.

(7) Materials used for anchorage in Sentence (6) shall be corrosion-resistant.

THIN MASONRY VENEERS SECURED BY MORTAR ADHESION

4.4.6.6.(1) Except as provided in Article 4.4.6.7., veneers of natural or artificial stone or other masonry materials secured by mortar shall,

- (a) be not less than ⅝ in. thick and not more than 1⅝ in. thickness with individual units,
 - (i) not exceeding 144 sq in. in area,
 - (ii) not less than 2 in. in height, and
 - (iii) having a greatest face dimension not more than 10 times its least face dimension;
- (b) be supported by backing conforming to backing for glass veneer in Sentence 4.4.6.8.(6);
- (c) comply with the compressive strength and the absorption requirements for the materials used, but in no case shall the absorption be more than 16 per cent or less than 5 per cent;

- (d) extend not more than 36 ft above the top of foundation wall on masonry walls or 24 ft above the top of foundation wall on frame walls;
- (e) be flashed at the top to prevent the penetration of moisture;
- (f) have all joints grouted and pointed with waterproofing cement compound;
- (g) be secured to the backing by the equivalent of,
 - (i) metal lath fastened in place by not less than 2½-in. galvanized nails spaced not more than 8 in. o. c. vertically and 16 in. o. c. horizontally, and
 - (ii) a full undercoat of Type M mortar at least ¾ in. thick applied to the back of the veneer units to provide full embedment of the units.

TILE VENEER 1 IN. OR LESS IN THICKNESS

4.4.6.7.(1) Except as provided in Sentence (2), tile veneer secured by mortar shall,

- (a) extend not more than 36 ft above the top of foundation wall;
- (b) not exceed 1 in. in thickness with individual units,
 - (i) not exceeding 144 sq in. in area,
 - (ii) not exceeding 16 in. in any dimension, and
 - (iii) corrugated or scored on the back for increased bond when the tile exceeds 36 sq in. in area;
- (c) be supported by backing conforming to backing for glass veneer in Sentence 4.4.6.8.(6);
- (d) be applied to its backing by means of full embedment in Type M mortar with all joints filled; and
- (e) be flashed at the top to prevent the penetration of moisture.

(2) Mosaic tile not exceeding ¼ in. in thickness or 2¼ sq in. in area applied to a wall on a mortar or plaster bed shall not be deemed to be a veneer.

GLASS VENEER

4.4.6.8.(1) Glass veneer shall not be applied to the exterior of a wall at the height of more than 18 ft or less than 6 in. above the top of foundation wall.

- (2) Glass veneer shall be not less than ¼ in. in thickness.
- (3) Glass veneer units shall not exceed 8 sq ft in area and shall not exceed 4 ft in any dimension.
- (4) Glass veneer shall be set in asphaltic mastic cement applied over a priming or bonding coat of a composition to ensure adequate adhesion of the 2 materials.
- (5) Jointing or pointing cement used to butter the edges of glass veneer units shall be durable non-shrink type.
- (6) The backing for glass veneer shall provide a sound, dry, rigid plane surface consisting of masonry, reinforced concrete, cement plaster on metal lath or other non-combustible material.
- (7) Cement plaster in Sentence (6) shall be at least ¾-in. thick conforming to the requirements of Part 9 and applied to metal lath supported vertically and horizontally at intervals not exceeding 12 in.

(8) Wood sheathing shall not be used as a base for the direct application of glass veneer.

(9) In addition to the mastic cement in Sentence (4), glass veneer more than 4 ft above the top of foundation wall shall be supported by corrosion-resistant metal shelf

- (a) not less than 2 in. in length;
- (b) of not less than No. 16 gauge;
- (c) located near each end of each glass unit and spaced not more than 2 ft o. c. horizontally and 3 ft o. c. vertically, except that units not exceeding 1 ft in width may be supported on a single support located near the centre of the unit;
- (d) located so that the outside edge of the shelf angle is approximately $\frac{1}{8}$ in. from the face of the veneer; and
- (e) attached to the masonry backing by means of expansion bolts.

(10) Horizontal joints in glass veneer shall be cushioned with pads of adhesive cork extending from the back of the glass to within $\frac{1}{8}$ in. from the face.

(11) No glass unit shall touch any other glass unit.

(12) Every joint shall be filled with joint cement to ensure watertight construction.

(13) Every exposed edge of glass veneer shall be protected from the weather by non-corrosive flashing, and uncompleted exterior glass veneer shall be made watertight when work is not in progress.

(14) Individual glass veneer units used in soffits shall,

- (a) not exceed 4 sq ft in area;
- (b) not exceed 30 in. in any dimension; and
- (c) be held in place by wood or metal mouldings providing a continuous bearing of not less than $\frac{3}{4}$ in. for the glass.

(15) Where 4 corners of adjoining glass veneer units meet, moulding described in Sentence (14) may be replaced by a screw and metal rosette attached to a wood ground provided mastic cement is used behind the glass.

FACING ON PRECAST CONCRETE

4.4.6.9.(1) Where a thin slab of stone or other material forms a facing for a precast concrete wall panel, such stone slab shall not be deemed to be a veneer provided,

- (a) the stone is bonded to the concrete back-up when the wall panels are cast; and
- (b) evidence is provided to show that the facing and concrete back-up will act monolithically.

LIMESTONE VENEER

4.4.6.10.(1) Veneers of limestone shall conform to Standards listed in (a), (b), (c), (d), as revised to 1 May, 1975,

- (a) conform to ASTM C568-67 (1972), "Dimension Limestone", classified as Type II, medium density;

- (b) have an ultimate compressive dry strength not less than 5,000 psi when tested in accordance with ASTM C170-50 (1970), "Compressive Strength of Natural Building Stone";
 - (c) have a modulus of rupture of at least 850 psi when tested in accordance with ASTM C99-52 (1970), "Modulus of Rupture of Natural Building Stone";
 - (d) have a percentage absorption by weight not exceeding 5.3 when tested in accordance with ASTM C97-47 (1970), "Absorption and Bulk Specific Gravity of Natural Building Stone";
 - (e) have no visible bedding or cleavage plane; and
 - (f) be not less than 3⅞ in. in actual thickness.
- (2) Except as otherwise specified, all limestone veneer shall conform to all other applicable requirements of this Subsection.
- (3) All limestone veneer that is applied more than 18 ft above finished ground level shall,
- (a) bear on noncorrosive bearing supports spaced vertically not more than 36 times the actual thickness of the stone;
 - (b) be supported against lateral load by corrosion-resistant supports spaced so that the allowable stresses in the stone are not exceeded, but not farther apart vertically than 30 times the thickness of the stone;
 - (c) be tied to each bearing support and to each lateral support with noncorrosive anchors capable of resisting all inward and outward lateral loads; and
 - (d) be anchored to a backing with corrosion-resistant anchors spaced not more than 18 in. o. c. along the perimeter of each unit.
- (4) The allowable stresses in limestone veneer units shall not exceed 1/10 of the appropriate value determined in accordance with the standard methods of test listed in Sentence (1).
- (5) All limestone veneer shall be anchored and supported so that normal building movements will not cause loads to be transmitted from panel to panel or from floor to floor.
- (6) Limestone that shows evidence of cracking or other deterioration shall not be used.

Subsection 4.4.7. Prefabricated Masonry

4.4.7.1. All provisions of this Section except Subsections 4.4.4., 4.4.5. and 4.4.6. shall apply to prefabricated masonry except as provided in this Subsection.

4.4.7.2.(1) RESERVED

(2) Lifting devices designed for 100 per cent impact shall be provided in prefabricated masonry sections and the material used in the lifting device shall,

- (a) not be brittle; and
- (b) be capable of resisting all forces which might arise during the process of erection.

4.4.7.3.(1) Elements shall be stored, transported and placed so that they will not be overstressed or damaged.

(2) Prefabricated masonry elements shall be adequately braced and supported during the erection to ensure proper alignment and safety, and such bracing or support shall be maintained until permanent connections are made.

4.4.7.4.(1) Design and detailing of all joints and bearings shall be based on the forces to be resisted and the effects of dimensional changes due to shrinkage, elastic deformation, creep and temperature.

(2) Joints and connections shall be detailed to allow sufficient tolerances for manufacture and erection of the elements.

(3) Bearings shall be detailed to provide for stress concentrations, rotations and the possible development of horizontal forces by friction or other restraints.

Subsection 4.4.8. Laying, Placing and Erection

4.4.8.1.(1) Laying, placing and erection shall be in conformance with CSA A224-1970, "Design and Construction of Unit Masonry", as revised to 1 May, 1975.

SECTION 4.5 PLAIN, REINFORCED AND PRESTRESSED CONCRETE

Subsection 4.5.1. General

APPLICATION

4.5.1.1.(1) This Section applies to the following buildings and their structural members made from plain, reinforced or prestressed concrete whether precast or cast in place:

- (a) all buildings used or intended for the following occupancies,
 - (i) Group A, Assembly Occupancies,
 - (ii) Group B, Institutional Occupancies,
 - (iii) Group F, Division 1, High Hazard Industrial Occupancies;
- (b) all buildings exceeding 3 storeys in building height or 6,000 sq ft in building area and which are used or intended to be used for the following occupancies,
 - (i) Group C, Residential Occupancies,
 - (ii) Group D, Business and Personal Services Occupancies,
 - (iii) Group E, Mercantile Occupancies,
 - (iv) Group F, Divisions 2 and 3, Medium and Low Hazard Industrial Occupancies;
- (c) retaining walls;
- (d) signs;
- (e) communication towers exceeding 50 ft in height;
- (f) pedestrian bridges;
- (g) permanent crane runways that impose loads on buildings;
- (h) fire escapes;
- (i) exterior storage tanks.

N.B.: For buildings not listed in Sentence 4.5.1.1.(1), requirements for design will be found in Part 9.

(2) RESERVED

4.5.1.2. RESERVED

4.5.1.3. RESERVED

MINIMUM SAFETY AND PERFORMANCE

4.5.1.4. Buildings and their structural members shall be designed to resist all effects of loads and influences that may be expected and shall satisfy the requirements of Section 4.1.

Subsection 4.5.2. Design Requirements

4.5.2.1. Except as set forth in Article 4.1.1.4. buildings and their structural members made of plain, reinforced concrete and prestressed concrete shall conform to CSA A23.3-1973, "Code for the Design of Concrete Structures for Buildings", as revised to 1 May, 1975.

4.5.2.2. RESERVED

Subsection 4.5.3. RESERVED

SECTION 4.6 STEEL

Subsection 4.6.1. General

APPLICATION

4.6.1.1.(1) This Section applies to the design of all structural members and their assemblies used in the following:

- (a) all building used or intended for the following occupancies;
 - (i) Group A, Assembly Occupancies,
 - (ii) Group B, Institutional Occupancies,
 - (iii) Group F, Division 1, High Hazard Industrial Occupancies;
- (b) all buildings exceeding 3 storeys in building height or 6,000 sq ft in building area and which are used or intended to be used for the following occupancies:
 - (i) Group C, Residential Occupancies,
 - (ii) Group D, Business and Personal Services Occupancies,
 - (iii) Group E, Mercantile Occupancies,
 - (iv) Group F, Divisions 2 and 3, Medium and Low Hazard Industrial Occupancies;
- (c) retaining walls;
- (d) signs;
- (e) communication towers exceeding 50 ft in height;
- (f) pedestrian bridges;
- (g) permanent crane runways that impose loads on buildings;
- (h) fire escapes;
- (i) exterior storage tanks.

N.B.: For buildings not listed in Sentence 4.6.1.1.(1), requirements for design will be found in Part 9.

(2) RESERVED

4.6.1.2. RESERVED

4.6.1.3. RESERVED

MINIMUM SAFETY AND PERFORMANCE

4.6.1.4. Buildings and their structural members shall be designed to resist all effects of loads and influences that may be expected and shall satisfy the requirements of Section 4.1.

Subsection 4.6.2. Design Requirements

4.6.2.1. Except as provided in Article 4.1.1.4., buildings and their structural members made of structural steel shall conform to CSA S16-1969, "Steel Structures for Buildings" or CSA S16.1-1974, "Steel Structures for Buildings—Limit States Design", both as revised to 1 May, 1975.

4.6.2.2. Except as set forth in Article 4.1.1.4., buildings and their structural members made of light gauge steel shall conform to CSA S136-1974, "Cold Formed Steel Structural Members", as revised to 1 May, 1975.

4.6.2.3. RESERVED

SECTION 4.7 ALUMINUM

Subsection 4.7.1. General

APPLICATION

4.7.1.1.(1) This Section applies to the following buildings and their structural members made from structural and light gauge aluminum,

- (a) all buildings used or intended for the following occupancies,
 - (i) Group A, Assembly Occupancies,
 - (ii) Group B, Institutional Occupancies,
 - (iii) Group F, Division 1, High Hazard Industrial Occupancies;
- (b) all buildings exceeding 3 storeys in building height or 6,000 sq ft in building area and which are used or intended to be used for the following occupancies,
 - (i) Group C, Residential Occupancies,
 - (ii) Group D, Business and Personal Services Occupancies,
 - (iii) Group E, Mercantile Occupancies,
 - (iv) Group F, Divisions 2 and 3, Medium and Low Hazard Industrial Occupancies;
- (c) retaining walls;
- (d) signs;
- (e) communication towers exceeding 50 ft in height;
- (f) pedestrian bridges;

- (g) permanent crane runways that impose loads on buildings;
- (h) exterior storage tanks.

N.B.: For buildings not listed in Sentence 4.7.1.1.(1), requirements for design will be found in Part 9.

(2) RESERVED

4.7.1.2. RESERVED

4.7.1.3. RESERVED

MINIMUM SAFETY AND PERFORMANCE

4.7.1.4. Buildings and their structural members shall be designed to resist all effects of loads and influences that may be expected and shall satisfy the requirements of Section 4.1.

Subsection 4.7.2. Design Requirements

4.7.2.1. Except as set forth in Article 4.1.1.4., buildings and their structural members made of structural aluminum shall conform to CSA S157-1969, "Structural Use of Aluminum in Buildings", as revised to 1 May, 1975.

4.7.2.2. Except as set forth in Article 4.1.1.4., buildings and their structural members made of light gauge aluminum shall conform to CSA S190-1968, "Design of Light Gauge Aluminum Products", as revised to 1 May, 1975.

SECTION 4.8 WIND, WATER AND VAPOUR PROTECTION

Subsection 4.8.1. General

APPLICATION

4.8.1.1.(1) This Section applies to the design of the following building assemblies with respect to the control of groundwater, condensation, and the penetration of wind and rain,

- (a) all buildings used or intended for the following occupancies:
 - (i) Group A, Assembly Occupancies,
 - (ii) Group B, Institutional Occupancies,
 - (iii) Group F, Division 1, High Hazard Industrial Occupancies;
- (b) all buildings exceeding 3 storeys in building height or 6,000 sq ft in building area and which are used or intended to be used for the following occupancies,
 - (i) Group C, Residential Occupancies,
 - (ii) Group D, Business and Personal Services Occupancies,
 - (iii) Group E, Mercantile Occupancies,
 - (iv) Group F, Divisions 2 and 3, Medium and Low Hazard Industrial Occupancies.

N.B.: For buildings not listed in Sentence 4.8.1.1.(1), requirements for design will be found in Part 9.

(2) RESERVED

CONTROL OF CONDENSATION

4.8.1.2.(1) Except as provided in Sentence (3), where a building assembly is to be subjected to a temperature differential and differential in water vapour pressure and will be adversely affected by condensation, the assembly shall be designed to prevent condensation by providing a continuous vapour and air barrier in the assembly on the high vapour pressure side of the material that has the major thermal resistance.

Vapour
and air
barriers

(2) Except as provided in Sentence (3), where a material or combination of materials that have a resistance to water vapour flow equivalent to that of a vapour barrier are used on the low vapour pressure side of the material that has the major thermal resistance in a building assembly,

(a) a continuous vapour barrier, for use in above-grade building construction, shall be installed on the high vapour pressure side; and

(b) an air space ventilated to the outside or other method of equal effectiveness shall be provided for removing the water vapour that may pass from the high vapour pressure side through the material with the major thermal resistance.

(3) The requirements of Sentences (1) & (2) do not apply where proof is provided to the Chief Building Official to show that the performance of a building assembly is satisfactory with respect to the control of condensation.

CONTROL OF WIND AND RAIN PENETRATION

4.8.1.3.(1) Joints in exterior cladding and the junctions of different exterior claddings shall be constructed to minimize the entrance of rain water into the building assembly.

Joints

(2) Components of a building assembly shall be so constructed as to limit the amount of air infiltration and exfiltration at junctions of components.

Air infiltration
and exfiltration

(3) An opening in an exterior wall or roof shall be so constructed as to prevent the entrance of rain or snow into the building.

(4) Roofing shall be installed so as to,

Roofing

(a) shed or drain water effectively;

(b) reduce the likelihood, when the roofing is comprised of overlapping units, of water backing up under the units due to ice damming or other cause; and

(c) be resistant to damage due to wind.

(5) Where the top of a wall is exposed to the weather,

Parapets

(a) it shall be capped; and

(b) a through-wall flashing shall be installed immediately under the cap of the wall, and at such other points in the wall as are necessary to divert to the outside rain-water that has penetrated.

(6) Exterior cladding shall be so installed that it sheds water to prevent its entry into other components of the building assembly and where there is a likelihood of some penetration, drainage shall be provided to take water to the outside.

Exterior wall
cladding

CONTROL OF GROUNDWATER

4.8.1.4.(1) Where moisture from the ground can move upward into a wall and cause deterioration of the materials in the wall assembly, a through-wall flashing shall be installed in the wall below the materials likely to be so affected.

Through wall
flashing

(2) The portion of an exterior basement or cellar wall below ground level or any floor slab in contact with the ground shall be dampproofed or waterproofed as appropriate in

accordance with the requirements in Part 9 where such wall or floor is not impervious to water.

(3) Crawl spaces shall be provided with a ground cover in conformance with Part 9.

(4) Unless groundwater levels and site conditions are such that water will not accumulate in the crawl space the crawl space shall be sloped to drain to a sewer, ditch or dry well.

Subsection 4.8.2. Materials

Material specifications

4.8.2.1. A material used for exterior cladding, vapour barrier, flashing, thermal insulation or fastening device shall comply with the appropriate material requirements as set forth in the appropriate sections of Parts 3, 4 and 9.

Materials resistant to deterioration

4.8.2.2. A material exposed to corrosive conditions shall be corrosion resistant or shall be resistant to deterioration under those conditions.

Fastening devices

4.8.2.3. Fastening devices shall be made of a material which is compatible with the materials to be so joined and shall be resistant to the type of corrosion likely to be present.

Subsection 4.8.3. Practices

Installation practices

4.8.3.1. Where a material is used for exterior cladding, vapour barrier, thermal insulation, sheathing paper, flashing or fastening device, the practices to be followed in installing it shall be in accordance with the requirements set forth in the appropriate sections of Parts 3, 4 and 9.

4.8.3.2.(1) Exterior cladding shall be securely fastened to backing that is,

(a) an integral structural element of a building; or

(b) an element added to the structure for the purpose of supporting such exterior cladding.

(2) Backing for exterior cladding as provided for in Sentence (1) shall be so located, secured and of a kind suitable for the type of fasteners to be used for attachment.

Attachment to accommodate stresses and deformation

4.8.3.3. Exterior cladding shall be designed, constructed and attached so as to accommodate stresses and deformations within the structure, the cladding system and all points of attachment caused by wind, earthquake and temperature effects, as described in Section 4.9.

SECTION 4.9 CLIMATIC INFORMATION FOR BUILDING DESIGN IN ONTARIO

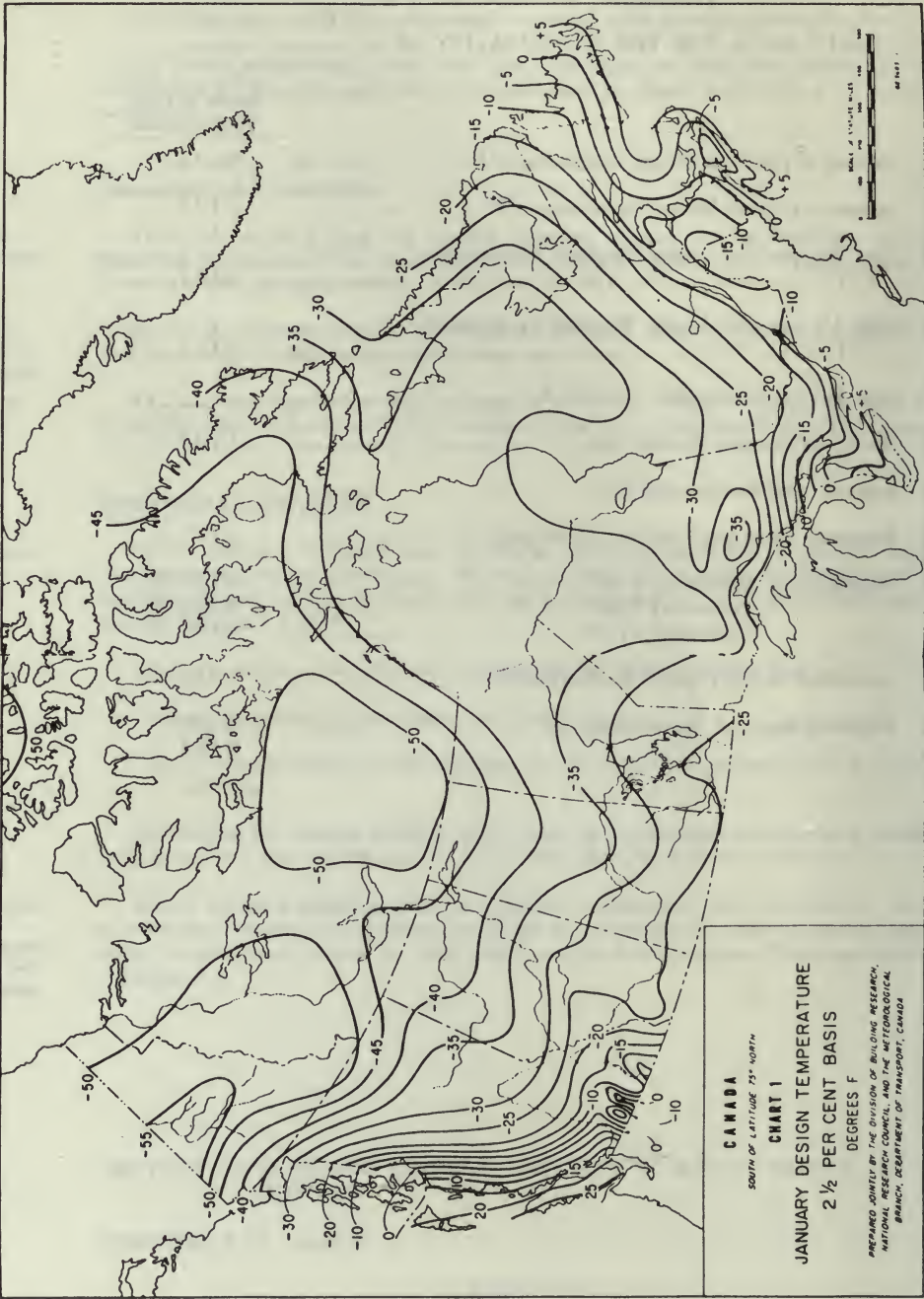
Subsection 4.9.1. General

APPLICATION

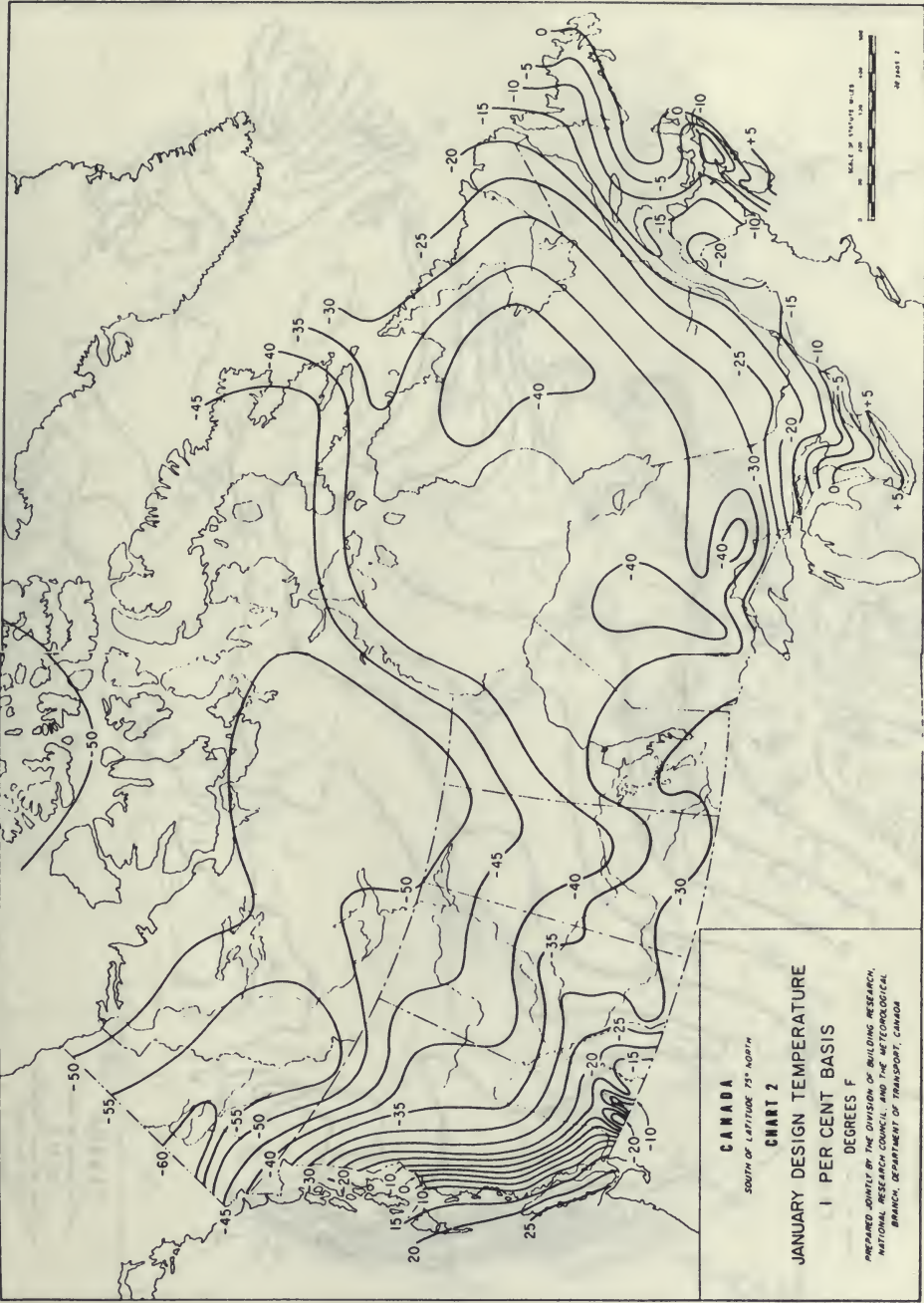
4.9.1.1.(1) The climatic data contained in Charts 1-12 and Tables 4.9.9.A and 4.9.10.A shall be used in the design of all buildings.

(2) Climatic data for Municipalities shall be listed in Table 4.9.2.A. in conformance with the data in Subsection 4.9.10., Table 4.9.10.A., together with the depth of foundations.

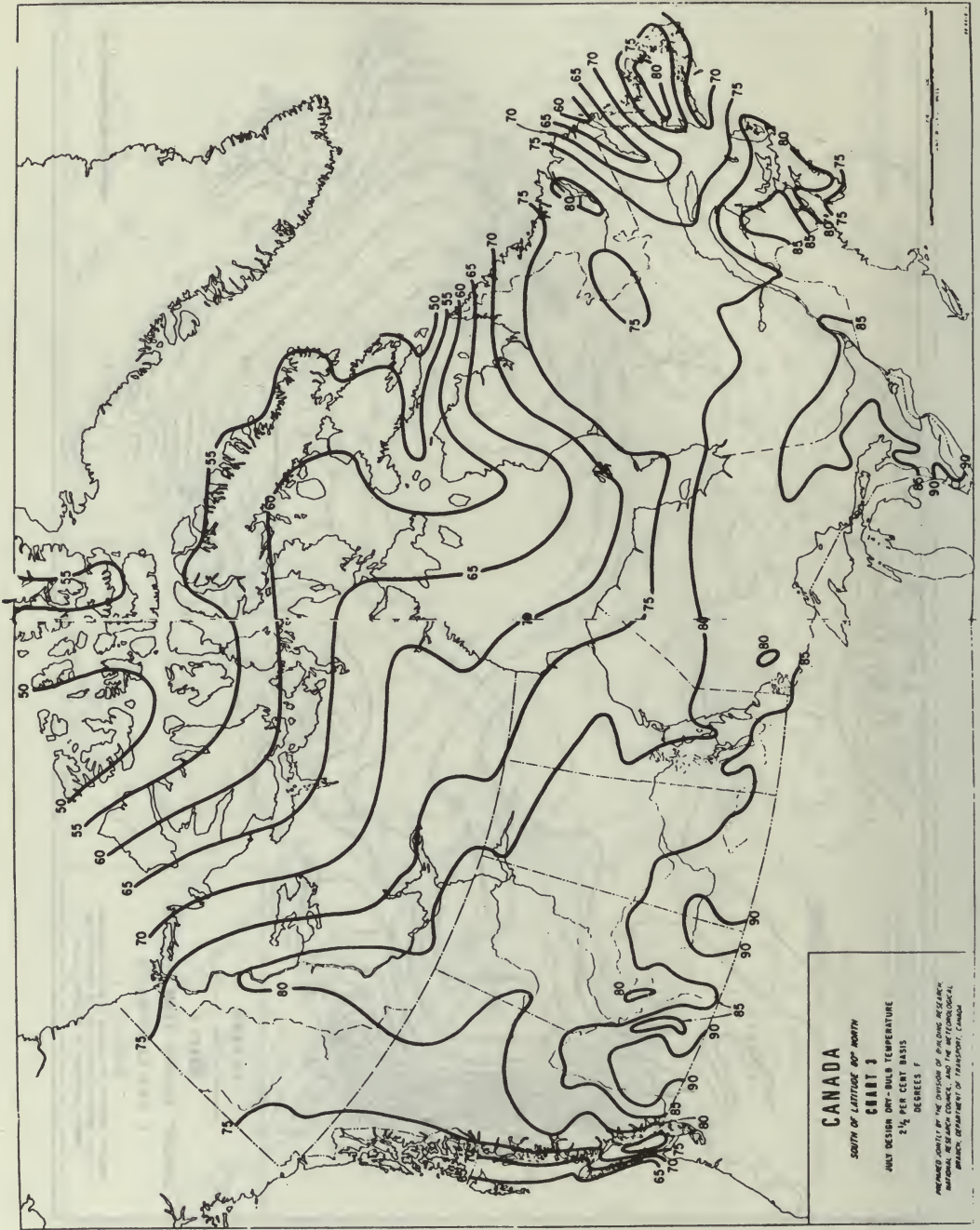
Subsection 4.9.2. January Design Temperature



Subsection 4.9.2. January Design Temperatures



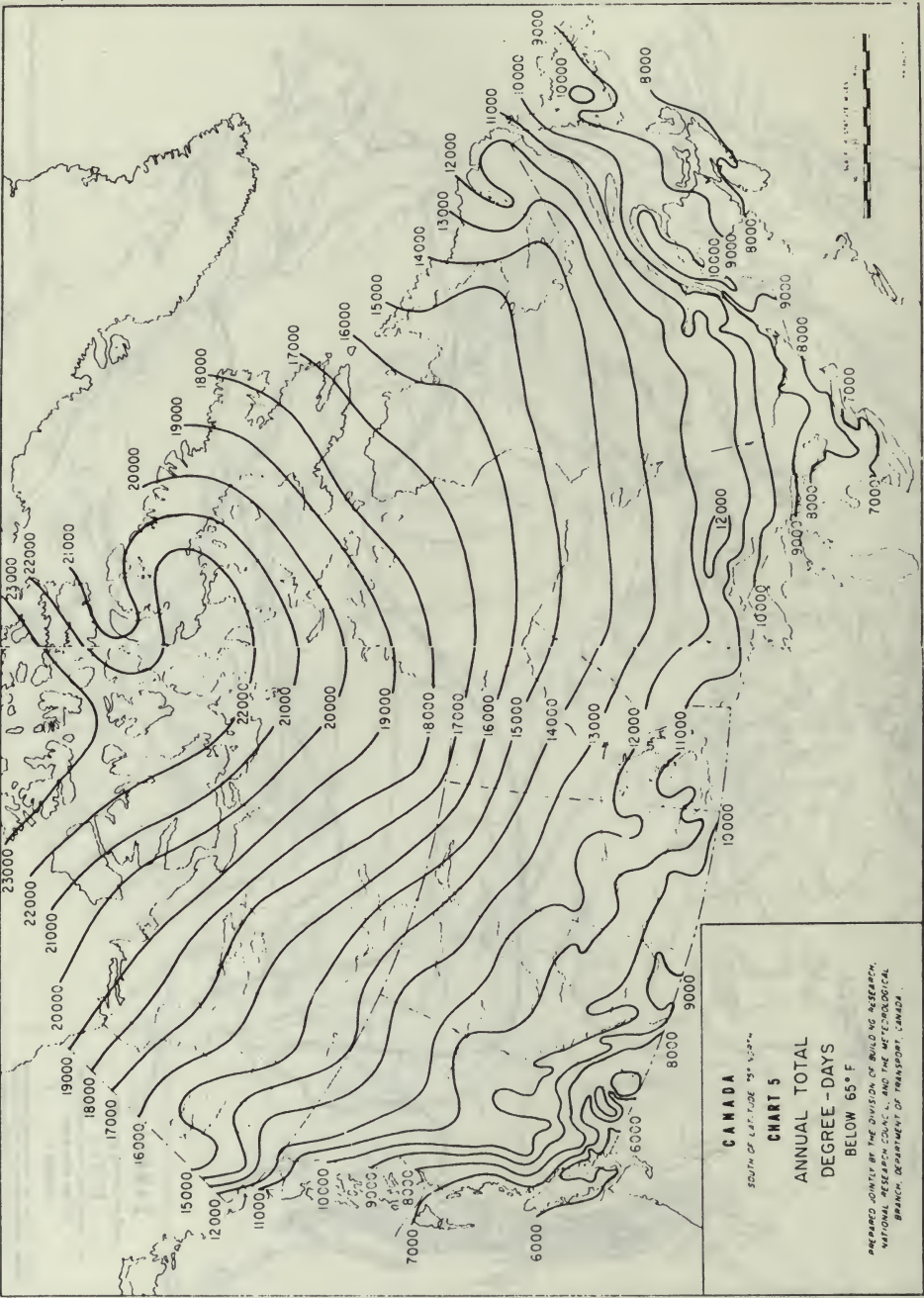
Subsection 4.9.3. July Design Temperatures



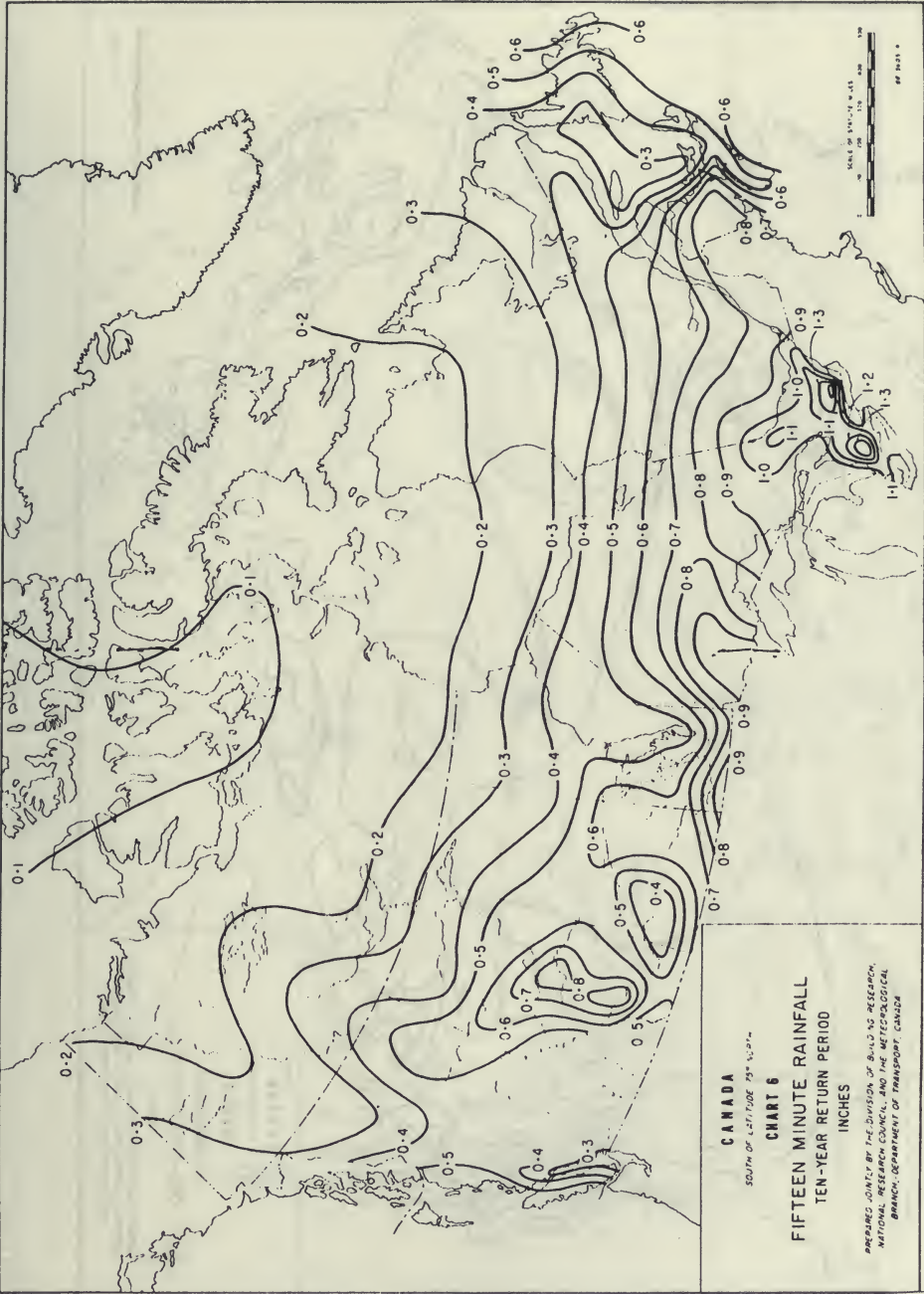
Subsection 4.9.2. July Design Temperatures



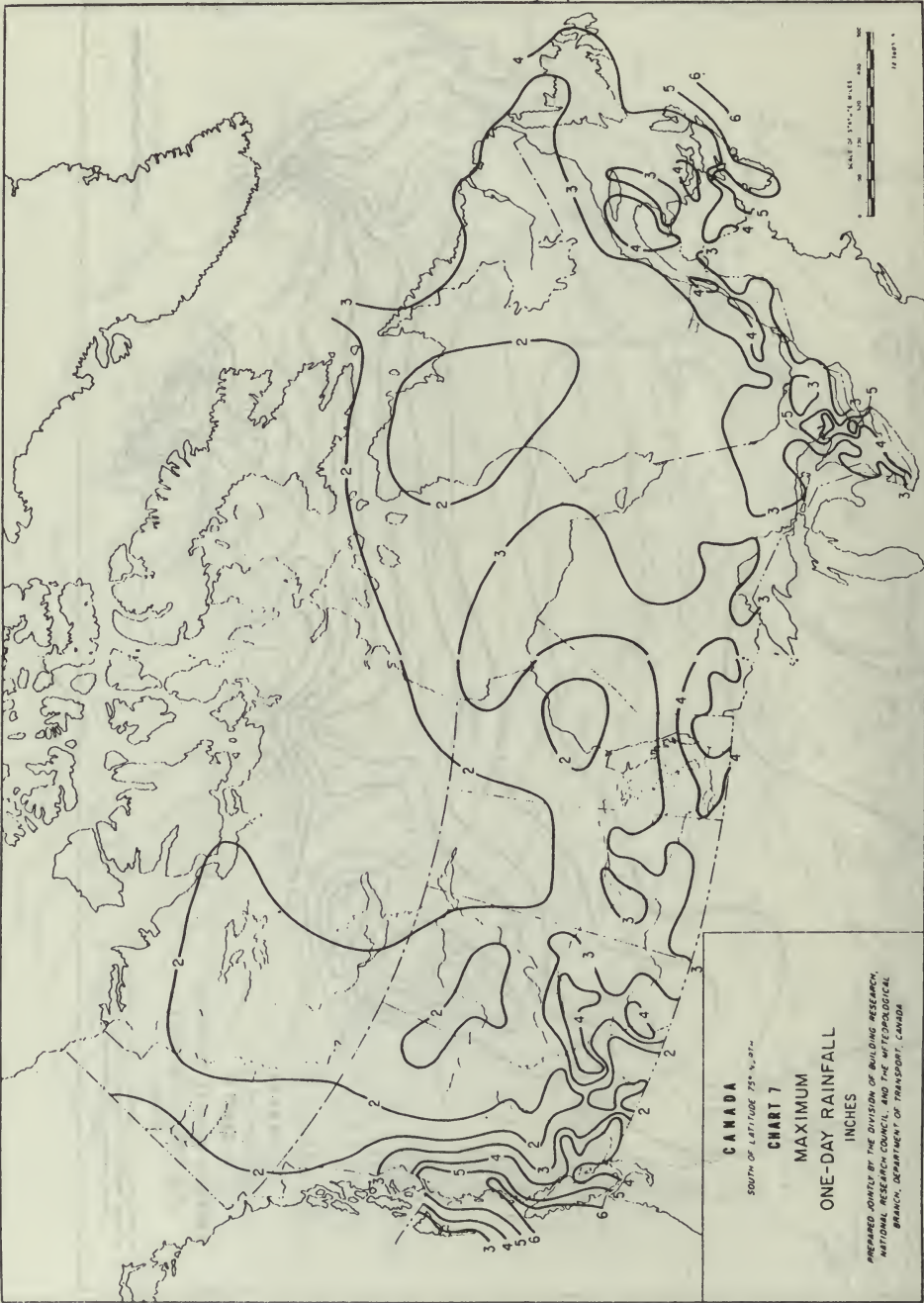
Subsection 4.9.4. Heating Degree-Days



Subsection 4.9.5. Rainfall Intensity (15 Minute)



Subsection 4.9.5. Rainfall Intensity (24 hours)



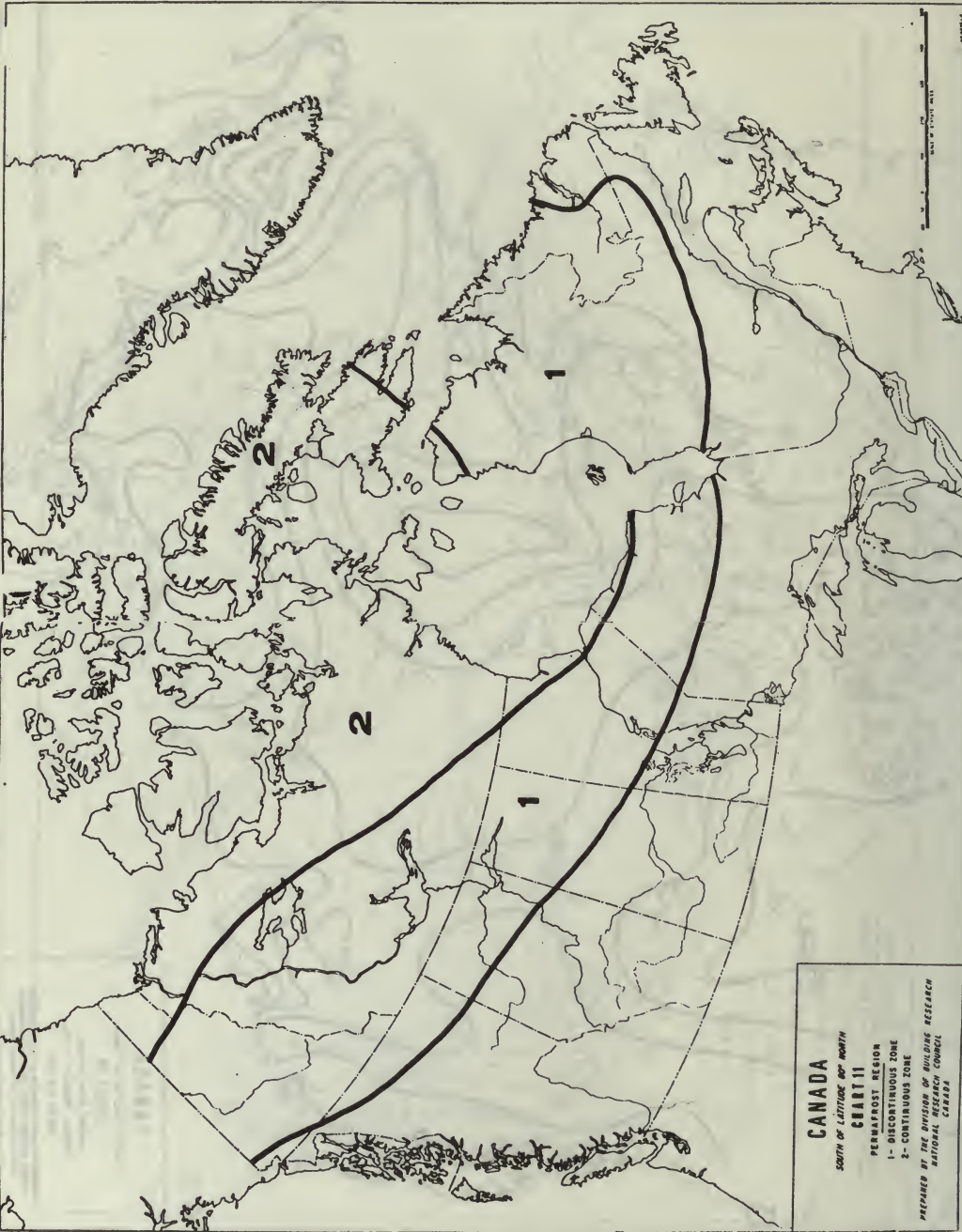
Subsection 4.9.5. Rainfall Intensity
(Annual Total Precipitation)



Subsection 4.9.6. Snow Loads



Subsection 4.9.8. Permafrost



Subsection 4.9.9. Seismic Zones



TABLE 4.9.9.A.
Definition of Seismic Zones

Seismic Zone	Range of Horizontal Ground Acceleration g (units of gravity)	Assigned Horizontal Design Ground Acceleration A, g (units of gravity)
0	Less than 0.01	0
1	Equal to or greater than 0.01 to less than 0.03	0.02
2	Equal to or greater than 0.03 to less than 0.06	0.04
3	Equal to or greater than 0.06	0.08
Column 1	2	3

Subsection 4.9.10. Design data for selected locations in Ontario

TABLE 4.9.10.A.
Forming Part of Subsection 4.9.10.

DESIGN DATA FOR SELECTED LOCATIONS IN ONTARIO

Province and Location	Design Temperature				Degree Days Below 65°F	15 Min. Rain. in.	One Day Rain. in.	Ann. Tot. Peppn. in.	Gnd. Snow Load. psf	Hourly Wind Pressures			Seismic Zone
	January		July 2½%							1/10. psf	1/30. psf	1/100. psf	
	2½%, °F	1%, °F	Dry, °F	Wet, °F									
Ailsa Craig.....	4	1	88	74	7300	1.0	3.5	38	40	8.3	10.4	12.9	1
Ajax.....	-2	-5	87	75	7500	0.9	3.0	32	44	9.0	11.0	13.3	1
Alexandria.....	-11	-16	86	74	8400	1.1	3.0	37	58	6.4	7.8	9.4	2
Alliston.....	-7	-11	85	74	8300	1.1	4.5	30	67	4.6	6.1	7.9	1
Almonte.....	-14	-18	86	74	8700	1.0	3.0	33	61	6.2	7.8	9.6	2
Ansonville.....	-27	-32	86	71	11400	0.8	2.5	30	71	6.4	7.8	9.4	1
Armstrong.....	-38	-44	83	71	12458	0.9	4.0	27	79	4.3	5.1	6.0	0
Arnprior.....	-16	-20	87	74	8800	0.9	3.0	31	61	5.7	7.1	8.7	2
Atikokan.....	-29	-34	85	72	11066	1.0	3.5	25	61	4.2	5.1	6.0	0
Aurora.....	-4	-8	86	74	7900	1.1	4.0	29	48	6.4	8.2	10.5	1
Bancroft.....	-15	-19	84	73	9100	1.0	2.5	30	71	4.8	6.1	7.6	1
Barrie.....	-9	-13	85	73	8200	1.1	5.0	32	61	4.4	6.1	8.1	1
Barrie/field.....	-7	-10	82	75	7800	0.9	4.5	34	46	7.3	8.9	10.8	1
Beaverton.....	-10	-14	86	73	8400	1.1	5.5	34	52	5.0	6.7	8.7	1
Belleville.....	-7	-11	86	75	7709	0.9	3.0	32	42	6.7	8.2	10.1	1
Belmont.....	4	0	88	75	7300	1.0	3.5	37	38	7.3	9.4	12.0	1
Bowmanville.....	-3	-6	86	75	7600	0.9	3.0	32	44	9.6	11.5	13.7	1
Bracebridge.....	-13	-17	84	72	8800	1.0	4.5	40	67	4.0	5.3	6.8	1
Bradford.....	-7	-11	86	74	8100	1.1	4.5	30	54	5.0	6.7	8.8	1
Brampton.....	0	-4	87	75	7721	1.1	6.0	31	42	6.6	8.2	10.2	1
Brantford.....	3	-1	88	75	7202	0.9	4.0	31	42	6.5	7.8	9.2	1
Brighton.....	-5	-8	86	75	7800	0.9	3.0	32	42	8.7	10.4	12.4	1
Brockville.....	-9	-13	85	75	7900	1.0	3.5	38	50	6.6	8.2	10.1	2
Brooklin.....	-3	-7	87	75	7800	0.9	3.0	31	46	8.0	9.9	12.2	1
Burks Falls.....	-14	-18	84	71	9300	1.0	4.0	36	69	4.2	5.5	7.1	1
Burlington.....	3	0	88	75	6800	0.9	4.0	31	33	7.5	8.9	10.5	2
Caledonia.....	4	1	88	75	7200	0.9	4.0	31	36	6.6	7.8	9.2	2
Cambridge.....	1	-3	86	75	7600	1.0	4.0	33	52	5.5	6.7	8.1	1
Campbellford.....	-9	-13	87	74	8100	1.0	3.5	31	54	6.1	7.8	9.8	1
Camp Borden.....	-8	-12	85	73	8200	1.1	4.5	28	67	4.5	6.1	8.1	1
Canington.....	-9	-13	86	74	8400	1.1	5.0	32	52	5.1	6.7	8.7	1
Carleton Place.....	-13	-17	86	74	8600	1.0	3.0	33	58	6.2	7.8	9.7	2
Cavan.....	-7	-11	87	74	8200	1.1	3.0	31	54	6.5	8.2	10.3	1
Centralia.....	4	1	88	74	7243	1.0	3.5	38	42	7.8	9.9	12.5	1
Chapleau.....	-31	-36	82	71	10900	0.9	3.5	30	73	4.0	5.1	6.3	1
Chatham.....	6	3	90	75	6503	1.1	4.0	30	29	6.7	8.2	10.1	1
Chelmsford.....	-15	-20	86	70	9700	1.0	3.0	30	67	6.0	8.2	11.0	1
Chesley.....	0	-4	86	72	7800	1.1	3.0	35	75	6.9	8.9	11.4	1
Clinton.....	4	0	86	73	7600	0.9	3.5	35	52	7.8	9.9	12.5	1
Coboconk.....	-12	-16	85	73	8700	1.0	5.0	38	61	4.7	6.1	7.8	1

Subsection 4.9.10.

DESIGN DATA FOR SELECTED LOCATIONS IN ONTARIO

Province and Location	Design Temperature				Degree Days Below 65°F	15 Min. Rain. in.	One Day Rain. in.	Ann. Tot. Pcpn. in.	Gnd. Snow Load. psf	Hourly Wind Pressures			Seismic Zone
	January		July 2½%							1/10, psf	1/30, psf	1/100, psf	
	2½%, °F	1%, °F	Dry, °F	Wet, °F									
Cobourg.....	-4	-7	86	75	7700	0.9	3.0	32	44	9.7	11.5	13.6	1
Cochrane.....	-28	-32	85	71	11412	0.8	2.5	31	69	5.4	6.7	8.2	1
Colborne.....	-5	-8	86	75	7700	0.9	3.0	32	44	9.2	11.0	13.0	1
Collingwood.....	-6	-10	84	72	8400	1.1	4.0	32	79	5.3	7.1	9.3	1
Cornwall.....	-9	-14	86	75	8200	1.1	2.5	38	52	6.3	7.8	9.5	2
Corunna.....	6	2	90	74	7000	0.9	3.5	32	31	7.3	8.9	10.8	1
Deep River.....	-20	-24	88	73	9500	0.9	3.5	29	54	4.2	5.0	6.0	2
Deseronto.....	-7	-11	84	75	7500	0.9	3.5	33	44	6.7	8.2	10.1	1
Dorchester Sta.....	3	-1	88	75	7400	1.1	3.5	36	40	6.9	8.9	11.5	1
Dorion.....	-27	-32	82	70	10800	0.8	3.0	29	69	5.2	6.1	7.1	1
Dresden.....	5	2	90	75	6800	1.1	3.0	31	31	6.7	8.2	10.1	1
Dryden.....	-29	-32	78	72	11147	1.0	4.0	25	63	4.2	5.1	6.0	0
Dunbarton.....	-1	-4	87	75	7400	0.9	4.0	32	44	9.0	11.0	13.3	1
Dunnville.....	7	4	87	75	7000	0.9	4.0	35	38	7.0	8.2	9.7	2
Durham.....	-2	-6	85	75	8474	1.1	3.0	35	79	6.5	8.2	10.3	1
Dutton.....	5	2	89	75	6900	1.1	3.5	35	33	7.1	8.9	11.1	1
Earlton.....	-26	-32	87	71	10792	0.9	3.5	29	69	6.6	8.5	10.7	1
Edison.....	-28	-32	82	72	11000	1.0	3.5	25	65	4.2	5.0	6.0	0
Elmvale.....	-9	-13	84	72	8400	1.1	5.0	33	73	4.9	6.7	8.9	1
Embro.....	3	-1	86	75	7600	1.1	3.5	35	50	6.9	8.9	11.3	1
Englehart.....	-26	-32	87	71	10900	0.9	4.0	29	69	6.1	7.8	9.8	1
Espanola.....	-13	-17	84	70	9300	0.9	3.5	32	63	5.9	7.8	10.1	1
Exeter.....	4	1	88	74	7500	1.0	3.5	38	44	7.8	9.9	12.5	1
Fenelon Falls.....	-11	-15	86	74	8600	1.0	5.2	32	58	5.2	6.7	8.5	1
Fergus.....	-2	-6	85	74	8452	1.3	3.5	33	79	5.4	6.7	8.3	1
Fonthill.....	6	3	87	75	6800	0.9	4.0	33	38	7.0	8.2	9.7	2
Forest.....	6	2	89	74	7031	0.9	3.5	34	38	8.1	9.9	12.1	1
Fort Erie.....	7	5	87	75	6600	0.9	4.0	34	46	7.6	8.9	10.5	2
Fort Francis.....	-27	-31	85	73	10700	1.0	3.5	28	58	4.2	5.1	6.0	0
Gananoque.....	-7	-11	83	75	7800	0.9	3.5	36	48	7.3	8.9	10.9	1
Georgetown.....	0	-4	86	75	7817	1.1	5.0	32	50	5.7	7.1	8.8	1
Geraldton.....	-31	-36	83	71	12000	0.8	3.0	27	73	4.2	5.0	6.0	0
Glencoe.....	5	2	90	75	7000	1.1	3.5	35	33	6.5	8.2	10.3	1
Goderich.....	4	1	85	73	7712	0.9	3.5	31	52	8.3	10.4	13.0	1
Gore Bay.....	-9	-13	86	70	9009	0.9	2.5	32	56	6.3	7.5	9.0	1
Graham.....	-35	-40	84	71	11838	0.9	4.0	27	69	4.3	5.1	6.0	0
Gravenhurst.....	-13	-17	84	72	8700	1.0	4.5	40	65	4.0	5.3	6.9	1
Grimshy.....	5	2	88	75	6592	0.9	4.5	31	36	7.6	8.9	10.5	2
Guelph.....	0	-4	85	75	7749	1.1	4.5	33	54	5.2	6.3	7.5	1
Guthrie.....	-10	-14	85	73	8300	1.1	5.0	33	56	4.5	6.1	8.1	1
Hagersville.....	5	2	88	75	7200	1.0	4.0	33	36	7.0	8.2	9.7	1
Haileybury.....	-25	-30	87	71	10700	0.9	3.5	29	67	6.6	8.2	10.2	1
Haliburton.....	-15	-19	84	73	9038	1.0	3.5	34	73	4.0	5.1	6.5	1
Hamilton.....	3	0	88	75	6821	0.9	4.0	31	33	7.6	8.9	10.5	2
Hanover.....	0	-4	87	73	8000	1.1	3.0	36	75	7.0	8.9	11.3	1
Hastings.....	-9	-13	87	74	8200	1.1	3.5	31	56	6.1	7.8	9.8	1
Hawkesbury.....	-13	-18	86	74	8800	0.9	3.5	39	63	6.5	7.8	9.3	2
Hearst.....	-28	-32	84	71	11900	0.8	2.5	28	61	4.2	5.3	6.6	1
Honey Harbour.....	-10	-13	84	72	8400	0.9	5.0	35	79	5.3	7.1	9.4	1
Hornepayne.....	-35	-40	84	71	12066	0.8	3.0	25	56	4.0	5.1	6.3	0
Huntsville.....	-14	-18	84	72	8726	1.0	4.0	36	84	4.0	5.2	6.7	1
Ingersoll.....	3	-1	87	75	7400	1.1	3.5	35	42	6.9	8.9	11.3	1
Jarvis.....	5	2	88	75	7100	1.1	4.0	34	36	6.9	8.2	9.7	1
Jellicoe.....	-32	-37	83	71	11800	0.8	3.0	28	73	4.2	5.1	6.0	0
Kapuskasing.....	-28	-31	84	71	11560	0.8	2.5	28	61	4.8	5.9	7.2	1
Kemptville.....	-12	-16	86	75	8338	1.0	3.0	34	56	6.2	7.8	9.7	2
Kenora.....	-28	-31	83	73	10796	1.0	3.5	25	65	4.2	5.0	6.0	0
Killaloe Sta.....	-18	-22	87	73	9074	0.9	3.0	28	58	4.9	6.1	7.5	1
Kincardine.....	3	0	84	72	7800	0.9	3.0	35	77	8.4	10.4	12.8	1
Kingston.....	-7	-10	82	75	7724	0.9	4.5	34	46	7.3	8.9	10.8	1

Subsection 4.9.10.

DESIGN DATA FOR SELECTED LOCATIONS IN ONTARIO

Province and Location	Design Temperature				Degree Days Below 65°F	15 Min. Rain. in.	One Day Rain. in.	Ann. Tot. Pcpn. in.	Gnd. Snow Load, psf	Hourly Wind Pressures			Seismic Zone
	January		July 2½%							1/10, psf	1/30, psf	1/100, psf	
	2½%, °F	1%, °F	Dry, °F	Wet, °F									
Kinmount.....	-13	-17	85	73	8800	1.0	4.0	38	65	4.2	5.5	7.0	1
Kirkland Lake.....	-27	-32	87	71	11269	0.8	3.5	29	69	6.2	7.8	9.7	1
Kitchener.....	1	-3	85	75	7566	1.1	4.0	33	61	5.7	7.1	8.7	1
Lakefield.....	-10	-14	86	74	8500	1.1	3.5	30	61	5.5	7.1	9.0	1
Lansdowne House.....	-38	-44	82	70	13021	0.7	2.5	24	67	5.0	6.1	7.3	0
Leamington.....	7	4	90	75	6547	1.1	3.5	30	23	7.4	8.9	10.8	1
Lindsay.....	-9	-13	87	74	8400	1.0	4.0	32	56	5.5	7.1	9.0	1
Lions Head.....	-1	-5	82	71	8000	1.0	3.0	35	69	6.9	8.9	11.3	1
Listowel.....	0	-4	85	74	8500	1.2	3.0	38	79	7.1	8.9	11.1	1
London.....	3	-1	88	75	7349	1.1	3.5	38	40	7.6	9.9	12.8	1
Lucan.....	4	0	88	75	7395	1.0	3.5	38	42	8.2	10.4	13.1	1
Maitland.....	-9	-13	85	75	7900	1.0	3.0	38	50	6.6	8.2	10.1	2
Markdale.....	-3	-7	84	73	8600	1.1	3.0	33	84	6.0	7.8	9.9	1
Martin.....	-32	-37	84	72	11600	1.0	4.5	26	67	4.3	5.1	6.0	0
Matheson.....	-27	-32	86	71	11400	0.8	3.0	29	71	6.3	7.8	9.5	1
Mattawa.....	-19	-23	87	72	9800	0.9	3.5	31	56	5.1	6.1	7.3	2
Midland.....	-9	-13	84	72	8400	1.0	5.0	34	79	5.3	7.1	9.4	1
Milton.....	1	-3	87	75	7500	1.0	5.0	31	46	6.7	8.2	10.0	1
Milverton.....	0	-4	85	74	8300	1.2	3.0	38	71	6.5	8.2	10.3	1
Minden.....	-14	-18	84	73	8900	1.0	4.0	38	67	4.0	5.2	6.6	1
Mississauga.....	2	-2	87	75	7000	1.0	5.5	31	38	7.7	9.4	11.5	1
Mitchell.....	-2	-2	86	74	8076	1.1	3.0	38	63	7.3	9.4	12.0	1
Moosonee.....	-32	-36	84	70	12723	0.7	2.5	31	58	4.1	5.0	6.1	1
Morrisburg.....	-9	-14	86	75	8105	1.0	3.0	38	52	6.3	7.8	9.6	2
Mount Forest.....	-2	-6	84	74	8800	1.2	3.0	33	84	6.1	7.8	9.7	1
Muskoka Airport.....	-13	-17	84	72	8758	1.0	4.5	40	65	4.0	5.3	6.8	1
Nakina.....	-30	-34	83	71	11969	0.8	3.0	28	65	4.2	5.0	6.0	0
Napanee.....	-7	-11	84	75	7600	0.9	3.5	33	46	6.7	8.2	10.1	1
Newcastle.....	-3	-6	86	75	7600	0.9	3.0	32	44	9.6	11.5	13.7	1
New Liskeard.....	-25	-30	87	71	10700	0.9	3.5	29	67	6.6	8.2	10.2	1
Newmarket.....	-6	-10	86	74	8000	1.1	4.0	30	50	5.4	7.1	9.3	1
Niagara Falls.....	5	2	87	75	6881	0.9	3.5	32	42	6.9	8.2	9.7	2
North Bay.....	-17	-21	84	70	9677	1.1	4.0	33	56	5.4	6.5	7.8	2
Norwood.....	-10	-14	87	74	8300	1.1	3.5	32	58	6.1	7.8	9.8	1
Oakville.....	2	-1	87	75	6700	0.9	4.5	31	36	7.8	9.4	11.3	1
Orangeville.....	-4	-8	85	74	8526	1.2	3.0	33	75	5.2	6.7	8.5	1
Orillia.....	-11	-15	85	73	8463	1.0	5.0	34	52	4.0	5.5	7.4	1
Oshawa.....	-2	-5	87	75	7600	0.9	3.0	32	44	9.0	11.0	13.3	1
Ottawa.....	-13	-17	87	74	8693	0.9	3.5	35	61	6.2	7.8	9.6	2
Owen Sound.....	-1	-5	84	72	7762	1.1	3.0	33	79	6.9	8.9	11.4	1
Pagwa River.....	-29	-33	83	71	11599	0.8	3.0	30	67	4.0	5.2	6.6	0
Paris.....	3	-1	87	75	7400	0.9	3.5	37	46	6.5	7.8	9.3	1
Parkhill.....	5	2	89	74	7300	0.9	3.5	37	40	8.4	10.4	12.8	1
Parry Sound.....	-10	-13	83	71	8480	0.9	3.5	38	75	5.1	7.1	9.7	1
Pembroke.....	-18	-22	88	73	9100	0.9	3.5	29	54	4.5	5.5	6.7	2
Penetanguishene.....	-9	-13	84	72	8400	1.0	5.0	34	79	5.3	7.1	9.4	1
Perth.....	-12	-16	86	74	8300	1.0	3.0	34	58	6.2	7.8	9.7	2
Petawawa.....	-19	-23	88	73	9200	0.9	3.5	29	54	4.1	5.0	6.1	2
Peterborough.....	-9	-13	87	74	8300	1.1	3.5	31	58	6.1	7.8	9.8	1
Petrolia.....	5	2	90	75	6900	1.0	3.0	32	33	7.3	8.9	10.9	1
Pictou.....	-5	-9	85	75	7500	0.9	3.0	33	42	7.8	9.4	11.4	1
Plattsville.....	2	-2	85	75	7600	1.1	3.5	33	58	6.2	7.8	9.7	1
Point Alexander.....	-20	-24	88	73	9500	0.9	3.5	29	54	4.2	5.0	6.0	2
Porcupine.....	-28	-33	87	71	11400	0.7	3.0	28	71	5.7	7.1	8.8	1
Port Burwell.....	6	3	88	75	7000	1.0	4.0	36	33	7.2	8.9	11.0	1
Port Colborne.....	7	4	87	75	6700	0.9	4.0	34	42	7.6	8.9	10.4	2
Port Credit.....	2	-2	87	75	6800	1.0	5.5	31	38	7.7	9.4	11.5	1
Port Dover.....	6	3	88	75	7046	1.0	4.0	34	36	7.5	8.9	10.7	1
Port Elgin.....	2	-1	83	71	7800	0.9	3.0	36	88	8.3	10.4	12.9	1
Port Hope.....	-4	-7	86	75	7700	0.9	3.0	32	44	9.7	11.5	13.6	1

Subsection 4.9.10.

DESIGN DATA FOR SELECTED LOCATIONS IN ONTARIO

Province and Location	Design Temperature				Degree Days Below 65°F	15 Min. Rain. in.	One Day Rain. in.	Ann. Tot. Pcpn. in.	Gnd. Snow Load. psf	Hourly Wind Pressures			Seismic Zone
	January		July 2½%							1/10. psf	1/30. psf	1/100. psf	
	2½% °F	1% °F	Dry. °F	Wet. °F									
Port Perry.....	-6	-10	87	74	8100	1.0	3.5	31	48	6.5	8.2	10.3	1
Port Stanley.....	6	3	89	75	7000	1.0	4.0	36	33	7.1	8.9	11.1	1
Prescott.....	-9	-13	85	75	8000	1.0	3.0	38	50	6.6	8.2	10.1	2
Princeton.....	3	-1	85	75	7400	1.0	3.5	33	48	6.3	7.8	9.6	1
Raith.....	-30	-35	83	71	11100	0.8	3.0	27	71	4.3	5.1	6.0	0
Red Lake.....	-29	-32	82	72	11400	0.7	4.0	21	73	4.6	5.5	6.5	0
Renfrew.....	-17	-21	87	74	8787	0.9	3.0	30	61	5.4	6.7	8.2	2
Ridgeway.....	7	5	87	75	6600	1.1	4.0	34	46	7.6	8.9	10.4	2
Rockland.....	-14	-18	87	74	8800	0.9	3.5	36	61	6.3	7.8	9.5	2
St. Catharines.....	5	2	88	75	6537	0.9	3.5	31	36	7.6	8.9	10.5	2
St. Marys.....	3	-1	87	75	7600	1.1	3.5	38	52	7.3	9.4	12.0	1
St. Thomas.....	5	1	89	75	7073	1.0	3.5	36	36	6.9	8.9	11.3	1
Sarnia.....	6	2	90	74	7061	0.9	3.5	32	33	7.3	8.9	10.8	1
Sault Ste. Marie.....	-15	-20	85	70	9500	1.0	2.5	32	63	6.7	7.8	9.1	1
Schreiber.....	-30	-34	81	70	11131	0.8	3.0	31	52	5.2	6.1	7.1	1
Seaforth.....	3	-1	87	74	7800	1.0	3.5	36	54	7.8	9.9	12.5	1
Simcoe.....	5	2	88	75	7100	1.1	4.0	35	36	6.9	8.2	9.8	1
Sioux Lookout.....	-29	-32	83	72	11313	1.1	4.5	27	61	4.3	5.1	6.0	0
Smiths Falls.....	-12	-16	86	75	8300	1.1	3.0	34	56	6.2	7.8	9.7	2
Smithville.....	5	2	87	75	7200	0.9	4.5	32	38	7.0	8.2	9.7	2
Smooth Rock Falls.....	-28	-32	85	71	11500	0.8	2.5	30	65	4.9	6.1	7.5	1
Southampton.....	2	-2	83	71	7811	0.9	3.0	37	88	7.9	9.9	12.4	1
South Porcupine.....	-28	-33	87	71	11400	0.7	3.0	28	71	5.7	7.1	8.8	1
South River.....	-15	-19	84	71	9500	1.1	3.5	35	65	4.8	6.1	7.6	1
Stirling.....	-9	-13	86	74	7976	1.0	3.0	31	48	5.9	7.5	9.5	1
Stratford.....	2	-2	85	75	7900	1.1	4.5	38	65	7.0	8.9	11.3	1
Strathroy.....	4	1	90	75	7200	1.0	3.0	37	38	7.4	9.4	11.8	1
Streetsville.....	1	-3	87	75	7500	1.0	5.5	31	40	7.3	8.9	10.9	1
Sturgeon Falls.....	-16	-20	85	70	9500	1.1	3.5	33	58	5.3	6.7	8.3	1
Sudbury.....	-15	-20	86	70	9600	1.0	3.0	29	63	6.1	8.5	11.4	1
Sundridge.....	-15	-19	84	71	9400	1.1	4.0	36	67	4.8	6.1	7.6	1
Tavistock.....	2	-2	85	75	7700	1.1	3.5	35	61	7.1	8.9	11.2	1
Thamesford.....	3	-1	87	75	7400	1.1	3.5	36	42	6.9	8.9	11.4	1
Thedford.....	5	2	89	74	7100	0.9	3.5	34	40	8.5	10.4	12.8	1
Thunder Bay.....	-23	-27	83	70	10405	0.8	3.0	28	71	5.2	6.1	7.1	1
Tillsonburg.....	5	1	88	75	7200	1.0	4.0	35	38	6.5	8.2	10.3	1
Timagami.....	-22	-26	87	71	10200	1.0	3.5	29	67	5.7	7.1	8.8	1
Timmins.....	-28	-33	87	71	11400	0.7	3.0	28	71	5.3	6.7	8.3	1
Toronto.....	1	-3	87	75	6827	1.0	5.0	31	38	8.1	9.9	12.1	1
Trenton.....	-5	-9	86	75	7510	0.9	3.0	32	42	7.3	8.9	10.8	1
Trout Creek.....	-16	-20	84	71	9600	1.1	3.5	34	63	4.9	6.1	7.5	1
Trout Lake.....	-36	-40	77	68	14040	0.5	3.5	25	81	7.0	8.2	9.7	0
Uxbridge.....	-7	-11	86	74	8170	1.0	4.0	31	48	6.0	7.8	9.9	1
Vanier.....	-13	-17	87	74	8600	0.9	3.5	35	61	6.2	7.8	9.6	2
Vittoria.....	6	3	88	75	7100	1.0	4.5	35	36	7.4	8.9	10.8	1
Walkerton.....	1	-3	88	73	7647	1.1	3.5	36	73	7.4	9.4	11.9	1
Wallaceburg.....	6	3	90	75	6668	1.1	3.0	31	29	6.7	8.2	10.1	1
Waterloo.....	1	-3	85	75	7566	1.1	4.0	33	61	5.7	7.1	8.7	1
Watford.....	5	2	90	75	7000	1.0	3.0	34	36	7.1	8.9	11.1	1
Wawa.....	-32	-37	81	70	10331	0.8	3.0	36	63	5.0	5.9	6.9	1
Welland.....	6	3	87	75	6691	0.9	4.0	34	38	6.9	8.2	9.7	2
West Lorne.....	5	2	89	75	6900	1.1	4.0	35	31	7.2	8.9	11.0	1
Whitby.....	-2	-5	87	75	7500	0.9	3.0	32	44	9.0	11.0	13.3	1
White River.....	-39	-44	84	71	11674	0.8	3.5	30	52	4.2	5.0	6.0	0
Wiarton.....	1	-3	83	71	8063	1.0	3.0	37	69	6.9	8.9	11.4	1
Windsor.....	7	4	90	75	6579	1.1	3.0	33	23	6.1	7.5	9.2	1
Wingham.....	2	-2	87	73	7800	1.1	3.5	36	75	7.3	9.4	12.0	1
Woodstock.....	3	-1	85	75	7542	1.1	3.5	34	50	6.4	8.2	10.4	1
Wyoming.....	5	2	90	74	7000	1.0	3.0	32	33	7.3	8.9	10.9	1

PART 5 BUILDING REQUIREMENTS FOR HANDICAPPED PERSONS

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SECTION 5.4 Building Services

Subsection 5.4.1. Application

SECTION 5.1 GENERAL

Subsection 5.1.1. Application

5.1.1.1. This part applies to the design and construction requirements for the types of buildings or parts of buildings in Table 5.2.1.A to provide access and entry to such buildings by handicapped persons.

SECTION 5.2 BUILDING REQUIREMENTS

5.2.1.1. This section applies to the type of buildings in Table 5.2.1.A.

5.2.1.2.(1) All the types of buildings described in 5.2.1.1. shall have at least one primary entrance that,

- (a) is designed for and is accessible to physically handicapped persons in wheelchairs;
- (b) opens to the outdoors at sidewalk level or to a ramp designed and constructed in conformance with Subsection 5.3.5. that leads to sidewalk level; and
- (c) where elevators are provided in the building, has access to at least one elevator.

5.2.1.3.(1) Assembly buildings shall have,

- (a) accessible seating accommodation for physically handicapped persons in wheelchairs, equal to at least one per cent of an occupant load of one hundred (100) or more persons; and
- (b) washrooms for each sex designed in accordance with Subsection 5.3.9., and Article 3.6.4.2. and accessible within the building to physically handicapped persons in wheelchairs.

TABLE 5.2.1.A

Forming Part of Article 5.2.1.1.

GROUP	TYPE
Assembly	Arenas Auditoria to which the public is normally admitted Colleges Community Centres Community Halls Court rooms Exhibition halls to which the public is normally admitted Museums to which the public is normally admitted Passenger stations and depots other than local transit Public Art Galleries Public libraries Schools Stadia Theatres
Government and Office	Government buildings to which the public is normally admitted Office buildings exceeding 6,000 sq ft in building area or exceeding 3 storeys in building height
Retail Commercial	Supermarkets Shopping Malls
Residential	Hotels—lobby floor, conference and meeting rooms and elevators Apartment buildings—lobby floor and elevators of all such buildings exceeding 6,000 sq ft in building area or exceeding 3 storeys in building height

5.2.1.4.(1) Government buildings, to which the public is normally admitted, and Office buildings exceeding 6,000 sq ft in building area or exceeding 3 storeys in building height shall have,

- (a) all public corridors providing access to or from elevators accessible to physically handicapped persons in wheelchairs;
- (b) an entrance to each occupancy or tenancy for physically handicapped persons in wheelchairs, accessible from the primary entrance to the building and from public corridors providing access to an elevator or directly from the outside of the building; and
- (c) on every floor normally used by the public and accessible to physically handicapped persons in wheelchairs,
 - (i) washrooms constructed in accordance with Subsection 5.3.9. accessible to such persons, and
 - (ii) at least one stall in each washroom accessible to such persons designed and constructed in conformance with subsection 5.3.10.

5.2.1.5.(1) Supermarkets and Shopping Malls shall have,

- (a) on the ground floor and on all other floors accessible by passenger elevators,
 - (i) all corridors, covered malls and walkways made accessible to handicapped persons in wheelchairs, and

- (ii) all floor areas opening to corridors, covered malls and walkways made accessible to handicapped persons in wheelchairs;
- (b) washrooms where required for the shopping public constructed in accordance with Subsection 5.3.9.,
 - (i) made accessible to handicapped persons in wheelchairs, and
 - (ii) contain at least one stall designed and constructed for handicapped persons in wheelchairs in conformance with Subsection 5.3.10.; and
- (c) where there are controlled checkout lanes, turnstiles or any other restricted passageways, at least one alternate route constructed in accordance with Subsection 5.3.4.

5.2.1.6.(1) Residential type buildings, hotels and apartment buildings exceeding 6,000 sq ft in building area or exceeding 3 storeys in building height shall have,

- (a) all public corridors providing access to or from elevators accessible to physically handicapped persons in wheelchairs;
- (b) all rooms and spaces intended for common use of the occupants accessible to physically handicapped persons in wheelchairs;
- (c) one level in every subsidiary storage garage accessible to physically handicapped persons in wheelchairs; and
- (d) doorways intended for use by physically handicapped persons constructed in conformance with Subsection 5.3.2.

SECTION 5.3 DESIGN STANDARDS

Subsection 5.3.1. Primary Entrance

5.3.1.1. Where a building is required to be accessible to physically handicapped persons a primary entrance shall be at least 2 feet 8 inches wide and shall be accessible at sidewalk level or by a ramp designed and constructed in conformance with Subsection 5.3.5. that leads to sidewalk level.

Subsection 5.3.2. Doors and Doorways

5.3.2.1.(1) Doorways intended for use by physically handicapped persons shall have a clear opening free of protruding hardware of at least 2 feet 6 inches when the door is open, except that doors for broom closets, clothes closets and minor storage spaces shall be not less than 1 foot 8 inches in width.

(2) In a doorway that has more than one manually operated door, one of the doors shall meet the requirements of Sentence 5.3.2.1.(1).

(3) Thresholds shall not exceed $\frac{5}{8}$ inches in height above the finished floor on either side.

5.3.2.2.(1) Where installed, door closers shall be of a type that,

- (a) permit opening of the door with a minimum effort; and
- (b) are slow closing to permit uninterrupted passage of a physically handicapped person in a wheelchair.

5.3.2.3. Where revolving doors are installed, an auxiliary side-hung door shall be provided in accordance with Article 5.3.2.1.

Subsection 5.3.3. Vestibules

5.3.3.1. Where vestibules are constructed at a primary entrance in buildings required to be accessible to physically handicapped persons they shall be at least 7 feet by 5 feet.

Subsection 5.3.4. Restricted Passageways

5.3.4.1. Wherever turnstiles are installed, controlled checkout lanes are used or any other restricted passageways are constructed in buildings required to be accessible to physically handicapped persons, there shall be at least one clearly marked alternate route not less than 36 inches in width.

Subsection 5.3.5. Ramps

5.3.5.1.(1) All ramps shall have,

- (a) a maximum gradient of 1 in 12;
- (b) an unobstructed width of at least 3 feet, except that handrails may project not more than $3\frac{1}{2}$ inches into such width;
- (c) a non-skid finish or non-skid strips;
- (d) one handrail on either side at a height of not less than 30 inches nor more than 42 inches extending at least 1 foot beyond the top and bottom ends of the ramp;
- (e) landings which meet the following requirements,
 - (i) upper landings with at least a 1 foot projection beyond the latch of the door and at least 5 feet square, except that where the door opens in the direction of travel the depth may be reduced to 3 feet,
 - (ii) intermediate doorway landings not less than the width of the ramp, with level floors on the inside and outside of the door opening extending at least 1 foot beyond the latch side of the door opening, at least 2 feet beyond both edges of a door opening at a landing between two ramps constructed on the same centre line, and at least 5 feet in the direction of door swing,
 - (iii) level resting platforms 4 feet long and the same width as the ramp, or intermediate doorway landings, at not more than 30 foot intervals and at each change of direction, and
 - (iv) the lower end landing at least 6 feet long and the same width as the ramp, except where there are no doors the landing length may be reduced to 4 feet;
- (f) all doors to intermediate landings installed so that the door swing is away from the landing, except where the door is recessed so that its swing does not project into the landing width; and
- (g) illumination equipment capable of providing at least 10 foot candles at floor level on landings, slopes, platforms, entrances, intersections and changes of direction.

Subsection 5.3.6. Stairs

5.3.6.1.(1) Stairs in buildings required to be accessible to physically handicapped persons shall have,

- (a) the ratio of rise to run in conformance with Subsection 9.8.3.;
- (b) a non-skid finish or non-skid strips;

- (c) a handrail on at least one side of stairs less than 44 inches in width but on both sides of a stair 44 inches or wider;
- (d) a handrail located between 30 inches and 42 inches in height measured vertically from the nose of the tread; and
- (e) all handrails extending at least 1 foot 6 inches beyond the first and last step in a stair along a continuing wall or otherwise designed so as not to constitute a hazard.

Subsection 5.3.7. Vertical Transportation

5.3.7.1. Where elevators are provided in the buildings described in this Part, at least one elevator shall be accessible to physically handicapped persons for transportation to all floors to which the public is normally admitted.

Subsection 5.3.8. Floors

5.3.8.1. Floors, other than those in auditoria, where required to be accessible to physically handicapped persons, shall be at the same level throughout or shall be connected by a ramp in accordance with Subsection 5.3.5.

Subsection 5.3.9. Washrooms

5.3.9.1.(1) Where provided in accordance with Section 5.2 a washroom shall,

- (a) be accessible to physically handicapped persons in wheelchairs;
- (b) have doors in accordance with Sentence 5.3.2.1.(1);
- (c) have at least one toilet stall for physically handicapped persons in wheelchairs constructed in accordance with Subsection 5.3.10.;
- (d) have wash basin faucet handles that are not spring loaded or pressure operated;
- (e) have insulated hot water inlet and waste outlet pipes wherever they constitute a burn hazard.

Subsection 5.3.10. Toilet Stalls

5.3.10.1.(1) Where a washroom is designed and installed, in conformance with Subsection 5.3.9., to be accessible to the physically handicapped, a toilet stall in each washroom shall,

- (a) be at least 4 feet 6 inches wide by 5 feet;
- (b) have a minimum clearance of 5 feet 6 inches between the stall face and the face of any in-swinging washroom door and 4 feet 6 inches between the stall face and any wall-mounted fixture;
- (c) have an out-swinging door at least 2 feet 8 inches wide;
- (d) have a water closet,
 - (i) located 1 foot 6 inches from the centre of the fixture to the side wall,
 - (ii) with flushing controls for hand operation that are easily accessible to a physically handicapped person in a wheelchair,
 - (iii) with a seat lid, or equivalent, with nonspring-up action, to serve as a back support for paraplegics,
 - (iv) with two grab bars located in the following manner,
 - a. one on the side wall at least 2 feet in length of 2 inch to 1 ¼ inch tubular bar, with at least 1 ¾ inches between the bar and the wall,

and installed at a 50 degree angle to the floor with the bottom end 2 feet 1 inch above the finished floor, nearer the rear wall, and 2 inches behind the front of the seat lid,

- b. one on the back wall at least 2 feet in length of 1 inch to 1¼ inch tubular bar, with at least 1¾ inches between the bar and the wall and to be centred on the centre line of the water closet and fixed at a level 11 inches above the water closet and any flushing control and the set-out distance from the wall will be dependent on the style of water closet used, but in no case shall the bar interfere with the water closet seat lid in the up position, and

- (v) with a coat hook mounted about 5 feet above the floor level on a side wall.

SECTION 5.4 BUILDING SERVICES

Subsection 5.4.1. Application

5.4.1.1. The plumbing facilities provided in accordance with this Part shall be considered part of the total plumbing facilities required by Subsection 3.6.4.

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- Subsection 6.7.4. Sprinkler Systems

SECTION 6.8. Voice Communication Life Safety Systems for High Rise Buildings

- Subsection 6.8.1. General
- Subsection 6.8.2. Coverage
- Subsection 6.8.3. Preannounce Signal
- Subsection 6.8.4. Speakers & Speaker Zone
- Subsection 6.8.5. Handsets
- Subsection 6.8.6. Central Control Facility (Voice Communication System)
- Subsection 6.8.7. Wiring
- Subsection 6.8.8. Identification

SECTION 6.9. Inhalation Anesthetics

- Subsection 6.9.1. Application

SECTION 6.1 GENERAL**Subsection 6.1.1. Application**

6.1.1.(1) This Part applies to systems and equipment for the following,

- (a) heating, ventilating and air-conditioning services;
- (b) incinerators;
- (c) electrical services;
- (d) elevators, dumbwaiters and escalators;
- (e) service shafts and chutes;
- (f) fire alarm and fire extinguishing services;
- (g) voice communication, life safety systems for high rise buildings; and
- (h) inhalation anesthetics.

(2) Service water heaters shall conform to Subsection 6.2.5.

(3) This Part applies to,

- (a) all buildings used for,
 - (i) Group A, Assembly Occupancies,
 - (ii) Group B, Institutional Occupancies,
 - (iii) Group F, Division 1, High Hazard Industrial Occupancies; and
- (b) all buildings exceeding 3 storeys in building height, 6,000 sq. ft. in building area and which are used or intended to be used for the following occupancies,
 - (i) Group C, Residential Occupancies,
 - (ii) Group D, Business and Personal Services Occupancies,
 - (iii) Group E, Mercantile Occupancies,
 - (iv) Group F, Divisions 2 and 3, Medium and Low Hazard Industrial Occupancies.

(4) For buildings not listed in Sentence (3), requirements for building services will be found in Part 9.

Subsection 6.1.2. Life Safety

6.1.2.1. Where life-safety is wholly dependent upon the electrical or mechanical system, emergency stand-by equipment shall be installed.

Subsection 6.1.3. RESERVED

Subsection 6.1.4 Minimum Metal Thickness

6.1.4.1. Minimum metal thickness in this Part is specified in inches and where reference documents in this Part specify minimum metal thickness by gauge number, inches shall be substituted for gauge numbers according to Table 6.1.4.A.

TABLE 6.1.4.A.
Forming Part of Article 6.1.4.1.

SUBSTITUTION OF DECIMAL INCHES FOR GAUGE NUMBERS IN THE DESIGNATION OF MINIMUM SHEET METAL THICKNESSES ¹				
Gauge No.	Minimum Thickness of Sheet Metal, in.			
	Galvanized Sheet Gauge (GSG) ⁽²⁾	Manufacturers' Standard Gauge (MSG) uncoated steel	United States Standard Gauge (USSG) stainless steel	Brown & Sharpe Gauge (B&SG) aluminum alloy sheets up to 84 in. in width
	ASTM A525-71	ASTM A568-72	ASTM A167-70	ASTM B209-73
6	—	0.184	—	0.146
7	—	0.171	—	0.128
8	0.159	0.156	0.158	0.115
9	0.144	0.142	0.142	0.106
10	0.129	0.127	0.129	0.094
11	0.114	0.112	0.115	0.084
12	0.099	0.097	0.100	0.074
13	0.084	0.082	0.086	0.065
14	0.070	0.067	0.071	0.057
15	0.065	0.060	0.064	0.050
16	0.058	0.053	0.057	0.044
17	0.053	0.047	0.051	0.039
18	0.047	0.043	0.045	0.034
19	0.041	0.038	0.039	0.030
20	0.036	0.033	0.034	0.026
21	0.033	0.030	0.030	0.023
22	0.030	0.027	0.027	0.021
23	0.027	0.024	0.024	0.019
24	0.024	0.021	0.022	0.016
25	0.021	0.018	0.019	0.014
26	0.019	0.016	0.016	0.012
27	0.017	0.014	0.014	0.011
28	0.016	0.013	0.014	0.009
29	0.014	—	0.012	0.008
30	0.013	—	0.011	0.008
Col. 1	2	3	4	5

Notes to Table 6.1.4.A.:

(¹)Minimum thickness in this Table is the nominal thickness corresponding to the gauge number reduced by the greatest allowable minus-thickness-tolerance specified in the appropriate ASTM standard.
(²)Applies to galvanized (zinc-coated) steel and is the overall thickness including coating.

**SECTION 6.2 HEATING, VENTILATING AND AIR-CONDITIONING
SYSTEMS AND EQUIPMENT**

Subsection 6.2.1. Scope

6.2.1.1.(1) This Section applies to the design, construction and installation of,

- (a) solid-fuel-fired heating systems;
- (b) heating systems in which the rated heat input exceeds 400,000 Btu per hr (117 kW); and
- (c) ventilating and air-conditioning systems in which the rated fan capacity exceeds 4,000 cfm.

(2) Where the rated heat input of heating systems or equipment does not exceed 400,000 Btu per hr (117.24 kW) or the rated fan capacity of ventilating or air-conditioning systems and equipment does not exceed 4,000 cfm the requirements in Part 9 shall apply.

Repairs or
adjustments

(3) Repairs, adjustments or component replacements that change the capacity or extent of safety of an existing heating, ventilating or air-conditioning system and that the method of operation shall conform to this Section.

Subsection 6.2.2. RESERVED

Subsection 6.2.3. Design and Installation

6.2.3.1.(1) RESERVED

(2) Heating, ventilating, refrigerating and air-conditioning systems shall be designed, constructed and installed to conform to the procedures in the NFPA Fire Codes, the ASHRAE Guide and Data Books, the ASHRAE Handbook of Fundamentals, the HRA Digest, the IBR Manuals and/or other approved similar engineering handbooks.

(3) RESERVED

- (a) RESERVED
- (b) RESERVED
- (c) RESERVED
- (d) RESERVED
- (e) RESERVED
- (f) RESERVED

Design
conditions

6.2.3.2. The outside conditions to be used in designing heating, ventilating and air-conditioning systems shall be the appropriate values in Climatic Information for Building Design in Ontario, Section 4.9.

Access

6.2.3.3.(1) Equipment forming part of a heating, ventilating or air-conditioning system, with the exception of embedded pipes or ducts, shall be installed with provision for access for inspection, maintenance, repair and cleaning.

Guards

(2) Mechanical equipment and heating terminal devices shall be guarded to prevent injury to any person.

Protection
from freezing

(3) Equipment forming part of a heating, or air-conditioning system, that may be adversely affected by freezing temperatures and which is located in unheated areas shall be adequately protected from freezing.

6.2.3.4. Heating and cooling systems shall be designed to allow for expansion and contraction of the heat transfer fluid, and to maintain the system pressure within the rated working pressure limits of all components of the system.

Expansion
and
contraction

6.2.3.5.(1) Systems serving spaces that contain sources of contamination shall be operated in such a manner as to prevent spreading of such contamination to other occupied parts of the building and surrounding areas.

Equipment for
contaminated
spaces

(2) Systems serving spaces that contain hazardous gases, dusts or liquids such as grain elevators, metal powder plants and ammonium nitrate storage, shall be designed, constructed and installed to conform to the requirements for the design and installation of such systems as contained in publications of the National Fire Protection Association and in the National Fire Code of Canada.

(3) Systems for the ventilation of restaurant and other commercial cooking equipment shall be designed, constructed and installed to conform to NFPA 96-1973, "Standard for the Installation of Equipment for the Removal of Smoke and Grease-laden Vapors from Commercial Cooking Equipment," as revised to 1 May, 1975.

6.2.3.6. RESERVED

6.2.3.7. RESERVED

Subsection 6.2.4. Air Duct Systems

6.2.4.1.(1) Except as provided in Sentences (2) and (3), all ducts including flexible duct connectors, associated fittings and plenums used in air duct systems shall be constructed of steel, aluminum alloy, copper, or other similar metal, or of clay, asbestos-cement or similar noncombustible material.

Duct
construction
materials

(2) Ducts, flexible duct connectors, associated fittings and plenums may contain limited amounts of combustible material provided they,

- (a) conform to the appropriate requirements for Class 1 air duct materials and connectors in ULC S110 1970, 'Air Ducts,' as revised to 1 May, 1975;
- (b) are not used in vertical runs serving more than 2 storeys; and
- (c) are not exposed to heated air or radiation from heat sources that would result in the exposed surface exceeding a temperature of 250°F.

(3) The concealed space between the ceiling and floor or ceiling and roof of a building may be used as a plenum and need not conform to Sentences (1) and (2) provided,

Ceiling spaces
used as
plenums

- (a) all materials within the ceiling space have a flame-spread rating of not more than 25 and a smoke developed classification of not more than 50;
- (b) the supports for the ceiling membrane are of noncombustible material having a melting point of at least 1,400°F; and
- (c) when the concealed space is used as a return air plenum, and incorporates a ceiling membrane that forms part of the required fire-resistance rating of the assembly, every opening through the membrane shall be protected by a fire stop flap which shall in the event of a fire,
 - (i) stop the flow of air into the concealed space, and
 - (ii) be supported in a manner that will maintain the integrity of the fire resistance of the ceiling membrane for the duration of time required to provide the required fire-resistance rating. (See also 3.1.5.6.(5)).
- (d) when the concealed space above a public corridor is used as a return air plenum and does not incorporate a ceiling membrane that forms part of the required fire-resistance rating of the assembly, such ceiling membrane shall be smoke and air tight.

Note: 6.2.4.1. (3)—amended by O. Reg. 31/79, s. 1.

(4) Materials in Sentences (1) and (2) which when used in a location where they may be subject to excessive moisture shall have no appreciable loss of strength when wet and shall be corrosion-resistant.

Materials
subjected to
moisture

Duct
construction
and support

6.2.4.2. The construction and support of air ducts, fittings and plenums, including joints, seams, stiffening, reinforcing and access openings shall conform to the applicable requirements of the duct construction standards contained in the ASHRAE Guide and Data Books 1970 (Systems) and 1972 (Equipment).

Access
openings

6.2.4.3. Air duct systems shall be made substantially air tight throughout and shall have no openings other than those required for proper operation and maintenance of the system,

- (a) Access openings shall be provided where debris, paper or other combustible material may accumulate in plenums and ducts. Removable grilles, requiring only the loosening of catches or screws for removal, may be considered as access openings;
- (b) Fastenings on walk-in access doors shall be such that the door may be readily opened from the inside without the use of keys.

Vibration
isolation
connectors

6.2.4.4.(1) Vibration isolation connectors in air duct systems shall be noncombustible, except that combustible fabric connectors are permitted provided they,

- (a) do not exceed 10 in. in length;
- (b) comply with the flame-resistance requirements of ULC S109 1969, "Standard for Flame Tests of Flame-Resistant Fabrics and Films", as revised to 1 May, 1975; and
- (c) are not used in a location where they are exposed to heated air or radiation from heat sources that may cause the exposed surface to exceed a temperature of 250°F.

Joint tape

6.2.4.5. Tape used for sealing joints in air ducts, plenums and other parts of air duct systems shall meet the flame-resistance requirements for fabric in ULC S109 1969, "Standard for Flame Tests of Flame-Resistant Fabrics and Films", as revised to 1 May, 1975.

Coverings
and linings

6.2.4.6.(1) Coverings, linings and associated adhesives and insulation of air ducts, plenums and other parts of air duct systems shall be of noncombustible material when exposed to heated air or radiation from heat sources that would result in the exposed surface exceeding a temperature of 250°F.

(2) When combustible coverings and linings, including associated adhesives and insulation, are used they shall have a flame-spread rating of not more than 25 on any exposed surface or any surface that would be exposed by cutting through the material in any direction, and a smoke-developed classification of not more than 50, except that the outer covering of ducts, plenums and other parts of air duct systems used within an assembly of combustible construction may have an exposed surface flame-spread rating of not more than 75 and may have a smoke-developed classification greater than 50.

(3) Combustible coverings and linings in Sentence (2) shall not flame, glow, smoulder or smoke when tested in accordance with the method of test ASTM C411-61, (1967), "Hot-Surface Performance of High-Temperature Thermal Insulation" at a temperature of 250°F. as revised to 1 May, 1975.

(4) Combustible coverings and linings of ducts, including associated adhesives and insulation, shall be interrupted at the immediate area of operation of heat sources in a duct system such as electric resistance heaters or fuel-burning heaters or furnaces, and where the duct penetrates a fire separation.

(5) Linings of ducts shall be installed so that they will not interfere with the operation of fire dampers, fire stop flaps and other closures.

Underground
ducts

6.2.4.7. Underground ducts shall be constructed to provide interior drainage and shall not be connected directly to a sewer.

6.2.4.8.(1) The clearances from combustible material of supply plenums, supply ducts, boots and registered boxes of heating systems shall conform to the requirements of Subsection 9.34.3. Clearances

(2) Public corridors shall not be used as return or exhaust plenums for a heating, ventilating or air-conditioning system.

6.2.4.9.(1) Fire dampers shall conform to the requirements of Articles 3.1.7.1. and 3.5.1.2. and to this Article. Fire dampers

(2) Fire dampers shall be arranged to close automatically upon the operation of a fusible link conforming to ULC S505 1974, 'Fusible Links for Fire-Protection Service,' as revised to 1 May, 1975, or other similar heat or smoke actuated device and such device shall,

(a) be located where it is readily affected by an abnormal rise of temperature in the duct; and

(b) have a temperature rating approximately 50°F above the maximum temperature that would exist in the system either when it is in operation or shut down.

(3) Fire dampers shall be installed in the plane of the fire separation so as to stay in place should the duct be dislodged during a fire.

(4) Fire dampers tested in the vertical or horizontal position shall be installed in the manner in which they were tested.

(5) A tightly fitted access door shall be installed for each fire damper to provide access for the inspection of the damper and resetting of the release device.

6.2.4.10—REVOKED by O. Reg. 445/80, s. 1.

6.2.4.11.(1) Except as provided in Sentence (2), exhaust ducts of non-mechanical ventilating systems serving separate rooms or spaces shall not be combined. Exhaust ducts

(2) Exhaust ducts of non-mechanical ventilating systems serving similar occupancies may be combined immediately below the point of final delivery to the outside, such as at the base of a roof ventilator.

(3) Exhaust ducts of ventilating systems shall have provision for the removal of condensation where this may be a problem and the exhaust outlet shall be designed to prevent back draft under wind conditions.

(4) Except as provided in Sentence (6), exhaust ducts serving rooms containing water closets, urinals, bidets, showers or slop sinks shall be independent from exhaust ducts serving other areas of the building and the exhaust air provided shall be not less than 50 cfm for each of the above fixtures.

(5) Except as provided in Sentence (6), exhaust ducts serving rooms containing residential cooking equipment shall be independent from exhaust ducts serving other areas of the building.

(6) Two or more exhaust systems in Sentences (4) and (5) may be interconnected or connected with exhaust ducts serving other areas of the building, provided the connections are made at the inlet of an exhaust fan and all interconnected systems are equipped with suitable back pressure devices to prevent passage of odours from one system to another when the fan is not in operation.

(7) Where exhaust ducts containing air from heated spaces pass through or are adjacent to unheated spaces, the ducts shall be insulated to prevent moisture condensation in the duct.

**Air
recirculation**

6.2.4.12. In residential occupancies sleeping rooms occupied separately (and not as suites), suites or dwelling units shall not have air duct systems that allow air to be circulated from such rooms, suites or dwelling units to other rooms, suites or dwelling units or to public corridors.

Make-up air

6.2.4.13.(1) In ventilating systems that exhaust air to the outdoors, provision shall be made for the admission of a supply of make-up air in sufficient quantity so that the efficiency of the exhaust system is not adversely affected.

Air openings

(2) Supply, return and exhaust air openings in rooms or spaces in buildings when located less than 7 ft above the floor, shall be protected by a substantial grille having openings of a size that will not allow the passage of a 1/2-in. diameter sphere.

(3) Outdoor air intakes and exhaust outlets at the building exterior shall be designed or located so that the air entering the building system will not contain more contaminants than the normal exterior air of the locality in which the building is situated.

(4) Exterior openings for outdoor air intakes and exhaust outlets shall be shielded from the entry of snow and rain and shall be fitted with corrosion-resistant screens of mesh not larger than 1/2 in., except where climatic conditions may require larger openings. Such screens shall be accessible for maintenance.

Air filters

6.2.4.14.(1) Air filters for air duct systems shall conform to the requirements for Class 1 and Class 2 air filter units when subjected to the flame-exposure and spot-flame tests of ULC-S111 1970, "Standard for Air-Filter Units", as revised to 1 May, 1975.

Air washers

(2) The filter and water evaporation medium of every air washer and evaporative cooling section enclosed within a building shall be made of noncombustible material and sumps for such sections shall be constructed and installed so that they can be flushed and drained.

**Evaporative
cooling
equipment**

(3) Evaporative cooling sections or towers of combustible material located on or outside buildings shall have a clearance of at least 40 ft from sources of ignition such as chimneys or incinerators when the tower exterior construction is noncombustible, and a clearance of at least 100 ft when the tower exterior construction is combustible.

(4) Evaporative cooling sections or towers, the main structure of which exceeds a volume of 2,000 cu ft, shall comply with the requirements of NFPA 214-1971, "Water-cooling Towers", as revised to 1 May, 1975.

**Electrostatic
filters**

(5) Electrostatic-type filters when used shall be installed to ensure that the electric circuit is automatically de-energized when access doors are opened and facilities for flushing and drainage shall be provided where the filters are designed to be washed in place.

**Odour removal
equipment**

(6) When odour removal equipment of the adsorption type is used it shall be,

- (a) installed to provide access so that the adsorption material can be reactivated or renewed; and
- (b) protected from dust accumulation by air filters installed on the inlet side.

6.2.4.15.(1) Fans for heating, ventilating and air-conditioning systems shall be located and installed so that their operation,

- (a) does not adversely affect the draft required for proper operation of fuel-fired appliances; and
- (b) does not allow the air in the air duct system to be contaminated by air or gases from the boiler room or furnace room.

(2) Fans and associated air handling equipment such as air washers, filters and heating and cooling units when installed on the roof or otherwise outside the building, shall be of a type designed for outdoor use.

(3) Exposed drive assemblies and openings into fan housings shall be protected with substantial metal screens or gratings to prevent accidents.

Subsection 6.2.5. Heating Appliances

6.2.5.1.(1) Fuel-fired heating appliances shall be located, enclosed, or separated from the remainder of the building in conformance with Section 3.5., and

Enclosures
and
separation

(a) No roof top heating appliance shall be installed within 10 ft of any other ventilation openings;

Outdoor
installation
of appliances

(b) Outdoor rooftop heating appliances serving residential buildings and assembly buildings such as schools shall be mounted on a pad not less than 2 in. thick, and extending not less than 36 in. beyond the furthestmost horizontal projection of the appliance in any direction, such pad shall be constructed of reinforced concrete, or other similar materials having an equivalent fire resistance and all ducts breaching this pad shall be equipped with fire dampers.

(2) Heating appliances using oil, gas or electrical energy shall be installed,

Appliances
using oil, gas
or electricity

(a) RESERVED

(b) to ensure that there is no damage to piping or equipment from possible movements of the building structure.

(3) Heating appliances using solid fuel shall be connected to a chimney directly or by a flue pipe or breeching conforming to Subsection 6.2.8.

Chimney
connection

BOILERS AND FURNACES USING SOLID FUEL

6.2.5.2. RESERVED

6.2.5.3. Boilers and furnaces using solid fuel shall be installed in a room or space having,

(a) a volume sufficiently large to permit accessibility to the appliance and to provide clearances as required in Article 6.2.5.5.; and

(b) permanent opening or openings providing an area of at least 1½ sq in. per 1,000 Btu per hr (293.1 W) input, connecting with the outdoors or with some space that freely connects with the outdoors.

6.2.5.4.(1) Except as provided in Sentences (2) to (6), every boiler and furnace using solid fuel shall be mounted,

Mounting

(a) on the ground;

(b) on a concrete floor; or

(c) on any type of floor that is protected by two courses of 4-in. thick hollow masonry units arranged so that the hollow cores in the two courses are at right angles to each other and will permit air circulation from side to side.

(2) A solid-fuel-fired boiler or furnace of a type in which flame or hot gases do not come in contact with its base may be mounted on any type of floor when,

(a) the floor is protected with at least 4 in. of hollow masonry units covered with sheet metal at least 0.022 in. thick; and

(b) the masonry units are arranged so that the hollow cores will permit air circulation through them.

(3) Except as provided in Sentence (6), a solid-fuel-fired forced air furnace may be mounted on any type of floor provided the blower compartment,

- (a) occupies the entire area beneath the combustion chamber and is at least 18 in. in height; and
- (b) has at least one metal baffle between the combustion chamber and the base of the appliance.

(4) Except as provided in Sentence (6), a solid-fuel-fired hot water boiler may be mounted on any type of floor provided the water chamber extends under the whole of the ash pit and combustion chamber, or under the whole of the combustion chamber if there is no ash pit.

(5) Except as provided in Sentence (6), a solid-fuel-fired boiler or furnace may be mounted on any type of floor provided the boiler or furnace,

- (a) is mounted on legs that provide a clear space at least 4 in. high; and
- (b) is of a type in which flame or hot gases do not come in contact with its base.

(6) A floor surface of combustible material beneath a solid-fuel-fired boiler or furnace shall be protected by a layer of sheet metal at least 0.022 in. thick over $\frac{1}{4}$ -in. asbestos or asbestos millboard for a distance of at least 18 in. beyond the appliance on both the firing side and the side where ashes are removed and extending at least 6 in. beyond the appliance on the other sides.

Clearances

6.2.5.5.(1) The minimum clearance between boilers or furnaces using solid fuel and combustible material whether or not such material is covered with noncombustible material shall conform to Table 6.2.5.A. except that where protection is provided as described in Table 6.2.5.B. the clearance shall conform to that Table.

(2) Temperature high limit control shall be installed not more than 10 in. above the top surface or the heat exchanger in a supply plenum that extends at least 12 in. above the top surface of the heat exchanger.

(3) Barometric draft control shall be operated by draft pressure and permanently set to limit the maximum draft to 0.13 in. of water.

(4) The clearances for projecting flue collars shall conform to the clearances for flue pipes in Sentence 6.2.8.9.(5).

(5) The protection in Column 1 of Table 6.2.5.B. shall be applied to the combustible material, unless otherwise specified, and shall cover all surfaces within the distances specified, as minimum clearances in Table 6.2.5.A.

(6) All clearances in Table 6.2.5.B. shall be measured from the outer surface of,

- (a) the appliance; or
- (b) the insulation on the appliance to combustible material whether such material is protected by noncombustible material or not.

TABLE 6.2.5.A.

Forming Part of Article 6.2.5.5.

Minimum Clearances between Combustible Material and Furnaces and Boilers Using Solid Fuel				
Type of Furnace or Boiler	Minimum Clearance, in.			
	Above and Sides of Bonnet or Plenum	Jacket Sides and Rear	Front	Projecting Flue Collar
Automatically stoker fired, forced air furnace, equipped with 250°F temperature high limit control and barometric draft control	6	6	48	6.2.8.9.(5)
Steam boilers limited to 15 psig max.	6	6	48	6.2.8.9.(5)
Hot water boilers limited to 250°F max. of the waterwall type or having a jacket or lining of masonry or other insulating material	6	6	48	6.2.8.9.(5)
Hot water boilers and forced air furnaces not limited to 250°F max.	18	18	48	6.2.8.9.(5)
Steam boilers limited between 15 psig and 50 psig	18	18	48	6.2.8.9.(5)
Steam boilers not limited to 50 psig max. but not over 400,000 Btu/hr rated heat input	18	18	48	6.2.8.9.(5)
Other boilers and forced air furnaces.	36	36	96	36
Column 1	2	3	4	5

TABLE 6.2.5.B.

Forming Part of Article 6.2.5.5.

Minimum Clearances, in., between Combustible Material with Specified Forms of Protection and Furnaces and Boilers Using Solid Fuel				
Minimum Protection	Minimum clearances of 18 in. and 6 in. in Table 6.2.5.A. may be reduced to			
	Above and Sides of Bonnet or Plenum	Jacket Sides and Rear	Above and Sides of Bonnet or Plenum	Jacket Sides and Rear
¼-in. asbestos millboard spaced out 1 in. by noncombustible material	15	9	3	2
0.013-in. sheet metal on ¼-in. asbestos millboard	12	9	3	2
0.013-in. sheet metal spaced out 1 in. by noncombustible material	9	6	2	2
0.013-in. sheet metal on ⅛-in. asbestos millboard spaced out 1 in. by noncombustible material	9	6	2	2
1½-in. asbestos cement covering on heating appliances	9	6	2	1
¼-in. asbestos millboard on 1-in. mineral wool batts reinforced with wire mesh or equivalent	6	6	2	2
0.027-in. sheet metal on 1-in. mineral wool batts reinforced with wire mesh or equivalent	4	3	2	2
¼-in. asbestos cement board or ¼-in. asbestos millboard	18	18	4	4
¼-in. cellular asbestos	18	18	3	3
Column 1	2	3	4	5

CONTROLS AND SAFETY DEVICES

Safety devices

- 6.2.5.6.(1) Every steam and hot water boiler using solid fuel shall be equipped with controls and safety devices in conformance with the applicable provincial regulations as amended and supplemented by this Part.
- (2) Every stoker serving a steam boiler using solid fuel or serving a hot water boiler using solid fuel shall be equipped with the following controls,
- (a) a device for manually stopping the supply of fuel to the stoker located near the entrance to the stoker space;
 - (b) an automatic device for stopping the stoker motor under conditions of,
 - (i) low water level,
 - (ii) failure of a fan providing combustion air,

- (iii) pressure exceeding the design working pressure of a steam boiler or the setting of the pressure relief valve whichever is lower,
- (iv) pressure exceeding the design working pressure of a hot water boiler,
- (v) temperatures exceeding the design working temperature of a hot water boiler or the setting of the temperature relief valve whichever is lower; and

(c) a device for maintaining a minimum fire; and

(d) at least one automatic control to regulate or control the normal operation of the stoker.

6.2.5.7.(1) Every forced-air furnace using solid fuel and equipped with a mechanical draft fan for the supply of combustion air shall be equipped with a limit control to stop the mechanical draft fan when the temperature in the furnace supply plenum exceeds 250°F.

Forced air
furnace,
safety devices
and controls

(2) Every hand-fired forced-air furnace using solid fuel and operating on natural draft shall be equipped with,

(a) a barometric draft control located in the flue pipe downstream from the check damper and permanently set to limit the draft to a maximum of 0.13 in. water or to the maximum draft for which the furnace is designed, whichever is lower; and

(b) a temperature combustion regulator to control the rate of combustion and to prevent the temperature in the furnace supply plenum from exceeding 250°F,

(i) an electric damper controller of the spring-loaded type, which will close the fire damper and open the check damper in case of power failure, may be used for this purpose, and

(ii) such a regulator shall be installed as close to the top of the furnace supply plenum as possible, or at the beginning of the main supply duct.

(3) Every stoker serving a forced-air furnace using solid fuel shall be equipped with the following controls,

Stoker
controls

(a) a device for manually stopping the supply of fuel to the stoker located near the entrance to the stoker space;

(b) an automatic device for stopping the stoker motor under conditions of,

(i) temperature exceeding 250°F in the furnace supply plenum, and

(ii) failure of a fan providing combustion air;

(c) a device for maintaining a minimum fire; and

(d) at least one automatic control to regulate or control the normal operation of the stoker.

(4) Every stoker-fired forced-air furnace using solid fuel shall be provided with an automatic control to operate the circulating fan when the air temperature in the furnace supply plenum exceeds 250°F and where a manually operated switch is installed in the electric circuit serving the circulating fan, it shall be installed so as to de-energize simultaneously the motors of the circulating fan and the stoker.

STOVES, RANGES, SPACE HEATERS AND SERVICE WATER HEATERS USING SOLID FUEL

6.2.5.8.(1) Stoves, ranges, space heaters and service water heaters using solid fuel shall be installed in a room or space sufficiently large to permit accessibility to the appliance and to provide clearances as required in Article 6.2.5.9.

(2) The requirements for the mounting of stoves, ranges, space heaters and service water heaters using solid fuel shall be those in Article 6.2.5.4. for boilers and furnaces of similar type.

6.2.5.9.(1) The minimum clearance between stoves, ranges, space heaters or service water heaters using solid fuel and combustible material whether or not such material is covered with noncombustible material, shall conform to Table 6.2.5.C. except that where protection is provided as described in Table 6.2.5.D. the clearance shall conform to that Table.

(2) The required clearances in Column 3 of Table 6.2.5.C. may be reduced to 18 in. except on the side where there is a fire box located.

(3) All clearances for flue pipes of appliances listed in Table 6.2.5.C. shall conform to the requirements of 6.2.8.9.(5).

(4) The protection in Column 1 of Table 6.2.5.D. shall be applied to the combustible material and cover all surfaces within the distances specified as minimum clearances in Table 6.2.5.C.

(5) All clearances in Table 6.2.5.D. shall be measured from the outer surface of the appliance to combustible material whether protected by noncombustible material or not.

TABLE 6.2.5.C.
Forming Part of Article 6.2.5.9.

Minimum Clearances between Combustible Material and Stoves, Ranges, Space Heaters and Service Water Heaters Using Solid Fuel				
Appliances	Minimum Clearance, in.			
	Top	Sides	Rear	Front
Stoves, ranges and service water heaters without refractory lining	36	36	36	48
Stoves, ranges and service water heaters with refractory lining	36	24	12	48
Space heaters	36	12	12	48
Column 1	2	3	4	5

TABLE 6.2.5.D.

Forming Part of Article 6.2.5.9.

Minimum Clearances, in., to Combustible Material with Specified Forms of Protection For Stoves, Ranges, Space Heaters and Service Water Heaters Using Solid Fuel					
Type of Protection	Where the Minimum Clearance in Table 6.2.5.C. is				
	12 in.	18 in.	24 in.	36 in.	
	Sides and Rear	Sides	Sides	Top	Sides and Rear
¼-in. asbestos millboard spaced out 1 in. by noncombustible material	6	9	12	30	18
0.013-in. sheet metal on ¼-in. asbestos millboard	6	9	12	24	18
0.013-in. sheet metal spaced out 1 in. by noncombustible material	4	6	8	18	12
¼-in. asbestos millboard on 1-in. mineral wool batts reinforced with wire mesh or equivalent	4	6	8	18	12
0.027-in. sheet metal on 1-in. mineral wool batts reinforced with wire mesh or equivalent	2	4	8	18	12
Column 1	2	3	4	5	6

6.2.5.10. RESERVED

FIREPLACES

6.2.5.11. Masonry or concrete fireplaces and factory-built fireplaces shall conform to Section 9.22.

Fireplaces

STORAGE BINS

6.2.5.12.(1) Service pipes passing through a storage bin for solid fuel shall be protected or so located to avoid damage to the pipes.

Storage bins

(2) Except for fuel-thawing pipes, every pipe designed to operate at a temperature of 120°F or more shall be located where fuel cannot be stored in contact with it.

(3) Sewer or drain openings shall not be located under a storage bin for solid fuel.

(4) The floor and walls of a storage bin for solid fuel shall be constructed of noncombustible material.

Construction of fuel bins

(5) Solid fuels shall not be stored where the air temperature in the bin or the surface temperature of any part of the floor or walls is 120°F or more.

6.2.5.13.(1) Every ash storage bin shall be constructed of noncombustible material and where the bin is not covered, the ceiling of the room in which it is located shall be of noncombustible material.

Construction of ash bins

(2) Every opening in an ash storage bin shall be protected by a tight-fitting metal door with metal frame securely fastened to the bin.

INDIRECT SERVICE WATER HEATERS AND UNIT HEATERS

6.2.5.14.(1) Indirect service water heaters for installation within the heat exchanger of a boiler shall be installed to conform to NFPA Fire Codes and The ASHRAE Guide and Data Books.

(2) Where indirect service water heaters are supplied by a cold water line containing a check valve,

Relief
valves

(a) a pressure relief valve shall be installed downstream from the check valve; and

(b) no valve or other closure shall be installed between the relief valve and the heater.

(3) RESERVED

Clearances

6.2.5.15. Every indirect service water heater and unit heater using either steam or hot water as the heating medium shall be installed so as to provide a clearance of at least 1 in. between the appliance and adjacent combustible material and the steam and hot water piping shall be installed to conform to Subsection 6.2.6.

RADIATORS AND CONVECTORS

Radiators
and convectors

6.2.5.16. Every steam or hot water radiator and convector located in a recess or concealed space or attached to the face of a wall of combustible construction shall be provided with a noncombustible lining or backing.

Subsection 6.2.6. Piping for Heating and Cooling Systems

6.2.6.1.(1) Every pipe used in a heating or air-conditioning system, shall be designed for strength and durability.

(2) Non-metallic piping shall not be used in a heating or air-conditioning system unless approved by the chief official.

Expansion and
contraction

6.2.6.2. Every pipe used in a heating or air-conditioning system shall be installed to allow for expansion and contraction due to temperature changes.

Supports

6.2.6.3. Supports for piping in a heating or air-conditioning system shall be designed and installed to conform to ASHRAE Guide and Data Books.

Insulation and
coverings

6.2.6.4.(1) Insulation and coverings on pipes shall be composed of material suitable for the operating temperature of the system to withstand deterioration from softening, melting, mildew and mold.

(2) Insulation and coverings on pipes in which the temperature of the fluid exceeds 250°F,

(a) shall be composed of noncombustible material; or

(b) shall not flame, glow, smoulder or smoke when tested in accordance with the method of test ASTM C411-61, "Hot-Surface Performance of High-Temperature Thermal Insulation," as revised to 1 May 1975, at the maximum temperature to which such insulation or covering is to be exposed in service.

(3) Where combustible insulation is used on piping in a horizontal or vertical service space, the insulation and coverings on such pipes shall have a flame-spread rating throughout the material not exceeding 25 in buildings of noncombustible construction and not exceeding 75 in buildings of combustible construction, except that no flame-spread rating limitation is required when located as described in Clauses (a), (b) and (c) of Sentence (5).

(4) Insulation and coverings on piping located in rooms and spaces other than the service spaces described in Sentence (3) shall have a flame-spread rating not exceeding that required for the interior finish of the room or space, except that no flame-spread rating limitation is required when located as described in Clauses (a), (b) and (c) of Sentence (5).

(5) Where combustible insulation and covering is used on piping in buildings described in Subsection 3.2.6., they shall have smoke developed classification of not more than 50, except where such pipe is,

- (a) located within a concealed space in a wall;
- (b) located in a floor slab; or
- (c) enclosed in a noncombustible raceway or conduit.

(6) Pipes that are exposed to human contact shall be insulated so that the exposed surface does not exceed 160°F.

6.2.6.5. Clearances between combustible material and bare pipes carrying steam or hot water shall conform to Table 6.2.6.A.

TABLE 6.2.6.A.

Forming Part of Article 6.2.6.5.

Steam or Water Temperature, °F	Minimum Clearance, in.
up to 250	½
above 250	1
Column 1	Column 2

6.2.6.6.(1) Where a pipe carrying steam or hot water at a temperature in excess of 250°F passes through a combustible floor, ceiling or wall, the construction shall be protected by a sleeve of metal or other noncombustible material at least 2 in. larger in diameter than the outside diameter of the pipe.

Sleeves

(2) Steam or hot water pipes that pass through a storage space shall be insulated with at least 1 in. of noncombustible material or otherwise protected to prevent direct contact between the surface of the pipe and the material stored.

Pipes in storage spaces

6.2.6.7. Where piping for heating or air-conditioning systems is enclosed in a shaft, the requirements for shafts of Article 3.5.3.1. shall apply.

Pipes in shafts

Subsection 6.2.7. Refrigerating Systems and Equipment for Air Conditioning

6.2.7.1. Fuel-fired appliances for space cooling shall be separated from the remainder of the building in conformance with Section 3.5.

6.2.7.2.(1) RESERVED

(2) Where a cooling unit is combined with a fuel-fired furnace in the same duct system, the cooling unit shall be installed,

Cooling units combined with furnaces

- (a) in parallel with the heating furnace;
- (b) upstream of the furnace, provided the furnace is designed for such application; or
- (c) downstream of the furnace, provided the cooling unit is designed to prevent excessive temperature or pressure in the refrigeration system.

Subsection 6.2.8. Chimneys and Venting Equipment

6.2.8.1.(1) Except as provided in Sentence (2), this Subsection applies to the construction and installation of,

(a) masonry chimneys, concrete chimneys, metal chimneys, factory-built chimneys and chimney flues serving all fuel-fired appliances; and

(b) flue-pipes and breechings serving appliances using solid fuel.

(2) The construction and installation of chimneys serving fireplaces or appliances using gas or oil having a combined total rated heat input of 400,000 Btu per hr (117.24 kW) or less, shall conform to Section 9.21.

(3) RESERVED

(4) Every chimney shall be capable of providing sufficient draft to vent properly the appliance that it serves.

Marking

(5) Every chimney or gas vent for use with an appliance using gas but which is not suitable for appliances using solid or liquid fuel shall be plainly and permanently marked to that effect.

(6) Every chimney or gas vent for use with an appliance using oil but which is not suitable for an appliance using solid fuel shall be plainly and permanently marked to that effect.

Tests

(7) The chief official may require a test of any chimney, gas vent or flue pipe to ensure gas-, smoke- and flame-tightness.

Clearance from windows and doors

(8) The top of every chimney shall be located at least 10 ft above the top of any door or window within a horizontal distance of 50 ft from the chimney.

Height above roof or structure

(9) The top of every chimney shall be at least,

(a) 3 ft above the highest point at which it comes in contact with the roof; and

(b) 2 ft above a roof surface or structure within a horizontal distance of 10 ft from the chimney.

Design and construction

6.2.8.2.(1) Every chimney shall be designed and constructed to withstand the forces due to its weight and to the design wind, temperature and earthquake conditions conforming to the requirements of Part 4.

Foundations

(2) Foundations for chimneys shall be designed and constructed to conform to Section 4.2.

(3) Except for factory-built chimneys, every chimney shall be provided with a cleanout opening at the base of the flue equipped with a metal frame and tightfitting metal door and where the chimney is of a size requiring entry for cleaning, the cleanout opening shall be at least 2 ft by 3 ft.

(4) RESERVED

Access ladders

(5) Access ladders, when used, shall consist of steel or bronze rungs, built into the walks and in the case of external ladders, such rungs shall begin at least from ground level.

RECTANGULAR BRICK MASONRY CHIMNEYS**Masonry units**

6.2.8.3.(1) Brick and mortar for rectangular brick masonry chimneys shall conform to Section 4.4., except that fireclay brick shall be laid with fireclay mortar conforming to ASTM C105-47 (1971), "Ground Fireclay as a Refractory Mortar for Laying up Fireclay Brick", as revised to 1 May, 1975, or with other mortar compatible for use with fireclay brick.

- | | |
|--|------------------------------|
| <p>(2) Every rectangular brick masonry chimney shall be lined with,</p> <p>(a) chimney liners of clay conforming to ASTM C315-56, (1972) "Clay Flue Linings"; as revised to 1 May, 1975;</p> <p>(b) fireclay refractory brick conforming to the following appropriate standard:</p> <p style="padding-left: 40px;">ASTM C315-56 (1972), "Clay Flue Linings",</p> <p style="padding-left: 40px;">ASTM C64-72, "Refractories for Incinerators and Boilers", as revised to 1 May 1975;</p> <p>(c) hard burned lining brick conforming to ASTM C279-54 (1972), "Specification for Chemical-Resistant Masonry Units," as revised to 1 May, 1975; or</p> <p>(d) metal having durability and resistance to corrosion and heat at least equivalent to 0.012-in. thick stainless steel, provided the intended flue gas temperature does not exceed 1,000°F.</p> | <p>Liners</p> |
| <p>(3) Every rectangular brick masonry chimney shall be constructed so that,</p> <p>(a) the chimney lining is installed as the surrounding masonry is constructed;</p> <p>(b) the chimney lining extends from a point at least 2 ft below the lowest point of a flue pipe connection, to at least the top of the chimney cap; and</p> <p>(c) chimney caps and flashing at junctions with adjacent construction conform to Part 9.</p> | <p>Construction</p> |
| <p>(4) Two or more flues in a rectangular brick masonry chimney shall be separated by partitions of at least,</p> <p>(a) 3 in. of solid unit masonry when clay chimney liners are used; or</p> <p>(b) 3½ in. of fire-brick when a fire-brick lining is used.</p> | <p>Partition</p> |
| <p>(5) A masonry chimney may be corbelled, provided,</p> <p>(a) the wall from which the chimney is corbelled is at least 12 in. thick;</p> <p>(b) the corbelling does not project more than 6 in.;</p> <p>(c) the chimney is not supported on a cavity wall or a wall made of hollow units; and</p> <p>(d) no brick projects more than 1 in. beyond the brick immediately below.</p> | <p>Corbelling</p> |
| <p>(6) The clearance between masonry chimneys and combustible framing shall be at least 2 in. for interior chimneys and ½ in. for exterior chimneys.</p> | <p>Clearances</p> |
| <p>(7) The clearance between a cleanout opening for a masonry chimney and combustible material shall be at least 6 in.</p> | |
| <p>(8) Spaces between chimneys and floor or ceiling assemblies shall be firestopped with noncombustible material and where such assemblies have wood framing members the firestopping shall not exceed 1 in. in depth.</p> | <p>Fire-stopping</p> |
| <p>(9) The clearance between masonry chimneys and flooring shall be at least ½ in.</p> | <p>Clearance to flooring</p> |
| <p>(10) Wood trim shall be separated from masonry chimneys by at least ⅛ in. of asbestos, asbestos millboard or other noncombustible material.</p> | <p>Wood trim</p> |

RADIAL BRICK MASONRY CHIMNEYS

- | | |
|--|----------------------|
| <p>6.2.8.4.(1) Radial brick used in the construction of a radial brick chimney shall be acid resistant and shall conform to Type I-B, C, D or E brick in CSA A82.1-1965, "Burned</p> | <p>Masonry units</p> |
|--|----------------------|

Clay Brick", as revised to 1 May, 1975, and shall be cut radially with curved inner and outer faces conforming closely to the circular and radial lines of the finished chimney.

Mortar

(2) Mortar used in the construction of a radial brick chimney shall consist of a mixture of portland cement, lime and sand conforming to Section 4.4 in the proportion of 1 part cement, 2 parts lime and not less than 5 parts sand by volume.

Fireclay mortar

(3) Fireclay brick shall be laid up with fireclay mortar, conforming to ASTM C105-47 (1971), "Ground Fireclay as a Refractory Mortar for Laying Up Fireclay Brick", as revised to 1 May, 1975, or other mortar compatible for use with fireclay brick.

Linings

(4) Every radial brick masonry chimney shall be lined with a material suitable for the temperature and corrosion conditions to be encountered in service.

Construction

(5) A radial brick chimney may be constructed without the masonry outer shell provided,

(a) the chimney is contained within a noncombustible shaft or structure protecting it from the weather;

(b) the lining is laid up with fireclay mortar conforming to ASTM C105-47(1971), "Ground Fireclay as a Refractory Mortar for Laying Up Fireclay Brick", as revised to 1 May, 1975.

Caps and ladders

(6) Every radial brick chimney shall be provided with,

(a) a chimney cap of cast iron or reinforced concrete to protect the top of the chimney and lining; and

(b) an access ladder conforming to Sentence 6.2.8.2.(5).

REINFORCED CONCRETE CHIMNEYS**Design and construction**

6.2.8.5.(1) The design and construction of reinforced concrete chimneys shall conform to Section 4.5 and to recognized Engineering Handbooks.

Linings

(2) Every reinforced concrete chimney shall be lined with material suitable for the temperature and corrosion conditions to be encountered in service.

Caps and ladders

(3) Reinforced concrete chimneys shall be provided with a chimney cap conforming to Sentence 6.2.8.4.(6), and an access ladder conforming to Sentence 6.2.8.2.(5).

METAL CHIMNEYS

6.2.8.6.(1) Except as provided in Sentence (2) every metal chimney shall be designed and constructed to conform to Section 4.2.

Supports

(2) A metal chimney may be supported by noncombustible material provided,

(a) the supports are independent of the appliance it serves; and

(b) the supports have at least a 4-hr fire-resistance rating.

(3) The fire-resistance rating required for the supports described in Sentence (2) need not apply below the floor of the room containing the appliance.

Metal

(4) The thickness of metal in every metal chimney shall be at least 0.127 in. and shall be adequate to resist all stresses.

Corrosion protection

(5) A metal chimney shall be constructed of,

(a) corrosion-resistant alloy;

(b) galvanized metal, provided the design temperature of the flue gases entering the chimney does not exceed 600°F; or

- (c) other metal, provided the exterior of the chimney is painted with a paint to protect it against corrosion.
- (6) Joints of every metal chimney shall be riveted, bolted or welded and such joints shall be at least as corrosion resistant as the sheets or plates so joined. Joints
- (7) Every metal chimney in which the design temperature of the flue gases entering the chimney is greater than 1,000°F shall be lined with at least 4½ in. of firebrick set in fireclay mortar and other suitable refractory lining providing equivalent temperature protection may be used and such lining shall extend at least 25 ft above the flue pipe or breeching connection and to a point where the flue gas temperature is not more than 1,000°F. Lining
- (8) The minimum clearance between an exterior metal chimney and, Clearances for exterior chimneys
- (a) combustible material shall be 3 ft;
- (b) an opening in a wall or a means of egress shall be 6 ft; and
- (c) a masonry or concrete wall shall be 4 in.
- (9) Except as provided in Sentence (10), every interior metal chimney shall have a clearance of at least 3 ft to combustible material within the storey in which the heating appliance is contained. Clearances for interior chimneys
- (10) Where a metal chimney passes through a combustible roof assembly, the clearance between the chimney and the nearest combustible material may be reduced to 12 in. provided the metal chimney is guarded by a metal thimble extending at least 9 in. above and 9 in. below the roof construction and such thimbles shall have double cylindrical walls with a ventilated space between the walls and between the metal chimney and thimble, and the clearance between the metal thimble and combustible material shall be at least 6 in.
- (11) Every interior metal chimney that passes through more than one storey or through an attic space shall be enclosed above the room in which the heating appliance is located by a noncombustible fire separation extending through the roof having a fire-resistance rating of at least 4 hr and such fire-resistance rating shall apply to the enclosure only and not to its supporting structure. Enclosures
- (12) The space between the enclosing fire separation and the metal chimney shall be, Enclosure spaces
- (a) sufficient to permit examination and repair of the chimney;
- (b) ventilated to the outside air at the top; and
- (c) provided with suitable air inlets below the required fire separation.

FACTORY-BUILT CHIMNEYS

6.2.8.7. Every factory-built chimney shall conform to ULC-S604-1963, "Chimneys, Factory-built", as revised to 1 May, 1975.

CHIMNEY FLUES

- 6.2.8.8.(1) A chimney flue serving a fuel-fired appliance shall, General
- (a) be contained in a chimney;
- (b) not have an offset inclined more than 45 deg. to the vertical; and
- (c) have a cross-sectional area sufficient to vent the appliance which it serves in accordance with ULC Standards, ULI Standards, NFPA Fire Codes and ASHRAE Guide and Data Books.

- Cross-section proportion
- Multiple connections
- (2) The width of a rectangular or oval chimney flue shall be at least $\frac{2}{3}$ its larger dimension.

(3) A chimney flue serving a fireplace or incinerator shall not serve any other fuel-fired appliance.

(4) Two or more fuel-fired appliances, other than fireplaces or incinerators, may be connected to the same chimney flue provided,

(a) adequate draft (negative flue outlet pressure) is maintained at each appliance;

(b) every appliance is equipped with individual draft control, to maintain the over-fire draft (over-fire pressure) for which the appliance is designed;

(c) the flue pipes or breechings of the appliances are connected directly to a common flue pipe or breeching of adequate cross-sectional area and as close to the chimney as practical, or directly to the chimney flue so that,

(i) where all appliances utilize the same fuel, the flue pipe from the smallest appliance is on top, and

(ii) where different fuels are used, the flue pipe serving a gas-fired appliance is on top, that serving an oil-fired appliance is in the middle and that serving a solid-fuel fired appliance is at the bottom;

(d) the chimney flue is capable of venting the flue gas by natural draft when all appliances are firing at the same time or a mechanical flue gas exhauster (draft inducer) is used.

(5) RESERVED

FLUE PIPES AND BREECHINGS FOR APPLIANCES BURNING
SOLID FUELS

- Material
- Minimum metal thickness
- 6.2.8.9.(1) A flue pipe or breeching serving one or more solid-fuel-burning appliances shall be constructed of steel, masonry or other noncombustible material with a melting point of not less than 2,000°F.

(2) Galvanized steel may be used provided the design temperature of the flue gas does not exceed 600°F. Tile shall not be used as a flue pipe.

(3) The thickness of metal used in steel flue pipes for solid-fuel-burning appliances shall conform to Table 6.2.8.A.

TABLE 6.2.8.A.

Forming Part of Sentence 6.2.8.9.(2)

Diameter of Flue pipe, in.	Minimum Thickness of Metal, in.	
	Uncoated Steel	Galv. Steel
Below 6	0.016	0.016
6 to 8 (incl.)	0.021	0.019
Over 8 to 10	0.027	0.024
Over 10 to 12	0.033	0.030
Over 12 to 16	0.043	0.036
Over 16	0.067	0.058
Column 1	2	3

- (4) A flue pipe or breeching serving a solid-fuel-fired appliance shall not pass through, Passage restrictions
- (a) an attic or roof space, closet or similar concealed space; or
 - (b) a floor, ceiling, wall or partition of combustible construction.
- (5) A flue pipe or breeching serving a solid-fuel-fired appliance shall, Installation
- (a) be securely supported by metal or other noncombustible supports;
 - (b) be as short and straight as possible;
 - (c) be designed and constructed to allow for expansion;
 - (d) be sloped upward toward the chimney at least $\frac{1}{4}$ in. per ft of horizontal run;
 - (e) have a cross-sectional area not less than,
 - (i) the area of the flue outlet of the appliance served by a flue pipe, or
 - (ii) the combined area of the flue outlets of all the appliances served by a breeching;
 - (f) enter a chimney through a metal thimble or masonry flue ring;
 - (g) not extend into the chimney flue; and
 - (h) have a tight connection with the chimney.
- (6) The minimum clearance between a flue pipe or breeching serving a solid-fuel-fired appliance and combustible material whether or not such material is covered with non-combustible material shall be 18 in. except that where protection is provided as described in Table 6.2.8.B. the clearance shall conform to that Table. Clearance
- (7) The protection in Column 1 of Table 6.2.8.B. shall be applied to the combustible material, unless otherwise specified, and shall cover all surfaces within 18 in. of the flue pipe or breeching.
- (8) All clearances from flue pipes and breechings in Table 6.2.8.B. shall be measured from the outer surface of,
- (a) the flue pipe or breeching; or
 - (b) the protective covering on the flue pipe or breeching to combustible material whether such material is protected by noncombustible material or not.

TABLE 6.2.8.B.

Forming Part of Sentence 6.2.8.9.(5), (6) and (7)

Minimum Thickness and Type of Protection	Minimum Clearance with Protection, in.
¼-in. asbestos millboard spaced out 1 in. by noncombustible material.	12
0.013-in. sheet metal on ¼-in. asbestos millboard.	12
0.013-in. sheet metal spaced out 1 in. by noncombustible material.	9
0.013-in. sheet metal on ⅛-in. asbestos millboard spaced out 1 in. by noncombustible material.	9
1 ½-in. asbestos-cement or mineral wool covering on flue pipe or breeching.	9
0.027-in. sheet metal on 1 in. mineral wool batts reinforced with wire mesh or equivalent.	3
Column 1	Column 2

SECTION 6.3 INCINERATORS

Subsection 6.3.1. General

6.3.1.1. The design, construction, installation and alteration of every indoor incinerator shall conform to NFPA 82-1972 "Incinerators and Rubbish Handling", as revised to 1 May, 1975.

Subsection 6.3.2. Installation

Chimney flue

6.3.2.1.(1) Every incinerator shall be served by a chimney flue conforming to Article 6.2.8.8.

Separation

(2) A chimney flue serving a flue-fed-incinerator shall serve no other appliance.

6.3.2.2. Rooms containing incinerators shall be separated from the remainder of the building in accordance with Subsection 3.5.2.

6.3.2.3. Every incinerator shall be equipped with a spark arrestor as specified in NFPA 82-1972 "Incinerators and Rubbish Handling", as revised to 1 May, 1975.

SECTION 6.4 ELECTRICAL EQUIPMENT, INSTALLATIONS AND WIRING

Subsection 6.4.1. RESERVED

SECTION 6.5 ELEVATORS, DUMBWAITERS AND ESCALATORS

Subsection 6.5.1. RESERVED

Subsection 6.5.2. Elevators and Dumbwaiters

6.5.2.1. Elevator and dumbwaiter hoistways shall conform to Subsections 3.2.6. and 3.5.3.

6.5.2.2.(1) Except where a building has been designed to control smoke movement, every elevator or dumbwaiter shaft shall have an opening to the outdoors at the top of the shaft having an area at least 10 per cent of the cross-sectional area of the shaft and such openings may be permanently open if protected against the weather.

(2) Where the openings referred to in Sentence (1) are not permanently open, they shall be enclosed with a covering that can be opened manually from the outside and open automatically by means of a fusible link and such fusible link shall have a temperature rating approximately 50°F above the maximum temperature that would normally be encountered in the shaft.

6.5.2.3. Every machinery room for elevators and dumbwaiters shall conform to Subsection 3.5.2.

6.5.2.4.(1) RESERVED

(2) Sidewalk-type elevators shall not be installed in a public thoroughfare.

Sidewalk type

Subsection 6.5.3. Escalators

6.5.3.1.(1) Where escalators serve as a required means of egress, they shall conform to Part 3.

(2) Enclosures for escalators shall conform to Part 3.

(3) The escalator machinery shall be separated from the remainder of the building by a fire separation conforming to Subsection 3.5.2.

SECTION 6.6 SERVICE SHAFTS AND CHUTES

Subsection 6.6.1. RESERVED

Subsection 6.6.2. Linen and Refuse Chutes

6.6.2.1. Linen and refuse chutes shall be enclosed in a shaft conforming to Subsection 3.5.3. and shall be internally smooth, impervious to moisture, corrosion resistant and noncombustible.

Linen and
refuse chutes

6.6.2.2. Every intake opening for a chute shall be not greater in area than 60 per cent of the cross-sectional area of the chute.

6.6.2.3. Intake openings for linen and refuse chutes shall be fitted with closures designed to close automatically and latch after use.

6.6.2.4.(1) Every interior linen or refuse chute shall,

(a) be vented through the roof by means of a labelled factory-built chimney conforming to ULC S.604-1963 "Chimneys, Factory-built" as revised to 1 May, 1975 or by a similar means of equal performance and such venting means shall be properly isolated from the structure where it passes through the roof and extend at least 3 ft above the roof;

(b) have an area at least 10 per cent of the cross-sectional area of the chute; and

(c) be equipped with a fire shutter that shall open automatically in the event of a fire.

(2) Skylights over chutes shall be,

(a) constructed of noncombustible material or of metal-covered wood framing; and

(b) glazed with glass of no greater thickness than $\frac{1}{8}$ in. or other noncombustible material that can be easily pierced by fire-fighting personnel.

(3) A window in the side of the chute may replace a skylight or shutter provided that,

- (a) the window sill is at least 3 ft above the adjacent roof level, and at least 2 ft above a roof surface or structure within a horizontal distance of 10 ft from the shaft;
- (b) the window or other venting arrangement opens automatically in the event of fire; and
- (c) the window conforms to Subsection 3.2.3.

Refuse
chute
discharge

6.6.2.5. The room or bin into which a refuse chute discharges shall be of sufficient size to contain the refuse between normal intervals of emptying and such room or bin shall be impervious to moisture and shall have a water supply and a floor drain.

SECTION 6.7 FIRE ALARM AND FIRE EXTINGUISHING EQUIPMENT

Subsection 6.7.1. General

6.7.1.1. RESERVED

Protection
from freezing

6.7.1.2. Equipment forming part of a fire protection system that may be adversely affected by freezing temperatures and which is located in unheated areas shall be adequately protected from freezing.

6.7.1.3. All fire alarm and fire protection systems shall be, performance tested upon completion of installation, to the satisfaction of the chief official.

Subsection 6.7.2. Fire Alarm Systems

DESIGN AND INSTALLATION

Installation

6.7.2.1.(1) All local fire alarm systems shall be installed in accordance with CSA Standard B222.0 1974 "Installation Code for Local Fire Alarm Systems", as revised to 1 May, 1975.

(2) Except as provided in Subsections 3.2.4. and 3.2.6. fire alarm systems shall be designed so that the operation of any fire alarm box or automatic fire detecting device will cause the instantaneous operation of all alarm sounding and visual warning devices and such warning devices shall remain in operation until the system is manually shut off.

(3) There shall be no push buttons or toggle switches for drill purposes on a fire alarm system, but key operated devices may be provided for drill purposes.

6.7.2.2. RESERVED.

6.7.2.3. Mechanical Alarm Systems where acceptable shall consist of permanently mounted audible sounding devices which are operated manually and which shall have a distinct sound and be clearly audible throughout the entire building.

Subsection 6.7.3. Standpipe and Hose Systems

STANDPIPES

6.7.3.1.(1) Where standpipe and hose sytems are required by Part 3, they shall be installed progressively to provide fire protection during construction, and shall be kept in such condition that water will be supplied to every hose station on each floor without delay when a fire department pump is connected to the fire department connection at street level.

Installation during construction

(2) During construction the standpipe system need not be connected to a water supply.

(3) Pipes supplying standpipe systems shall be of a size conforming to Table 6.7.3.A.

Size of piping

(3a) Pipe connecting one or more fire hose cabinets to a riser or lateral extension in any single storey shall be of a size conforming to Table 6.7.3.B.

TABLE 6.7.3.A.

Forming Part of Sentence 6.7.3.1.(3)

Size of Building		Minimum Nominal Size of Piping, In.		
Building Height(1)	Building Area	Standpipe Risers(3)	From Street Main to Standpipe Riser	Lateral Extensions(2)
Less than 75 ft. or 6 Storeys	Less than 40,000 sq. ft.	2	2	2
	More than 40,000 sq. ft.	4	4	4
Over 75 ft. or 6 Storeys	Unlimited Area	6	6	6
Column 1	2	3	4	5

Notes to Table 6.7.3.A.:

- (1) A Penthouse that exceeds 500 sq. ft. in floor area shall be considered a storey or 12 ft. in height of building for the purpose of this Table.
- (2) Lateral Extension means piping from the first riser to the last riser.
- (3) Riser means vertical pipe supplying water to one or more fire hose cabinets.

TABLE 6.7.3.B.

Forming Part of Sentence 6.7.3.1.(3a)

PIPING RUNOUTS TO FIRE HOSE CABINETS CONTAINING 2½ IN. HOSE CONNECTIONS		
Riser Size, in.	Number of Cabinets	Minimum Size of Piping, in.
4	1	3
	2 or more	4
6	1	3
	2 or 3	4
	4 or more	6
Column 1	2	3

(4) Buildings over 275 ft in building height shall be served by at least two sources of water supply from a public water system.

(5) RESERVED

HOSE STATIONS

Location

6.7.3.2.(1) Hose stations shall be readily accessible and hose valves shall be not more than 5 ft above the floor.

(2) Hose stations shall be located so that every portion of the building can be reached by a hose stream and is within 10 ft of a hose nozzle when the hose is extended.

(3) Required hose stations shall be located outside of normal work areas near exits from floor areas.

(4) A hose station on one side of horizontal exit shall be considered to serve only the floor area on that side of the exit.

Valves

(5) A hose valve and connection shall be provided at every hose station.

(6) Suitable means shall be provided to prevent the pressure on the hose exceeding 90 psig when flowing.

(7) Hose valves shall be provided with suitable connection installed so that leakage past the valve seat will be carried off and prevented from entering the fire hose.

(8) Every hose station shall be equipped with a listed hose rack fitted with not more than 75 ft of listed 1½-in. fire hose.

(9) The hose at hose stations shall be equipped with a shut-off type adjustable spray to straight stream nozzle.

(10) Where a 2½ inch hose valve is provided in a hose station, it shall be equipped with a cap and chain for the use of a fire department.

(11) No municipality shall have, and no person shall have in connection with any fire apparatus or fire-fighting equipment that is installed on any premises, couplings for 1½-in. fire hose or other fittings used in connection with such couplings that are not of the iron pipe standard thread of 11½ threads an inch and that do not conform to the standards and specifications for such couplings and fittings contained in the Canadian Standards Association Standard B89-1954 "1½-Inch Fire Hose Couplings, Screw Thread and Tail Piece Internal Diameters" as revised to 1 May, 1975.

(12) Standpipes and hoses shall be installed for each roof inclosure exceeding 500 sq. ft. in floor area.

HOSE CABINETS

6.7.3.3.(1) Hose rack, nozzle, fire hose and valves shall be in a hose cabinet except for Group F occupancies. Hose cabinets

(2) Hose cabinets shall be of sufficient size to contain the equipment mentioned in Sentence (1) and a listed fire extinguisher.

(3) Every hose cabinet shall be provided with a glass viewing panel at least 3/16 in. thick constituting at least 70 per cent of the door area.

(4) Every hose cabinet shall be located so that its door when fully open will not obstruct any doorway or corridor.

(5) Doors to hose cabinets shall have no locking devices, except that locking devices and solid doors conspicuously identified may be utilized in areas where a person or persons are under legal restraint.

WATER SUPPLIES

6.7.3.4.(1) The water supply for every standpipe and hose system shall be from a public water system, gravity tank, pressure tank, automatic fire pump, or combinations thereof, and

(a) standpipe system shall be wet and directly connected to the source of the water supply;

(b) where a pump is necessary to ensure the required flow and pressure, it shall be operated automatically to stop and start on pressure rise and fall; and

(c) the pressure setting shall ensure delivery of 50 psig to the highest and most remote hose connection.

(2) The water supply for a standpipe system serving only a 1½ inch hose connection shall be sufficient to provide a minimum flow of 70 U.S. gpm for at least 30 minutes at a pressure of at least 50 psig measured at the two highest and most remote hose valves or hose connections, provided that no less than 35 U.S. gpm can be supplied from each of the two outlets simultaneously.

(3) An electrically supervised control valve located inside a building or an indicator post valve located outside shall be provided for every water supply facility and installed in an accessible location. Water supply control

(4) Check valves shall be installed to prevent water flow from a standpipe system through the fire department pumper connection and every water supply system.

(5) Where a water supply serves both a standpipe system and a system serving other equipment, control valves shall be provided so that either system can be shut off independently and the control valve for the standpipe system shall be electrically supervised.

(6) The standpipe connection shall be upstream of any water meter. Connections

(7) Standpipe risers shall,

(a) be cross-connected at the bottom; and

(b) where supplied by gravity tanks or pressure tanks, they shall also be cross-connected at the top and a check valve may if necessary be provided at the base of every riser to prevent circulation.

(8) Sufficient electrically supervised control valves shall be provided to permit shutting off every standpipe riser without interrupting the water supply to other risers. Control valves

- (9) Every electrically supervised control valve controlling a water supply to a standpipe system shall be left in its normal operating position and shall be clearly identified.
- (10) Pressure gauges,
- (a) shall be installed,
 - (i) at every water supply connection,
 - (ii) at the highest point of every standpipe riser, and
 - (iii) before and after all pumps;
 - (b) shall be connected by at least $\frac{1}{4}$ in. diameter pipe; and
 - (c) shall be equipped with a shut-off valve.
- (11) The standpipe system for buildings more than 6 storeys in building height or 75 ft. above grade but less than 275 ft. in building height shall,
- (a) be equipped with double valved fire hose cabinets having one $1\frac{1}{2}$ inch and one $2\frac{1}{2}$ inch hose valves;
 - (b) have pumping capacity sufficient to supply a minimum flow of 70 U.S. gpm for at least 30 minutes at a minimum discharge pressure of 50 psig to the two highest and most remote $1\frac{1}{2}$ inch hose valves, provided that not less than 35 U.S. gpm can be supplied from each of the two outlets simultaneously;
 - (c) have provision via the Fire Department siamese connection to supply 500 U.S. gpm to the two highest and most remote $2\frac{1}{2}$ inch hose valves, provided that not less than 250 U.S. gpm can be supplied from each of the two outlets simultaneously.
- (12) The standpipe system for buildings in excess of 275 feet in building height shall,
- (a) be equipped with double valved fire hose cabinets having one $1\frac{1}{2}$ inch and $2\frac{1}{2}$ inch fire hose valves;
 - (b) have pumping capacity sufficient to provide a minimum flow of 500 U.S. gpm for at least 30 minutes at a minimum discharge pressure of 50 psig at the two highest and most remote $2\frac{1}{2}$ inch hose valves, provided that not less than 250 U.S. gpm can be supplied from each of the two outlets simultaneously.
- (13) Only fire-fighting water connections including those allowed under Section 6.7.4. shall be permitted in any standpipe system.
- (14) Where the water main pressure is not adequate, automatic pumping equipment shall be provided for compliance with Sentences (2) and (12).
- (15) In addition to the requirements specified in 6.7.3.1.(4), buildings in excess of 275 feet in building height shall be equipped with water storage capacity at the top of the building to supply a minimum flow of 500 U.S. gpm for at least 30 minutes at a minimum discharge pressure of 50 psig measured at the two highest and most remote hose valves or hose connections, provided that not less than 250 U.S. gpm can be supplied from each of the two outlets simultaneously.
- (16) Means shall be provided by valving to permit maintenance to the pump.
- (17) Buildings in excess of 275 ft. in building height shall be provided with a standby fire pump capable of delivering water as per Sentence (12).
- (18) Fire pumps and controllers supplying water for systems with $2\frac{1}{2}$ -in. connections shall be listed and labelled by the Underwriters' Laboratories of Canada.

FIRE DEPARTMENT CONNECTIONS

6.7.3.5.(1) All standpipe systems shall be served by at least one fire department siamese connection.

(2) Fire department siamese connection shall be,

(a) located on the outside of a building adjacent to a street at least 1 ft and not more than 3 ft above grade; Location

(b) readily accessible to the fire department for the attachment of hose and not more than 150 ft from a hydrant;

(c) of a diameter as specified in Table 6.7.3.A. and provided with two 2½-in. hose connections with female swivel hose couplings having hose threads conforming to sentence 6.7.3.5.(8); and Connection outlets and valves

(d) sufficient clearance must be provided around the couplings to use a standard fourteen in. (14") Fire Department hose spanner for tightening.

(3) Check valves shall be provided in every hose connection except that a two-way hose connection may be provided with a single check valve arranged to shut one outlet when the other is in use.

(4) Shut-off valves shall not be installed in the fire department connection.

(5) An automatic drain valve shall be provided in the fire department connection at its lowest point, between the hose connections and the check valve.

(6) The fire department connection shall be provided with a sign having raised letters at least 1 in. in size, cast in a metal plate or fitting, clearly indicating its intended service and size. Identification

(7) Every fire department connection shall be equipped with a cap or plug to protect the threads and to exclude foreign matter.

(8) No municipality shall have, and no person shall have in connection with any fire apparatus or fire-fighting equipment that is installed on any premises, couplings for 2½-in. fire hose or other fittings use in connection with such couplings that do not have 5 threads an inch and 3⅛ in. outside diameter of the male coupling and that do not conform to the standards and specifications for such couplings and fittings contained in the Canadian Standards Association Standard B89.2-1966 "2½ In. Fire Hose Couplings and Fittings" as revised to 1 May, 1975.

PIPING, FITTINGS AND HANGERS

6.7.3.6.(1) Pipe and tube used in standpipe systems shall,

Design and construction

(a) be designed to withstand a working pressure of not less than 175 psig; and

(b) conform to the following standards as revised to 1 May, 1975,

(i) ASTM A120-72a, "Black and Hot-Dipped, Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses",

- (ii) ANSI Standard B36. 10-1970, "Wrought-Steel and Wrought Iron Pipe,"
- (iii) ASTM B75-73, "Seamless Copper Tube", or
- (iv) ASTM B251-71, "General Requirements for Wrought Seamless Copper and Copper-Alloy Tube".

(2) Brazing alloy for standpipe systems shall conform to AWS Classification BCuP-3 of American Welding Society Specification A5. 8-69, "Brazing Filler Metal", as revised to 1 May, 1975.

(3) Ferrous piping for working pressures,

- (a) up to 300 psig shall be at least Schedule 40 pipe except that Schedule 30 pipe may be used for piping 8" and larger in size; or
- (b) over 300 psig shall be at least Schedule 60 pipe or for sizes not subject to Schedule classification at least "extra-heavy" type.

Fittings

(4) Standpipe fittings shall be at least "extra heavy" type when the pressures may exceed 175 psig.

(5) All pipe connections shall be made by means of threaded, flanged or welding fittings or other means.

(6) Where welded connections are used, welding fittings shall be used.

Hangers

(7) Pipe hangers shall be of a type capable of securely supporting the piping.

Drains

(8) The system shall be provided with drain valves piped to an open drain.

(9) The drain shall be so arranged as to be free from freezing. The drains shall be so arranged and sized so as to,

- (a) allow complete draining of the system for repair; and
- (b) conduct operational tests.

VALVES

Design and construction

6.7.3.7.(1) Valves shall be "Standard weight" for pressures up to 175 psig and shall be "extra heavy" for pressures in excess of 175 psig and shall be listed and labelled by ULC.

(2) Hose valves shall be angle-type.

(3) Valves controlling water supplies to standpipe systems shall be outside-screw-and-yoke type or indicator type.

(4) Check valves shall be of swing check or other design.

(5) All control valves for standpipes systems shall be electrically supervised.

IDENTIFICATION OF PIPING

6.7.3.8. When piping for standpipe and hose systems is identified or colour coded such identification shall conform to CGSB 24-GP-3a (1967) "Code for Identification and Classification of Piping Systems", as revised to 1 May, 1975.

PRESSURE TESTS

6.7.3.9.(1) Every standpipe and hose system, including water supply connections and fire department connections, shall be subject to hydrostatic tests.

Hydrostatic
test

(2) The test pressure shall be at least 50 psig greater than maximum hydrostatic pressure in service, but not less than 200 psig and maintained for at least 2 hours without pressure loss.

(3) All fire department standpipe systems shall be performance tested upon completion of the installation, to the satisfaction of the chief official.

PORTABLE FIRE EXTINGUISHERS

6.7.3.10.(1) Fire extinguishers shall be of a type tested and listed by Underwriters' Laboratories of Canada.

(2) Portable fire extinguishers shall be conspicuously located where they will be readily accessible in the event of fire and to ensure accessibility, they shall be hung on hangers, set on shelves or brackets or placed in an equally accessible position.

(3) Portable extinguishers shall be located throughout the building to conform with NFPA Number 10-1973, "Installation of Portable Fire Extinguishers" as revised to 1 May, 1975.

(4) Vaporizing liquid fire extinguishers containing as the extinguishing agent any of,

- (a) carbon tetrachloride (CTC);
- (b) chlorobromomethane (CBM); or
- (c) methyl bromide (MB),

shall not be installed in any indoor location.

Subsection 6.7.4. Sprinkler Systems

6.7.4.1.(1) Where the installation of sprinklers is required in the building code, they shall be designed, constructed, installed and tested in conformance with NFPA 13-1973, "Installation of Sprinkler Systems", as revised to 1 May, 1975.

(2) Where the building code requires that sprinklers be installed to protect a room, chute or bin as indicated in Sentence 3.3.4.2.(6), Section 3.5.2.6. and Sentence 3.5.3.2.(8) such sprinklers may be supplied with water from the fire standpipe system provided that,

- (a) not more than eight sprinkler heads will be required to protect any room, chute or bin based on a maximum of 130 sq. ft.;
- (b) the standpipe riser is not less than 6 in. in diameter;
- (c) the water supply for the standpipe system, pumping capability and water storage facility, if required, is increased to supply 25 U.S. gpm for each sprinkler head over and above the requirements for the standpipe system; and
- (d) an electrically supervised control valve is installed in the sprinkler main adjacent to the point of connection to the standpipe riser.

(3) Fire department connections for sprinkler systems shall conform to Sentences 6.7.3.5.(2) to 8.

Subsection 6.7.5. Valve Supervision

6.7.5.1. Where standpipe and sprinkler systems control valves are required to be electrically supervised as indicated in Subsections 6.7.3. and 6.7.4. such supervision shall be accomplished by electrically connecting, on a separate circuit, each valve supervisory device attached to a valve, directly to an annunciator located adjacent to but in no way electrically connected to the fire alarm annunciator or annunciators.

6.7.5.2. Power to operate the valve supervision system shall be taken directly from the main source of power supply to the building and where an emergency power supply is required in a building, connected also to the emergency power supply.

SECTION 6.8 VOICE COMMUNICATION LIFE SAFETY SYSTEMS FOR HIGH RISE BUILDINGS**Subsection 6.8.1. General**

6.8.1.1.(1) The voice communication system shall be completely dedicated to fire and life safety use upon activation of the "Master" switch at the central control facility.

(2) Installation shall conform with the requirements of this Section.

Subsection 6.8.2. Coverage

6.8.2.1. Except for Group C major occupancy apartment buildings, where a voice communication system is required in Article 3.2.6.9., the voice communication system shall provide,

- (1) clear and undistorted coverage of all public corridors, lobbies, stairwells, areas of assembly for emergency announcements, and all other areas deemed necessary; and
- (2) A minimum Preset Sound Pressure Level of 85 db or 10 db above the average ambient noise level, whichever is greater, within the area of coverage—Reference 0.0002 microbar.

Subsection 6.8.3. Preannounce Signal

6.8.3.1. The system shall be equipped with a preannounce signal which shall produce a sound pressure level of 91 db or 10 db above the coverage ambient noise level, whichever is greater, within the area of coverage—Reference 0.0002 microbar.

Subsection 6.8.4. Speakers & Speaker Zones

6.8.4.1. A speaker zone shall consist of a number of speakers controlled as a group from the central control facility.

6.8.4.2. A minimum of one speaker zone per floor and one speaker zone for each stairwell shall be provided.

6.8.4.3. Each speaker zone shall have a minimum of two circuits with a minimum of one speaker per circuit.

6.8.4.4. Automatic equipment shall be installed to ensure that a fault in any one circuit does not interfere with the broadcast transmission capability of any other circuit.

6.8.4.5. Speaker in any zone shall be divided equally between the two circuits and the speakers in the circuits shall be staggered to provide equal distribution throughout the speaker zone.

6.8.4.6.(1) Cone speakers shall have the minimum technical requirements,

- (a) of being capable of producing sound pressure level of 94 db at 4 ft. on axis with 1 watt input;

- (b) of power handling capacity of 10 watts minimum;
 - (c) of metal enclosure, acoustically treated or of a gauge to ensure non-resonance at 10 watts output; and
 - (d) of frequency response of 60 hertz to 10 kilohertz.
- (2) Re-entrant horn type speakers shall have the minimum technical requirements,
- (a) of being capable of producing a sound pressure level of 121 db at 4 ft. on axis with 15 watts input;
 - (b) of power handling capacity of 15 watts;
 - (c) of metal construction with a universal swivel mounting bracket; and
 - (d) of frequency response of 275 hertz to 14 kilohertz.

Subsection 6.8.5. Handsets

6.8.5.1. Remote handsets shall be provided on each floor in each exit stairwell.

6.8.5.2. Handsets shall be mounted not less than 3 ft 6 in. and not more than 4 ft 6 in. above the floor.

6.8.5.3.(1) Handsets shall be equipped with a retractable 5 ft coil cord and shall be mounted in protective red enclosures.

(2) Handsets shall be equipped with a noise cancelling transmitter which shall effectively discriminate against sound originating at distances greater than 6 inches from the transmitter.

(3) The handset shall be installed so that the removal of the handset from its cradle shall provide automatic signalling facilities to a central control facility.

(4) The voice quality and operation of the handset shall be at least equal to that of the public telephone system.

(5) The protective enclosures shall normally be locked with capability for automatic unlocking from the central control facility or by a master key.

Subsection 6.8.6. Central Control Facility (Voice Communication System)

6.8.6.1.(1) The voice communication function of the central control facility shall provide,

- (a) master switch to provide priority operation;
- (b) one speaker selection switch per floor or zone with visual indication of switch position;
- (c) all locations call facility under control of one switch;
- (d) hand held close talking microphone with 5 ft coil cord and storage bracket;
- (e) facility to sound preannounce tone;
- (f) facility to silence fire alarm signalling devices during preannounce tone and emergency broadcast with automatic restoration of signals upon completion of broadcast;
- (g) audio amplification both normal and standby for a minimum of 1 watt per cone speaker and 2.5 watts per horn speaker with frequency response peaked for maximum voice articulation;

- (h) audible and visual amplifier failure indication with automatic transfer to standby amplifier;
- (i) one handset selector switch per floor or zone with visual indication of switch position;
- (j) one handset annunciator lamp per floor or zone;
- (k) separate switch for unlocking all remote handset enclosures;
- (l) push to test button for all indicating lights on the console;
- (m) proper identification for all switches and lights;
- (n) trouble indication as required in Article 6.8.7.1.

Subsection 6.8.7. Wiring

6.8.7.1. All wiring shall be continuously supervised with individual "Visual and Audible" trouble indication at the central control facility for each speaker and handset circuit and facility to silence trouble signal.

6.8.7.2. All wiring for voice communication systems shall be installed in Class I metallic raceways and protected in conformance with Sentence 3.2.6.10.(1).

Subsection 6.8.8. Identification

6.8.8.1. All remote handset enclosures shall be identified with permanent white lettering one inch high as follows:

"EMERGENCY FIRE TELEPHONE"

SECTION 6.9 HEALTH CARE FACILITY SYSTEMS

Subsection 6.9.1 Electrical Systems

6.9.1.1. In anaesthetizing locations electrical systems shall be designed, constructed and installed in conformance with CSA Standard Z32.1-1970, "Code for Prevention of Explosions or Electrical Shock in Hospital Operating Rooms", as revised to 1 May, 1975.

Subsection 6.9.2 Medical Gas Systems

6.9.2.1. All medical gas piping systems shall be designed, constructed and installed in conformance with CSA Standard Z305.1-1975, "Nonflammable Medical Gas Piping Systems", as revised to 1 May, 1975.

PART 7 RESERVED

PART 8

SECTION 8.1. DEMOLITION

8.1.1.(1) Subject to subsection 2.5.2. of the building code, this part applies to every building to be demolished.

(2) The structural design characteristics of the building shall be determined before commencement of demolition and such information and the method of demolition to be used shall be included in an application for a permit to demolish a building.

(3) No person shall commence demolition of a building or any part of a building before the building has been vacated by the occupants.

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Table V-C	Maximum Spans for Wood Fink Trusses with 2-in. by 6-in. Bottom Member Size
Table V-D	Maximum Spans for Wood Howe Trusses with 2-in. by 4-in. Bottom Member Size
Table V-E	Maximum Spans for Wood Howe Trusses with 2-in. by 5-in. Bottom Member Size
Table V-F	Maximum Spans for Wood Howe Trusses with 2-in. by 6-in. Bottom Member Size

PART 9 HOUSING AND SMALL BUILDINGS**SECTION 9.1 GENERAL****Subsection 9.1.1. Application**

9.1.1.1.(1) This Part applies to buildings of three storeys or less in building height, having a building area not exceeding 6,000 square feet and that are used or intended to be used for residential (group C), business and personal services (group D), mercantile (group E) and medium and low hazard industrial occupancy (group F, Divisions 2 and 3). This Part applies both to site assembled and manufactured buildings intended for residential occupancy.

(2) Site assembled buildings and manufactured buildings intended for residential occupancy that are constructed in sections wider than fourteen feet shall comply with all the requirements of this Part.

(3) Manufactured buildings intended for residential occupancy that are constructed in sections not wider than fourteen feet shall be designed and constructed to comply with the requirements of CSA Standard Z-240.2.1-1979. "Structural Requirements for Mobile Homes" and CSA Standard Z-240.8.1-1978 "Light Duty Windows".

- 9.1.1.2. Measures to ensure the safety of the public during construction shall conform to the appropriate requirements in Part 8.

Public safety
- 9.1.1.3. Buildings, other than those described in Article 9.1.1.1., are regulated by the appropriate provisions contained in Parts 1, 2, 3, 4, 5, 6, 7 and 8.
- 9.1.1.4. Where a building or a component of a building is assembled off the building site in such a manner that it cannot be inspected on site, off-site inspection shall be provided to ensure compliance with this Regulation.
- 9.1.1.5. The Climatic Information for building design in Ontario described in Section 4.9 shall apply to this Part.

SECTION 9.2 RESERVED

SECTION 9.3 MATERIALS, SYSTEMS AND EQUIPMENT

Subsection 9.3.1. General

- 9.3.1.1. Materials, systems and equipment shall possess the essential properties necessary to perform their intended functions.

Performance
- 9.3.1.2. When required, materials, systems or equipment shall be tested to determine the suitability for their intended use.

Required tests
- 9.3.1.3. Except as provided in Article 9.3.1.5., the test method used to determine the suitability of materials, systems or equipment shall be one that is published by a recognized agency.

Published test methods
- 9.3.1.4. Materials, systems and equipment not specifically described herein, or which vary from the specific requirements in this Part, or for which no recognized test procedure has been established, may be used if it can be shown that the material, system or equipment is suitable on the basis of past performance or on the basis of tests described in Article 9.3.1.5.

Assessment of materials, systems and equipment
- 9.3.1.5. Where no published test method exists the tests shall be designed to simulate or exceed anticipated service conditions or shall be designed to compare the performance of the material, system or equipment with similar material, system or equipment that is known to be acceptable.

Where no published test methods exist
- 9.3.1.6. Every test shall be carried out by a testing laboratory acceptable to the chief official.

Testing laboratories
- 9.3.1.7. RESERVED

Subsection 9.3.2. Concrete

- 9.3.2.1. Concrete shall be designed, mixed, placed and cured in accordance with CSA A23.1-1973, "Concrete Materials and Methods of Concrete Construction," and tested in accordance with CSA A23.2-1973, "Methods of Test for Concrete," both as revised to 1 May, 1975.

Design criteria
- 9.3.2.2.(1) Cement shall meet the requirements of CSA A5-1971, "Portland Cements," as revised to 1 May, 1975.

Sulphate soils
- (2) Sulphate-resisting cement shall be used for concrete in contact with sulphate soil deleterious to normal cement and such concrete shall conform to the requirements in Section 25 of CSA A23.1-1973, "Concrete Materials and Methods of Concrete Construction," as revised to 1 May, 1975.
- 9.3.2.3. Aggregates shall consist of sand, gravel, crushed rock, crushed air-cooled blast furnace slag, expanded shale or expanded clay conforming to CSA A23.1-1973, "Concrete Materials and Methods of Concrete Construction," as revised to 1 May, 1975 and such aggregate shall be clean, well-graded and free of injurious amounts of organic and other deleterious material.

Aggregate

Water 9.3.2.4. Water shall be clean and free of injurious amounts of oil, organic matter, sediment or any other deleterious material.

Compressive strength 9.3.2.5. Unless otherwise specifically required elsewhere in this Part, the compressive strength of unreinforced concrete shall be not less than 2,000 psi after 28 days.

9.3.2.6. When concrete is used for garage and carport floors and exterior steps, it shall have a minimum compressive strength of 3,000 psi after 28 days and shall have air entrainment of 5 to 7 per cent.

Concrete mix 9.3.2.7. The concrete mixes described in Table 9.3.2.A shall be considered acceptable if the slump does not exceed 4-in. when measured according to the slump test described in CSA A23.2-1973, "Methods of Test for Concrete," as revised to 1 May, 1975. The maximum size of coarse aggregate in Table 9.3.2.A shall not exceed 2-in.

TABLE 9.3.2.A.

Forming Part of Article 9.3.2.7.

CONCRETE MIXES, BY VOLUME			
Concrete Strength, psi	Cement, part	Sand, parts	Coarse Aggregate
2,000	1	2	4 parts
	1	—	6 parts pit run gravel
2,500	1	2	3½ parts up to 1½-in. in size
	1	—	5½ parts pit run gravel
Column 1	2	3	4

Admixtures 9.3.2.8. The use of admixtures other than those for air entrainment shall be subject to the approval of the chief official and such admixtures shall conform to CSA A266.1-1973, "Air Entraining Admixtures for Concrete" as revised to 1 May, 1975, or CSA A266.2-1973, "Chemical Admixtures for Concrete", as applicable, as revised to 1 May, 1975.

Reinforced concrete design 9.3.2.9. Reinforced concrete shall be designed to conform to the requirements of Part 4.

Cold weather requirements 9.3.2.10. When the air temperature is below 40°F, concrete shall be kept at a temperature of not less than 50°F or more than 80°F while being mixed and placed, and maintained at a temperature of not less than 50°F for 72-hr after placing and no frozen material or ice shall be used in the mix.

Subsection 9.3.3. Lumber and Wood Products

Grade marking 9.3.3.1. Lumber for the uses listed in Table 9.3.3.A. shall be identified by the grade stamp of an association or independent grading agency approved to grade stamp lumber by an appropriate organization acceptable to the chief official.

9.3.3.2. Exterior-type particleboard and plywood used for roof sheathing, wall sheathing and subflooring shall be legibly identified to indicate the manufacturer of the material, the standard to which it is produced and that the material is of exterior type.

9.3.3.3.(1) Except as provided in Sentences (2) and (3), lumber grades shall conform to Table 9.3.3.A., for the particular use. On-site cross-cutting of a piece shall not be considered to affect the grade of the piece as originally marked.

TABLE 9.3.3.A.

Forming Part of Sentence 9.3.3.3.(1)

MINIMUM LUMBER GRADES FOR SPECIFIC END USES ⁽¹⁾						
USE	BOARDS				FRAMING	
	Paragraph in the 1970 NLGA grading rules under which boards are graded ⁽²⁾				2-4 in. thick 2-5 in. wide	2-4 in. thick 6-in. and wider
		All species		Eastern white pine & red pine	All Species	All Species
	Para 111	Para 113	Para 114	Para 115		
Stud wall framing (loadbearing members)	—	—	—	—	Standard, Stud, No. 2	No. 2
Stud wall framing (non-loadbearing members)	—	—	—	—	Stud, Utility, No. 3	No. 3
Floor, roof & ceiling framing	—	—	—	—	(³)	(³)
Plank frame construction (loadbearing members)	Standard	No. 3 Common	—	No. 3	—	No. 2
Plank frame construction (non-loadbearing members)	Economy	No. 5 Common	—	No. 5	Economy, No. 3	Economy, No. 3
Posts and beams See 9.3.3.3.(2)	—	—	—	—	Standard, No. 2	No. 2
Roof sheathing	Standard	No. 3 Common	Standard	No. 4	—	—
Sub-flooring	Standard	No. 3 Common	Standard	No. 3	—	—
Wall sheathing See 9.3.3.3.(3)	Utility	No. 4 Common	Utility	No. 4	—	—
Preserved wood foundation framing	—	—	—	—	No. 2	No. 2
Column 1	2	3	4	5	6	7

Notes to Table 9.3.3.A.:

(¹)Graded in conformance with the 1970 NLGA Standard Grading Rules for Canadian Lumber, published by the National Lumber Grades Authority, Vancouver.

(²)To identify board grades, the paragraph number of the NLGA rules under which the lumber is graded must be shown in the grade mark. The grade descriptions in Paragraph 113 of the NLGA rules are the same as the 1970 Standard Grading Rules for Western Lumber published by WWPA. The grade descriptions in paragraph 114 are the same as the 1970 Standard Grading Rules for West Coast Lumber, No. 16, published by WCLIB. When graded in accordance with WWPA or WCLIB rules, the grade mark will not contain a paragraph number.

(³)Grades to conform to those listed in Span Tables for Wood Rafters, Joists, Beams and Roof Trusses. (see Articles 9.23.13.14 and 9.23.13.15 for roof trusses).

(2) Where 5-in. or thicker lumber is used for posts or beams, the grade shall not be less than "Standard."

(3) Where wall sheathing is not required as a nailing base, one grade lower than those specified is permitted.

Moisture
content

9.3.3.4. Moisture content of lumber shall be not greater than 19 per cent at the time of installation.

9.3.3.5. Lumber dimensions of less than 1-in. referred to in this Part are actual dimensions. Lumber dimensions of 1-in. or more referred to in this Part are nominal dimensions. The corresponding actual dimensions shall be those shown in CSA 0141-1970, "Softwood Lumber."

9.3.3.6. Joist, rafter, lintel and beam members up to 5 per cent less than the actual Canadian standard sizes may be used provided the allowable spans for the grade and species of lumber under consideration are reduced 5 per cent from those shown in the span tables for full size members.

9.3.3.7. Where wood is pressure treated with a chemical toxic to termites, such treatment shall be in accordance with the requirements of one of the following standards, all as revised to 1 May, 1975.

CSA 080.1-1974, "Preservative Treatment of All Timber Products by Pressure Processes,"

CSA 080.2-1974, "Preservative Treatment of Lumber, Timber, Bridge Ties and Mine Ties by Pressure Processes,"

CSA 080.9-1974, "Preservative Treatment of Plywood by Pressure Processes", or

CSA 080.15-1974, "Preservative Treatment of Wood for Building Foundation Systems, Basements and Crawl Spaces by Pressure Processes."

Wood
foundations

9.3.3.8. Lumber and plywood used or intended for use in wood foundation walls, footings and crawl spaces in which they are in contact with the ground shall be treated in accordance with CSA 080.15-1974, "Preservative Treatment of Wood for Building Systems, Basements and Crawl Spaces by Pressure Processes," as revised to 1 May, 1975.

Subsection 9.3.4. Metal

9.3.4.1. Minimum thicknesses for sheet metal material given in this Part refer to the actual minimum thicknesses measured at any point of the material, and in the case of galvanized steel includes the thickness of the coating unless otherwise indicated.

SECTION 9.4 LOADS

Subsection 9.4.1. General

9.4.1.1. When the size of structural members and their connections are not given in this Part, the members and their connections shall conform to Part 4 except that design live loads and deflection limits shall conform to Subsection 9.4.2. to 9.4.6.

Subsection 9.4.2. Floor Loads

Floor loads

9.4.2.1. The minimum design live load on a floor area is the load listed in Table 9.4.2.A. applied uniformly over the entire area, or the load listed in Table 9.4.2.B. applied over an area $2\frac{1}{2}$ ft by $2\frac{1}{2}$ ft located so as to cause maximum effects, whichever causes the greater stresses.

TABLE 9.4.2.A.

Forming Part of Article 9.4.2.1.

UNIFORM DESIGN LOADS FOR FLOORS	
Use of Area of Floor	Minimum Design Live Load, psf
Corridors, balconies, lobbies and aisles over 4 ft in width, except for public corridors above the first storey in residential occupancies	100
Public corridors above the first storey in residential occupancies	40
Corridors, balconies, lobbies and aisles 4 ft or less in width	Same as occupancy they serve
Mezzanines	Same as occupancy they serve
Equipment rooms	75 ⁽¹⁾
Exits	100
Factories	125 ⁽¹⁾
Garages	
for passenger cars	50
for unloaded buses and light trucks	125
for loaded trucks and buses and all trucking spaces	250
Kitchens	
other than domestic type	100
Office areas	
basements	100
other storeys	50
Laboratories excluding small medical and dental laboratories	75
Residential occupancies	
bedrooms	30
all other rooms	40
Mercantile occupancies	
retail and wholesale areas	100
Driveways, sidewalks and grilles that are not supported by the ground such as those over basements and areaways and which are subject to loads from cars and trucks	250
Sidewalks and grilles that are not subject to loads from cars or trucks	100
Storage areas	100 ⁽¹⁾
Water-closet rooms	
except in residential occupancies	50
Column 1	2

Notes to Table 9.4.2.A.:

⁽¹⁾Total equipment loads must be calculated and allowed for in the design.

TABLE 9.4.2.B.

Forming Part of Article 9.4.2.1.

CONCENTRATED DESIGN LOADS FOR FLOORS	
Use of Area of Floor	Minimum Concentrated Design Load, lb
Floors of offices, manufacturing buildings	2,000
Floors and areas used by passenger cars	2,500
Floors and areas used by vehicles not exceeding 8,000 lb gross weight	4,000
Floors and areas used by vehicles exceeding 8,000 lb but not exceeding 20,000 lb gross weight	8,000
Floors and areas used by vehicles exceeding 20,000 lb gross weight	12,000
Driveways or sidewalks over basements, cellars or other open areas	12,000
Column 1	2

Subsection 9.4.3. Snow Loads

Snow loads

9.4.3.1. Except as provided in Article 9.4.3.2., design snow loads shall be not less than 60 per cent of the appropriate ground snow load listed in Section 4.9, but in no case shall the snow load be considered less than 20 psf of horizontal roof projection.

9.4.3.2. Where the entire width of a roof does not exceed 14 ft. the design snow load shall be not less than 50 per cent of the appropriate ground snow load listed in Section 4.9, but in no case less than 20 psf of horizontal roof projection.

Subsection 9.4.4. Wind Loads

Wind loads

9.4.4.1. Except for accessory buildings and except as permitted by Article 9.23.6.4., design wind loads shall conform to the appropriate requirements in Section 4.1.

9.4.4.2. RESERVED

Subsection 9.4.5. Deflections

Deflections

9.4.5.1. The maximum deflection of structural members shall conform to Table 9.4.5.A. Dead loads need not be considered in computing such deflections.

TABLE 9.4.5.A.

Forming Part of Article 9.4.5.1.

MAXIMUM DEFLECTIONS		
Structural Members	Type of Ceiling Supported	Maximum Allowable Deflection Expressed as a Ratio of the Clear Span
Roof rafters, roof joists, roof beams and roof decking of plank and beam construction	No ceiling	1/180
	Other than plaster or gypsum board	1/240
	Plaster or gypsum board	1/360
Ceiling joists	Other than plaster or gypsum board Plaster or gypsum board	1/240 1/360
Floor beams, floor joists and floor decking of plank and beam construction for floor areas other than bedrooms in dwelling units	No. ceiling	1/360
	Other than plaster or gypsum board	1/360
	Plaster or gypsum board	1/360
Floor beams, floor joists and floor decking of plank and beam construction for floor areas of bedrooms in dwelling units	No ceiling	1/240
	Other than plaster or gypsum board	1/240
	Plaster or gypsum board	1/360
Column 1	2	3

Subsection 9.4.6. Earthquake Loads

9.4.6.1. Except as provided in Articles 9.4.6.2. to 9.4.6.4., 2- and 3-storey buildings in seismic Zone 3 and 3-storey buildings in seismic Zone 2 shall be designed for the earthquake loads in Section 4.1.

9.4.6.2. Buildings with structural loadbearing precast concrete elements (normal or lightweight) shall have connections designed for the earthquake loads in Section 4.1.

9.4.6.3. Buildings constructed with loadbearing masonry walls which are required to resist the earthquake loads specified in Article 9.4.6.1. may, in lieu of engineered design, be reinforced as required in Subsection 9.20.18.

9.4.6.4. Buildings with structural systems of wood frame construction need not be designed for the earthquake loads in Section 4.1.

Subsection 9.4.7. Bearing Capacity for Soil and Rock

9.4.7.1. Except as provided in Articles 9.4.7.2. to 9.4.7.4. and Section 9.15, where the footing width does not exceed 3 ft, the allowable bearing pressure for soil or rock shall be determined in conformance with ASTM D1194-72, "Standard Method of Test for Bearing Capacity of Soil for Static Load on Spread Footings," as revised to 1 May, 1975, provided the bearing plate used in the test is at least 12 in. by 12 in. and the allowable bearing pressure does not exceed $\frac{1}{3}$ the ultimate bearing capacity of the soil or rock, and does not exceed $\frac{1}{3}$ the pressure that would cause the plate to settle 1 in.

9.4.7.2. Where a foundation rests on rock or on soil that has been identified in conformance with the "Guide to the Field Description of Soils," published by the

Associate Committee on Geotechnical Research, National Research Council of Canada, to a depth equal to at least twice the width of the footing, the values in Table 9.4.7.A. may be used in determining the allowable bearing pressure for soil or rock.

TABLE 9.4.7.A.

Forming Part of Article 9.4.7.2.

Type and Condition of Soil or Rock	Maximum Allowable Bearing Pressure, psf
Dense sand, dense sand and gravel ⁽¹⁾	6,000
Compact sand, compact sand and gravel ⁽¹⁾	3,000
Loose sand, loose sand and gravel ⁽¹⁾	1,000
Dense silt ⁽²⁾	3,000
Compact silt ⁽²⁾	2,000
Very stiff clay ⁽²⁾	6,000
Stiff clay ⁽²⁾	3,000
Firm clay ⁽²⁾	1,500
Soft clay ⁽²⁾	750
Till, dense or hard	8,000
Till, compact or firm	3,000
Cemented sand and gravel	10,000
Clay shale	6,000
Sound rock	10,000
Rock with discontinuities ⁽³⁾	2,000
Column 1	2

Notes to Table 9.4.7.A.:

⁽¹⁾Sand, or sand and gravel may be classified by means of a picket test in which a 2 in. by 2 in. picket bevelled at the end at 45 deg. to a point, is pushed into the soil. Such material is classified as "dense" if a man of average weight cannot push the picket more than 1½ in. into the soil, "compact" if the picket penetrates more than 1½ in. but less than 8 in. into the soil and "loose" if the picket penetrates 8 in. or more.

⁽²⁾Clay and cohesive silts may be classified as "very stiff" if it is impossible to indent by thumb pressure, "stiff" if it is difficult to indent by thumb pressure, "firm" if it can be indented by moderate thumb pressure, "soft" if it can be penetrated several inches by thumb pressure, where this test is carried out on undisturbed soil in the wall of a test pit.

⁽³⁾Indicates rock containing close discontinuities or cracks infilled with soft cohesive soil.

9.4.7.3. Where a soil or rock within a distance equal to twice the footing width below the bearing surface has a lower allowable bearing pressure than that at the bearing surface as shown in Article 9.4.7.2., the design capacity of the foundation shall not be greater than would cause the weakest soil or rock to be stressed beyond its allowable bearing pressure. In calculating such subsurface pressures, the loads from the footings shall be assumed to be distributed uniformly over a horizontal plane within a frustum extending downward from the footing at an angle of 60 deg. to the horizontal.

9.4.7.4. Where a foundation bears on gravel, sand or silt and where the water table is within a distance below the bearing surface equal to the width of the foundation, the allowable bearing pressure shall be 50 per cent of that determined in Articles 9.4.7.1. and 9.4.7.2.

9.4.7.5. The design procedures described in Section 4.2 may be used in lieu of the design procedures in this Subsection, and shall be used where deep foundations are used, or if the footing size falls outside the scope of this Section, or if the foundation is constructed on peat or on filled ground.

9.4.7.6. Where a foundation is located in an area in which soil movement caused by changes in soil moisture content is known to occur to the extent that it will cause significant damage to a building, measures shall be taken to minimize the effect of such movement on the building.

SECTION 9.5 ROOM AND SPACE DIMENSIONS

Subsection 9.5.1. General

- 9.5.1.1. This Section applies only to dwelling units that are intended for use on a continuing or year-round basis as the principal residence of the occupant, to tourist cottages and cabins for rent and to hotel and motel rooms.

9.5.1.2. Unless otherwise indicated herein, the areas, dimensions and height of rooms or spaces shall be measured between finished wall surfaces and between finished floor and ceiling surfaces.

9.5.1.3. Minimum dimensions listed for rooms or spaces in combination with other rooms or spaces refer to the minimum dimension of the combined space.

9.5.1.4. Minimum floor areas specified in this Section do not include closets or built-in bedroom cabinets unless otherwise indicated.

9.5.1.5. Two or more areas are considered as a combination room if the dividing wall occupies less than 60 per cent of the separating plane.

9.5.1.6. Areas and dimensions of rooms and spaces may be less than required in this Section when permitted by the chief official and the rooms and spaces are adequate for their intended use, such as by the provision of built-in furniture to compensate for reduced sizes.
- Method of measurement

Combined space

Floor areas

Combination rooms

Subsection 9.5.2. Ceiling Heights

- 9.5.2.1. Heights of rooms or spaces in residential occupancies shall conform to Table 9.5.2.A.
- Room heights

TABLE 9.5.2.A.

Forming Part of Article 9.5.2.1.

ROOM HEIGHTS	
Room or Space	Minimum Heights
Living room or space dining room or space, kitchen or kitchen space	7 ft. 6 in. over at least 75 per cent of the required floor area with a clear height of 7 ft. at any point over the required area.
Bedroom or bedroom space	7 ft. 6 in. over at least 50 per cent of the required floor area or 7 ft. over all of the required floor area. Any part of the floor having a clear height of less than 4 ft. 6 in. shall not be considered in computing the required floor area.
Unfinished basement or cellar including laundry area therein	6 ft. 4 in. under beams, ducts or pipes in laundry areas and in any location that would normally be used, for passage to laundry and required storage areas.
Bathroom, water-closet room or laundry area above grade	7 ft. in any area where a person would normally be in a standing position.
Passage, hall or main entrance vestibule and finished rooms not specifically mentioned above	7 ft.
Column 1	2

9.5.2.2. The clear height above and below a mezzanine floor assembly in all occupancies shall be not less than 7 ft unless otherwise permitted by the chief official.

9.5.2.3. The clear height in a storage garage shall be not less than 6 ft 6-in.

Subsection 9.5.3. Living Rooms or Spaces within Dwelling Units

Living room
area

9.5.3.1.(1) Subject to Sentence (2), living areas within dwelling units either as separate rooms or in combination with other spaces shall have,

(a) at least 145 sq ft of floor area; and

(b) no dimension less than 9 ft 10-in. within the required area.

(2) Where the area of a living space is combined with a kitchen and dining area, the living area alone in a bachelor dwelling unit shall be at least 120 sq ft.

Subsection 9.5.4. Dining Rooms or Spaces within Dwelling Units

Dining room
area

9.5.4.1.(1) A dining space in combination with other space shall have a minimum floor area of 85 sq ft.

(2) A dining room not combined with other space shall have a minimum area of 75 sq ft.

9.5.4.2. Except as permitted in Article 9.5.4.3., a dining room or space combined with other space shall have no dimension less than 7 ft 6-in. within the required area measured between wall faces or a wall face and a built-in cabinet or appliance.

9.5.4.3. When a required dining area is provided in a kitchen or serves a bachelor dwelling unit, the minimum dimension of such space may be reduced to 5 ft 6-in.

Subsection 9.5.5. Kitchens within Dwelling Units

Kitchen area

9.5.5.1. Kitchen areas within dwelling units either separate from or in combination with other space shall have at least 45 sq ft of floor area, except that in bachelor dwelling units the minimum floor area shall be 40 sq ft.

Subsection 9.5.6. Bedroom or Space in Dwelling Units

Main bedroom
area

9.5.6.1.(1) Except as provided in Article 9.5.6.3. at least one bedroom in every dwelling unit shall have,

(a) where built-in cabinets are not provided, a minimum floor area of 105 sq ft; or

(b) where built-in cabinets are provided, a minimum floor area of 95 sq ft.

(2) Except for buildings designed and constructed in accordance with CSA Standard Z-240.2.1-1979, the minimum dimension of the bedroom referred to in Sentence (1) shall be at least eight feet, ten inches.

Other bedroom
areas

9.5.6.2.(1) Except as provided in Article 9.5.6.3., each additional bedroom shall have,

(a) where built-in cabinets are not provided, a minimum floor area of 75 sq ft; or

(b) except for buildings designed and constructed in accordance with CSA Standard Z-240.2.1-1979, where built-in cabinets are provided, a minimum floor area of sixty-five feet.

(2) The minimum dimension within the area of a bedroom referred to in Sentence (1) shall be at least 6 ft 6-in.

Combination
bedroom areas

9.5.6.3. Bedroom spaces in combination with other spaces shall have at least 45 sq ft of floor area and have no dimension less than 6 ft 6-in. within the required area.

Subsection 9.5.7. Bathrooms and Water-Closet Rooms

9.5.7.1.(1) In every dwelling unit an enclosed space of sufficient size shall be provided to accommodate a bathtub, water closet and lavatory.

Bathroom areas

- (2) Bathtubs of the rectangular type shall have at least 5 ft nominal length and,
- (a) a clearance of at least 1 ft 9-in. shall be provided in front of the tub or shower stall to an opposite wall face; or
- (b) a clearance of at least 1 ft 6-in. shall be provided in front of the tub or shower stall to another fixture,

over at least a 2 ft length of the bathtub or shower.

(3) The centreline of the water closet shall be at least 1 ft 3-in. away from an adjacent side wall and from a vanity and at least 1 ft 6-in. clearance shall be provided in front of the water closet to the opposite wall or another fixture.

(4) The centreline of a wash basin shall be at least 1 ft 3-in. from an adjacent side wall and,

- (a) a clearance of at least 1 ft 9-in. shall be provided in front of the wash basin to an opposite wall; or
- (b) a clearance of at least 1 ft 6-in. in front of the wash basin to another fixture.

Subsection 9.5.8. Halls and Vestibules within Dwelling Units

9.5.8.1. The minimum width of a hall or passage within a dwelling unit shall be at least 2 ft 10-in., except that in buildings not exceeding 14 ft in width the hallway width may be 2 ft 4-in. where a second exit is provided near the end of the hallway farthest from the living area.

Width of hallways

SECTION 9.6 DOORS

Subsection 9.6.1. General

9.6.1.1. Requirements relating to doors in fire separations and means of egress shall conform to the appropriate requirements in Sections 9.9 and 9.10.

Doors in fire separations

Subsection 9.6.2. Required Doors

9.6.2.1. A door shall be provided at each entrance to a dwelling unit, bathroom, water-closet room, shower room and room containing a boiler or furnace.

Required doors

9.6.2.2. In buildings containing more than one dwelling unit, doors shall be provided at the exterior entrances, laundry or drying rooms, storage rooms, public water-closet rooms, garbage and incinerator rooms, furnace rooms, recreation rooms and any other locations required by Section 9.10.

Required doors in multiple dwelling units

Subsection 9.6.3. Doorway Sizes

9.6.3.1. Doorway openings within dwelling units shall be designed to accommodate not less than the door sizes in Table 9.6.3.A. for swing-type doors and where folding doors are to be provided, the same openings apply.

Doorway openings

TABLE 9.6.3.A.

Forming Part of Article 9.6.3.1.

MINIMUM SIZE OF DOORS		
At Entrance to	Width, ft.—in.	Height, ft.—in.
Dwelling unit (required entrance) Vestibule or entrance hall	2 — 8	6 — 8
Stairs to a floor level that contains a finished space All doors in at least one line of passage from the exterior to the basement Utility rooms	2 — 8	6 — 6
Walk-in closet Where 2 ft. 4 in. hallways are permitted Bathroom, water-closet room, shower room	2 — 0	6 — 6
Rooms not mentioned above, exterior balconies	2 — 6	6 — 6
Column 1	2	3

Public
water-closets

9.6.3.2. Doors to public water-closet rooms shall be not less than 2 ft 8-in. in width and 6 ft 8-in. in height.

Subsection 9.6.4. Exterior Doors

Wood doors

9.6.4.1. Exterior wood doors shall be exterior type conforming to CSA O132.2-1972, "Wood Doors," as revised to 1 May, 1975.

Aluminum
frames

9.6.4.2. All sliding glass doors shall conform to the appropriate requirements in CGSB 82-GP-1a(1972), "Doors, Glass, Aluminum Frame, Sliding, Standard-Duty," or to CGSB 82-GP-2a(1972), "Doors, Glass, Aluminum Frame, Sliding, Medium-Duty," both as revised to 1 May, 1975.

9.6.4.3. In buildings of residential occupancy all exterior doors, except garage doors, shall be provided with storm doors, or other means of minimizing heat loss and infiltration.

9.6.4.4. All sliding glass doors shall be provided with storm doors or have double glazing.

Subsection 9.6.5. Glass

9.6.5.1. Glass thickness and the size of glass for doors shall conform to Table 9.6.5.A.

TABLE 9.6.5.A.

Forming Part of Article 9.6.5.1.

GLASS SIZE FOR DOORS	
Minimum Glass Weight or Thickness	Maximum Perimeter, in.
18 oz.	80
24 oz.	120
32 oz.	160
3/16-in.	180
7/32-in.	not limited
Column 1	2

9.6.5.2. Glass side lights greater than 18-in. in width that could be mistaken for doors, glass in storm doors and glass in sliding doors within or at every entrance to a dwelling unit shall be safety glass of the laminated or tempered type conforming to CGSB 12-GP-1c(1973), "Glass, Safety, Tempered or Laminated, for Building Construction," as revised to 1 May, 1975, or shall be of wired glass.

Safety glass

9.6.5.3. Glass in entrance doors to dwelling units, other than the entrance doors described in Article 9.6.5.2., shall be safety glass or wired glass of the type described in Article 9.6.5.2. where the glass area exceeds 5 sq ft and extends to less than 36-in. from the bottom of the door.

9.6.5.4. Every glass door accessible to the public shall be constructed with safety glass or wired glass conforming to Article 9.6.5.2.

9.6.5.5. Every glass or transparent door accessible to and used by the public shall be equipped with hardware, bars or other permanent fixtures designed so that the existence and position of such door will be readily apparent.

9.6.5.6. Glass other than safety glass shall not be used for a shower or bathtub enclosure.

Subsection 9.6.6. Caulking and Weatherstripping

9.6.6.1. Caulking shall be provided for all exterior doors between door frames and exterior siding or masonry.

9.6.6.2. In buildings of residential occupancy weatherstripping shall be provided around all exterior doors except garage doors.

SECTION 9.7 WINDOWS

Subsection 9.7.1. Scope

9.7.1.1. This Section applies to installation of windows and to the requirements for natural lighting to be provided by windows in residential occupancies.

Natural lighting

9.7.1.2. Windows shall be installed in compliance with the requirements for fire protection set out in Section 9.10.

9.7.1.3. Windows shall be installed in compliance with the requirements for ventilation set out in Section 9.33.

Subsection 9.7.2. General

9.7.2.1. Windows shall be designed and installed so that they shed water.

Window design

9.7.2.2. The minimum window glass area for rooms in buildings of residential occupancy or which are used for sleeping shall conform to Table 9.7.2.A. and the unobstructed glass area of a door or skylight is considered equivalent to that of a window.

Minimum
window glass
areas

TABLE 9.7.2.A.
Forming Part of Article 9.7.2.2.

MINIMUM GLASS AREAS FOR ROOMS OF RESIDENTIAL OCCUPANCY		
Location	Unobstructed Glass Area	
	With No Electric Lighting	With Electric Lighting
Laundry, basement recreation room, unfinished basement or cellar	4 per cent of area served	Windows not required
Water-closet room	4 sq ft	Windows not required
Kitchen, kitchen space kitchen alcove	10 per cent of area served	Windows not required
Living rooms, Dining rooms, Bedrooms and other finished rooms not mentioned above	10 per cent of area served	10 per cent of area served
Column 1	2	3

Windows in public spaces

9.7.2.3. Wherever practicable, windows shall be provided to light corridors, stairways and similar public space in buildings.

9.7.2.4. Where termites are known to exist and where windows or other openings at or below grade contain wood elements, the bottom of window wells or adjacent ground shall be at least 6-in. below the nearest wood unless the wood is pressure treated with a chemical toxic to termites in accordance with Article 9.3.3.7.

9.7.2.5. In buildings of residential occupancy all windows shall be provided with storm windows, or other means of minimizing heat loss and infiltration.

Subsection 9.7.3. Window Standards

9.7.3.1.(1) Unless otherwise specified in this Section, windows shall conform to one of the following Standards, as revised to 1 May, 1975:

- CSA O132.1-1965, "Wood Windows;,"
- CGSB 12-GP-8(1966), "Factory-Sealed Double-Glazing Units;,"
- CGSB 63-GP-2a(1966), "Windows, Extruded Aluminum, Vertical and Horizontal Sliding, Medium-Duty;,"
- CGSB 63-GP-3a(1966), "Windows, Extruded Aluminum, Vertical and Horizontal Sliding, Standard-Duty;,"
- CGSB 63-GP-4a(1971), "Windows, Sashless, Horizontal Sliding;," or
- CGSB 63-GP-5a(1970), "Windows, Steel, Vertical and Horizontal Sliding, Standard-Duty."

(2) The standards in Sentence 9.7.3.1.(1) do not apply to buildings designed and constructed in accordance with CSA Standard Z.240.2.1-1979 provided the windows in such buildings comply with CSA Standard Z.240.8.1-1978.

Subsection 9.7.4. Glass

Quality of glass

9.7.4.1. Glass shall conform to one of the following Standards, as revised to 1 May, 1975:

CGSB 12-GP-1c(1973), "Glass, Safety, Tempered or Laminated for Building Construction;"

CGSB 12-GP-2a(1970), "Glass, Sheet: Flat, Clear;" or

CGSB 12-GP-3b(1970), "Glass, Plate: Flat, Polished Plate or Float."

9.7.4.2. Thickness of glass in windows shall conform to Table 9.7.4.A., except as provided in Article 9.7.4.3.

Thickness of glass

TABLE 9.7.4.A.

Forming Part of Article 9.7.4.2.

MAXIMUM GLASS SIZE FOR VARIOUS THICKNESSES			
Minimum Glass Thickness or Weight of Inner and Outer Panes	Sash Type or Fixed Glazing	Factory-sealed Double Glazing	
		Fused Edges	Other than Fused Edges
18 oz.	120-in. perimeter	180-in. perimeter	150-in. perimeter
24 oz.	168-in. perimeter	252-in. perimeter	210-in. perimeter
32 oz.	240-in. perimeter	360-in. perimeter	300-in. perimeter
3/16-in.	280-in. perimeter	420-in. perimeter	350-in. perimeter
7/32-in.	50 sq ft	113 sq ft	78 sq ft
1/4-in.	no limit	no limit	no limit
Column 1	2	3	4

9.7.4.3. Sashless window glass thickness shall conform to CGSB 63-GP-4a(1971), "Windows: Sashless, Horizontal Sliding," as revised to 1 May, 1975.

Subsection 9.7.5. Caulking and Glazing

9.7.5.1. Sealing compound used in the glazing of factory-sealed double-glazed units shall be compatible with the material used to edge seal the units.

Glazing compound

9.7.5.2. Caulking shall be provided between window frames or trim and the exterior siding or masonry.

Caulking

Subsection 9.7.6. Glass Panels in Areas Accessible to the Public

9.7.6.1. Windows or glass panels which exceed 18-in. width and extend to less than 12-in. from the floor shall be protected by barriers or railings.

9.7.6.2. Windows in exit stairways that extend to less than 42-in. above the landing shall be protected by barriers or railings located approximately 42-in. above such landings.

SECTION 9.8 STAIRS, RAMPS, HANDRAILS AND GUARDS

Subsection 9.8.1. Scope

9.8.1.1. This Section applies to the design and construction of interior and exterior stairs, steps, ramps, railings and guards.

Design and construction of stairs

9.8.1.2. Where the stair forms part of an exit, the appropriate requirements in Sections 9.9 and 9.10 shall also apply.

Stairs as part of exit

9.8.1.3. Escalators and moving walkways shall conform to the appropriate requirements in Part 3 and Part 6.

Escalators and moving walkways

Subsection 9.8.2. General

- Treads and risers 9.8.2.1. Treads and risers shall have uniform rise and run in any one flight.
- Number of risers required in stairs 9.8.2.2. Except for interior stairs within a dwelling unit, at least 3 risers shall be provided for interior stairs.
- Stairway protection 9.8.2.3. Interior stairways extending through the roof of a building shall be protected from ice and snow.

Subsection 9.8.3. Stair Dimensions

- Stair dimensions 9.8.3.1. Interior stairs within dwelling units to areas used only for storage, laundry and mechanical equipment such as unfinished basements, cellars and attics, shall have a maximum rise of 9-in., a minimum run of 8-in. and a minimum tread width of 9-in.
- Maximum rise, minimum run and tread width 9.8.3.2. Interior stairs within dwelling units other than those listed in Article 9.8.3.1. and exterior stairs serving dwelling units shall have a maximum rise of 8-in., a minimum run of 8¼-in. and a minimum tread width of 9¼-in.
- 9.8.3.3. Interior stairs not contained within dwelling units and exterior stairs for buildings, except those serving not more than 1 dwelling unit, shall have a maximum rise of 7¾-in., a minimum rise of 5-in., a minimum run of 9-in. and a minimum tread width of 10-in. and the product of the run and rise (expressed in inches) for such stairs shall be not less than 70 nor more than 75.
- Nosing 9.8.3.4. Where the run of any stair is less than 10-in., a nosing of at least 1-in. shall be provided beyond the face of the riser, or an equivalent back slope on the risers shall be provided.
- Stairway width 9.8.3.5. Except as required in Article 9.9.3.3., exit stairs and stairs used by the public shall have a width, measured between wall faces or guards, of at least 36-in., except that where the stair serves 1 or more floor areas having a combined occupant load greater than 100 persons, the width shall be at least 44-in.
- 9.8.3.6. At least 1 stairway between each floor level in a dwelling unit shall have a minimum width between wall faces of at least 2 ft 10-in.
- Clear height 9.8.3.7. The head room measured vertically from a line drawn through the outer edges of the nosings shall be at least 6 ft 4-in. for stairs located in dwelling units and 6 ft 9-in. for all other stairs.

Subsection 9.8.4. Landings

- Landings 9.8.4.1. Landings shall be at least as wide and as long as the width of stairs in which they occur, except that the length of landing for exterior stairs serving not more than 1 dwelling unit need not exceed 36-in., and the length of landing for all other stairs in a straight run need not exceed 44-in.
- Door swing on stairs 9.8.4.2. Where a door swings towards a stair, the full arc of its swing shall be over a landing and except as provided in Article 9.8.4.3., a landing shall be provided at the top and bottom of each flight of interior stairs and where a doorway occurs in a stairway.
- 9.8.4.3. Where a door occurs at the top of the stair in a dwelling unit, no landing is required between the doorway and the stairs.
- 9.8.4.4. A landing shall be provided at the top of all exterior stairs, except that a landing may be omitted at a secondary entrance to a building containing a single dwelling unit provided the stair does not contain more than 3 risers.
- Height between landings 9.8.4.5. The vertical height between any landings shall not exceed 12 ft.

9.8.4.6. The clear height over landings shall be at least 6 ft 4-in. in dwelling units and 6 ft 9-in. for other landings.

Clear height
over landings

Subsection 9.8.5. Curved Stairs and Winders

9.8.5.1. Except as permitted in Article 9.8.5.2., no winders shall be used in any exit stairway.

9.8.5.2. A curved stair may be used as an exit provided the treads have a minimum width of 9-in. measured 9-in. away from the handrail at the narrow end of the tread, and a handrail is installed on both sides.

Curved stairs in
exits

9.8.5.3. Except as permitted in Article 9.8.5.4., a curved stair not required as an exit shall have a minimum average tread width of 9-in. and a minimum tread width of 7-in. and such stairs shall not exceed 44-in. between handrails.

Curved stairs
not in exits

9.8.5.4. Stairs within dwelling units may contain winders that converge to a centre point provided the winders turn through an angle of not more than 90 deg. and individual treads turn through an angle of 30 deg. and only 1 set of such winders shall be permitted between floor levels.

Winders

Subsection 9.8.6. Ramps

9.8.6.1. The maximum gradient for pedestrian ramps shall be 1 in 10 for residential occupancies, 1 in 6 for mercantile or industrial occupancies and 1 in 8 for all other occupancies and the maximum gradient for every exterior ramp shall be 1 in 10.

Maximum
gradient for
ramps

9.8.6.2. Where a doorway or stairway opens onto the side of a ramp there shall be a level area extending across the full width of the ramp and for a distance of at least 12-in. on either side of the wall opening.

Level area in
ramps

9.8.6.3. Where a doorway or stairway opens onto the end of a ramp, there shall be a level area extending across the full width of the ramp and along the ramp for at least 36-in.

Doorways near
ramps

Subsection 9.8.7. Handrails

9.8.7.1. Except as permitted in Articles 9.8.7.2. and 9.8.7.3., a handrail shall be provided on at least 1 side of stairs less than 44-in. in width, and on 2 sides of stairs 44-in. in width or greater.

9.8.7.2. Handrails are not required for stairs within a dwelling unit that have fewer than 3 risers.

9.8.7.3. Only 1 handrail is required on exterior stairs more than 44-in. in width and having 3 or more risers provided such stairs serve not more than 1 dwelling unit.

9.8.7.4. Handrails on stairways shall be located between 32 and 36-in. measured vertically above a line drawn through the outside edges of the stair nosings.

9.8.7.5. A clearance of at least 1½-in. shall be provided between each handrail and the wall to which it is fastened.

9.8.7.6. Handrails shall be so constructed that there will be no obstruction on or above them to break a handhold.

9.8.7.7. Handrails and stair stringers shall not project more than 3½-in. into the required width of stairway.

9.8.7.8. Where ramps are used in lieu of stairs, the handrail requirements for stairs in Article 9.8.7.1., and Articles 9.8.7.3. to 9.8.7.7. shall apply where the gradient exceeds 1 in 10.

Subsection 9.8.8. Guards

9.8.8.1. Every exterior landing, porch and every balcony, mezzanine, gallery, raised walkway and roof to which access is provided for other than for maintenance purposes, shall be protected by guards on all open sides where the difference in elevation between adjacent levels exceeds 24-in., and every exterior stair with more than 6 risers shall be protected with guards on all open sides where the difference in elevation between the adjacent ground level and the stair exceeds 24-in.

9.8.8.2. When an interior stair has more than 2 risers, the sides of the stair and the landing or floor level around the stair well shall be enclosed by walls or be protected by guards, except that a stair to an unfinished basement or cellar in a dwelling unit may have 1 unprotected side.

9.8.8.3. Except as provided in Articles 9.8.8.4. and 9.8.8.5., all guards including those for balconies shall be at least 42 in. in height, except that guards for porches not more than 4 ft. above the finished ground level may be a minimum of 32 in. in height.

9.8.8.4. Except for stairs within a dwelling unit, and except a stairway serving not more than 1 dwelling unit, guards for stairs shall be at least 36-in. in height measured vertically from a line drawn through the outside edges of the stair nosings, and 42-in. in height at landings.

9.8.8.5. Guards for stairs within dwelling units and for exterior stairs serving not more than 1 dwelling unit shall be at least 32-in. measured vertically above a line drawn through the outside edges of stair nosings, and above landings and around the top of unenclosed stairwells or stairs.

9.8.8.6. Except for floors of garages in Section 9.36, a continuous curb at least 6-in. in height and a guard not less than 42-in. above the floor level shall be provided at every opening through a garage floor and around the perimeter of such floor and ramps where the exterior walls are omitted where the top of the floor is 2 ft or more above an adjacent ground or floor level.

9.8.8.7. Openings through a guard on a balcony or an exit stair, except an exit stair serving not more than 1 dwelling unit, shall be of a size as to prevent the passage of a spherical object having a diameter of 4-in., unless it can be shown to the satisfaction of the chief official that the location and size of such openings which exceed this limit do not represent a hazard.

9.8.8.8. Except in buildings of residential occupancy in which there is no dwelling unit located above another dwelling unit, guards around exterior balconies of buildings of residential occupancy shall be designed so that no member, attachment or opening located between 4-in. and 36-in. above the balcony floor will facilitate climbing and shall conform to Subsection 4.1.10.

9.8.8.9. Guards for ramps including vehicular ramps shall conform to the requirements for guards for stairs in Articles 9.8.8.3., 9.8.8.4. and 9.8.8.7.

Subsection 9.8.9. Construction

9.8.9.1. Exterior concrete stairs with more than 2 risers and 2 treads shall be supported on unit masonry or concrete walls or piers at least 6-in. by 6-in. or shall be cantilevered from the main foundation wall. When such concrete steps are cantilevered from the foundation wall, the main foundation wall shall be at least 8-in.-thick solid concrete and the depth below grade for foundations for exterior steps shall conform to the requirements in Section 9.12. Exterior wood steps shall not be in direct contact with the ground unless treated with wood preservative.

9.8.9.2.(1) Wooden stair stringers shall,

Support for
exterior stairs

Wooden stair
stringers

- (a) have a minimum effective depth of 3½-in. and an overall depth of at least 9¼-in.;
- (b) be supported and secured top and bottom;
- (c) if supported along their length, be at least 1-in. actual thickness;
- (d) if unsupported along their length be at least 1½-in. actual thickness; and
- (e) be spaced not more than 3 ft o.c. in dwelling units and 2 ft o.c. when located in other than dwelling units.

9.8.9.3. Lumber or plywood treads for stairs within dwelling units shall be at least 1-in. actual thickness, except that if open risers are used, and the distance between stringers exceeds 2 ft 6-in., the treads shall be at least 1½-in. actual thickness.

Wooden treads

9.8.9.4. The finish for treads and landings of interior stairs in dwelling units, other than stairs to unfinished basements and cellars, shall consist of hardwood, vertical grain softwood, resilient flooring or other material providing equivalent performance.

Tread finish

9.8.9.5. The finish for treads and landings of interior and exterior stairs, other than those in dwelling units, shall have a non-skid finish or shall be provided with non-skid strips.

Non-skid finish

SECTION 9.9 MEANS OF EGRESS

Subsection 9.9.1. Scope

9.9.1.1. This Section applies to requirements that are designed to permit the safe and convenient access to the exterior of a building, to a public thoroughfare or to open space.

9.9.1.2. Stairways, handrails and guards in a means of egress shall conform to the requirements in Section 9.8 as well as to the requirements in this Section.

Stairs,
handrails and
guards

9.9.1.3. Flame-spread ratings, fire-resistance ratings and fire-protection ratings shall conform to Section 9.10.

Fire protection

Subsection 9.9.2. General

9.9.2.1. Exits shall be provided from every floor area.

9.9.2.2. An access to exit shall be provided from every roof intended for occupancy and from every podium, terrace, platform or contained open space. Where a roof is intended for an occupant load of more than 60 persons, at least 2 separate means of egress shall be provided from the roof to stairs designed in conformance with the requirements for exit stairs and located remote from each other. Where a podium, terrace, platform or contained open space is provided, egress requirements shall conform to the appropriate requirements for rooms or suites of rooms in Article 9.9.8.5.

9.9.2.3. Exits may consist of doorways, passageways, ramps, stairways, fire escapes as permitted in Article 9.9.2.7., horizontal exits, escalators and moving walkways, provided that where escalators or moving walkways are used as required exits, they are capable of moving only in the direction of exit travel.

9.9.2.4.(1) Except where permitted in Sentence (2), elevators, slide escapes or windows shall not be considered as being part of a required means of egress.

Not considered
as exits

(2) Except for floor areas of mercantile occupancy, casement windows not less than 42-in. high, 22-in. wide, with a sill height not more than 36-in. above the inside floor, may be considered part of a required means of egress to provide access to fire escapes, when fire escapes are permitted.

- Use of exits

9.9.2.5. An exit shall be designed for no purpose other than for exiting except that an exit may also serve as an access to a floor area.
- 9.9.2.6. Ancillary rooms such as storage rooms, washrooms, water-closet rooms, garbage rooms and laundry rooms shall not open directly into an exit.
- Fire escapes

9.9.2.7. Fire escapes shall not be installed on any new building, and shall not be installed on an existing building, unless authorized by the chief official.
- 9.9.2.8. When a fire escape is installed on an existing building it shall conform to Section 3.4, Part 3 and Part 4.
- Horizontal exits

9.9.2.9. Horizontal exits used shall conform to Section 3.4.
- 9.9.2.10. The front edge of stair treads in exits and access to exits shall be at right angles to the direction of exit travel.
- 9.9.2.11. RESERVED

Subsection 9.9.3. Dimensions of Means of Egress

- Scope

9.9.3.1. This Subsection applies to every means of egress except exits that serve not more than 1 dwelling unit and access to exits within dwelling units.
- Occupant load

9.9.3.2. The occupant load of floor areas or part of floor areas used in determining the minimum required width of a means of egress shall be the number of persons for which such areas are designed, but not fewer than that determined from Table 9.9.3.A. nor less than 2 persons per bedroom or sleeping area in dwelling units.

TABLE 9.9.3.A.

Forming Part of Article 9.9.3.2.

MAXIMUM AREA PER PERSON TO BE ASSUMED IN CALCULATING OCCUPANT LOAD	
Occupancy or Use of Floor Area	Max. Area per Person, sq ft
Residential	
Dwelling units	See Article 9.9.3.2.
Dormitories	50
Business and personal services	
Shops	50
Offices	100
Mercantile	
Retail sales floors at grade, cellar or basement	30
Other mercantile floors	60
Industrial	
Manufacturing or process rooms	50
Storage garage	500
Warehouse storage space	300
Other storage space	500
Aircraft hangers	500
Other uses	
Cleaning and repair	50
Kitchens	100
Column 1	2

9.9.3.3.(1) Except as provided in Subsection 9.9.6., exit width shall be computed on the basis of occupant load,		Exit width
(a) at or near ground level not less than 1 unit per 90 persons (see Article 9.9.3.6.);		
(b) at other than ground or near ground level not less than 1 unit per 30 persons for residential occupancies, and 1 unit per 60 persons for other occupancies (see also Article 9.8.3.5.).		
(2) Notwithstanding Sentence (1), the minimum aggregate widths for exits at all floor levels shall not be less than 44-in. for an exit corridor and 36-in. for all other types of exits.		
9.9.3.4. Except as provided in Subsection 9.9.6., the minimum width of a doorway, corridor or passageway in an access to exit shall be 1 unit (see Article 9.9.3.6.) per 90 persons, but in no case shall the minimum width of a public corridor be less than 44-in.		Access to exit width
9.9.3.5. Except as provided in Subsection 9.9.6., the minimum width of a stairway or ramp in an access to exit shall be 1 unit per 60 persons (see Article 9.9.3.6.).		Width of stairs in an access to exit
9.9.3.6.(1) The units of exit width in Articles 9.9.3.3. to 9.9.3.5. shall be determined by dividing the width (in inches) of an exit by 22.		Calculation of units of exit width
(2) In a determination under Sentence (1), where the remainder is less than 12-in. it shall not be considered as contributing to the number of units.		
(3) In a determination under Sentence (1) where the remainder is 12-in. or more, it shall be considered as contributing ¼ unit of exit width in the case of stairs and ½ unit of exit width in the case of other exit facilities.		
9.9.3.7. Where an exit serves more than 1 floor area, the aggregate width of such exit need not be cumulative from floor to floor, except that where exits from above or below converge at an intermediate level, the width beyond the convergence in the direction of exit travel shall be not less than the aggregate required width of the converging exits.		Aggregate width of exits
9.9.3.8. Except as provided in Subsection 9.9.6. and Article 9.8.3.7., the minimum height of exits and corridors which provide access to exits shall be 7 ft.		Height of means of egress
Subsection 9.9.4. Fire Protection of Exits		
9.9.4.1. This Subsection applies to the fire protection of all exits except exits serving not more than 1 dwelling unit.		Scope
9.9.4.2.(1) Except as provided in Articles 9.9.4.3. and 9.9.4.5., every exit other than a doorway opening directly to the outdoors at ground level shall be separated from the remainder of the building or from another exit by a fire separation having a fire-resistance rating of at least ¾-hr.		Fire separation of exits
(2) A fire separation common to 2 exits shall be smoke tight and not be pierced by doorways, duct work, piping or any other opening that may affect the continuity of the separation.		
9.9.4.3. Not more than 1 exit in a building with 2 or more exits may be separated from the adjacent floor areas by wired glass, including doors and such wired glass shall conform to the requirements in Article 9.10.14.3.		Wired glass in exits
9.9.4.4. Openings in the exterior wall of an exit shall be protected with wired glass or glass block installed in accordance with Articles 9.10.14.3. and 9.10.14.4., where openings could be exposed to a fire in another fire compartment of the same building.		Protection of windows in exits

9.9.4.5. The requirements in Article 9.9.4.2. do not apply to an exterior passageway that is designed as an exit facility provided the passageway is open to the outside air and is served by an exit stair at each end of the passageway.

9.9.4.6.(1) Notwithstanding the requirements of Articles 9.9.4.2. and 9.10.9.7., in buildings intended for D or E occupancy unenclosed stairs may serve as a required exit in such occupancies provided,

- (a) the building does not exceed 2 storeys in height;
- (b) the occupancy containing the open stair consists of a single tenancy and is separated from other occupancies by at least a $\frac{3}{4}$ hour fire separation;
- (c) the area occupied does not exceed 800 sq. ft. per storey;
- (d) the maximum travel distance from any point in the building does not exceed 75 ft.;
- (e) the floor assemblies have at least a $\frac{3}{4}$ hr. fire resistance rating or are of non-combustible construction;
- (f) the basement and the first floor are separated by at least a $\frac{3}{4}$ hr. fire separation; and
- (g) a listed products of combustion detector of the single station alarm type is installed on each floor, including the basement, in accordance with Sentence 9.10.18.13.(2).

(2) The requirements of Article 9.10.13.1 do not apply to an occupancy conforming with Sentence (1).

Subsection 9.9.5. Obstructions and Hazards in means of Egress

Scope	9.9.5.1. This Subsection applies to obstructions and hazards in every means of egress except those within a dwelling unit or serving not more than 1 dwelling unit.
Mirrors in exits	9.9.5.2. No mirror shall be placed in or adjacent to any exit so as to confuse the direction of exit, and no mirror or draperies shall be placed on or over exit doors.
Appliances in a means of egress	9.9.5.3. Fuel-fired appliances shall not be installed in a required means of egress or immediately over, under or within 8 ft horizontally of such egress, unless the appliance is separated from the means of egress by an enclosure with a fire-resistance rating of not less than 1-hr.
Location of boiler rooms	9.9.5.4. Service rooms containing equipment subject to possible explosion, such as boilers designed to operate at a pressure in excess of 15 psi gauge pressure, and certain types of refrigerating and transformer equipment, shall not be located under required exits.
Obstructions in exits	9.9.5.5. Except as permitted in Subsection 9.9.6. and Article 9.8.7.7., no fixture, turnstile or construction shall project within the required width of exit.

Subsection 9.9.6. Doors in a means of Egress

Scope	9.9.6.1. This Subsection applies to all doors in a means of egress except exterior doors serving not more than 1 dwelling unit unless otherwise stated herein.
Door obstructions	9.9.6.2. Exit doors shall not decrease the required exit width by more than 2-in. for each full unit of exit width (22-in.), and where such doors lead out of stairs or ramps in the direction of exit travel they shall not be less than $\frac{3}{4}$ of the width of such stairs or ramps.

9.9.6.3. Doors in their swing shall not reduce the effective width of exit stairs or landings to less than 30-in., nor shall they reduce the effective width of an exit passageway to less than the required width.	Doors over landings
9.9.6.4. No door closer or other device shall be installed in an exit in such a manner as to reduce the head room clearance to less than 6 ft 6-in.	Door closure headroom
9.9.6.5.(1) An exit door or a door that opens to or is located in a public corridor or other facility providing access to exit from individually rented rooms, suites of rooms or dwelling units shall be not less than 6 ft 8-in. in height.	Door height and width
(2) Except as required in Articles 9.6.3.1. and 9.9.6.2., such doors shall be at least 32-in. in width when only 1 door leaf is installed in an opening, and 24-in. in width where more than 1 door leaf is provided in the width of an opening. The width of an individual door leaf shall not exceed 48-in. in such openings.	
9.9.6.6.(1) Every door that opens onto a corridor or other facility that provides access to exit from a room or suite of rooms where such room or suite of rooms is used or intended for use by more than 60 persons, and every door that is located within a corridor that is required to be separated from the remainder of the floor area by a fire separation shall swing on a vertical axis in the direction of exit travel and shall not open onto a step.	Direction of door swing
(2) This shall not be considered to prohibit sliding doors designed to swing on a vertical axis when pressure is applied provided such doors are identified as swinging doors by means of a sign or decal.	
9.9.6.7. Except as permitted in Article 9.9.6.8., where an exit door opens onto a landing, the landing shall be not less than 1 ft wider and longer than the width of the door. Such doors either in the open or closed position shall be not closer than 12-in. to the nearest riser.	Size of landings
9.9.6.8. Where there is a danger of blockage from ice or snow, an exit door may open onto not more than 1 step provided the rise of such step does not exceed 7¾-in.	Exterior doors
9.9.6.9. Every required exit door including an exit door serving not more than 1 dwelling unit shall swing on a vertical axis and such door shall open in the direction of exit travel except that a door serving a single dwelling unit is permitted to swing inward.	Exit door swing
9.9.6.10.(1) Revolving doors used as exits,	Revolving doors
(a) shall be of a collapsible type;	
(b) shall be permitted only at ground level not less than 10 ft from the foot of any stairway; and	
(c) may assume not more than ½ unit of exit.	
(2) Where revolving doors are used as exits, swing doors shall be provided adjacent to such doors.	
9.9.6.11. Exit doors and doors to dwelling units shall be openable from the inside without the use of keys.	Door latches
9.9.6.12. A door opening onto a public corridor which provides access to exit from individually rented rooms, suites of rooms or dwelling units shall be designed not to lock automatically when such doors are equipped with automatic self-closing devices.	Automatic locking prohibited
9.9.6.13. Every exit door shall be designed and installed so that when the latch is released the door will open in the direction of exit travel under a force of not more than 20 lb applied at the knob or other latch releasing device.	

Subsection 9.9.7. Exits from Floor Areas

- Scope** 9.9.7.1. This Subsection applies to exits from all floor areas except exits serving not more than 1 dwelling unit unless otherwise stated herein.
- Separation of exits** 9.9.7.2. Where more than 1 exit is required from a floor area, each exit shall be independent from every other exit leading from that floor area.
- Horizontal exits** 9.9.7.3. Not more than $\frac{1}{2}$ the required exits from a floor area may be horizontal exits.
- Number of exits** 9.9.7.4. Except as provided in Articles 9.9.7.5., 9.9.7.6. and 9.9.8.8., at least 2 exits shall be provided from every storey.
- 9.9.7.5. A single exit is permitted from every dwelling unit where such exit is an exterior door located at or near ground level and access to such exit is not through a garage or through a room not under the immediate control of the occupants of the dwelling unit served.
- 9.9.7.6. In buildings of 1 and 2 storeys in building height, a single exit is permitted from each storey having an occupant load of 60 persons or less provided the building does not contain a residential occupancy, except as permitted in Article 9.9.7.5. (see Article 9.9.9.1.).
- Distance between exits** 9.9.7.7. Where more than 1 exit is required from a floor area, every exit shall be placed remote from each other along the path of travel between them.
- Size of exits** 9.9.7.8. Where more than 1 exit is required, every such exit shall be considered as contributing not more than $\frac{1}{2}$ the required units of exit width.
- Exits through lobbies** 9.9.7.9.(1) Not more than 1 exit from a floor area above or below the main entrance lobby shall lead through the lobby and such lobby shall be not more than 15 ft above grade, and the path of travel through the lobby shall not exceed 50 ft.
- (2) Occupancies adjacent to such lobby shall be separated from the lobby by fire separations having fire-resistance ratings conforming to the requirements in Subsection 9.10.9., unless the storey in which the lobby is located is sprinklered.
- 9.9.7.10. Where an exit leads through the lobby as permitted in Article 9.9.7.9., the lobby must conform in all respects with the requirements for exits, except for Articles 9.9.2.5. and 9.9.2.6.

Subsection 9.9.8. Access to Exits

- Scope** 9.9.8.1. This Subsection applies to access to exits within floor areas except within individually rented rooms, suites of rooms or dwelling units unless otherwise stated herein.
- General requirements** 9.9.8.2. Except as permitted in 9.9.8.3., each individually rented room or suite of rooms on a floor area occupied by more than 1 tenancy and each dwelling unit shall have an exterior doorway at or near ground level or a doorway leading to an exterior passageway open to the outdoors or to an interior corridor and from the point where such doorway enters the exterior passageway or interior corridor, it shall be possible to go in opposite directions to each of 2 separate exits, except as otherwise permitted in this Section.
- 9.9.8.3. A doorway to a dwelling unit is permitted into an exit stairway or into a public corridor served by a single exit stairway provided each dwelling unit is provided with a second and separate means of egress.
- Dead-end corridors** 9.9.8.4.(1) Except as permitted in Article 9.9.8.3., a dead-end public corridor is acceptable in residential occupancies, provided it,

- (a) does not exceed 20 feet in length, measured from the end of the corridor to the nearest exit; and
 - (b) contains no door openings except entrance doors to individually rented rooms, suites of rooms or dwelling units.
- (2) Entrance doors located in a dead-end public corridor shall,
- (a) be located so that it is not necessary to pass more than 2 doors in travelling to the nearest exit; and
 - (b) be equipped with self-closing devices and self-latching devices which are designed not to lock automatically.

9.9.8.5. Access to exit from a room or suite of rooms containing an industrial occupancy with an occupant load of more than 30 shall not be through a dead-end corridor unless the suite or room has a second and separate means of egress. Where such access to exit is permitted to be by a dead-end corridor, the travel distance from the most remote part of the dead end to the nearest exit shall not exceed 30 ft.

9.9.8.6.(1) Dead-end public corridors are permitted in business and personal services occupancies only when the occupant load served by the public corridor does not exceed 30 persons and the dead-end portion does not exceed 30 ft in length, measured from the end of the corridor to the nearest exit.

(2) Dead-end public corridors referred to in Sentence (1) shall contain no door openings other than to individually rented rooms or suites, and such door openings shall be located so that it is not necessary to pass more than 2 doors in travelling to the nearest exit. Doors in such openings shall be equipped with self-closing devices and shall be designed not to lock automatically.

9.9.8.7.(1) When an individually rented room, suite of rooms, or dwelling unit is intended for an occupant load of more than 60 persons, or where the distance from any point within such rooms, suite of rooms or dwelling unit to the nearest door opening to a public corridor is more than 75 ft, no fewer than 2 egress doors shall be provided and such doors shall be spaced so that in the event that one doorway is made inaccessible by a fire within such room, suite or dwelling unit, the other doorway will provide safe egress.

Number of egress doors

(2) Where two egress doorways are required in Sentence (1), each doorway shall have an exit sign in accordance with Subsection 9.9.10.

9.9.8.8. Except as permitted in Article 9.9.7.5., a dwelling unit containing more than 1 storey shall have an exit or doorway into a public access to exit from each of its top and bottom storeys unless a listed products of combustion detector and alarm of the single station type is provided at each storey of the individual dwelling unit in accordance with Article 9.10.18.13. and provided it is possible to reach an egress doorway within 60 ft from any point in the dwelling unit without travelling through more than one other storey.

Access to exits on each floor

9.9.8.9. Required access to exit from individually rented rooms, suites of rooms or dwelling units shall not be through any other dwelling unit, service room or other occupancy.

Location of access to exits

Subsection 9.9.9. Travel Distance

9.9.9.1.(1) Where one exit from a storey is permitted in Article 9.9.7.6., the travel distance to such exit from any point on the floor area shall not exceed 75 ft.

Travel distance where a single exit door is used

(2) Where one exit is used, the building area shall not exceed 1,500 sq ft in the case of mercantile and industrial occupancies and 2,000 sq ft for other occupancies.

Travel distance
in floor areas
not divided
into suites

9.9.9.2. Where more than 1 exit is required in Article 9.9.7.4., the travel distance to the nearest exit from any point on a floor area shall be not greater than 125 ft in the case of business and personal services occupancies, and 100 ft for all other occupancies where the floor area is not divided into individually rented rooms, suites of rooms or dwelling units.

Travel distance
in floor areas
divided into
suites

9.9.9.3. Where more than 1 exit is required in Article 9.9.7.4., the travel distance measured to the nearest exit from the entrance doorway to an individually rented room, suite of rooms or dwelling unit shall be not greater than 125 ft in the case of business and personal services occupancies and 100 ft for all other occupancies, except that where the floor area is sprinklered the travel distance for all occupancies may be increased to 150 ft.

Subsection 9.9.10. Exit Signs

Scope

9.9.10.1. This Subsection applies to all exits except those serving not more than 1 dwelling unit.

Location

9.9.10.2. Exits shall be located so as to be clearly visible or their locations shall be clearly indicated.

9.9.10.3.(1) Every exit door other than the main entrance to a room or building shall have an exit sign placed over it when the exit serves,

- (a) a building exceeding 2 storeys in building height;
- (b) a building having an occupant load greater than 150;
- (c) a room with a high occupant load greater than 60; or
- (d) a room or floor area that has a fire escape as part of a required means of egress.

Exit direction
sign

9.9.10.4. Exit direction signs shall be placed in corridors and passageways where necessary to indicate the direction of exit travel.

9.9.10.5.(1) Exit signs shall,

- (a) be installed so as to be visible from the exit approach;
- (b) when the sign is internally lighted, have the word "EXIT" in red letters on a contrasting background or white letters on a red background;
- (c) where the sign is externally lighted, have the word "EXIT" in white letters on a red background or red letters on a white background.

(2) Lettering shall be made with at least $\frac{3}{4}$ -in.-wide strokes and be at least 6-in. high when the signs are externally lighted, and at least $4\frac{1}{2}$ -in. high if the sign is internally lighted.

Illumination

9.9.10.6. Provisions shall be made to illuminate exit signs required in Article 9.9.10.3. by an electrical circuit separate from other electrical circuits.

9.9.10.7. In 3-storey buildings any part of an exit ramp or stair that continues past the exit door at ground level shall be clearly marked to indicate that it does not lead to an exit, where there is a possibility that the portion below ground level may be mistaken as the direction of exit travel.

Subsection 9.9.11. Lighting

Scope

9.9.11.1. This Subsection applies to the lighting of all exits except those serving not more than 1 dwelling unit.

9.9.11.2. Every exit and public corridor shall be provided with lighting in accordance with the requirements in Article 9.35.2.9.	Means of egress lighting
9.9.11.3. Emergency lighting shall be provided in exits, corridors used by the public and principal routes providing access to exit in an open floor area where such exits, corridors and access routes are below grade, are windowless or are required in buildings in Subsection 9.10.18. to have a fire alarm system.	Emergency lighting
9.9.11.4.(1) Emergency lighting required in Article 9.9.11.3. shall, (a) be provided from a source of energy separate from the electrical supply for the building; (b) be designed to be automatically actuated when the electric lighting in the affected area is interrupted.	Automatic emergency lighting
(2) Illumination from such lighting shall be at least 1 foot-candle for a period of at least ½-hr.	
(3) Where incandescent lighting is provided, lighting equal to 1 Watt per 10 sq ft of floor area shall be considered to meet this requirement.	

SECTION 9.10 FIRE PROTECTION

Subsection 9.10.1. Scope

9.10.1.1. This Section contains requirements to minimize the collapse of buildings in the event of fire and to limit the spread of fire throughout the buildings or to other buildings.	Scope of fire protection
9.10.1.2. Where buildings are connected by enclosed walkways or covered malls, such walkways and malls shall conform to Part 3.	Walkways and malls
9.10.1.3. Tents and air-supported structures shall conform to Part 3.	Tents and air-supported structures
9.10.1.4. Where elevators, transformer vaults, moving walkways or escalators are provided, they shall conform to Parts 3 and 6.	Elevators, etc.
9.10.1.5. Where fuel-fired appliances are installed on a roof, such appliances shall be installed in conformance with Part 6.	Roof top appliances
9.10.1.6. Where rooms or spaces are intended for the storage, manufacture, or use of hazardous or explosive material, or for assembly, such rooms or spaces shall conform to Part 3.	Hazardous substances
9.10.1.7. Where sprinkler, standpipe and hose systems or fire alarm and detection systems are installed, they shall be installed to conform to Part 6.	Sprinklers, standpipes, fire alarm and detection systems

Subsection 9.10.2. General

9.10.2.1. Except for construction supporting a service room and for fire separations of major occupancies as described in Article 9.10.8.2., and except as provided in Article 9.10.8.9., construction required to have a fire-resistance rating shall be supported on construction having at least the same fire-resistance rating.	Support of rated assemblies
9.10.2.2. An assembly required to be of noncombustible construction shall be supported by noncombustible construction.	Support of non-combustible construction

Firewalls

9.10.2.3. Where a firewall divides a building, each portion of the building so divided may be considered as a separate building and such firewalls shall be constructed to conform to Articles 9.10.11.3. to 9.10.11.7.

9.10.2.4. RESERVED

9.10.2.5. In kitchens containing commercial cooking equipment used in processes producing grease-laden vapours, the equipment shall be designed and installed in conformance with Sentence 6.2.3.5.(3), except as required by Sentence 3.5.3.1.(1) and Article 3.5.4.2.

Subsection 9.10.3. Occupancy Classification

9.10.3.1. A building to be used for one or more major occupancies shall be classified according to all major occupancies for which it is intended.

Building classification

9.10.3.2. For the purposes of the classification of buildings according to occupancy, a major occupancy shall be considered to include the subsidiary occupancies which are contingent upon it.

Residential occupancy

9.10.3.3. Buildings or parts of buildings used for sleeping accommodation except those of institutional occupancy (Group B), shall be classified as residential occupancy (Group C) and such buildings as classified shall include children custodial homes and convalescent homes for ambulatory occupants living as a single housekeeping unit in a dwelling unit with sleeping accommodation for not more than 10 persons, apartments, boarding houses, convents, dormitories, houses, hotels, lodging houses, monasteries, motels, residential clubs, residential colleges and residential schools.

Business and personal services occupancy

9.10.3.4. Buildings or parts of buildings used for conducting business and rendering of professional or personal service shall be classified as business and personal service occupancy (Group D) and such buildings shall include banks, barber and hairdressing shops, beauty parlours, dental offices, self-service dry-cleaning establishments not employing flammable cleaners, fire stations, self-service laundries, medical offices, offices, police stations without detention quarters, radio stations, small tool and appliance rental and service establishments, and telephone exchanges.

Mercantile occupancy

9.10.3.5. Buildings or parts of buildings used for displaying or selling retail goods, wares or merchandise, shall be classified as mercantile occupancies (Group E) and these shall include department stores, exhibition halls, markets, shops, stores and supermarkets.

Medium hazard industrial occupancy

9.10.3.6. Buildings or parts of buildings used for assembling, fabricating, manufacturing, processing, repairing or storing of goods and materials in which the combustible content is greater than 10 lb or 100,000 Btu per sq ft of floor area, but do not involve sufficient quantities of highly combustible and flammable or explosive material to constitute a special fire hazard shall be classified as medium hazard industrial occupancies (Group F, Division 2) and these shall include aircraft hangars, box factories, candy plants, dry cleaning plants not using flammable or explosive cleaners, electrical substations, factories, freight depots, heliports, laboratories, laundries (except self-service), mattress factories, planing mills, printing plants, repair garages, sales rooms, service stations, storage rooms, television studios that do not admit viewing audiences, warehouses, wholesale rooms, wood working factories, and workshops.

High hazard industrial occupancy

9.10.3.7. Where buildings or parts of buildings of industrial occupancy involve sufficient quantities of flammable or explosive materials that constitute a special fire hazard, they shall conform to the requirements in Part 3 for high hazard industrial occupancy (Group F, Division 1).

Low hazard industrial occupancy

9.10.3.8. Buildings or parts of buildings used for assembling, fabricating, manufacturing, processing, repairing or storing goods and materials in which the fire load is less than 10 lb or 100,000 Btu per sq ft of floor area shall be classified as low hazard industrial occupancies (Group F, Division 3) and these shall include creameries, factories, laboratories,

power plants, sales rooms, sample display rooms, garages except those serving individual dwelling units, storage rooms, workshops and warehouses.

Subsection 9.10.4. Ratings

9.10.4.1. Where a fire-resistance rating or a fire-protection rating is required in this Section for an element of a building, such rating shall be determined in conformance with the test methods described in Part 3, National Research Council of Canada publication No. 13987, "Fire-Performance Ratings 1975", or Tables 1-A, 1-B and 1-C.

Test methods

9.10.4.2.(1) Where a flame-spread rating is required in this Section for an element of a building, such rating shall be determined in accordance with the test methods described in Part 3, National Research Council of Canada publication No. 13987, "Fire-Performance Ratings 1975", or in accordance with Tables 1-A, 1-B and 1-C.

Flame-spread rating

(2) Unless such rating is referred to herein as a "surface flame-spread rating", it shall apply to any surface of the element being considered that would be exposed by cutting through it as well as to the exposed surface of the element.

9.10.4.3. Floor and roof assemblies shall be rated for exposure to fire on the underside.

Floors and roofs

9.10.4.4. Exterior walls shall be rated for exposure to fire from inside the building and such walls need not comply with the temperature rise limitations required by the standard tests referred to in Article 9.10.4.1. if such walls have a limiting distance of at least 4 ft, and due allowance is made for the effects of heat radiation in accordance with the requirements in Part 3.

Exterior walls

9.10.4.5. Firewalls and interior vertical fire separations required to have fire-resistance ratings shall be rated for exposure to fire on both sides.

Firewalls

9.10.4.6. Where a ceiling construction has a suspended membrane ceiling with lay-in panels or tiles which contribute to the required fire-resistance rating, hold down clips or other means shall be provided to prevent the lifting of such panels or tiles in the event of a fire.

Subsection 9.10.5. Permitted Openings in Wall and Ceiling Membranes

9.10.5.1. Except as permitted in Articles 9.10.5.2. to 9.10.5.4., a membrane forming part of an assembly required to have a fire-resistance rating shall not be pierced by openings into the assembly unless the assembly has been tested and rated for such openings.

9.10.5.2. A wall or ceiling membrane forming part of an assembly required to have a fire-resistance rating may be pierced by openings for noncombustible electrical and similar service outlet boxes provided such outlet boxes are tightly fitted.

Permitted openings

9.10.5.3 Except as provided in Article 9.10.5.4, a membrane ceiling forming part of an assembly required to have a fire-resistance rating may be pierced by openings into noncombustible ducts within the ceiling space provided such openings are located not less than 7 ft apart and do not constitute more than 1 per cent of the ceiling area within a fire compartment and individual openings shall not exceed 1 sq ft in area, and if greater than 20 sq in. shall be protected by a fire stop flap as described in Article 9.10.14.10 provided asbestos paper is not exposed in supply and return air systems.

Openings for ducts

9.10.5.4. Where ducts within a ceiling space are protected within such space by construction providing a fire-resistance rating of not less than $\frac{1}{2}$ that required for the assembly, the opening into such ducts through a ceiling membrane is not restricted as described in Article 9.10.5.3.

NOTE: Subsection 9.10.5. amended by O. Reg. 445/80, s. 3 (1).

Subsection 9.10.6. Construction Types

9.10.6.1. Where a wall, floor or roof assembly is required to be of noncombustible construction, combustible elements shall be in conformance with the requirements in Article 3.1.4.5.

Non-combustible construction

Heavy timber construction 9.10.6.2. Heavy timber construction shall be considered to have $\frac{3}{4}$ -hr fire-resistance rating when it is constructed in accordance with the requirements for heavy timber construction in Part 3.

Garage floors 9.10.6.3. The finish of every garage floor shall be of asphalt, noncombustible material or other similar material.

Subsection 9.10.7. Protection of Steel Members

Protection of steel members 9.10.7.1. Except as permitted in Articles 9.10.7.2. to 9.10.7.8., structural steel members used in construction required to have a fire-resistance rating shall be protected in a manner to provide the required fire resistance.

Lintels 9.10.7.2. Steel lintels in loadbearing walls spanning not more than 6 ft. and 8 in. and steel lintels in non-loadbearing walls spanning not more than 10 ft. need not be protected.

Shelf angles 9.10.7.3. The bottom flanges of shelf angles and plates that are not part of the structural frame need not be protected.

Elevator shafts 9.10.7.4. Steel members around elevator shaft doorways or supporting elevator and dumbwaiter guides, counterweights and other such equipment when entirely enclosed in a shaft and not forming part of the structural frame of the building need not be protected.

Stairs and escalators 9.10.7.5. Steel members for stairways and escalators that are not part of the structural frame of the building need not be protected.

Porches, balconies, stairways, fire escapes, cornices and marquees 9.10.7.6. Steel members of porches, balconies, stairways, fire escapes, cornices, marquees and other similar constructions need not be protected provided they are outside of the building.

9.10.7.7. Except in buildings of medium hazard industrial occupancy or mercantile occupancy, steel members not less than 10 ft from a property line or a centreline of a public thoroughfare and which are at least 3 ft away from an unprotected opening need not be protected.

Loadbearing walls, columns and arches 9.10.7.8. Loadbearing steel or concrete members such as columns, beams and arches at least 10 ft from a property line or centreline of a public thoroughfare and which are shielded from a possible fire within the building by construction having a fire-resistance rating at least equivalent to that required for the loadbearing walls, columns and arches in Subsection 9.10.8. need not be protected provided such members are located so that they are not closer to an unprotected opening than the maximum horizontal projection of the member from the wall face.

Subsection 9.10.8. Fire Resistance in Relation to Occupancy and Height

Fire-resistance ratings 9.10.8.1. Fire-resistance ratings of floors, roofs, walls, columns, arches, balconies and mezzanines shall conform to Table 9.10.8.A., except that where there are more restrictive requirements elsewhere in this Part the more restrictive requirements shall apply.

Buildings having more than one occupancy 9.10.8.2. Except as permitted in Article 9.10.8.3., where a building contains more than one major occupancy the requirements in Table 9.10.8.A. for the occupancy having the more-restrictive requirements shall be applied to the entire building.

9.10.8.3.(1) Except as permitted in Sentence (2), where a major occupancy is located entirely above another major occupancy, the portion of the building containing such upper occupancy may be considered as if the entire building contained that occupancy when applying the requirements in Table 9.10.8.A.

(2) In a building containing more than one major occupancy where the aggregate area of all major occupancies in that particular group or division does not exceed 10 per cent of the floor area on the storey on which they are located, they need not be considered as major occupancies for the purposes of Articles 9.10.8.1. and 9.10.8.2. provided they are not classified as Group F, Division 2 occupancies.

(3) The fire separation for the fire compartment as provided in Sentence (1) need not be supported in conformance with Article 9.10.2.1. except as required because of the building type, building area and occupancy fire hazard to which the supporting element is exposed.

9.10.8.4. Where a crawl space exceeds 6 ft in height is used for any occupancy or for the passage of flue pipes or as a plenum, it shall be considered as a cellar in applying the requirements in Table 9.10.8.A.

Crawl space

9.10.8.5. Elevator machine rooms, stairway bulkheads and penthouse service rooms need not be considered as a storey in applying the requirements in Table 9.10.8.A., and need not be constructed in conformance with Table 9.10.8.A.

Storey height

9.10.8.6. In applying the requirements in Table 9.10.8.A., a mezzanine need not be considered as a storey where it occupies less than 40 per cent of the room or storey in which it is located and is used as an open floor area provided the space above the mezzanine floor and the floor beneath it have no visual obstructions more than 42-in. above such floors.

9.10.8.7. Roofs with slopes at 60 deg. or more to the horizontal and which are adjacent to a room or space intended for occupancy shall be considered as a wall in applying the requirements in Table 9.10.8.A.

Roofs considered as walls

TABLE 9.10.8.A.

Forming Part of Articles 9.10.8.1. to 9.10.8.13.

MINIMUM REQUIRED FIRE-RESISTANCE RATINGS FOR STRUCTURAL MEMBERS AND ASSEMBLIES, hr						
Major occupancy	Maxi- mum Building Height, Storeys	Building Element				
		Floors Above Basements and Cellars	Other Floors Except Floors Over Crawl Spaces	Interior Mezzanines and Interior Balconies	Roofs	Load- bearing Walls, Columns and Arches
Residential (Group C)	3	$\frac{3}{4}$ 9.10.8.10	$\frac{3}{4}$ 9.10.8.10.	$\frac{3}{4}$ *	—	9.10.8.8.
Business and personal services (Group D)	2	$\frac{3}{4}$	—	—	—	9.10.8.9.
	3	1	$\frac{3}{4}$ *	$\frac{3}{4}$ *	$\frac{3}{4}$ *	9.10.8.9.
Mercantile (Group E)	2	$\frac{3}{4}$	$\frac{3}{4}$	—	—	9.10.8.8.
	3	1 9.10.8.12.	$\frac{3}{4}$	$\frac{3}{4}$ *	$\frac{3}{4}$	9.10.8.9.
Medium hazard industrial (Group F Division 2)	2	$\frac{3}{4}$	$\frac{3}{4}$ *	—	—	9.10.8.9.
	3	1 9.10.8.13.	$\frac{3}{4}$	$\frac{3}{4}$ *	$\frac{3}{4}$ *	9.10.8.9.
Low hazard industrial (Group F Division 3)	2	$\frac{3}{4}$	—	—	—	9.10.8.9.
	3	1	$\frac{3}{4}$ *	$\frac{3}{4}$ *	$\frac{3}{4}$ *	9.10.8.9.
Column 1	2	3	4	5	6	7

Notes to Table 9.10.8.A.:

(¹)A minimum fire-resistance rating is not required wherever a dash appears in the Table.

(²)Where an asterisk mark appears in the Table, it refers to Article 9.10.8.11.

(³)9.10.8.8., 9.10.8.9., 9.10.8.10, 9.10.8.12 and 9.10.8.13 refer to Article numbers.

9.10.8.8. Loadbearing walls, columns and arches for residential and 2-storey mercantile occupancies shall have a fire-resistance rating not less than that required for the supported construction.

9.10.8.9. Loadbearing walls, columns and arches for major occupancies in Table 9.10.8.A., except those in Article 9.10.8.8., shall have a fire-resistance rating not less than that required for the supported assembly except when such assembly is not required to be a fire separation, unrated noncombustible construction may be used.

9.10.8.10. A fire-resistance rating is not required for floors within dwelling units provided such dwelling units are not located over another dwelling unit or over another major occupancy.

9.10.8.11. Where marked with an asterisk in Table 9.10.8.A., a fire-resistance rating is not required when noncombustible construction is used.

9.10.8.12. In 3-storey mercantile occupancies, floors above basements and cellars may be of heavy timber construction when the basements and cellars are sprinklered.

9.10.8.13. Floors above basements and cellars in 3-storey medium hazard industrial occupancies shall be of noncombustible construction.

Basements
and cellars

9.10.8.14. Basements and cellars which are more than 1 storey below ground level shall conform to the requirements contained in Part 3.

Subsection 9.10.9. Fire Separations between Rooms and Spaces within Buildings

Scope

9.10.9.1. This Subsection applies to fire separations required between rooms and spaces in buildings except rooms and spaces within a dwelling unit.

9.10.9.2. Except as permitted in Articles 9.10.9.3. to 9.10.9.11., a wall, partition or floor assembly required to be a fire separation shall be constructed as a continuous element of a fire compartment.

Closures

9.10.9.3. Except as permitted in Articles 9.10.9.5. to 9.10.9.11., openings in required fire separations shall be protected with closures conforming to Subsection 9.10.14.

Floor
assemblies

9.10.9.4. Except as permitted in Articles 9.10.9.5. to 9.10.9.8., all floor assemblies except those contained within dwelling units and those for which no fire-resistance rating is listed in Table 9.10.8.A. shall be constructed as fire separations.

Openings in
floor assemblies

9.10.9.5. Where openings through floors required to be fire separations are essential to a manufacturing process in an industrial occupancy, the omission of closures for such openings may be permitted provided adequate precautions are taken to offset the fire hazard caused by such openings.

Crawl spaces

9.10.9.6. A floor assembly over a crawl space which is not used for any occupancy and which does not contain a flue pipe need not be constructed as a fire separation provided the crawl space is 6 ft or less in height and is not used as a plenum, except as permitted in Article 9.10.9.4.

Open stairways

9.10.9.7. The first storey may be connected either to the storey above or below the first storey by an open stairway not forming part of a required exit where the building is intended only for business and personal services or mercantile occupancy provided such building is sprinklered or is of noncombustible construction.

Openings in
floors for ramps

9.10.9.8. Openings in floors for vehicle ramps in a low hazard industrial occupancy need not be protected with closures.

Fire stopping of
pipes and ducts

9.10.9.9. Pipes and ducts that penetrate through a required fire separation shall be tightly fitted or fire stopped to prevent the passage of smoke and flame if such pipes or ducts are not enclosed in a shaft and unenclosed ducts that penetrate through a required fire separation shall be provided with fire dampers installed to conform to Part 6 (See also Subsection 9.10.5.).

9.10.9.10. Every pipe, duct, electrical conduit, electrical outlet box or other similar service equipment that partly or wholly penetrates through a required fire separation shall be noncombustible, except that such equipment may be combustible where the assembly has been tested incorporating such combustible equipment (see also Subsection 9.10.4.).	Pipes, ducts outlet boxes, etc.
9.10.9.11. Where a fire separation required to be of noncombustible construction terminates on the exterior wall or roof surface, no combustible material shall extend across the end of the fire separation to form a bridge where fire could cross.	Non-combustible fire separations
9.10.9.12. Combustible construction that abuts on or is supported by a noncombustible fire separation shall be constructed so that its collapse under fire conditions will not cause collapse of the fire separation.	Support of combustible construction
9.10.9.13. Combustible members shall not pierce a noncombustible fire separation or reduce the thickness of the fire separation to less than 4 in.	
9.10.9.14. Except as provided in Article 9.10.9.15., a horizontal service space or other concealed space located above a required vertical fire separation shall be divided at the fire separation by an equivalent fire separation within the space.	Concealed horizontal space
9.10.9.15.(1) Where a horizontal service space or other concealed space is located above a required vertical fire separation, the fire-resistance rating of a membrane ceiling protection between such space and the spaces below, when forming part of a horizontal fire separation, may be added to the fire-resistance rating of the fire separation within the space as required in Article 9.10.9.14., provided that a fire separation equivalent to the required vertical fire separation is supplied by the membrane ceiling protection in combination with the fire separation within the space.	
(2) The fire separation within the space referred to in Sentence (1) may be eliminated provided that the membrane ceiling protection has an equivalent fire-resistance rating to the required vertical fire separation.	
9.10.9.16. Except as provided in Articles 9.10.9.17. to 9.10.9.18., 2 or more major occupancies having different occupancy classifications shall be separated from each other by a fire separation having a fire-resistance rating of not less than 1-hr.	Separation of major occupancies
9.10.9.17. A medium hazard industrial occupancy shall be separated from a residential occupancy by a fire separation having not less than a 2-hr fire-resistance rating.	
9.10.9.18. Where 3 or more dwelling units are contained in a building having a mercantile occupancy, such mercantile occupancy shall be separated from the dwelling units by a fire separation having not less than a 2-hr fire-resistance rating.	
9.10.9.19. In buildings classified as residential occupancy, dwelling units containing not more than 1 storey, suites and sleeping rooms that do not form part of a suite shall be separated from adjacent dwelling units, suites and rooms by a fire separation having a fire-resistance rating of at least $\frac{3}{4}$ -hr.	Separation between suites, rooms and dwelling units
9.10.9.20. Dwelling units which contain 2 or more floor levels including basements or cellars shall be separated from adjacent dwelling units and from other parts of the building by a fire separation having a fire-resistance rating of not less than 1-hr.	
9.10.9.21. Public corridors shall be separated from the remainder of the building by a fire separation having at least $\frac{3}{4}$ -hr fire-resistance rating, except that no fire-resistance rating is required in other than residential occupancies where the floor area is sprinklered.	
9.10.9.22.(1) Except as provided in Articles 9.10.9.23. to 9.10.9.24., a storage garage shall be separated from other occupancies by a fire separation having not less than a $1\frac{1}{2}$ -hr fire-resistance rating.	Separation of garages
(2) A repair garage shall be separated from other occupancy by a fire separation having not less than a 2-hr fire-resistance rating and such separation between a repair garage and a residential occupancy shall have no opening through it.	

Separation of
storage garages,
5 cars or fewer

9.10.9.23. Except as permitted in Article 9.10.9.24., storage garages containing 5 cars or fewer shall be separated from other occupancies by a fire separation of not less than 1-hr.

Separation of
garages serving
1 dwelling unit

9.10.9.24. In houses containing a single dwelling unit or 2 vertically separated dwelling units, the fire separation required in Article 9.10.9.23. may be omitted where an attached or built-in garage serves only the dwelling unit adjacent to it, and the construction between the garage and the dwelling unit provides an effective barrier to gas and exhaust fumes, and any door between the garage and dwelling unit conforms to Article 9.10.14.13. Where an attic space is common to 2 dwelling units and to the garage, the attic space adjacent to the garage shall be separated from such common attic space by a membrane at least equivalent to type B, C, D, E, I or K finishes in Tables 1-A to 1-C, or the ceiling of the garage shall be protected with a similar membrane.

Separation of
shafts, chutes
and service
rooms

9.10.9.25. The fire separation requirements for vertical shafts and chutes shall comply with Subsection 9.10.12.; boiler, furnace, incinerator and service rooms shall comply with Subsection 9.10.10.; firewalls shall comply with Subsection 9.10.11.

9.10.9.26. Combustible drain, waste and vent piping shall not be used in a plumbing system within a building where part of the system is located within or passes through a fire separation, except that where drain, waste and vent piping penetrates through a vertical fire separation, the piping on one side of the separation may be combustible provided the combustible piping is not located in a vertical shaft or in a fire separation.

Subsection 9.10.10. Service Rooms

Application

9.10.10.1. This Subsection applies to service rooms in all buildings except rooms located within a dwelling unit.

9.10.10.2.(1) Service rooms containing only service machinery or electrical equipment rooms shall be separated from the remainder of the building by a fire separation having a fire-resistance rating of at least one hour when the floor area containing the service room is not sprinklered.

(2) Where the service room is intended for the storage or use of hazardous substance, the requirements in Article 3.5.2.1. shall apply.

Separation of
fuel-fired
appliances

9.10.10.3. Except as provided in Articles 9.10.10.4. and 9.10.10.5., fuel-fired appliances other than fireplaces shall be located in a service room or service space designed for that purpose, and separated from the remainder of the building by a fire separation having not less than a 1-hr fire-resistance rating.

Exception

9.10.10.4. Fuel-fired space-heating appliances, space-cooling appliances and service water heaters that serve a single room, space or suite of rooms, or serving a building having a building area of not more than 4,000 sq ft containing not more than 2 storeys in building height need not be separated from the remainder of the building as required in Article 9.10.10.3.

Incinerator
rooms

9.10.10.5. Service rooms containing incinerators shall be separated from the remainder of the building by a fire-separation having a fire-resistance rating of not less than 2-hr.

Incinerators

9.10.10.6. The design, construction, installation and alteration of each indoor incinerator shall conform to NFPA 82-1972, "Incinerators and Rubbish Handling", as revised to 1 May, 1975.

Chimneys for
incinerators

9.10.10.7. Every incinerator shall be connected to a chimney flue conforming to the requirements in Section 9.21 and such chimney flue shall serve no other appliance.

9.10.10.8. An incinerator shall not be located in a room with other fuel-fired appliances.

Storage rooms

9.10.10.9.(1) Except as required in Article 9.10.10.5. and subject to Sentence (2) rooms for the temporary storage of combustible refuse in all occupancies or for public storage in residential occupancies shall be separated from the remainder of the building by a fire separation having not less than a 1-hr fire-resistance rating.

(2) Notwithstanding Sentence (1), where the fire-resistance rating of the floor assembly is not required to exceed ¾-hr or where such rooms are sprinklered a ¾-hr fire separation is permitted.

Subsection 9.10.11. Firewalls

9.10.11.1. RESERVED

9.10.11.2. RESERVED

9.10.11.3. A required firewall (see Articles 9.10.2.3. and 9.10.15.12.) shall be constructed as a fire separation having a fire-resistance rating of not less than 4-hr where there is a mercantile or industrial occupancy adjacent to the firewall, and not less than 2-hr for other occupancies and such firewall shall be of noncombustible construction (see also Subsection 9.10.6.).

Fire-resistance rating

9.10.11.4. Except as provided in Article 9.10.11.5., every firewall shall extend from the top of the footings continuously through all storeys and not less than 6 in. above the roof surface where the firewall is required to have a 2-hr fire-resistance rating, and not less than 36 in. above the roof surface where the firewall is required to have a 4-hr fire-resistance rating (see also Article 9.10.9.11.).

Parapets for firewalls

9.10.11.5. In buildings of noncombustible construction, a firewall need not extend above the roof provided the roof assembly on both sides of the firewall has not less than a 1-hr fire-resistance rating where the firewall is required to have a 2-hr fire-resistance rating, and not less than a 2-hr fire-resistance rating where the firewall is required to have a 4-hr fire-resistance rating and such firewall shall terminate at the underside of a solid roof slab or deck with a smoketight joint, and there shall be no concealed spaces within the roof slab in that portion above the firewall.

Parapet not required

9.10.11.6. A firewall may be offset at any intermediate floor construction provided the fire separation for the complete assembly is continuous.

Offsets

9.10.11.7. Openings in a firewall shall conform to the requirements in Subsection 9.10.14.

Openings

Subsection 9.10.12. Chutes and Vertical Shafts

9.10.12.1. This Subsection applies to shafts and chutes in all buildings except where such shafts and chutes are entirely contained within a dwelling unit.

Scope

9.10.12.2. Where a vertical shaft penetrates a floor construction required to be a fire separation, the shaft shall be separated from the floor area by a fire separation.

9.10.12.3. Except as provided in Article 9.10.12.5., where the floor assembly through which a shaft passes is required to be a fire separation, the shaft walls shall have a fire-resistance rating conforming to Table 9.10.12.A.

Fire-resistance rating

TABLE 9.10.12.A.
Forming Part of Article 9.10.12.3.

MINIMUM FIRE-RESISTANCE RATINGS FOR SHAFT WALLS		
Minimum Required Fire-Resistance Rating of Floor Assembly Through Which the Shaft Passes, hr	Type of Shaft	
	Exit and Elevator Shafts, hr	Other Shafts, hr
Less than ¾	¾	—
¾	¾	¾
1	¾	¾
1 ½	1	1
2	1 ½	1
Column 1	2	3

Top of shaft	9.10.12.4. Where the top of a shaft does not extend through the roof of the building, or where the bottom of the shaft does not extend to the bottom of the building, such top or bottom of the shaft shall be separated from the remainder of the building by a fire separation having a fire-resistance rating not less than that required for the shaft walls.
Linen and refuse chutes	<p>9.10.12.5.(1) Linen and refuse chutes shall be enclosed in a shaft constructed of noncombustible materials and having a fire-resistance rating of,</p> <ul style="list-style-type: none">(a) not less than 1-hr where the chute outlet is protected with an automatic self-latching closure held open by a fusible link; or(b) not less than 2-hr where an automatic self-latching closure held open by a fusible link is not provided.
Lining	9.10.12.6. Linen and refuse chutes shall be lined with not less than 0.016-in.-thick copper-bearing galvanized steel, or 0.019-in.-thick aluminum or other similar material.
Intake openings	<p>9.10.12.7.(1) The intake openings for refuse and linen chutes shall be located in a compartment,</p> <ul style="list-style-type: none">(a) having no dimension less than 30-in. ; and(b) separated from the remainder of the building by a fire separation having a fire-resistance rating of not less than $\frac{3}{4}$-hr. <p>(2) Such compartment shall be used only as a facility for separating the intake opening from the remainder of the floor area, and shall not open into an exit.</p> <p>(3) The intake openings for such chutes,</p> <ul style="list-style-type: none">(a) shall be not greater in area than 60 per cent of the cross-sectional area of the chutes; and(b) shall be fitted with closures designed to close automatically after use.
Discharge	<p>9.10.12.8.(1) A refuse or linen chute shall discharge into a room or bin separated from the remainder of the building by a fire separation which shall have a fire-resistance rating of,</p> <ul style="list-style-type: none">(a) not less than 1-hr in the case of linen chutes; and(b) not less than 2-hr in the case of refuse chutes, <p>and doors into such rooms shall not be located in an exit.</p>
Design of refuse room or bin	<p>9.10.12.9.(1) The room or bin into which a refuse chute discharges shall,</p> <ul style="list-style-type: none">(a) be of sufficient size to contain the refuse between normal intervals of emptying;(b) be impervious to moisture;(c) have wash water supply and floor drains; and(d) contain no other service equipment.
Sprinklers	9.10.12.10. Automatic sprinklers shall be installed at the top of each refuse or linen chute, and in the room or bin into which the chute discharges.
Washing equipment	9.10.12.11. Every refuse chute shall be equipped at the top with spray equipment for washing the chute.
Venting	9.10.12.12. Refuse and linen chutes exceeding 1 sq ft in cross-sectional area shall be vented to the exterior to conform to Part 6.

Subsection 9.10.13. Prevention of Fire Spread at Building Exteriors

- 9.10.13.1. In buildings of mercantile or medium hazard industrial occupancy, the exterior openings in one storey shall be separated from openings in an adjacent storey by not less than 3 ft of wall, or a canopy or balcony not less than 3 ft in width having a fire-resistance rating at least equal to that required for the floor assembly, except that the rating need not exceed 1-hr.

9.10.13.2. Openings in an exterior face of a building on either side of a firewall shall conform to the requirements in Article 9.10.15.11.

9.10.13.3. Where an exterior wall of a building is located above an adjacent roof having a fire-resistance rating of less than 1-hr and is part of a fire compartment in the same building, separate from that enclosed by the roof, every opening in such wall above the roof and within 15 ft horizontally of the roof shall be protected with wired glass in steel frames or glass blocks.
- Separation of openings

Firewalls

Protection of openings above roofs

Subsection 9.10.14. Doors, Dampers and Other Closures in Fire Separations

- 9.10.14.1.(1) Openings in required fire separations shall be protected with closures conforming to Table 9.10.14.A., which shall be installed in accordance with NFPA 80-1973, "Fire Doors and Windows", as revised to 1 May, 1975 unless otherwise specified herein (see also Article 9.10.4.1.).
- Installation

TABLE 9.10.14.A.
Forming Part of Sentence 9.10.14.1.(1)

FIRE-PROTECTION RATINGS FOR CLOSURES	
Minimum Fire-Resistance Rating of Fire Separation, hr	Minimum Fire-Resistance Rating of Closure, hr
Less than ¾	No minimum
¾	⅓
1	¾
1½	1
2	1½
3	2
4	3
Column 1	2

- (2) Where the fire separation for exits is permitted to be ¾-hr, not more than one exit shaft may include wired glass or glass block including wired glass in doors between such shaft and a public corridor or vestibule located within a floor area provided such wired glass or glass block conforms to Sentence (1).

(3) A 1¾-in.-thick solid core wood door may be used where a minimum fire-protection rating of ⅓-hr is permitted, or between a public corridor and an individually rented room, dwelling unit or suite of rooms; and such door shall have not more than ¼-in. clearance beneath and not more than ⅛-in. at the sides and top; and such doors shall conform to CSA O132.2-1972, "Wood Doors", as revised to 1 May, 1975.

(4) Doors required to provide a ⅓-hr fire-protection rating or permitted to be 1¾-in. solid core wood shall be mounted in a wood frame of at least 2-in. thickness where the frame has not been tested and rated.

9.10.14.2. Doors forming part of an exit or a public means of egress shall conform to Subsection 9.9.6. in addition to this Subsection.
- Doors in a public means of egress

Wired glass

9.10.14.3.(1) Wired glass which has not been tested in accordance with Article 9.10.14.1. is permitted as a closure in a fire separation required to have a fire-resistance rating of not more than 1-hr provided such glass is not less than $\frac{1}{4}$ -in. thick and such glass shall be mounted in steel frames.

(2) Individual panes of glass as referred to in Sentence (1) shall not exceed 9 sq ft in area or 4 ft 6 in. in height or width, and the area of glass between structural mullions shall not exceed 80 sq ft.

Glass block

9.10.14.4. Glass block that has not been tested in accordance with Article 9.10.4.1. is permitted as a closure in a fire separation required to have a fire-resistance rating of not more than 1-hr provided they are installed according to Section 4.4 and reinforced with steel reinforcement in each horizontal joint.

Maximum closure size

9.10.14.5.(1) Closures in fire separations shall not exceed 120 sq ft in area, and 12 ft in height or width.

(2) Except in exits, the aggregate width of the openings referred to in Sentence (1) shall not exceed 25 per cent of the length of the fire separation in which they occur.

Self-closing devices and latches

9.10.14.6. Every door in an interior fire separation shall have a self-closing device and latch or other device designed to close and hold the door closed, except that self-closing devices need not be provided for doors between public corridors and rooms or suites of business and personal service occupancy, or at the entrance to individually rented sleeping rooms, or dwelling units which do not open directly into an exit or which are not located in a dead-end corridor.

9.10.14.7.(1) Except in exit stairshafts, hold-open devices may be installed on closures, provided the safety of the occupants is not impaired.

(2) Such devices shall be actuated by smoke detectors, the building alarm system or a heat actuated device designed for this purpose.

(3) The devices in Sentence (2) shall be of the type listed.

Service room doors

9.10.14.8.(1) Swing-type doors to service rooms such as boiler, furnace or incinerator rooms shall swing into such rooms where such doors lead to public corridors or rooms used for assembly.

(2) Such doors shall swing outward from such rooms in all other cases and doors from such rooms shall not lead directly into an exit.

9.10.14.9. Except as permitted in Articles 9.10.5.3., 9.10.5.4., 9.10.14.10., 9.10.14.11. and 9.10.14.12., where a duct pierces a required fire separation, a fire damper shall be installed in the duct at the fire separation in conformance with Article 6.2.4.9.

9.10.14.10 Fire stop flaps in ceiling membranes required in Article 9.10.5.3 shall be equipped with corrosion-resistant pins and hinges and such flaps shall be designed to close automatically at a temperature 50°F above the maximum temperature that will normally be encountered in the system.

9.10.14.11. When a noncombustible branch duct having a melting point of at least 1,200°F and a cross-sectional area less than 20 sq in. supplies only air-conditioning units discharging air at not more than 4 ft above the floor, no fire damper is required where the branch duct pierces a required fire separation provided the duct does not pierce the floor at more than one place.

9.10.14.12. Where a noncombustible branch duct having a melting point of at least 1,200°F pierces a required fire separation around an exhaust duct riser in which the air flow is upward, no fire damper is required provided the branch duct is carried up the riser at least 22 in.

9.10.14.13.(1) A door between an attached or built-in garage and a dwelling unit shall be an exterior type, tight fitting and weather-stripped to provide an effective barrier against the passage of gas and exhaust fumes, and shall be fitted with a self-closing device.

(2) A doorway between an attached or built-in garage and a dwelling unit shall not be located in a room intended for sleeping.

9.10.14.14. Openings shall not be permitted through doors in required fire separations unless such openings are protected with covers which will not significantly reduce the fire-protection rating or increase the passage of smoke through the door assembly.

Openings in doors

9.10.14.15. Where a 1¾-in.-thick solid core wood door is permitted in a required fire separation, the requirement for a noncombustible sill in NFPA 80-1973, "Fire Doors and Windows", as revised to 1 May, 1975 shall not apply.

Subsection 9.10.15. Spatial Separations between Buildings

9.10.15.1.(1) Except as provided in Articles 9.10.15.4. to 9.10.15.6., the maximum percentage of unprotected openings calculated in accordance with Article 9.10.15.2. in an exposing building face shall conform to Table 9.10.15.A.

(2) The maximum percentage of unprotected openings determined in accordance with Part 3 shall be permitted as an alternative method for determining such allowable openings.

(3) The maximum area of an exposing building face shown in column 1 in Table 9.10.15.A. shall be calculated as the total area of exterior wall facing in 1 direction on any side of a building measured from the finished ground level to the uppermost ceiling, except as follows: where a building is divided by fire separations into fire compartments, the area of exposing building face may be calculated for each fire compartment provided such separations have not less than a 2-hr fire-resistance rating in the case of mercantile and medium hazard industrial occupancies and ¾-hr for other occupancies.

TABLE 9.10.15.A.

Forming Part of Article 9.10.15.1.

MAXIMUM PERCENTAGE OF UNPROTECTED OPENINGS IN EXTERIOR WALLS											
Maximum Area of Exposing Building Face	Limiting Distance										
	Less than 4 ft	4 ft	6 ft	8 ft	10 ft	15 ft	20 ft	30 ft	40 ft	50 ft	60 ft
Up to 300 sq ft	0	8	11	17	25	54	100	—	—	—	—
301 to 400 sq ft	0	7	10	15	21	43	75	100	—	—	—
401 to 500 sq ft	0	7	10	14	19	36	62	100	—	—	—
501 to 1,000 sq ft	0	7	8	11	13	23	37	76	100	—	—
Over 1,000 sq ft	0	7	8	9	10	14	20	37	60	90	100
Column 1	2	3	4	5	6	7	8	9	10	11	12

9.10.15.2. The area of unprotected openings shall be calculated as the aggregate of the window and door openings which are not equipped with closures as described in Subsection 9.10.14. and that portion of the wall having a fire-resistance rating less than that required in Articles 9.10.15.6. to 9.10.15.9. Glass blocks and wired glass shall not be considered as closures for the purpose of this Article.

Unprotected openings

9.10.15.3.(1) The limiting distance shown in Table 9.10.15.A. may be reduced provided it is not less than the square root of the aggregate area of unprotected openings in an exposing building face in residential occupancies, business and personal services occupancies

Limiting distance

and low hazard industrial occupancies, and is not less than the square root of twice the aggregate area of unprotected openings in mercantile occupancies and medium hazard industrial occupancies.

(2) Where the exterior wall of a building is an irregular shape the limiting distance may be determined by measuring from a vertical plane located so that no portion of the exterior wall of the building is between such vertical plane and the line to which the limiting distance is measured and in such cases the area of unprotected openings shall be determined from the projection onto this plane of the unprotected openings occurring in the exterior wall.

(3) The percentage of unprotected openings for mercantile and medium hazard industrial occupancies shall be $\frac{1}{2}$ the values in Table 9.10.15.A.

Allowance for
wired glass,
sprinklers

9.10.15.4. The area of unprotected openings in Articles 9.10.15.1. and 9.10.15.3. may be doubled where the building is sprinklered, or where the unprotected openings are glazed with wired glass in steel frames or glass blocks as described in Articles 9.10.14.3. and 9.10.14.4.

9.10.15.5. An exposing building face is permitted to have unlimited unprotected openings in the first storey when the exposing building face faces a street and has a limiting distance of at least 30 ft.

9.10.15.6. Except for a garage serving one dwelling unit only when a storage garage has at least 25 per cent of the total area of the perimeter walls open to the outdoors and such open area is distributed to provide cross ventilation, the exposing building face of such garage is permitted to have unlimited unprotected openings provided the storage garage has a limiting distance of at least 10 ft.

Design of
exposing
building face

9.10.15.7. Except as permitted in Articles 9.10.15.8., 9.10.15.9. and 9.10.15.10, each exposing building face shall be constructed to conform to Table 9.10.15.B. and Sub-section 9.10.8 except that heavy timber and steel columns need not comply with the requirements of Table 9.10.15.B. if the limiting distance is not less than 10 ft.

TABLE 9.10.15.B.

Forming Part of Article 9.10.15.7.

MINIMUM CONSTRUCTION REQUIREMENTS FOR EXTERIOR WALLS			
Occupancy Classification of Building	Maximum Percentage of Unprotected Openings Permitted per cent	Minimum Required Fire-Resistance Rating for Exposing Building Face, hr	Type of Construction
Residential, business and personal services, and low hazard industrial	0-10	1	Noncombustible construction Noncombustible cladding —
	11-25	1	
	26-100	$\frac{3}{4}$	
Mercantile, and medium hazard industrial	0-10	2	Noncombustible construction Noncombustible cladding —
	11-25	2	
	26-100	1	
Column 1	2	3	4

Fire resistance
of exterior walls
of houses

9.10.15.8.(1) Notwithstanding the requirements of Article 9.10.15.7. and except as provided in Sentence (2), in buildings containing only dwelling units in which there is no dwelling unit above another dwelling unit, the exposing building face,

- (a) may be of combustible construction, except that such exposing building face must be clad with non-combustible material where the limiting distance is less than 2 ft;
- (b) shall, where the limiting distance is less than 4 ft., have a fire-resistance rating of ¾ hr. and no unprotected openings.

(2) Where the spatial separation between dwelling units on adjoining properties is guaranteed in the title of both properties, the spatial separation may be calculated as if the dwelling units were constructed on the same property.

Zero lot line

(3) The maximum percentage of unprotected openings in an exposing building face shall conform to Table 9.10.15.A.

9.10.15.9.(1) The exposing building face of a detached garage that serves 1 dwelling unit only shall have a fire-resistance rating of at least ¾-hr, except that no fire-resistance rating is required where the limiting distance is 2 ft or greater.

Fire resistance of a garage serving a dwelling unit

(2) The exterior cladding of such detached garages is not required to be noncombustible regardless of the limiting distance.

(3) The percentage of window openings permitted in the exposing building face of such detached garages shall conform to the requirements for unprotected openings in Article 9.10.15.1.

9.10.15.10. In buildings of 1-storey in building height of noncombustible construction classified as low hazard industrial occupancy which are used only for low fire load occupancies such as power generating plants or plants for the manufacture or storage of noncombustible materials, non-loadbearing wall components need not have a minimum fire-resistance rating provided the limiting distance is 10 ft or more.

Unrated non-combustible construction permitted

9.10.15.11. Where 2 exterior walls of 2 buildings meet at a firewall at an angle of 135 deg. or less, the distance from an opening on one side of the firewall to another opening on the other side of the firewall shall conform to Part 3.

Firewalls

9.10.15.12. Except as provided in Article 9.10.15.13., a party wall on a property line shall be constructed as a firewall.

9.10.15.13.(1) In a building of Residential Occupancy in which there is no dwelling unit above another dwelling unit, a common wall between dwelling units need not be constructed as a firewall, provided it is constructed as a fire separation having not less than a 1-hr fire-resistance rating, provided the building area does not exceed 6,000 sq ft.

Common walls between dwelling units

(2) Such walls shall provide continuous protection from the top of the footings to the underside of the roof deck. Any space between the top of such walls and the roof deck shall be tightly sealed by caulking with mineral wool or noncombustible material.

9.10.15.14. Notwithstanding the requirements of Article 9.10.15.12., when a building is divided by fire separations in accordance with Subsection 9.10.9. to create separately owned spaces within a building, such separations need not be constructed as firewalls and shall not be considered as firewalls in calculating the building area.

Subsection 9.10.16. Fire Stopping

9.10.16.1. Fire stops shall be provided at floor, ceiling and roof levels to cut off all concealed draft openings occurring between storeys and between the top storey and roof space.

Fire stopping between storeys

9.10.16.2. Fire stops shall be provided at the ceiling and floor level of furred walls and partitions. The vertical dimension of any concealed space in a wall or partition of combustible construction shall not exceed 10 ft.

Stairs

9.10.16.3. Fire stops shall be provided at the top and bottom of each run of stairs where they pass through a floor containing concealed space.

Concealed spaces

9.10.16.4. In unsprinklered buildings of combustible construction, every concealed space created by a suspended ceiling, roof space or unoccupied attic space shall be separated by fire stops into draft-tight compartments not more than 3,000 sq ft in area where such space contains materials having a flame-spread rating greater than 25 and no dimension of such space shall exceed 150 ft.

Mansard roofs, balconies and canopies

9.10.16.5. Concealed spaces in mansard roofs, exterior cornices, balconies and canopies of combustible construction shall be fire stopped from the point where such concealed spaces extend across the ends of required fire separations.

Fire-stopping materials

9.10.16.6. Fire stops shall consist of sheet steel, asbestos board, gypsum board, ½-in. minimum thickness of plywood with joints backed with similar material, 2 thicknesses of nominal 1-in.-thick lumber with joints staggered or not less than 2-in.-thick lumber.

Pipes and ducts piercing fire stops

9.10.16.7. Where fire stops are pierced by pipes, ducts or other elements, the effectiveness of the fire stops shall be maintained around such elements.

Subsection 9.10.17. Interior Finish Flame-Spread Limits

Flame-spread rating of interior finishes

9.10.17.1. Except as provided in Articles 9.10.17.2. to 9.10.17.7., the exposed surface of every wall and ceiling shall have a surface flame-spread rating of not more than 150.

Means of egress ceilings

9.10.17.2. Not less than 90 per cent of the exposed surface of every ceiling in an exit, or unsprinklered ceiling in a public corridor shall have a surface flame-spread rating of not more than 25.

Exit walls

9.10.17.3. Not less than 90 per cent of the exposed surfaces of every wall of an exit, exclusive of doors, shall have a surface flame-spread rating of not more than 25, except that 25 per cent of the wall surface of a lobby at or near grade used as an exit may have a surface flame-spread rating of not more than 150.

Walls in a public access to exit

9.10.17.4. At least 90 per cent of the total wall surface, exclusive of doors, in any unsprinklered public corridor shall have a surface flame-spread rating of not more than 75, or not less than 90 per cent of the upper half of such walls, exclusive of doors, shall have a surface flame-spread rating of not more than 25.

Plastic light diffusers and lenses

9.10.17.5. Where transparent or translucent lighting elements such as light diffusers and lenses are used which have flame-spread ratings that exceed those permitted for the ceiling finish, such elements shall conform to the requirements of Article 3.1.11.1.

Duct covers and liners

9.10.17.6. Where a covering or a lining is used with a duct, such lining or covering shall have a flame-spread rating conforming to Article 6.2.4.6.

9.10.17.7. Except as provided in Articles 9.10.17.2. to 9.10.17.4., where listed products of combustion detectors of a single station alarm type are provided, the exposed surface of every wall and ceiling shall have a surface flame-spread rating of not more than 200.

Subsection 9.10.18. Alarm and Detection Systems

9.10.18.1. Except as provided in Articles 9.10.18.4 and 9.10.18.5. a listed fire alarm system shall be provided in buildings of residential occupancy containing 4 storeys including storeys below grade.

9.10.18.2. Except as provided in Article 9.10.18.3., in any building where a fire alarm system is required, listed heat detectors or smoke detectors shall be installed in storage

rooms, storage locker rooms, service rooms including furnace rooms and incinerator rooms, elevator shafts, chutes, exit stair shafts, janitors' closets and any other rooms where hazardous substances are intended to be used or stored.

9.10.18.3.(1) Where a building is sprinklered and the sprinkler system electrically supervised and equipped with a water flow alarm, a fire detector system is not required.

(2) Where a fire alarm system is required in a building and the building is sprinklered, the operation of the automatic sprinkler system shall activate the building fire alarm system.

9.10.18.4. Except as required in Article 9.10.18.3., a fire alarm and a fire detection system need not be provided in buildings of residential occupancy where each dwelling unit or individually rented sleeping room has direct access to outdoors by a door at ground level or to a balcony with access to ground level.

Exceptions

9.10.18.5. A listed fire alarm and a fire detection system shall be provided where sleeping accommodation is provided for more than 10 persons in buildings of residential occupancy, except that such systems need not be provided in buildings where the public corridor or exit serves not more than 4 dwelling units or individually rented sleeping rooms.

9.10.18.6. In buildings of business and personal service occupancy, a listed fire alarm and fire detection system shall be provided where the occupant load above or below the first storey exceeds 150.

Business and personal services occupancy

9.10.18.7. In buildings of mercantile occupancy, a listed fire alarm and fire detection system shall be provided where the total occupant load exceeds 300 or where the occupant load above or below the first storey exceeds 150.

Mercantile occupancy

9.10.18.8.(1) In buildings of medium hazard industrial occupancy a listed fire alarm system shall be provided where the total occupant load exceeds 100 or where the occupant load above or below the first storey exceeds 25.

(2) No fire alarm system is required in a 1 storey building where the floor area is undivided except for washrooms and service rooms.

9.10.18.9. In buildings of low hazard industrial occupancy, listed fire alarm and fire detection system shall be provided where the occupant load above or below the first storey exceeds 75 or where the occupant load of the building is 500 persons or more.

Low hazard industrial occupancy

9.10.18.10. Except for a recirculating air system serving not more than 1 dwelling unit, a listed smoke detection system shall be installed in recirculating air systems in residential occupancies where such systems supply more than 1 storey or more than 1 individually rented room or suite of rooms (see also Article 9.33.4.2.).

Smoke detection systems

9.10.18.11. In buildings of mixed occupancy the most restrictive fire alarm and detection requirements shall apply to all occupancies.

Buildings of mixed occupancy

9.10.18.12. Fire alarm, fire detection and smoke detection devices shall be installed in accordance with Part 6.

Installation

9.10.18.13.(1) In buildings containing a residential occupancy, a listed products of combustion detector or detectors of the single station alarm type, audible within bedrooms when intervening doors are closed, shall be installed between bedrooms or the sleeping areas and the remainder of the dwelling unit, such as in a hallway or corridor serving such bedrooms or sleeping area.

9.10.18.13.(2) The products of combustion detectors and alarms referred to in Sentence (1) shall,

- (a) be equipped with visual indication that they are in operating condition;

- (b) be permanently mounted on a standard outlet box on the ceiling or on the walls between 6 and 12 in. below the ceiling; and
- (c) not have a switch between the products of combustion detector and the distribution panel.

NOTE: Products of combustion detectors of the single station alarm type required in Article 9.10.18.13. are not to be confused with the fire alarm and fire detection systems required elsewhere in this Subsection; they are intended only to warn the occupants of the dwelling unit in which the detector is located, and are not necessarily connected to the building fire alarm and detection system.

Subsection 9.10.19. Firefighting

Access wall panels

9.10.19.1. Except as provided in Article 9.10.19.2., a window or access panel providing an opening not less than 42-in. high and 22-in. wide and having a sill height of not more than 36-in. above the floor shall be provided on the second and third storey of every building in at least 1 wall facing on a street if such storeys are not sprinklered and such access panels shall be readily openable from both inside and outside or be glazed with plain glass.

Exception

9.10.19.2. Access panels as described in Article 9.10.19.1. need not be provided in buildings containing only dwelling units where there is no dwelling unit above another dwelling unit.

Access to basements

9.10.19.3. Except in basements serving not more than 1 dwelling unit, each unsprinklered basement or cellar exceeding 75 ft in length or width shall be provided with direct access to the outdoors and such access may be provided by,

- (a) a door, window or other means that provides an opening not less than 42-in. high and 22-in. wide, the sill height of which shall not be more than 36-in. above the floor; or
- (b) by an interior stair accessible from the outdoors.

9.10.19.4. Access for fire department equipment shall be provided to each building by means of a street, private roadway or yard.

9.10.19.5. Where access to a building as required in Article 9.10.19.4. is provided by means of a private roadway or yard, the design and location of such roadway or yard shall be subject to the approval of the chief official taking into account connection with public thoroughfares, weight of firefighting equipment, width of roadway, radius of curves, overhead clearance, location of fire hydrants, location of fire department connections and vehicular parking.

SECTION 9.11 SOUND CONTROL

Subsection 9.11.1. Sound Transmission Class Rating for Airborne Sound

Test method

9.11.1.1. Sound transmission class ratings for construction shall be determined in accordance with ASTM E90-70, "Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions", as revised to 1 May, 1975.

Subsection 9.11.2. Required Sound Control Locations for Airborne Sound

Sound transmission rating

9.11.2.1. Construction shall provide a sound transmission class rating of not less than 45 between dwelling units in the same building and between a dwelling unit and any space common to 2 or more dwelling units.

9.11.2.2. Every service room or space such as a storage room, laundry, workshop or building maintenance room or garage serving more than 1 dwelling unit shall be separated from the dwelling units by a construction providing a sound transmission class rating of not less than 45.

Airborne sound rating

9.11.2.3. Construction described in Tables 1-A to 1-C of this Part as having airborne sound ratings of I and II shall be deemed to satisfy the requirements of Articles 9.11.2.1. and 9.11.2.2.

SECTION 9.12 EXCAVATION

Subsection 9.12.1. General

- 9.12.1.1.(1) The top soil and vegetable matter in all unexcavated areas under a building shall be removed.
- Top soil
- 9.12.1.2. The bottom of every excavation shall be free of all organic material.
- 9.12.1.3. Excavations shall be kept free of standing water.
- Water removed
- 9.12.1.4. The bottom of excavations shall be kept from freezing throughout the entire construction period.
- Freezing

Subsection 9.12.2. Depth

- 9.12.2.1. Excavations for foundations shall extend to undisturbed soil.
- 9.12.2.2. Except as provided in Articles 9.12.2.4. and 9.12.2.5., the minimum depth of foundations below finished grade shall conform to Table 9.12.2.A.

TABLE 9.12.2.A.
Forming Part of Article 9.12.2.2.

MINIMUM DEPTHS OF FOUNDATIONS				
Type of Soil ⁽¹⁾	Foundation Containing Heated Basement, Cellar or Crawl Space		Foundation Containing No Heated Space	
	Good Soil Drainage to at Least the Depth of Frost Penetration ⁽²⁾	Poor Soil Drainage	Good Soil Drainage to at Least the Depth of Frost Penetration ⁽²⁾	Poor Soil Drainage
Rock	No limit	No limit	No limit	No limit
Coarse grained soils	No limit	No limit	No limit	Below the depth of frost penetra-tion ⁽²⁾
Silt	No limit	No limit	Below the depth of frost penetra-tion ⁽²⁾	Below the depth of frost penetra-tion ⁽²⁾
Clay or soils not clearly defined ⁽³⁾	4 ft	4 ft	4 ft but not less than the depth of frost penetra-tion ⁽²⁾	4 ft but not less than the depth of frost penetra-tion ⁽²⁾
Column 1	2	3	4	5

Notes to Table 9.12.2.A.:

⁽¹⁾A description of the soil types is provided in "Guide to the Field Description of Soils," published by the Associate Committee on Geotechnical Research, National Research Council of Canada (NRC No. 3813).
⁽²⁾Depth of frost penetration shall be as established by Subsection 4.2.3.
⁽³⁾Intended to apply to soils that are subject to significant volume changes with changes in soil moisture content.

9.12.2.3.(1) The minimum depth of foundations for exterior concrete steps with more than 2 risers shall conform to Article 9.12.2.2.

(2) Concrete steps with 1 and 2 risers may be laid on ground level.

9.12.2.4. The foundation depths required in Article 9.12.2.2. may be decreased where experience with local soil conditions shows that lesser depths are satisfactory, or where the foundation is designed for lesser depths.

9.12.2.5. The foundation depths required in Article 9.12.2.2. do not apply to foundations for buildings whose superstructure will not be damaged by differential soil movement caused by frost action, or for accessory buildings of not more than 1 storey in building height and not more than 500 sq ft in building area.

Subsection 9.12.3. Backfill

Placing 9.12.3.1. Backfill shall be placed to avoid damaging the drainage tile or the waterproofing of walls.

Grading 9.12.3.2. Backfill shall be graded to prevent drainage towards the foundation after settling.

Boulders 9.12.3.3. Backfill within 2 ft of the foundation shall be free of deleterious debris, boulders or frozen material larger than 10-in. diam.

9.12.3.4. All wood scraps and forms shall be removed from around the foundations before backfilling and from under exterior steps or porches before construction is completed.

9.12.3.5. Where the height of a foundation wall is such that lateral support is required, the wall shall be braced or laterally supported before backfilling.

Subsection 9.12.4. Trenches Beneath Footings

Trenches beneath footings 9.12.4.1. The soil in trenches beneath footings for sewers and watermain shall be compacted by tamping up to the level of the footing base, or shall be filled with concrete having a strength not less than 1,500 psi to support the footing.

SECTION 9.13 WATERPROOFING AND DAMPPROOFING

Subsection 9.13.1. General

Waterproofing of walls 9.13.1.1. Where hydrostatic pressure occurs, floors on ground and exterior surfaces of walls below ground level shall be waterproofed.

Dampproofing of walls 9.13.1.2. Where hydrostatic pressure does not occur and the exterior finished ground level is at a higher elevation than the ground level inside the foundation walls, exterior surfaces of foundation walls below ground level shall be dampproofed.

Slabs in finished areas 9.13.1.3. Except as provided in Article 9.13.1.4., when hydrostatic pressure does not occur, slabs on ground in other than garages shall be dampproofed.

Basement slabs 9.13.1.4. When hydrostatic pressure does not occur, floor slabs in unfinished basements or cellars need not be dampproofed when the slab is supported on a base of granular fill as described in Subsection 9.16.2.

Method of application 9.13.1.5. The method of application of all bituminous waterproofing and dampproofing materials shall conform to one of the following Standards, as revised to 1 May, 1975:

CGSB 37-GP-3b(1971), "Application of Emulsified Asphalts for Dampproofing or Waterproofing",

CGSB 37-GP-12b(1971), "Application of Unfilled Cutback Asphalt for Dampproofing", or

CGSB 37-GP-22b(1971), "Application of Unfilled Tar Cutback Foundation Coating for Dampproofing".

Subsection 9.13.2. Material

9.13.2.1. Bituminous materials used for dampproofing or waterproofing shall conform to one of the following Standards, as revised to 1 May, 1975:

Dampproofing and waterproofing material specifications

CGSB 37-GP-2c(1971), "Emulsified Asphalt Mineral Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings",
CGSB 37-GP-6c(1971), "Cutback Asphalt: Unfilled, for Dampproofing",
CGSB 37-GP-16c(1971), "Cutback Asphalt: Filled, for Dampproofing and Waterproofing",
CGSB 37-GP-18c(1971), "Cutback: Tar, Unfilled, for Dampproofing", or
CSA A123.7-1973, "Asphalt for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems".

Subsection 9.13.3. Waterproofing of Walls

9.13.3.1.(1) Unit masonry walls to be waterproofed shall be parged on exterior surfaces below ground level with not less than $\frac{1}{4}$ -in. of mortar conforming to Subsection 9.20.3.

Parging

(2) Concrete walls shall have all holes and recesses resulting from removal of form ties sealed with mortar or waterproofing material.

(3) Parging shall be covered over footings.

9.13.3.2. Concrete or unit masonry walls to be waterproofed shall be covered on exterior face with not less than 2 layers of bitumen-saturated membrane, with each layer being cemented in place with bitumen and coated over-all with a heavy coating of bitumen.

Waterproofing membranes for walls

Subsection 9.13.4. Waterproofing of Floors

9.13.4.1. Basement floors to be waterproofed shall have a system of membrane waterproofing provided between 2 layers of concrete each of which shall be not less than 3-in. thick and the floor membrane shall be mopped to the wall membrane to form a complete seal.

Subsection 9.13.5. Dampproofing of Walls

9.13.5.1.(1) Unit masonry walls to be dampproofed shall be parged on the exterior face below ground level with not less than $\frac{1}{4}$ -in. of mortar conforming to Subsection 9.20.3. and shall be covered over the footing when the first course of block is laid.

Parging

(2) Concrete walls shall have holes and recesses resulting from the removal of form ties sealed with cement mortar or dampproofing material.

9.13.5.2. A heavy coat of bituminous or other dampproofing material shall be applied over the parging or concrete below ground level.

Bituminous coating

9.13.5.3.(1) Where a separate interior cladding is applied to a concrete or unit masonry wall which is in contact with the soil, or where wood members are applied to such walls for the installation of insulation or finish, the interior surface of the foundation wall below ground level shall be dampproofed.

Interior damp-proofing of walls

(2) The dampproofing shall extend from the basement floor and shall terminate at ground level, consist of at least 2-mil polyethylene lapped 4-in. at the joints, or at least 2 mopped-on coats of bitumen or a material providing equivalent performance.

(3) No membrane shall be applied above ground level between the insulation and the foundation wall.

9.13.5.4. Preserved wood foundation walls shall be dampproofed as described in the "Construction Guide for Preserved Wood Foundations" PWF-1, 1977 published by the Canadian Wood Council.

Subsection 9.13.6. Dampproofing of Slabs

- Dampproofing of slabs 9.13.6.1. When slabs are dampproofed, the dampproofing shall be installed below the slab, except that where a separate floor is provided over the slab, the dampproofing may be applied to the top of the slab.
- Dampproofing membranes 9.13.6.2. When installed below the slab, dampproofing shall consist of at least 6-mil polyethylene or 45-lb roll roofing and dampproofing shall be lapped not less than 4-in. at the joints.
- Dampproof coatings 9.13.6.3. When installed above the slab, dampproofing shall consist of at least 2 mopped-on coats of bitumen, 2-mil polyethylene or other material providing equivalent performance.

SECTION 9.14 DRAINAGE**Subsection 9.14.1. Scope**

- Drainage 9.14.1.1. This Section applies to subsurface drainage and to surface drainage.
- Drainage of crawl spaces 9.14.1.2. Drainage for crawl spaces shall conform to Section 9.18.
- Floor slabs 9.14.1.3. Drainage requirements beneath floor slabs shall conform to Section 9.16.

Subsection 9.14.2. General

- Footing tile drains 9.14.2.1. All exterior foundation walls enclosing a basement, cellar or crawl space, shall be drained by drainage tile or pipe laid around the exterior of the foundation so that the top of the tile or pipe is below the bottom of the floor slab or crawl space, except that for preserved wood foundations a continuous gravel bed at least 5-in. thick shall be laid over the entire excavation and extending at least 6-in. outside the wall footing plates and draining to a central sump pit as described in "Construction Guide for Preserved Wood Foundations" PWF-1, 1977, published by Canadian Wood Council may be used.

Subsection 9.14.3. Material for Foundation Drains

- Drainage material specifications 9.14.3.1. Drain tile and drain pipe used for foundation drainage shall conform to the following Standards, as revised to 1 May, 1975:
- ASTM A444-71, "Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process for Culverts and Underdrains",
- ASTM C4-62(1970), "Clay Drain Tile",
- ASTM C700-71T, "Extra Strength and Standard Strength Clay Pipe and Perforated Clay Pipe",
- ASTM C412-72, "Concrete Drain Tile",
- ASTM C444-68, "Perforated Concrete Pipe",
- CGSB 34-GP-22b(1973), "Pipe: Drain Asbestos Cement",
- CGSB 41-GP-29(1973), "Corrugated Plastic Drainage Tubing",
- CGSB 56-GP-1b(1970), "Pipe: Bituminized Fibre, Drain and Sewer",
- CGSB 56-GP-10a(1970), "Pipe: Bituminized Fibre, Perforated", or
- CSA B181.2-1973, "Poly (Vinyl Chloride) Drain, Waste and Vent Pipe and Pipe Fittings".

- 9.14.3.2. Where drainage is provided by a continuous gravel bed as described in Article 9.14.2.1., the gravel shall consist of clean, coarse, granular material of not more than 15% by weight of material passing through a No. 10 sieve.

Subsection 9.14.4. Installation of Foundation Drains

- 9.14.4.1. Drain tile or pipe shall be laid on undisturbed or well-compacted soil.

9.14.4.2. Drain tile or pipe with butt joints shall be laid with ¼ in. to ⅜ in. open joints and the top half of such joints shall be covered with sheathing paper, 6 mil polyethylene or No. 15 asphalt or tar-saturated felt.	Tile joints
9.14.4.3. When perforated drain pipe is used, the pipe shall be laid with perforations down and such pipe may be connected with couplings.	Perforated drain pipe
9.14.4.4. The top and sides of drain pipe or tile shall be covered with not less than 6-in. of crushed stone or other coarse clean granular material containing not more than 10 per cent of material that will pass a No. 4 sieve.	Granular cover

Subsection 9.14.5. Drainage Disposal

9.14.5.1. Drain pipe, tile or gravel bed shall drain to a sewer, drainage ditch, or dry well.	
9.14.5.2. Where gravity drainage is not practical, a covered sump with an automatic pump shall be installed to discharge the water into a sewer, drainage ditch or dry well.	Sumps
9.14.5.3. Dry wells shall be not less than 15 ft from the building foundation and located so that drainage is away from the building and dry wells may be used only when located in areas where the natural groundwater level is below the bottom of the dry well.	Dry wells

Subsection 9.14.6. Surface Drainage

9.14.6.1. The building shall be located and the building site graded so that water will not accumulate at or near the building and will not adversely affect adjacent properties.	Surface drainage
9.14.6.2. Surface drainage shall be directed away from the location of a water supply well or septic tank disposal bed.	
9.14.6.3. Where runoff water from a driveway is likely to accumulate or enter a garage, a catch basin shall be installed to provide drainage.	Interference with surface drainage
9.14.6.4. Where downspouts are provided and are not connected to a sewer, provisions shall be made to prevent soil erosion.	Downspouts

SECTION 9.15 FOOTINGS AND FOUNDATIONS

Subsection 9.15.1. Scope

9.15.1.1. This Section applies to foundations constructed on soils other than those described in Article 9.15.1.2. and where the building is of other than concrete or steel frame construction. (See Section 9.36 for small garages and carports.)	Scope
9.15.1.2.(1) Where a foundation is erected on soft clay, very soft clay, loose sand, very loose sand, loose sand and gravel or very loose sand and gravel, the footing sizes shall be designed in conformance with Subsection 9.4.7.	Foundations erected on various soil types
(2) Where a foundation is erected on filled ground or peat, the footing sizes shall be designed in conformance with Section 4.2.	

Subsection 9.15.2. General

9.15.2.1. A foundation design may deviate from the requirements in this Section where it is designed for the existing soil conditions in accordance with Section 4.2. or where past experience shows the foundation design to be adequate.	Deviation from specific requirements
9.15.2.2.(1) Foundation walls shall be constructed of monolithic concrete, unit masonry, treated wood or other material.	
(2) Footings shall be constructed of materials suitable to the foundation being supported.	

Concrete 9.15.2.3. Concrete shall conform to Section 9.3. Concrete for unreinforced footings and foundation walls shall have a minimum compressive strength of 2,000 psi after 28 days.

Concrete block 9.15.2.4. Concrete block shall be loadbearing type conforming to CSA A165.1-1972, "Concrete Masonry Units", as revised to 1 May, 1975 and shall have a compressive strength over the gross area of the block of at least 1,000 psi for hollow units and 1,800 psi for solid units.

9.15.2.5. Mortar, mortar joints, corbelling and protection for unit masonry shall conform to Section 9.20.

9.15.2.6. Where pier type foundations are used, the piers shall be designed to support the applied loads from the superstructure in conformance with Part 4.

9.15.2.7. Where preserved wood foundations are used for buildings of (Group C) major occupancy classification not more than 2 storeys and basement in height, the construction shall follow the procedures described in "Construction Guide for Preserved Wood Foundations", PWF-1, 1977, published by Canadian Wood Council.

9.15.2.8. Where preserved wood foundations are used for buildings of (Group C) major occupancy classification more than 2 storeys in building height, or for buildings of other occupancy classification, such foundations shall be designed to conform to the requirements of Part 4 using the "Construction Guide for Preserved Wood Foundations", PWF-1, 1977, published by Canadian Wood Council as a guide.

Subsection 9.15.3. Concrete Footings

9.15.3.1.(1) This Subsection applies only to concrete footings.

Where required (2) Footings shall be provided under walls, pilasters, columns, piers, fireplaces and chimneys that bear on soil or rock, except that footings may be omitted under piers or monolithic concrete walls if the safe loadbearing capacity of the soil or rock is not exceeded.

Size of footings 9.15.3.2. Footings shall rest on undisturbed soil or rock.

9.15.3.3.(1) Footings shall be of a size to support adequately all superimposed loads.

(2) Except as required in Article 9.15.3.4., the minimum footing size shall be as shown in Table 9.15.3.A. provided the length of supported joists does not exceed 16 ft and the design live load on any floor supported by the footing does not exceed 50 psf (Table 9.4.2.A.).

(3) Where the design live load exceeds 50 psf, the spacing between interior columns exceeds 10 ft., or the length of the supported joists exceeds 16 ft. the footings shall be designed in accordance with Section 4.2.

(4) The minimum areas of column footings shown in column 4 of Table 9.15.3.A are based on columns spaced 10 ft. on centre.

(5) The minimum widths of strip footings supporting exterior walls are based on wood frame construction and shall be increased by,

(a) 2½ in. for each storey of masonry veneer over wood-frame construction; and

(b) 5 in. for each storey of masonry construction other than foundation walls.

(6) The minimum width of strip footings supporting interior walls shall be increased by 4 inches for each storey of masonry supported by the footing.

Effect of water table depth

9.15.3.4. Where a foundation rests on gravel, sand or silt in which the water table level is less than the width of the footings below the bearing surface, the footing width shall be not less than twice the width shown in Table 9.15.3.A.

TABLE 9.15.3.A.
Forming Part of Articles 9.15.3.3. and 9.15.3.4.

MINIMUM FOOTING SIZES			
No. of Floors Supported	Minimum Width of Strip Footings, in.		Minimum Area of Column Footings, sq ft
	Supporting Exterior Walls	Supporting Interior Walls	
1	10	8	4½
2	14	14	8
3	18	20	11
Column 1	2	3	4

Notes to Table 9.15.3.A.: RESERVED.

9.15.3.5. The thickness of footings shall be not less than the projection beyond the face of the supported elements, except where the footing is reinforced and in no case shall the footing thickness be less than 4-in. except where laterally penetrated by drain tile or pipe.

Footing thicknesses

Subsection 9.15.4. Concrete or Unit Masonry Foundation Walls

9.15.4.1.(1) This Subsection applies to concrete or unit masonry foundation walls.

TABLE 9.15.4.A.
Forming Part of Sentence 9.15.4.1.(1)

THICKNESS OF FOUNDATION WALLS			
Type of Foundation Wall	Minimum Wall Thickness, in.	Maximum Height of Finish Grade Above Basement Floor or Inside Grade	
		Foundation Wall Laterally Unsupported At the Top ⁽¹⁾ (²)(³)(⁴), ft—in.	Foundation Wall Laterally Supported At the Top ⁽¹⁾ (²)(³)(⁴), ft—in.
Solid concrete (2,000 psi min. strength)	6	2—6	5—0
	8	4—0	7—0
	10	4—6	7—6
	12	5—0	7—6
Solid concrete (3,000 psi min. strength)	6	2—6	6—0
	8	4—0	7—6
	10	4—6	7—6
	12	5—0	7—6
Unit masonry	6	2—0	2—0
	8	3—0	4—0
	10	4—0	6—0
	12	4—6	7—0
Column 1	2	3	4

Notes to Table 9.15.4.A.:

- (¹) Foundation walls are considered laterally supported at the top if the floor joists are embedded in the top of the foundation walls or if the floor system is anchored to the top of the foundation walls with anchor bolts, in which case the joists may run either parallel or perpendicular to the foundation wall.
- (²) When a foundation wall contains an opening more than 4 ft in length or openings in more than 25 per cent of its length, that portion of the wall beneath such openings shall be considered laterally unsupported, unless the wall around the opening is reinforced to withstand the earth pressure.
- (³) When the length of solid wall between windows is less than the average length of the windows, the combined length of such windows shall be considered as a single opening.
- (⁴) When foundation walls support solid masonry walls, the foundation wall is considered to be laterally supported by the first floor.

Foundation
wall thickness

(2) Where average stable soils are encountered, the thickness of foundation walls subject to lateral earth pressure shall conform to Table 9.15.4.A. except that walls exceeding 8 ft in unsupported height shall be designed in conformity with Part 4.

Height above
grade

9.15.4.2. Exterior foundation walls shall extend not less than 6 in. above finished ground level.

Reduction in
thickness

9.15.4.3. Where the top of a foundation wall is reduced in thickness to permit the installation of floor joists, the reduced section shall be not higher than 14-in. and not less than 3 $\frac{1}{8}$ -in. thick.

9.15.4.4. Where the top of a foundation wall is reduced in thickness to permit the installation of a masonry exterior facing, the reduced section shall be not less than 3 $\frac{1}{8}$ -in. thick and tied to the facing material with metal ties conforming to Article 9.20.9.5. spaced not more than 8-in. o.c. vertically and 36-in. o.c. horizontally and the space between wall and facing shall be filled with mortar.

Corbelling

9.15.4.5. Corbelling of foundation walls supporting cavity walls shall conform to Article 9.20.12.2.

Crack control
joints

9.15.4.6. Crack control joints shall be provided in foundation walls exceeding 80 ft in length at intervals of not more than 50 ft and such joints shall be designed to resist moisture penetration and shall be keyed to prevent relative displacement of the wall portions adjacent to the joint.

Walls not
subject to earth
pressure

9.15.4.7. Interior masonry foundation walls not subject to lateral earth pressure shall conform to Section 9.20.

Subsection 9.15.5. Joist and Beam Support

Capping of
walls

9.15.5.1. Foundation walls of hollow unit masonry supporting floor joists shall be capped with at least 2-in. of solid masonry or concrete, or have the top course voids filled with mortar or concrete, except that such capping may be omitted where termites are not known to exist when the wood joists are supported on a wood plate not less than 2-in. by 4-in. and the siding overlaps the foundation wall not less than $\frac{1}{2}$ -in.

Beam support

9.15.5.2. Not less than an 8-in. depth of solid masonry shall be provided beneath beams supported on masonry and the ends of such beams shall be protected from the weather by not less than 2-in. of masonry or mortar.

Pilasters

9.15.5.3.(1) Pilasters shall be provided under beams that frame into 6-in. unit masonry foundation walls.

(2) The pilasters referred to in Sentence (1) shall not be less than 4-in. by 12-in. and shall be bonded or tied into the wall.

(3) The top 8-in. of pilasters shall be solid.

Subsection 9.15.6. Parging and Finishing

Parging and
finishing

9.15.6.1. Concrete block foundation walls shall be parged on the exterior face below ground level as required in Section 9.13.

- 9.15.6.2. All form ties shall be removed at least flush with the concrete surface.

Removal of form ties
- 9.15.6.3. Exterior surfaces of concrete block foundation walls above ground level shall have tooled joints, or shall be rendered, parged or otherwise suitably finished.

Exterior finish of block foundation

SECTION 9.16 SLABS ON GROUND

Subsection 9.16.1. Scope

- 9.16.1.1. This Section applies to basement and cellar slabs and to floor slabs-on-grade with perimeter foundation walls that support the superstructure.

Slabs on grade
- 9.16.1.2. Floor slabs-on-grade without foundation walls to support the superstructure shall be designed for the existing soil conditions in accordance with Part 4.

Design of floor slabs-on-grade

Subsection 9.16.2. Slab Supports

- 9.16.2.1.(1) When granular fill is used beneath basement and cellar slabs (see Article 9.13.1.4.), it shall consist of not less than 5-in. of coarse clean granular material containing not more than 15 per cent by weight of material passing a No. 10 sieve.

Granular fill
- (2) Where dampproofing or waterproofing is provided, such fill referred to in Sentence (1) is not required except where the gravel bed drainage system is used with preserved wood foundations in lieu of perimeter weeping tiles.

- 9.16.2.2.(1) The soil beneath concrete slabs-on-grade shall be compacted.

Soil compaction
- (2) Not less than 5-in. of course clean granular material containing not more than 15 per cent by weight of material passing a No. 10 sieve shall be provided beneath the slab and shall be compacted.

Subsection 9.16.3. Dampproofing and Waterproofing

- 9.16.3.1. Dampproofing and waterproofing of basement and cellar slabs and slabs-on-grade shall conform to Section 9.13.

Subsection 9.16.4. Drainage

- 9.16.4.1. Where groundwater level may cause uplift pressures against the bottom of a slab-below-grade, lateral drains shall be installed under the slab, or the slab shall be designed to resist such uplift pressures.

Uplift pressures
- 9.16.4.2. The accumulation of water underneath a slab-on-grade shall be prevented by grading, drainage or other method.

Drainage
- 9.16.4.3. When floor drains are installed (see Section 9.32) the floor surface shall be so sloped that no water will accumulate.

Subsection 9.16.5. Concrete

- 9.16.5.1. Concrete for floor slabs shall conform to Section 9.3 and shall have a maximum slump of 3-in.

Maximum slump of concrete
- 9.16.5.2. The finished surface of concrete floor slabs shall be trowelled smooth and even. Dry cement shall not be added to the floor surfaces to absorb surplus water.

Surface finish
- 9.16.5.3. When a topping course is provided for concrete floor slabs it shall consist of 1 part cement to 2½ parts clean, well-graded sand by volume with a water cement ratio approximately equal to that of the base slab.

Topping

Subsection 9.16.6. Thickness and Height

- 9.16.6.1. Concrete slabs-on-ground shall be not less than 3-in. thick exclusive of concrete topping and concrete topping shall be not less than ¾-in. thick.

Thickness

Height above ground level 9.16.6.2. The top of every slab-on-grade shall be not less than 6-in. above exterior finished ground level.

Subsection 9.16.7. Reinforcement

Reinforcement 9.16.7.1. Except for slabs for garages and carports serving dwelling units, concrete slabs-on-grade shall be reinforced with not less than $\frac{3}{8}$ -in. diam. steel spaced 24-in. o.c. in both directions, or 6-in. by 6-in., 6/6 mesh and such reinforcement shall be located near the mid-depth of the slab.

Subsection 9.16.8. Pipes and Ducts

Corrosive fill 9.16.8.1. Metal pipes in contact with cinders or other corrosive material shall be protected by a heavy coating of bitumen or other corrosion protection.

Encasement of ducts 9.16.8.2. Ducts in slabs shall be completely encased with not less than 2-in. of concrete, and installed so that water will not accumulate in the ducts (see also Section 9.34).

Subsection 9.16.9. Joints

9.16.9.1. Where termites are known to exist, joints between slabs-on-ground and foundation walls, and spaces around pipes, conduit or ducts that penetrate such slabs shall be filled with bitumen-rubber compound or coal-tar.

SECTION 9.17 COLUMNS

Subsection 9.17.1. Scope

Scope 9.17.1.1. This Section applies to columns used to support carport roofs (see Section 9.36), and beams carrying loads from not more than 2 wood-frame floors where the length of joists carried by such beams does not exceed 16 ft and the live load on any floor does not exceed 50 psf. (See Table 9.4.2.A.)

9.17.1.2. Columns for applications other than as described in Article 9.17.1.1. shall be designed in accordance with Part 4.

Subsection 9.17.2. General

Column support 9.17.2.1. Columns shall be centrally located on a footing conforming to Section 9.15.

9.17.2.2. Columns shall be securely fastened to the supported member to prevent lateral movement.

Subsection 9.17.3. Steel Columns

Size 9.17.3.1.(1) Except as permitted in Sentence (2) and Article 9.17.3.2., steel pipe columns shall have a minimum outside diameter of $2\frac{7}{8}$ -in. and a minimum wall thickness of $\frac{3}{16}$ -in.

(2) Where the area of the supported floor exceeds 220 sq ft and is for two floors, a steel pipe column having a minimum outside diameter of $3\frac{1}{2}$ -in. and a minimum wall thickness of 0.188-in. with a minimum of 6-in. \times 6-in. \times $\frac{3}{8}$ -in. base shall be used.

Exception 9.17.3.2. Columns of sizes other than specified in Sentences 9.17.3.1.(1) and (2) may be used provided,

(a) their loadbearing capacities are designed in accordance with Part 4 and substantiated by calculations or tests or both; and

(b) adjustable steel columns, where used, are permanently fixed at top and bottom ends after installation.

Bearing plates 9.17.3.3. Except as permitted in Article 9.17.3.4. and as required in Sentence 9.17.3.1.(2), steel columns shall be fitted with not less than 4-in. by $\frac{1}{4}$ -in. thick steel plates at each end.

9.17.3.4. The top plate required in Article 9.17.3.3. may be omitted where a column supports a steel beam and provision is made for the attachment of the column to the beam by welding, bolting or other method. Exception

9.17.3.5. Steel columns shall be treated on the outside surface with at least 1 coat of rust-inhibitive paint. Rust prevention

Subsection 9.17.4. Wood Columns

9.17.4.1. The width or diameter of a wood column shall be not less than the width of the supported member and columns shall be not less than 8-in. for round columns and 6-in. by 6-in. for rectangular columns, unless calculations are provided to show that lesser sizes are adequate. Size

9.17.4.2.(1) Wood columns shall be either solid, glued-laminated or built-up. Construction

(2) Built-up columns shall consist of not less than 2-in. thick full-length members bolted together with not less than $\frac{3}{8}$ -in. diam. bolts spaced not more than 18-in. o.c. or nailed together with not less than 3-in. nails spaced not more than 12-in. o.c. and glued-laminated columns shall conform to Section 4.3.

9.17.4.3. Wood columns shall be separated from concrete in contact with the ground by 2-mil polyethylene film or 45-lb roll roofing or other dampproofing material. Dampproofing

9.17.4.4.(1) Where termites are known to exist, exterior wood columns such as porch supports shall be,

(a) pressure treated with a chemical that is toxic to such termites, in accordance with Article 9.3.3.7.; or

(b) supported on non-cellulosic material extending at least 6-in. above grade and located at least 2-in. from the exterior wall of an adjacent building.

Subsection 9.17.5. Unit Masonry Columns

9.17.5.1. Unit masonry columns shall be built of loadbearing masonry units. Material

9.17.5.2. Unit masonry columns shall have a minimum nominal dimensions of 12-in. by 12-in. or 10-in. by 16-in. Size

Subsection 9.17.6. Solid Concrete Columns

9.17.6.1. Concrete shall conform to Section 9.3. Material

9.17.6.2. Concrete columns shall be not less than 8-in. by 8-in. for rectangular columns and 9-in. diameter for circular columns. Size

SECTION 9.18 CRAWL SPACES

Subsection 9.18.1. General

9.18.1.1. In this Section a crawl space refers to a space between the underside of a floor assembly and the ground cover directly below, with a clearance less than 6 feet in height. Crawl spaces

9.18.1.2. Foundations enclosing crawl spaces shall conform to Section 9.15. Foundation

9.18.1.3. Insulation shall conform to Section 9.26. Insulation

9.18.1.4. Heating of crawl spaces shall conform to Section 9.34. Heating

Subsection 9.18.2. Access

9.18.2.1. An access opening of not less than 1 ft 8-in. by 2 ft 4-in. shall be provided to each crawl space where the crawl space serves a single dwelling unit, and not less than 1 ft 10-in. by 3 ft for other crawl spaces. Size

Access hatch 9.18.2.2. Access openings shall be fitted with a door or hatch, except when the access opening into the crawl space is from an adjacent basement and provides ventilation to the crawl space.

Subsection 9.18.3. Ventilation

9.18.3.1. Crawl spaces shall be ventilated by natural or mechanical means.

Size of vents 9.18.3.2. Except as otherwise permitted in Article 9.18.3.5., natural ventilation for crawl spaces shall be provided to the outside air by not less than 1 sq ft of unobstructed vent area for every 500 sq ft of floor area.

Design of vents 9.18.3.3. Vents for crawl spaces shall be designed to prevent the entry of snow, rain and insects, and shall be provided with tight-fitting covers to prevent air leakage in winter if the crawl space is heated.

Distribution of vents 9.18.3.4. Vents for crawl spaces shall be uniformly distributed on opposite sides of the building.

Ventilation not required 9.18.3.5. Ventilation to the outside air is not required when the crawl space is used as a warm-air plenum, or if the crawl space is vented to an adjacent basement or cellar with an opening conforming to Article 9.18.3.2.

Subsection 9.18.4. Clearance

Clearance in crawl space 9.18.4.1. The ground level in a crawl space shall be not less than 12-in. below the level of all joists and beams, except that where termites are known to exist, the clearance shall be not less than 18-in., unless the joists are pressure treated with a chemical that is toxic to termites in accordance with Article 9.3.3.7.

Service clearance 9.18.4.2. Where equipment requiring service such as plumbing cleanouts, traps and burners is located in crawl spaces, an access way with a minimum height and width of 2 ft shall be provided from the access door to the equipment and for a distance of 3 ft on the side or sides of the equipment to be serviced.

Subsection 9.18.5. Drainage

Drainage 9.18.5.1. Unless groundwater levels and site conditions are such that water will not accumulate in the crawl space, the crawl space floor and access trenches shall be sloped to drain to a sewer, ditch or dry well.

9.18.5.2. Drains shall conform to Section 9.14.

Subsection 9.18.6. Ground Cover

Ground cover 9.18.6.1.(1) A ground cover consisting of not less than 2-in. of asphalt or 1,500 psi portland cement concrete, or 45-lb roll roofing or 4-mil polyethylene shall be provided in every crawl space.

(2) Joints in sheet-type ground cover shall be lapped not less than 4-in. and weighted down.

Subsection 9.18.7. Fire Protection

Fire protection 9.18.7.1.(1) Crawl spaces used as warm-air plenums in buildings of residential occupancy shall be restricted to 1-storey portions of dwelling units.

(2) Enclosing material, including insulation, shall have a surface flame-spread rating not greater than 150.

(3) Combustible ground cover shall be covered with noncombustible material or have noncombustible receptacles beneath the register openings.

SECTION 9.19 ROOF SPACES

Subsection 9.19.1. Ventilation

9.19.1.1. Except as provided in Article 9.19.1.2., every attic or roof space above an insulated ceiling shall be ventilated to the exterior as follows,

- (1) 1 sq ft of free unobstructed ventilating area for each 300 sq ft of insulated ceiling area for roofs with a slope exceeding 2 in 12;
- (2) 1 sq ft of free unobstructed ventilating area for each 150 sq ft of insulated ceiling area for,
 - (a) any roof irrespective of slope when an interior finish is applied to the underside of ceiling joists that span from ridge to exterior wall plate,
 - (b) roofs with a slope of 2 in 12 or less.

9.19.1.2. A roof space in a building need not be vented provided the vapour barrier protecting the ceiling insulation is applied as a single continuous sheet without openings over the entire ceiling area, and is a Type I barrier in accord with CGSB 70-GP-1a(1970), "Vapour Barrier: Sheet for Use in Above-Grade Building Construction", as revised to 1 May, 1975 and openings such as for plumbing vents may be cut in such vapour barrier provided the perimeters of such openings are sealed in a manner that will maintain the effectiveness of the vapour barrier.

9.19.1.3. Not more than one half of the required ventilation area shall be provided in the form of ventilators located near the ridge except that for cathedral ceilings and roofs with a slope of 2 in 12 or less, continuous eave and ridge ventilation shall be provided.

9.19.1.4. Vents shall be designed to prevent the entry of rain, snow and insects.

Subsection 9.19.2. Access

9.19.2.1. Every attic space more than 2 ft in height at the highest point shall be provided with an access stair or shall have a hatchway of not less than 22-in. by 36-in., except that where such hatchway serves not more than 1 dwelling unit, the hatchway may be reduced to 20-in. by 28-in. and hatchways shall be fitted with doors or covers.

Access to attic

SECTION 9.20 ABOVE-GRADE MASONRY

Subsection 9.20.1. Scope

9.20.1.1. This Section applies to unreinforced masonry and masonry veneer in which the wall height above the foundation wall does not exceed 36 ft and in which the roof or floor system above the first storey is not of concrete construction.

Above-grade masonry

9.20.1.2. For buildings other than those described in Article 9.20.1.1., or where the masonry is designed on the basis of design loads and allowable stresses, Section 4.4 shall apply.

Seismic zones

9.20.1.3. In seismic Zone 3, loadbearing elements of masonry buildings more than 1 storey in height shall be reinforced with at least the minimum amount of reinforcement as required in Subsection 9.20.18.

9.20.1.4. In seismic Zone 2, loadbearing elements of 3 storey masonry buildings shall be reinforced with at least the minimum amount of reinforcement as required in Subsection 9.20.18.

Subsection 9.20.2. Masonry Units

9.20.2.1. Masonry units shall comply with one of the following Standards, as revised to 1 May, 1975:

Material specifications for masonry units

- CSA A82.1-1965, "Burned Clay Brick",
- CSA A82.3-1973, "Calcium Silicate (Sand-Lime) Building Brick",
- CSA A82.4-1954, "Structural Clay Load-Bearing Wall Tile",
- CSA A82.5-1954, "Structural Clay Non-Load-Bearing Tile",

CSA A82.22-1963, "Gypsum Plasters",
 CSA A82.26-1950, "Keene's Cement",
 CSA A82.42-1950, "Quicklime for Structural Purposes",
 CSA A82.43-1950, "Hydrated Lime for Masonry Purposes", or
 CSA A82.56-1950, "Aggregate for Masonry Mortar".

9.20.3.2. Water and aggregate shall be clean and free of significant amounts of deleterious materials. Water and aggregate

9.20.3.3. Lime used in mortar shall be hydrated. Lime

9.20.3.4. If lime putty is used in mortar, it shall be made by slaking quicklime in water for not less than 24 hr (see Appendix to CSA Standard A82.42-1950, "Quicklime for Structural Purposes") as revised to 1 May, 1975, or soaking hydrated lime in water for not less than 12 hr. Lime putty

9.20.3.5. Except as provided in Articles 9.20.3.6. and 9.20.3.7., mortar mixes shall conform to Table 9.20.3.A. and mortar containing portland cement shall not be used later than 2½ hr after mixing. Mortar mixes

TABLE 9.20.3.A.
 Forming Part of Article 9.20.3.5.

MORTAR MIX PROPORTIONS (by volume)				
Permissible Use of Mortar	Portland Cement	Masonry Cement (Type H)	Lime	Aggregate
All locations	½ to 1 1	1 —	— ¼ to ½	Not less than 2¼ and not more than 3 times the sum of the volumes of the cement and lime
All locations except foundation walls and piers	— 1	1 —	— ½ to 1¼	
All locations except load-bearing walls of hollow units, parapet walls and chimneys	1	—	1¼ to 2½	
All non-loadbearing partitions and all loadbearing walls of solid units, except foundation walls, parapet walls and chimneys	1 —	— —	2¼ to 4 1	
Column 1	2	3	4	5

9.20.3.6. Mortar for gypsum units shall consist of 1 part gypsum and not more than 3 parts aggregate by weight. Mortar for gypsum units

9.20.3.7. Mortar for glass block shall consist of 1 part portland cement, 1 part hydrated lime to not more than 4 parts aggregate by volume. Mortar for glass block

9.20.3.8.(1) Mortar for sand-lime brick or concrete brick shall consist of 1 part masonry cement to 3 parts of aggregate by volume, or apply the 2 lower mixes shown in Table 9.20.3.A. Mortar for sand-lime brick and concrete brick

(2) Because of their relative high strength, the first and second mixes in Table 9.20.3.A. shall not be used for mortar for sand-lime brick or concrete brick.

Subsection 9.20.4. Mortar Joints

Mortar joint thickness	9.20.4.1. Maximum average joint thickness shall be $\frac{1}{2}$ -in. and the maximum thickness of an individual joint shall be $\frac{3}{4}$ -in.
Solid masonry joints	9.20.4.2. Solid masonry units shall be laid with full head and bed joints.
Hollow masonry joints	9.20.4.3. Hollow masonry units shall be laid with mortar applied to head and bed joints of both inner and outer face shells.

Subsection 9.20.5. Masonry Support

Masonry support	9.20.5.1. All masonry shall be supported on masonry, concrete or steel.
Lintels	9.20.5.2. Masonry over openings shall be supported by steel, reinforced concrete or masonry lintels or arches designed to support the imposed load and the minimum sizes for steel lintels relative to span openings shall be as indicated in Table III-A.
Thickness of supporting wall	9.20.5.3. Every masonry wall shall be at least as thick as the wall it supports, except as otherwise permitted in Article 9.20.12.2.

Subsection 9.20.6. Thickness and Height

Thickness of solid exterior walls	<p>9.20.6.1.(1) Masonry exterior walls, other than cavity walls, in 1-storey buildings and the top storeys of 2-storey buildings shall be not less than $5\frac{1}{2}$-in. thick provided the walls are not more than 9 ft high at the eaves and 15 ft high at the peaks of gable ends.</p> <p>(2) The exterior walls of the bottom storeys of 2-storey buildings and walls of 3-storey buildings shall be not less than $7\frac{1}{2}$-in. thick.</p> <p>(3) In walls composed of more than one wythe, each wythe shall be not less than $3\frac{5}{8}$-in. thick.</p>
Thickness of cavity walls	9.20.6.2. Cavity walls shall have not less than $3\frac{5}{8}$ -in.-thick wythes separated by a cavity of not less than 2-in. nor more than 3-in., except that where the wythes are bonded together with masonry units, the cavity shall be not less than 3-in. and not more than 4-in. and the minimum thickness of cavity walls above the supporting base shall be 10-in. for the top 25 ft and 14-in. for the remaining portion.
Thickness of interior walls	9.20.6.3. The thickness of loadbearing interior walls shall be determined on the basis of Article 9.20.10.1.
	9.20.6.4. Interior non-loadbearing partitions shall be not less than $2\frac{5}{8}$ -in. thick (see Article 9.20.10.1.).
Masonry veneer	<p>9.20.6.5.(1) Masonry veneer resting on a bearing support shall be of solid units not less than 3-in. thick for wall heights up to 36 ft.</p> <p>(2) Masonry veneer over wood-frame walls shall have not less than a 1-in. air space behind the veneer.</p> <p>(3) Masonry veneer less than $3\frac{5}{8}$-in. thick shall have unraked joints.</p>
Individually supported veneer units	9.20.6.6. Masonry veneer individually supported by the back-up material shall conform to the requirements contained in Section 4.4.
Parapet walls	9.20.6.7. The height of parapet walls above the adjacent roof surface shall be not more than 3 times the parapet wall thickness and parapet walls shall be solid from the top of the parapet to not less than 1 ft below the adjacent roof level.
Limestone slab facings	9.20.6.8. Limestone slab facings and precast concrete panel facings shall conform to the requirements of Section 4.4.

Subsection 9.20.7. Chases and Recesses

9.20.7.1. Except as permitted in Articles 9.20.7.3. and 9.20.7.5., the depth of any chase or recess shall not exceed $\frac{1}{3}$ the thickness of the wall, and the horizontal projection of the chase or recess shall not exceed 20-in.	Size of chases and recesses
9.20.7.2. Except as permitted in Articles 9.20.7.3. and 9.20.7.5., no chase or recess shall be constructed in any wall 8-in. or less in thickness.	Chases or recesses prohibited
9.20.7.3. Chases and recesses may be constructed in 8-in. walls provided they do not exceed 4-in. in depth and 30-in. in height, and the total horizontal projection of the chase does not exceed 20-in.	
9.20.7.4. Chases and recesses shall be not less than 4 times the wall thickness apart and not less than 2 ft away from any pilaster, cross wall, buttress or other vertical element providing required lateral support for the wall.	Location of chases and recesses
9.20.7.5. Chases or recesses that do not conform to the limits specified in Articles 9.20.7.1. to 9.20.7.4. shall be considered as openings, and any masonry supported above such a chase or recess shall be supported by a lintel or arch.	Oversized chases and recesses
9.20.7.6. Chases and recesses shall not be cut into walls made with hollow units after the masonry units are in place.	

Subsection 9.20.8. Support of Loads

9.20.8.1. Loadbearing walls of hollow masonry units supporting roof or floor framing members shall be capped with not less than 2-in. of solid masonry, or have the top course filled with concrete except that capping may be omitted where the roof framing is supported on a wood plate not less than 2-in. thick, the same width as the masonry wall.	Capping of walls
9.20.8.2.(1) Floor joists supported on cavity walls shall be supported on solid units not less than $2\frac{1}{2}$ -in. in height and shall not project into the cavity.	Floor joist support
(2) Roof and ceiling framing members bearing on cavity walls shall be supported on not less than $2\frac{1}{2}$ -in. of solid masonry, bridging the full thickness of the wall, or a wood plate not less than 2-in. thick, bearing not less than 2-in. on each wythe.	
9.20.8.3.(1) The bearing area under beams and joists shall be sufficient to carry the supported load.	Bearing area
(2) In no case shall the minimum length of end bearing of beams supported on masonry be less than $3\frac{1}{8}$ -in.	
(3) The length of end bearing of floor, roof or ceiling joists supported on masonry shall be not less than $1\frac{1}{2}$ -in.	
9.20.8.4.(1) Beams and columns supported on masonry walls shall be supported on pilasters where the thickness of the masonry wall or wythe is less than 8-in.	Pilasters
(2) Not less than 8-in. thickness of solid masonry or concrete shall be provided under the beam or column.	
(3) Pilasters shall be bonded or tied to masonry walls.	
(4) Concrete pilasters shall be not less than 2-in. by 12-in.	
(5) Unit masonry pilasters shall be not less than 4-in. by 12-in.	
9.20.8.5. The distance from the face of a wall to the edge of a supporting member attached to the structure, such as a shelf angle or the flange of a beam, shall not exceed $1\frac{1}{4}$ -in., except as otherwise permitted in Section 4.4.	Shelf angles

Subsection 9.20.9. Bonding and Tying**Reinforcing**

9.20.9.1. Vertical joints in adjacent courses of walls and partitions shall be offset unless each wythe of masonry is reinforced with the equivalent of not fewer than 2 corrosion-resistant steel bars of 0.148-in. diam. placed in the horizontal joints at vertical intervals not exceeding 18-in. and where joints in the reinforcing occur, the bars shall be lapped not less than 6-in.

9.20.9.2. Masonry walls that consist of 2 or more wythes shall have the wythes bonded or tied together with masonry bonding units as described in Article 9.20.9.3. or with metal ties as described in Articles 9.20.9.4 to 9.20.9.8.

9.20.9.3.(1) Where wythes are bonded together with masonry units, the bonding units shall comprise not less than 4 per cent of the wall surface area.

(2) The bonding units shall be spaced not more than 24-in. o.c. vertically and horizontally in the case of brick masonry and 36-in. o.c. in the case of block or tile and such units shall extend not less than 3 $\frac{5}{8}$ -in. into adjacent wythes.

9.20.9.4.(1) Where 2 or more wythes are bonded together with metal ties of the individual rod type, the ties shall conform to the requirements in Articles 9.20.9.5. to 9.20.9.8.

(2) Other metal bonding ties may be used provided that it can be shown that such ties provide walls that are at least as strong and as durable as those made with the individual rod type.

9.20.9.5. Metal ties of the individual rod type shall be corrosion-resistant and shall have a minimum cross-sectional area of not less than 0.0276 sq in. and such ties shall have not less than a 2-in. portion bent at right angles at each end.

9.20.9.6. Metal ties of the individual rod type shall extend from within 1-in. of the outer face of the wall to within 1-in. of the inner face of the wall and shall be completely embedded in mortar except for the portion exposed in cavity walls and such ties shall be staggered from course to course.

9.20.9.7.(1) Where 2 or more wythes in walls, other than cavity walls, are bonded together with metal ties of the individual rod type, the space between wythes shall be completely filled with mortar.

(2) Such ties as described in Sentence (1) shall be located within 12-in. of openings and spaced not more than 36-in. apart around openings.

(3) Ties at locations other than as referred to in Sentence (2) shall be spaced not more than 36-in. apart horizontally and 18-in. apart vertically.

9.20.9.8.(1) Where the inner and outer wythes of cavity walls are bonded together with metal ties of the individual rod type, the ties shall,

- (a) be shaped to provide a drip near their centres;
- (b) be spaced not more than 24-in. apart horizontally within 4-in. of the bottom of each tier of floor joists where the cavity extends below the joists;
- (c) be spaced apart 18-in. vertically and 36-in. horizontally;
- (d) be staggered from course to course; and
- (e) start not more than 12-in. from the opening edges, where openings occur in walls.

**Masonry
veneer
reinforcing**

9.20.9.9. Masonry veneer 3-in. or more in thickness and resting on a bearing support shall be tied to masonry back-up or to wood framing members with not less than 0.013-in.-thick, $\frac{7}{8}$ -in.-wide corrosion-resistant straps spaced in accordance with Table 9.20.9.A. and shaped to provide a key with the mortar.

TABLE 9.20.9.A.

Forming Part of Article 9.20.9.9.

VENEER TIE SPACING	
Maximum Vertical Spacing, in.	Maximum Horizontal Spacing, in.
16	32
20	24
24	16
Column 1	2

9.20.9.10. Masonry veneer individually supported by masonry or other back-up shall be secured to the back-up in conformance with Section 4.4.

9.20.9.11. Glass block shall have horizontal joint reinforcement of 2 corrosion-resistant bars of not less than 0.148-in. diam. or expanded metal strips not less than 3-in. wide spaced at vertical intervals not exceeding 24-in. for units 8-in. or less in height and in every horizontal joint for units higher than 8-in. and reinforcement shall be lapped not less than 6-in.

Glass block reinforcing

Subsection 9.20.10. Lateral Support

9.20.10.1. Masonry walls and partitions shall be supported at right angles to the wall by floor or roof construction or by intersecting masonry walls or buttresses and the spacing of such supports shall conform to Table 9.20.10.A.

Lateral support of masonry walls

9.20.10.2. Floor and roof constructions providing required lateral support for walls as required in Article 9.20.10.1. shall be constructed to transfer lateral loads to walls or buttresses approximately at right angles to the laterally supported walls.

TABLE 9.20.10.A.

Forming Part of Article 9.20.10.1.

MAXIMUM DISTANCE BETWEEN LATERAL WALL SUPPORTS	
Type of Wall	Maximum Spacing of Supports
Loadbearing walls of solid units	20 times the wall thickness
Loadbearing walls of hollow units or cavity walls	18 times the wall thickness
Non-loadbearing walls or partitions	36 times the wall thickness
Column 1	2

Subsection 9.20.11. Anchorage of Roofs, Floors and Intersecting Walls

9.20.11.1.(1) Where required to provide lateral support (see Subsection 9.20.10.) masonry walls shall be anchored to each tier of joists, beams or floor construction at maximum intervals of 6 ft 8-in., except that anchorage of floor joists not more than 3 ft above grade may be omitted.

Anchorage of roofs, floors and intersecting walls

(2) Ties shall be corrosion-resistant and be not less than the equivalent of 1½-in. by 3/16-in.-thick steel straps.

(3) Such anchors shall be shaped to provide a mechanical key with the masonry and shall be securely fastened to the horizontal support to develop the full strength of the tie.

(4) When joists are parallel to the wall, such ties shall extend across at least 3 joists.

Tying of intersecting walls

9.20.11.2.(1) Where required to provide lateral support, intersecting walls or partitions shall be bonded or tied together.

(2) Fifty per cent of the adjacent masonry units in the intersecting wall shall be embedded in the laterally supported wall, or corrosion-resistant metal ties equivalent to not less than 3/16-in. by 1 1/2-in. steel strapping shall be provided.

(3) Such ties shall be spaced not more than 2 ft 8-in. o.c. vertically and shaped at both ends to provide sufficient mechanical key to develop the strength of the ties.

9.20.11.3. Wood-frame walls or partitions shall be tied to intersecting masonry walls with not less than 3/16-in.-diam. corrosion-resistant steel rods spaced not more than 36-in. o.c. vertically and the ties shall be anchored to the wood framing at one end and shaped to provide a mechanical key at the other end to develop the strength of the tie.

Tying of wood frame roof systems

9.20.11.4. Roof systems of wood-frame construction shall be tied to exterior walls by not less than 1/2-in.-diam. anchor bolts, spaced not more than 8 ft apart, embedded not less than 4-in. into the masonry and fastened to a rafter plate of not less than nominal 2-in.-thick lumber; or the roof system may be anchored by nailing the wall furring strips to the side of the rafter plate.

Anchoring of projecting masonry

9.20.11.5. Cornices, sills or other trim of masonry material which project beyond the wall face shall have not less than 65 per cent of their mass, but not less than 3 5/8-in., within the wall or shall be adequately anchored to the wall with corrosion-resistant anchors.

Bedding of anchor bolts

9.20.11.6. Where anchor bolts are to be placed in the top of a pier, the pier shall be capped with concrete or reinforced masonry not less than 12-in. thick.

Subsection 9.20.12. Corbelling

Corbelling

9.20.12.1. All corbelling shall consist of solid units which shall be corbelled so that the horizontal projection of any unit does not exceed 1-in. and the total projection does not exceed 1/3 the total wall thickness.

9.20.12.2.(1) Cavity walls of greater thickness than the foundation wall on which they rest shall not be corbelled but may project 1-in. over the outer face of the foundation wall disregarding parging.

(2) The unit masonry foundation wall may be corbelled to meet flush with the inner face of a cavity wall provided the individual corbel does not exceed 1/2 the height or 1/3 the width of the corbelled unit and the total corbel does not exceed 1/3 the foundation wall thickness.

9.20.12.3. Masonry veneer resting on a bearing support shall not project more than 1-in. beyond the supporting base where the veneer is at least 3 5/8-in. thick, and 1/2-in. beyond the supporting base where the veneer is less than 3 5/8-in. thick and in the case of rough stone veneer, the projection, measured as the average projection of the stone units, shall not exceed 1/3 the bed width beyond the supporting base.

Subsection 9.20.13. Flashing

9.20.13.1.(1) Exposed flashing shall consist of not less than 0.068-in. sheet lead, 0.013-in. galvanized steel, 0.014-in. copper, 0.018-in. zinc or 0.019-in.-thick aluminum.

(2) Aluminum flashing in contact with masonry or concrete shall be effectively coated or separated from the masonry or concrete by an impervious membrane.

9.20.13.2. Concealed flashing shall consist of not less than 0.68-in. sheet lead, 0.013-in. galvanized steel, 0.014-in. copper, 0.018-in. zinc, 45-lb roll roofing, 6-mil polyethylene or 0.002-in. copper or aluminum laminated to felt or kraft paper.

9.20.13.3. Fastening devices for flashing shall be corrosion-resistant and compatible with the flashing with respect to galvanic action.

Fastening
devices for
flashing
Flashing in
masonry and
masonry veneer
walls

9.20.13.4. Flashing shall be installed in masonry and masonry veneer walls beneath jointed masonry window sills over the back and top of parapet walls, over the heads of glass block panels, beneath weep holes and over the heads of window or door opening in exterior walls when the vertical distance between the top of a window or door trim and the bottom edge of the eave exceeds $\frac{1}{4}$ of the horizontal eave overhang.

9.20.13.5. When installed beneath jointed masonry window sills or over the heads of openings, flashing shall extend from the front edge of the masonry up behind the sill or lintel.

9.20.13.6. Flashing beneath weep holes in cavity walls shall be installed so that it is bedded in both wythes and slopes toward the outside wythe and such flashing shall be bedded not less than 1-in. in the inside wythe and extend to the outside of the outer wythe.

9.20.13.7. Flashing beneath weep holes in masonry veneer over wood-frame walls shall be installed so that it extends from the front edge of the masonry to 6-in. up behind the sheathing paper.

Subsection 9.20.14. Weep Holes

9.20.14.1. Weep holes spaced not more than 2 ft apart shall be provided at the bottom of the cavity in cavity wall and masonry veneer wall construction to drain the cavity to the exterior.

Weep holes

Subsection 9.20.15. Dampproofing

9.20.15.1.(1) Subject to Sentence (2) where the interior finish of the exterior walls of a building is a type which may be damaged by moisture, exterior masonry walls, other than cavity walls or walls that are protected for their full height by a roof of a carport or porch, shall be parged on the interior surface and covered with No. 15 breather-type asphalt-saturated paper or felt conforming to CGSB 9-GP-2a(1971), "Building Paper: Cellulosic Fibre, Water Repellent, Breather Type", as revised to 1 May, 1975, lapped at least 4-in. at the joints.

Dampproofing

(2) Where the insulation effectively limits the passage of water vapour and is applied by a waterproof adhesive or by mortar directly to the masonry, the requirements for parging and building paper do not apply.

9.20.15.2. Cavity walls shall be constructed so that mortar droppings are prevented from forming a bridge to allow the passage of rain water across the cavity.

Prevention of
bridging in
cavity walls

9.20.15.3. The junction between door and window frames with masonry shall be caulked (see also Section 9.28).

Caulking

9.20.15.4. Where no flashing is installed beneath window sills, such sills shall be provided with a drip not less than 1-in. from the wall surface.

Sill drip

Subsection 9.20.16. Exterior Finish

9.20.16.1. Above-grade exterior walls of concrete block shall be stuccoed, painted or otherwise finished to provide breather-type water repellency.

Concrete block
exterior finish

Subsection 9.20.17. Protection

9.20.17.1. Mortar and masonry shall be maintained at a temperature of not less than 40°F during installation and for not less than 48 hr after installation and no frozen material shall be used in the mix.

Laying temper-
ature of mortar
and masonry

Protection from
the elements

9.20.17.2. The top surface of uncompleted masonry exposed to the weather shall be completely covered with a waterproofing material when construction is not in progress.

Subsection 9.20.18. Reinforcement for Earthquake Resistance

9.20.18.1. Where reinforcement is required in this Section, masonry walls shall be reinforced horizontally and vertically with steel having a total cross-sectional area of not less than 0.002 times the cross-sectional area of the wall, so that not less than $\frac{1}{3}$ of the required steel area is installed horizontally and vertically.

9.20.18.2. Where reinforcement for masonry is required in this Section, it shall be installed in conformance with the requirements for reinforced masonry as contained in Section 4.4.

SECTION 9.21 CHIMNEYS AND FLUES

Subsection 9.21.1. General

Chimney
design

9.21.1.1. Where a chimney exceeds 40 ft in height or where the cross-sectional area of a flue exceeds 126 sq in or where the capacity of an appliance connected to a flue has a rated input exceeding 400,000 Btu per hr, the requirements in Part 6 shall apply.

9.21.1.2. Metal chimneys consisting of a single thickness of metal shall conform to the requirements in Part 6.

9.21.1.3. Factory-built chimneys shall conform to ULC-S604-1974, "Chimneys, Factory-Built," as revised to 1 May, 1975.

9.21.1.4. RESERVED

9.21.1.5. RESERVED

Gas vents

9.21.1.6. Chimneys or gas vents designed for gas appliances but not suitable for solid- or liquid-fuel-fired appliances shall be plainly and permanently marked to that effect.

Testing of
chimney, vent
or flue pipe

9.21.1.7. The chief official may require a chimney, vent or flue pipe to be tested for gas, smoke and flame tightness.

Subsection 9.21.2. Chimney Flues

Chimney flue
limitation

9.21.2.1. A chimney flue serving a fireplace or incinerator shall not serve any other appliance.

9.21.2.2. Two or more fuel-burning appliances, other than fireplaces, may be connected to the same flue provided adequate draft is maintained for the connected appliances and the connections are made at different elevations.

Angle of
chimney flue

9.21.2.3. Chimney flues shall not be inclined more than 45 deg. to the vertical.

Size of chimney
flue

9.21.2.4.(1) The size of a chimney flue shall conform to Table 9.21.2.A. unless calculations are provided to show that smaller sizes can be justified.

(2) The minimum size permitted for fireplace flues shall be 9-in. in diam. for round flues and 8-in. by 12-in. for rectangular flues.

(3) Where the flues serve only one appliance, the flue area shall be at least equal to that of the flue pipe connected to it.

TABLE 9.21.2.A.

Forming Part of Sentence 9.21.2.4.(1)

FLUE SIZES		
Maximum Rated Input of One or More Appliances, Btu/hr	Minimum Size of Flue	
	Round	Rectangular
105,000	6-in. diam.	8-in. × 8-in. nom.
175,000	7-in. diam.	8-in. × 8-in. nom.
280,000	8-in. diam.	8-in. × 8-in. nom.
400,000	9-in. diam.	8-in. × 12-in. nom.
Column 1	2	3

9.21.2.5. The width of an oval chimney flue shall not be less than $\frac{2}{3}$ its breadth.

Subsection 9.21.3. Chimney Lining

9.21.3.1. Every masonry or concrete chimney shall have a lining of clay, firebrick, asbestos-cement or other similar material. Chimney lining

9.21.3.2. Clay liners shall conform to ASTM C315-56(1972) "Clay Flue Linings," as revised to 1 May, 1975, and such liners shall be not less than $\frac{5}{8}$ -in. thick and shall be capable of resisting, without softening or cracking, a temperature of 2,000°F. Clay liner specifications

9.21.3.3. Firebrick liners shall conform to ASTM C64-72, "Refractories for Incinerators and Boilers," as revised to 1 May, 1975, and such firebrick shall be laid with fireclay mortar or high temperature cement mortar. Firebrick liners specifications

9.21.3.4. Asbestos-cement chimney liners shall conform to CGSB 34-GP-11b(1970) "Pipe: Asbestos Cement, Flue," as revised to 1 May, 1975, and such liners shall not be used where the flue gas temperature exceeds 700°F.

9.21.3.5. Chimney liners shall be installed when the surrounding masonry or concrete is placed and spaces between the liner and surrounding masonry shall not be filled with mortar where the chimney walls are less than $7\frac{1}{2}$ -in. in thickness. Installation of chimney liners

9.21.3.6. Chimney liners shall extend from a point not less than 8-in. below the lowest flue pipe connection to a point not less than 2-in. above the chimney cap.

Subsection 9.21.4. Masonry and Concrete Chimney Construction

9.21.4.1. Unit masonry shall conform to Section 9.20. Unit masonry chimney

9.21.4.2. Concrete shall conform to Subsection 9.3.2. Concrete for chimneys

9.21.4.3. Footings for masonry chimneys and concrete chimneys shall conform to the requirements in Section 9.15. Footings for chimneys

9.21.4.4.(1) A chimney flue shall extend not less than 3 ft above the highest point at which the chimney comes in contact with the roof, and not less than 2 ft above the highest roof surface or structure within 10 ft of the chimney. Height of chimney flues

(2) In computing the height for purposes of Sentence (1), not more than 8-in. of chimney flue above the top of the chimney cap may be considered.

(3) When necessary, chimneys shall be braced to provide lateral stability.

Chimney caps 9.21.4.5. The top of a chimney shall have a waterproof noncombustible cap and the cap shall slope from the lining and be provided with a drip not less than 1-in. from the chimney wall and jointed masonry chimney caps shall have flashing installed beneath the cap extending from the liner to the drip edge.

Chimney flue cleanout 9.21.4.6. A cleanout opening equipped with a metal frame and a tight-fitting metal door shall be installed near the base of the chimney flue.

Masonry chimney wall thickness 9.21.4.7. The walls of a masonry chimney shall be built of solid units not less than 3-in. thick.

Separation of chimney flues 9.21.4.8. Flues in the same chimney shall be separated by not less than 3-in. of solid masonry or concrete exclusive of liners where clay liners are used, or 3½-in. of firebrick where firebrick liners are used.

Junction flashing 9.21.4.9. Junctions with adjacent materials shall be adequately flashed to shed water.

Subsection 9.21.5. Flue Pipes

Flue pipe specification 9.21.5.1. Flue pipes connecting a solid-fuel-burning appliance to a chimney flue shall be made of metal conforming to Table 9.21.5.A.

TABLE 9.21.5.A.

Forming Part of Article 9.21.5.1.

Diameter of Flue Pipe, in.	Minimum Thickness of Metal, in.	
	Uncoated Steel	Galvanized Steel
Below 6	0.016	0.016
6 to 8 (incl.)	0.021	0.019
Over 8 to 10	0.027	0.024
Over 10 to 12	0.033	0.030
Over 12 to 16	0.043	0.036
Over 16	0.067	0.058
Column 1	2	3

9.21.5.2. Flue pipes shall be as short and as straight as possible.

9.21.5.3. The cross-sectional area of the flue pipe shall not be less than the area of the flue outlet of the appliance, except that a tapered reduction in the section of the flue adjacent to the chimney is permitted provided adequate draft is maintained.

Flue pipe connection 9.21.5.4. The flue pipe connection with the chimney shall be made by a metal thimble or masonry flue ring and the connection shall be tight and made so that the flue pipe does not extend into the chimney flue.

Flue pipe support 9.21.5.5. A flue pipe shall be supported by metal or other noncombustible supports.

Restriction on flue pipe installation 9.21.5.6. No flue pipe shall pass through an attic, closet, concealed space or floor.

Subsection 9.21.6. Clearance from Combustible Construction

Clearance from combustible construction 9.21.6.1. The clearance between masonry or concrete chimneys and combustible framing shall be not less than 2-in. for interior chimneys and ½-in. for exterior chimneys.

9.21.6.2. A clearance of not less than 6-in. shall be provided between a cleanout opening and combustible material.

9.21.6.3. All spaces between masonry or concrete chimneys and combustible framing shall be sealed top or bottom with noncombustible material.

9.21.6.4. Flooring shall have not less than a 1/2-in. clearance from masonry or concrete chimneys and wood trim shall be separated from masonry or concrete chimneys by not less than 1/8-in. of asbestos, asbestos millboard or other noncombustible material.

Flooring and wood trim separation

9.21.6.5.(1) The clearance between flue pipes and unprotected combustible material shall be not less than 18-in., except that where the flue gas temperature does not exceed 750°F, the clearance may be reduced to 9-in.

Clearance from unprotected combustible material

(2) Where an 18-in. clearance is required, it may be reduced to the value shown in Table 9.21.6.A. where combustible material is protected.

TABLE 9.21.6.A.

Forming Part of Article 9.21.6.5.

CLEARANCE BETWEEN A FLUE PIPE AND PROTECTED COMBUSTIBLE MATERIAL	
Type of protection applied to the combustible material unless otherwise specified and covering all surfaces within 18-in. of the flue pipe	Clearance between flue pipe and combustible material, in.
1/4-in. asbestos millboard spaced out 1-in. by noncombustible material	12
0.013-in. sheet metal on 1/4-in. asbestos millboard	12
0.013-in. sheet metal spaced out 1-in. by noncombustible material	9
0.013-in. sheet metal on 1/8-in. asbestos millboard spaced out 1-in. by noncombustible material	9
1 1/2-in. asbestos-cement covering on flue pipe	9
0.027-in. sheet metal on 1-in. mineral wool batts reinforced with wire mesh or equivalent	3
Column 1	2

9.21.6.6. Joists or beams may be supported on masonry walls which enclose chimney flues provided the combustible members are separated from the flue by a minimum of 12-in. of solid masonry.

SECTION 9.22 FIREPLACES

Subsection 9.22.1. General

9.22.1.1. Except as otherwise stated in this Section, unit masonry shall conform to Section 9.20 and concrete to Subsection 9.3.2.

Fireplaces

9.22.1.2. Footings for masonry and concrete fireplaces shall conform to Section 9.15.

Footings for fireplaces

Subsection 9.22.2. Fireplace Liners

9.22.2.1. Every fireplace shall have a liner of not less than 2-in. of firebrick or an approved steel liner.

Fireplace liners

9.22.2.2. Firebrick liners shall be laid with fireclay mortar or high temperature cement mortar.

High temperature mortar

Subsection 9.22.3. Wall Thickness**Wall thickness**

9.22.3.1.(1) When a 2-in. firebrick liner or a steel liner is used without an air circulating chamber, the back and sides of a fireplace shall be not less than 7½-in. thick when constructed of masonry of solid units, and 12-in. thick when constructed of hollow units or stone, exclusive of liner thickness.

(2) When hollow units are used, the backs and sides shall consist of 2 wythes with all joints staggered in adjacent wythes.

9.22.3.2. When a firebrick liner not less than 3½-in. is used, the thickness of the liner may be included as part of the wall thickness required in Article 9.22.3.1.

9.22.3.3. When a steel fireplace liner is used with an air circulating chamber surrounding the firebox, the back and sides of the fireplace shall consist of not less than 3½-in. thickness of solid masonry units or 7½-in. thickness of hollow masonry units.

Subsection 9.22.4. Openings**Support for
masonry
openings**

9.22.4.1. Masonry above openings shall be supported by steel, reinforced concrete or a masonry arch as described in Article 9.20.5.2.

Subsection 9.22.5. Hearth**Hearth
construction**

9.22.5.1. Fireplaces shall have a noncombustible hearth extending not less than 16 in. in front of the fireplace opening and not less than 8-in. beyond each side of the fireplace opening.

9.22.5.2. The hearth shall be supported on not less than a 6-in.-thick trimmer arch of solid masonry units or not less than a 4-in.-thick reinforced concrete trimmer.

Subsection 9.22.6. Damper**Metal damper**

9.22.6.1. The throat of every fireplace shall be equipped with a metal damper sufficiently large to cover the full area of the throat opening.

Subsection 9.22.7. Smoke Chamber**Smoke
chambers**

9.22.7.1.(1) The sides of the smoke chamber connecting a fireplace throat with a flue shall not be sloped at an angle greater than 45 deg. to the vertical.

(2) Wall thickness of the smoke chamber above the damper shall conform to the chimney wall thicknesses in Section 9.21.

(3) Every smoke chamber shall be parged on the inside surface with fireclay or high temperature cement mortar or protected with tapered clay or concrete tile liners.

Subsection 9.22.8. Factory-Built Fireplaces**Specifications
for factory-
built fireplaces**

9.22.8.1. Factory-built fireplaces shall conform to ULC 610-1974 "Factory-Built Fireplaces" as revised to 1 May 1975 or to ULC S611-1976 "Factory-Built Free-Standing Fireplaces".

Subsection 9.22.9. Clearance of Combustible Material

9.22.9.1. Combustible material shall not be placed on or near the face of a fireplace within 6-in. of the fireplace opening, except that where the combustible material projects more than 1½-in. out from the face of the fireplace above the opening, such material shall be at least 12-in. above the top of the opening.

9.22.9.2. Metal exposed to the interior of a fireplace such as the damper control mechanism shall have at least a 2-in. clearance from any combustible material on the face of the fireplace where such metal penetrates through the face of the fireplace.

SECTION 9.23 WOOD-FRAME CONSTRUCTION**Subsection 9.23.1. Scope**

9.23.1.1. This Section applies to conventional wood-frame construction in which the framing members are spaced not more than 24-in. o.c. Wood-frame construction

9.23.1.2. The requirements in this Section with regard to floor framing, subflooring and their fastenings apply to floors for which the design live load does not exceed 50 psf. Design live load

9.23.1.3. The requirements in this Section with regard to wall framing and its fastenings apply to walls which support floors for which the design live load does not exceed 50 psf on any floor.

9.23.1.4. Where the conditions in Articles 9.23.1.2. or 9.23.1.3. are exceeded, the design of the framing and fastening shall conform to Section 4.3.

9.23.1.5. Post, beam and plank construction and plank frame wall construction shall conform to Section 9.24. Post, beam and plank construction

9.23.1.6. Preserved wood foundations shall conform to Sections 9.3, 9.13, 9.14, and 9.15.

Subsection 9.23.2. General

9.23.2.1. All members shall be so framed, anchored, fastened, tied and braced to provide the necessary strength and rigidity. Rigidity

9.23.2.2. Ends of wood joists or beams and other members framing into masonry or concrete shall be treated to prevent decay where the bottom of the member is at or below ground level, or a ½-in. air space shall be provided at the end and sides of the member. Treatment of end members

9.23.2.3. Wood framing members that are not pressure treated with a wood preservative and which are supported on concrete in contact with the ground or fill shall be separated from the concrete by at least 2-mil polyethylene film, 45-lb roll roofing or other damp-proofing material, except that such dampproofing is not required where the wood member is at least 6-in. above the ground.

9.23.2.4. Lumber shall conform to the appropriate requirements in Subsection 9.3.3.

9.23.2.5. Where termites are known to exist, unless pressure treated with a chemical that is toxic to such termites in accordance with Article 9.3.3.7., wood steps shall rest on a non-cellulosic base or apron extending at least 6-in. above grade, and wood lattice or skirting around porches shall be separated from piers and soil by at least 2-in.

Subsection 9.23.3. Nails and Staples

9.23.3.1. Nails specified in this Section shall be common steel wire nails or common spiral nails, conforming to CSA B111-1974, "Wire Nails, Spikes and Staples," as revised to 1 May, 1975, unless otherwise indicated but other nails providing at least equivalent performance may also be used. Nails and staples specification

9.23.3.2.(1) All nails shall be long enough so that not less than half their length penetrates into the second member. Nail length

(2) Splitting of wood members shall be minimized by staggering the nails in the direction of the grain and by keeping nails well in from the edges.

9.23.3.3. Nailing of framing shall conform to Table 9.23.3.A.

TABLE 9.23.3.A.

Forming Part of Article 9.23.3.3.

NAILING FOR FRAMING		
Construction Detail	Minimum Length of Nails, in.	Minimum Number or Maximum Spacing of Nails
Floor joist to plate—toe nail	3¼	2
Wood or metal strapping to underside of floor joists	2¼	2
Cross bridging to joists	2¼	2 each end
Doubled header or trimmer joists	3	12-in. o.c.
Floor joist to stud (balloon construction)	3	2
Ledger strip to wood beam	3¼	2 per joist
Joist to joist splice (see also Table 9.23.13.A.)	3	2 at each end
Tail joist to adjacent header joist (end nailed) around openings	3¼	5
	4	3
Each header joist to adjacent trimmer joist (end nailed) around openings	3¼	5
	4	3
Stud to wall plate (each end) toe nail	2½	4
or end nail	3¼	2
Doubled studs at openings, or studs at partition or wall intersections and corners	3	30-in. o.c.
Doubled top wall plates	3	24-in. o.c.
Bottom wall plate or sole plate to joists or blocking (exterior walls)	3¼	16-in. o.c.
Interior partitions to framing or subflooring	3¼	24-in. o.c.
Horizontal member over openings in non-loadbearing partitions—each end	3¼	2
Lintels to studs	3¼	2 at each end
Ceiling joist to plate—toe nail each end	3¼	2
Roof rafter, roof truss or roof joist to plate—toe nail	3¼	3
Rafter plate to each ceiling joist	4	2
Rafter to joist (with ridge supported)	3	3
Rafter to joist (with ridge unsupported)	3	see Table 9.23.13.A.
Gusset plate to each rafter at peak	2¼	4
Rafter to ridge board—toe nail	2¼	4
—end nail	3¼	3
Collar tie to rafter —each end	3	3
Collar tie lateral support to each collar tie	2¼	2
Jack rafter to hip or valley rafter	3¼	2
Roof strut to rafter	3	3
Roof strut to bearing partition—toe nail	3¼	2
2 by 6 or less plank decking to support	3¼	2
Plank decking wider than 2 by 6 to support	3¼	3
2-in. edge laid plank decking to support (toe nail)	3	1
2-in. edge laid plank to each other	3	18-in. o.c.
Column 1	2	3

9.23.3.4.(1) Fastening of sheathing and subflooring shall conform to Table 9.23.3.B.

TABLE 9.23.3.B.

Forming Part of Sentence 9.23.3.4.(1)

SHEATHING AND SUBFLOOR ATTACHMENT			
Element	Min. Nail Length, in.	Min. Staple Length, in.	Min. No. or Max. Spacing
5/16- and 3/8-in. plywood or particleboard	2	1 1/2	6-in. o.c. along edges and 12-in. o.c. along intermediate supports
1/2-in. to 3/4-in. plywood or particleboard	2	2	
7/8-in. plywood or particleboard	2 1/4	Not applicable	
7/16-in. and 1/2-in. fibreboard sheathing	1 3/4	1 1/2	
1/2-in. gypsum sheathing	1 3/4	Not applicable	
Board lumber 8-in. or less wide	2	2	2 per support
Board lumber more than 8-in. wide	2	2	3 per support
Column 1	2	3	4

(2) The minimum nail length for plywood or particleboard in column 2 in Table 9.23.3.B. may be reduced 1/4-in. if nails are annular grooved.

(3) Nails for fibreboard and gypsum sheathing in column 2 in Table 9.23.3.B. shall be not less than 0.126-in. diameter with minimum head diameter of 7/16-in.

(4) Staples in column 3 in Table 9.23.3.B. shall be not less than 0.063-in. diameter, or thickness, with not less than 3/8-in. crown, driven with crown parallel to framing.

9.23.3.5. Nails, staples or other fasteners intended for use in the construction of preserved wood foundation systems, basements or crawl spaces shall be hot dipped galvanized or other similar material.

9.23.3.6. Fastening requirements for preserved wood foundation members shall conform to the requirements of the "Construction Guide for Preserved Wood Foundations," PWF-1, 1977, published by the Canadian Wood Council.

Subsection 9.23.4. Allowable Spans

9.23.4.1. Except as required in Article 9.23.4.3. the spans for wood joists, rafters and beams shall conform to Section 9.39, "Span Tables for Wood Joists, Rafters, Trusses and Beams", for the uniform live loads shown in the tables for lumber graded under the grading rules shown in Table 9.3.3.A.

9.23.4.2.(1) The spans for steel beams in basements, cellars and crawl spaces in 1 and 2 storey dwellings shall conform to Tables II-A and II-B.

(2) Tables II-A and II-B shall apply only to,

- (a) steel grade that conforms to CSA G40.21-44W;
- (b) beams with laterally supported flanges.

(3) Allowable spans for steel beams other than those shown in Tables II-A and II-B shall be in conformity with Part 4.

9.23.4.3. Where a floor is required to be designed to support a concentrated load as specified in Table 9.4.2.B., or supports a uniform live load in excess of those shown in the span tables, such spans shall be determined in conformance with Section 4.3 or as otherwise permitted in the design assumptions of Tables IV-A to IV-K.

Subsection 9.23.5. Notching and Drilling

Notches and drilling

9.23.5.1. Holes drilled in roof, floor or ceiling framing members shall be not larger than $\frac{1}{4}$ the depth of the member and shall be located not less than 2-in. from the edges, unless the depth of the member is increased by the size of the hole.

9.23.5.2. Floor, roof and ceiling framing members may be notched provided the notch is located on the top of the member within $\frac{1}{2}$ the joist depth from the edge of bearing and is not deeper than $\frac{1}{3}$ the joist depth, unless the depth of the member is increased by the size of the notch.

9.23.5.3. Wall studs shall not be notched, drilled or otherwise damaged so that the undamaged portion of the stud is less than $\frac{2}{3}$ the depth of the stud if the stud is load-bearing or 1 $\frac{1}{2}$ -in. if the stud is non-loadbearing, unless the weakened studs are suitably reinforced.

9.23.5.4. The top plates in loadbearing walls and partitions shall not be notched, drilled or otherwise weakened to reduce the undamaged width to less than 2-in., unless the weakened plates are suitably reinforced.

9.23.5.5. Roof truss members shall not be notched, drilled or otherwise weakened, unless such notching or drilling is allowed for in the design of the truss.

Subsection 9.23.6. Anchorage

Anchorage

9.23.6.1. Except as provided in Article 9.4.4.1., building frames shall be anchored to the foundation, unless a structural analysis of wind and earth pressures shows anchorage is not required.

9.23.6.2. Except as provided in Article 9.23.6.4., where anchorage is required, it shall be provided by embedding the ends of the first floor joists in concrete or fastening the sill plate to the foundation with not less than $\frac{1}{2}$ in. diam. anchor bolts spaced not more than 8 ft. o.c. and such anchor bolts shall be embedded not less than 4 in. in the foundation and so designed that they may be tightened without withdrawing them from the foundation.

9.23.6.3. Exterior columns and posts shall be anchored to resist uplift and lateral movement.

9.23.6.4. Buildings not more than 14 ft. in width, not more than 1 storey in building height and not anchored to a foundation as described in Article 9.23.6.2., shall be anchored by means of corrosion-resistant steel rods or cables of at least $\frac{1}{2}$ in. diam., attached to the building frame near each corner of the building in a manner that will develop the full strength of the rod or cable and each such rod or cable shall be anchored to the ground by means of ground anchors having a withdrawal resistance of not less than 35 lb. per lineal foot length of the building.

Subsection 9.23.7. Sill Plates

Sill plates

9.23.7.1. Where sill plates provide bearing for the floor system they shall be not less than 2-in. by 4-in. material.

9.23.7.2. Sill plates shall be levelled by setting them on a full bed of mortar, except that where the top of the foundation is level they may be laid directly on the foundation provided the junction between foundation and sill plate is caulked.

Subsection 9.23.8. Beams for Basements, Cellars and Crawl Spaces

Beams

9.23.8.1. Beams shall have even and level bearing. Beams shall have not less than 3 $\frac{1}{8}$ -in. length of bearing at end supports.

9.23.8.2. Steel beams shall be shop primed.

Steel beams

9.23.8.3. Where a beam is made up of individual pieces of lumber that are nailed together, the individual members shall be 2-in. or greater in thickness and installed on edge.

9.23.8.4. Where the individual members of a beam described in Article 9.23.8.3. are butted together to form a joint, each such joint shall occur over a support or at or within 6-in. of the end quarter points of the clear span of the beam.

9.23.8.5. Joints in individual members of beams that are located at or near the end quarter points described in Article 9.23.8.4. shall not occur in adjacent members at the same quarter point and shall not reduce the effective beam width by more than half and members joined at quarter points shall be continuous over the adjacent supports.

Subsection 9.23.9. Floor Joists

9.23.9.1.(1) Except when supported on ribbon boards, floor joists shall have not less than 1 1/2-in. length of end bearing.

Floor joists,
methods of
support

(2) Ribbon boards shall be not less than 1-in. by 4-in. lumber let into the studs.

9.23.9.2. Floor joists may be supported on the top of beams or may be framed into the side of beams.

9.23.9.3. When framed into the side of a wood beam, the joists shall be supported on joist hangers or other acceptable mechanical connectors or on not less than 2-in. by 3-in. ledger strips nailed to the side of the beam.

9.23.9.4.(1) When framed into the side of steel beams, the joists shall be supported on the bottom flange of the beam or on not less than 2-in. by 2-in. lumber bolted to the web with not less than 1/4-in.-diam. bolts spaced not more than 24-in. apart.

(2) Such joists shall be spliced above the beam with not less than 2-in. by 2-in. lumber at least 2 ft long to support the flooring and not less than a 1/2-in. space shall be provided between the splice and the beam to allow for shrinkage of the wood joists.

9.23.9.5.(1) Unless ceiling furring or plywood cladding is installed on the underside of floor joists, floor joists shall be restrained from twisting at the end supports and at intervals between supports not exceeding 7 ft.

(2) Such restraint may be provided at end supports by toe nailing to the support, or by end nailing the joists to the header joist.

(3) Restraint at the intermediate locations or at the ends may be provided by not less than 1-in. by 3-in. or 1 1/2-in. by 2-in. cross bridging, or 1-in. by 1/8-in. steel strapping or 1-in. by 4-in. continuous wood strapping nailed to each joist and fastened at each end to the header or sill to prevent over-all movement.

(4) Blocking of 2 in. lumber the same depth as the joists, tightly fitted between joists and securely nailed in place is also permitted for restraining joist twisting.

(5) Where the clear span of floor joists is within 18 in. of the maximum span permitted in Table IV-B, cross-bridging or tightly-fitted blocking as described in Sentence (3) and (4) shall be installed at 4 ft. 6 in. on centres.

9.23.9.6. Header joists around floor openings shall be doubled when they exceed 4 ft in length. The size of header joists exceeding 10 ft 8-in. in length shall be determined by calculations.

Double joists

9.23.9.7. Trimmer joists around floor openings shall be doubled when the length of the header joist exceeds 32-in. When the header joist exceeds 6 ft 8-in. in length the size of the trimmer joists shall be determined by calculations.

Joist hangers	9.23.9.8. When tail joists and header joists are supported by the floor framing, they shall be supported by joist hangers, nailing or other acceptable connectors.
Support of non-load-bearing partitions	<p>9.23.9.9.(1) Non-loadbearing partitions parallel to floor joists shall be supported on beams, loadbearing walls or doubled joists where the partition is over 6 ft in length and contains openings that are not full ceiling height.</p> <p>(2) Where such partitions contain no openings, or openings that are full ceiling height, the joists need not be doubled.</p> <p>(3) Non-loadbearing partitions less than 6 ft in length need not be supported on framing but may be supported by the subfloor.</p> <p>(4) Doubled joists may be separated not more than 8-in. by blocking if the blocking is not less than 2-in. by 4-in. lumber spaced not more than 4 ft apart.</p>
	9.23.9.10. Non-loadbearing partitions at right angles to the floor joists are not restricted as to location.
Support of loadbearing partitions	9.23.9.11. Loadbearing interior walls parallel to floor joists shall be supported by beams or walls of sufficient strength to transfer safely the design loads to the vertical supports.
Location of loadbearing interior walls	9.23.9.12. Loadbearing interior walls at right angles to floor joists shall be located not more than 3 ft from the joist support when the wall does not support a floor, and not more than 2 ft from the joist support when the wall supports 1 or more floors, unless the joist size is designed to support such loads.

Subsection 9.23.10. Wall Studs

Wall studs	9.23.10.1. Wall studs shall be continuous for the full storey height except at openings and shall not be spliced, except by glued joints.
Position of wall studs	9.23.10.2. Wall studs shall be placed at right angles to the wall face, except that studs on the flat may be used in gable ends of roofs that contain only unfinished space or in non-loadbearing partitions. (See Note 1 to Table 9.23.10.A.).
Design of corners and intersections	<p>9.23.10.3.(1) Corners and intersections shall be designed to provide adequate support for the vertical edges of interior and exterior cladding materials, and in no instance shall exterior corners be framed with less than the equivalent of 2 studs.</p> <p>(2) Where the vertical edges of interior cladding at wall intersections are supported at vertical intervals by blocking or other acceptable method, the vertical distance between such supports shall not exceed the maximum distance between supports specified in Section 9.30.</p>
Double studs	9.23.10.4. Except as provided in Article 9.23.10.5., studs shall be doubled on each side of openings so that the inner studs extend from the lintel to the bottom wall plate and the outer studs extend from the top wall plates to the bottom wall plate.
Single studs	9.23.10.5. Single studs may be used on either side of openings in non-loadbearing partitions provided the studs extend from the top wall plate to the bottom wall plate.
	9.23.10.6. The size and spacing of studs shall conform to Table 9.23.10.A.

TABLE 9.23.10.A.

Forming Part of Article 9.23.10.6.

SIZE AND SPACING OF STUDS				
Type of Wall	Supported Loads (including dead loads)	Minimum Stud Size, in.	Maximum Stud Spacing, in.	Maximum Unsupported Height, ft
Interior	No load	2 by 2 2 by 4 flat	16 16	8 12
	Limited attic storage ⁽¹⁾	2 by 3 2 by 4	24 24	10 12
	Full attic storage ⁽²⁾ or roof-load or limited attic storage ⁽¹⁾ plus 1 floor	2 by 4	24	12
	Full attic storage ⁽²⁾ plus 1 floor or roof load plus 1 floor or limited attic storage ⁽¹⁾ plus 2 floors	2 by 4	16	12
	Full attic storage ⁽²⁾ plus 2 floors or roof load plus 2 floors	2 by 4 3 by 4 2 by 6	12 16 16	12 12 14
	Full attic storage ⁽²⁾ plus 3 floors or roof load plus 3 floors	2 by 6	12	14
Exterior	Roof with or without attic storage ⁽³⁾	2 by 3 2 by 4	16 24	8 10
	Roof with or without attic storage plus 1 floor	2 by 4	16	10
	Roof with or without attic storage plus 2 floors	2 by 4 3 by 4 2 by 6	12 16 16	10 10 12
	Roof with or without attic storage plus 3 floors	2 by 6	12	6
Column 1	2	3	4	5

Notes to Table 9.23.10.A.:

⁽¹⁾Applies to attics not accessible by a stairway.⁽²⁾Applies to attics accessible by a stairway.⁽³⁾2-in. by 3-in. studs at 16-in. o.c. shall be used only in buildings not wider than 14 ft that are fabricated in plant.

9.23.10.7. Stud bearing walls not sheathed on at least one side shall have mid-height blocking or other acceptable lateral support.

Subsection 9.23.11. Wall Plates

Wall plates

9.23.11.1. Wall plates shall be not less than 2-in. thick and shall be the same width as the wall studs, except that in non-loadbearing partitions and in loadbearing walls where the studs are located directly over framing members, the bottom wall plate may be $\frac{3}{4}$ -in. thick.

Bottom wall plates

9.23.11.2. A bottom wall plate shall be provided in all cases. The bottom plate in exterior walls shall not project more than $\frac{1}{8}$ the plate width over the support.

Top plates in loadbearing walls

9.23.11.3. Except as permitted in Articles 9.23.11.4., 9.23.11.5. and 9.23.11.6., no fewer than 2 top plates shall be provided in loadbearing walls and partitions.

Single top plates

9.23.11.4. A single top plate may be used in a section of a loadbearing wall containing a lintel provided the top plate forms a tie across the lintel.

Single top plates in loadbearing walls

9.23.11.5. A single top plate may be used in loadbearing walls where the concentrated loads from ceilings, floors and roofs are not more than 2-in. to one side of the supporting studs and in all non-loadbearing partitions.

Exclusion of top plates

9.23.11.6. The top plates may be omitted in a section of loadbearing wall containing a lintel provided the lintel is tied to the adjacent wall section with not less than 3-in. by 6-in. by 0.036-in.-thick galvanized steel, or 1-in. by 4-in. by 12-in. wood splice nailed to each wall section with no fewer than three $2\frac{1}{2}$ -in. nails.

Joints in top plates

9.23.11.7. Joints in top plates of loadbearing walls shall be staggered at least 1 stud spacing.

Tying of top plates at corners

9.23.11.8.(1) The top plates in loadbearing walls shall be lapped or otherwise suitably tied at corners and intersecting walls.

(2) Joints in single top plates used with loadbearing walls shall be suitably tied and such ties shall be the equivalent of at least 3-in. by 6-in. by 0.036-in.-thick galvanized steel nailed to each wall with at least the equivalent of three $2\frac{1}{2}$ -in. nails.

Subsection 9.23.12. Framing over Openings

9.23.12.1. Except as provided in Article 9.23.12.4., openings in non-loadbearing walls shall be bridged with not less than 2-in. material the same width as the studs securely nailed to adjacent studs.

9.23.12.2.(1) Openings in loadbearing walls shall be bridged with lintels designed to carry the superimposed loads to adjacent studs.

(2) Except as provided in Article 9.23.12.4., where 2 or more members are used in lintels, they shall be fastened together with not less than $3\frac{1}{4}$ -in. nails in a double row, with nails not more than 18-in. apart in each row and the lintel members may be separated by filler pieces.

9.23.12.3. In buildings of residential occupancy where the wall studs exceed 2-in. by 3-in. in size, and where the spans of supported joists do not exceed 16 ft and the spans of trusses do not exceed 32 ft, the spans for wood lintels shown in Table 9.23.12.A. may be used.

9.23.12.4. In loadbearing exterior and interior walls of 2-in. by 3-in. framing members, lintels shall consist of solid 3-in.-thick members on edge or 2-in.-thick and $\frac{3}{4}$ -in.-thick members securely nailed together and such lintels shall be at least 2-in. greater than those shown in Table 9.23.12.A. for the allowable spans, and shall not exceed 8 ft in length.

TABLE 9.23.12.A.

Forming Part of Articles 9.23.12.3. and 9.23.12.4.

WOOD LINTEL SPANS ⁽¹⁾			
Location of Lintels	Supported Loads Including Dead Loads and Ceiling	Nominal Depth of Lintels, in.	Maximum Allowable Spans, ft-in.
Interior walls	Limited attic storage	4	4-0
		6	6-0
		8	8-0
		10	10-0
		12	12-6
	Full attic storage or roof load or limited attic storage plus 1 floor	4	2-0
		6	3-0
		8	4-0
		10	5-0
		12	6-0
	Full attic storage plus 1 floor or roof load plus 1 floor or limited attic storage plus 2 or 3 floors	4	—
		6	2-6
		8	3-0
		10	4-0
		12	5-0
	Full attic storage plus 2 or 3 floors or roof load plus 2 or 3 floors	4	—
		6	2-0
		8	3-0
		10	3-6
		12	4-0
Exterior walls	Roof with or without attic storage	4	3-8
		6	5-6
		8	7-4
		10	9-2
		12	11-0
	Roof with or without attic storage plus 1 floor	4	1-10
		6	4-7
		8	6-5
		10	7-4
		12	8-3
	Roof with or without attic storage plus 2 or 3 floors	4	1-10
		6	3-8
		8	5-6
		10	6-5
		12	7-4
Column 1	2	3	4

Note to Table 9.23.12.A.:

⁽¹⁾Spans apply to 4-in.-thick lumber or 2 pieces of 2-in.-thick lumber on edge.

Subsection 9.23.13. Roof and Ceiling Framing

Roof and ceiling framing members	9.23.13.1. Roof rafters and joists and ceiling joists shall be continuous or shall be spliced over vertical supports that extend to suitable bearing.
Double roof and ceiling framing members	9.23.13.2. Roof and ceiling framing members shall be doubled on each side of openings greater than 2 rafter or joist spacings in width.
	9.23.13.3. The length of end bearing of joists and rafters shall be not less than 1 ½-in.
Location of rafters	9.23.13.4. Rafters shall be located directly opposite each other and tied together at the peak, or may be offset by their own thickness if nailed to a ridge board not less than 11/16-in. thick.
Slope of rafter at supports	9.23.13.5. Rafters shall be shaped at supports to provide even bearing surfaces and supported directly above the exterior walls.
Hip and valley rafters	9.23.13.6. Hip and valley rafters shall be not less than 2-in. greater in depth than the common rafters and not less than 1 ½-in. thick, actual dimension.
Collar ties and ceiling joists	9.23.13.7. Ceiling joists and collar ties of not less than 2-in. by 4-in. lumber may be assumed to provide intermediate support to reduce the span for rafters and joists where the roof slope is 4/12 or greater and such collar ties more than 8 ft in length shall be laterally supported near their centres by not less than 1-in. by 4-in. continuous members at right angles to the collar ties.
Dwarf walls and struts	9.23.13.8. Dwarf walls and struts may be used to provide intermediate support to reduce the span for rafters and joists and when struts are used they shall be not less than 2-in. by 4-in. material extending from each rafter to a loadbearing wall at an angle of not less than 45 deg. to the horizontal.
Framing of dwarf walls	9.23.13.9. When dwarf walls are used for rafter support, they shall be framed in the same manner as loadbearing walls and securely fastened top and bottom to the roof and ceiling framing to prevent over-all movement and solid blocking shall be installed between floor joists beneath dwarf walls that enclose finished rooms.
Support of roof ridges	9.23.13.10. Except as provided in Article 9.23.13.11., the ridge of the roof shall be supported by a loadbearing wall extending from the ridge to suitable bearing or by a ridge beam of not less than 2-in. by 6-in. material and such ridge beam shall be supported at intervals not exceeding 4 ft by not less than 2-in. by 4-in. members extending vertically from the ridge to suitable bearing.
Tying of rafter ends or ceiling joists	9.23.13.11.(1) When the roof slope is 4/12 or more, ridge support may be omitted provided the lower ends of the rafters are adequately tied to prevent outward movement. (2) Where rafters are tied in accordance with Sentence (1) the ties may consist of tie rods or ceiling joists forming a continuous tie for opposing rafters and nailed in accordance with Table 9.23.13.A. and members may be fastened together either directly or through a gusset plate.

TABLE 9.23.13.A.

Forming Part of Article 9.23.13.11.

MINIMUM RAFTER-TO-JOIST NAILING ⁽¹⁾⁽²⁾ (Unsupported Ridge)														
Roof Slope	Rafter Spacing, in.	Rafter tied to Every Joist							Rafter tied to Joist Every 4 ft					
		<i>Building</i> Width up to 26 ft			<i>Building</i> Width up to 32 ft				<i>Building</i> Width up to 26 ft			<i>Building</i> Width up to 32 ft		
		Roof Snow Load												
		20 psf or less	30 psf	40 psf or more	20 psf or less	30psf	40 psf or more	20 psf or less	30 psf	40 psf or more	20 psf or less	30 psf	40 psf or more	
4/12	16 24	4 6	5 8	6 9	5 8	6 11	8 —	11 11	— —	— —	— —	— —	— —	
5/12	16 24	4 5	4 6	5 8	5 7	6 8	7 11	7 7	9 9	— —	9 —	— —	— —	
6/12	16 24	4 4	4 5	4 6	4 5	4 6	5 8	6 6	8 8	9 9	8 8	11 11	— —	
7/12	16 24	4 4	4 4	4 5	4 5	4 6	4 7	5 5	6 6	8 8	7 7	8 8	11 11	
9/12	16 24	4 4	4 4	4 4	4 4	4 4	4 5	4 4	5 5	6 6	5 5	6 6	7 7	
12/12	16 24	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	5 5	
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	

Notes to Table 9.23.13.A.:

(1)Nails not less than 3 in.

(2)Ceiling joists shall be fastened together with at least 1 more nail per joist splice than required for the rafter-to-joist connection.

9.23.13.12. Roof joists supporting a finished ceiling other than plywood shall be restrained from twisting along the bottom edges by means of furring, blocking, cross bridging or strapping conforming to Article 9.23.9.5.

Roof joists

9.23.13.13. Ceiling joists supporting part of the roof load from the rafters shall be not less than 1-in. greater in depth than required for ceiling joists not supporting part of the roof load, except that when the roof slope is 3/12 or less the ceiling joist sizes shall be determined from the span tables for roof joists.

Ceiling joists

9.23.13.14. Roof trusses shall be designed in accordance with the appropriate requirements in Part 4 except that where the span of a roof truss does not exceed 40 ft and the roof truss spacing does not exceed 24-in. o.c., roof trusses are permitted provided they conform to the requirements in Articles 9.23.13.15. and 9.23.13.16.

9.23.13.15. The member sizes for wood roof trusses of the Howe or Fink configuration which are to be supported at or near their ends may be determined in conformance with Section 9.39. "Span Tables for Wood Joists, Rafters, Trusses and Beams," and the joint connections used in such trusses shall be designed in conformance with the requirements in Section 4.3.

9.23.13.16.(1) Except as permitted in Article 9.23.13.15., lumber roof trusses with spans that do not exceed 40 ft and spaced not more than 24 in. o.c. and which are not designed in conformance with Part 4,

Roof trusses

- (a) shall be capable of withstanding a load equal to the ceiling load plus 2⅔ times the design roof snow load, but not less than 60 psf for 24 hr; and

(b) shall not deflect more than 1/360 of the span after being loaded with the ceiling load plus 1 1/3 the design roof snow load after 1 hr in the case of trusses supporting a gypsum board or plastered ceiling, and not more than 1/240 of the span for other types of ceiling finish.

(2) Where the trusses referred to in Sentence (1) do not exceed 14 ft span the deflection is permitted to be not more than 1/180 of the span when loaded with the ceiling load plus 1 1/3 the design roof load where the trusses do not support a gypsum board or plastered ceiling.

(3) Where lumber roof trusses are tested, such tests shall be in accordance with Technical Note No. 423 published by the Division of Building Research of the National Research Council of Canada, July 1964.

Subsection 9.23.14. Subflooring

Subflooring required

9.23.14.1. Subflooring shall be provided beneath finish flooring where the finish flooring does not have adequate strength to support the design loads (see Subsection 9.31.3.).

Plywood for subfloors

9.23.14.2. Plywood for subfloors shall be exterior type conforming to CSA O121-1973, "Douglas Fir Plywood," CSA O151-1974, "Canadian Softwood Plywood," or CSA O153-1963, "Poplar Plywood." Particleboard subflooring shall conform to Type 1 board in CSA O188-1968, "Mat-Formed Wood Particleboard," all as revised to 1 May, 1975.

Edge support

9.23.14.3.(1) The edges of panel type subflooring shall be supported by not less than 2 in. by 2 in. blocking securely nailed between framing members.

(2) Tongued-and-grooved panel type plywood subflooring shall also be blocked as required in Sentence (1) but only at the unsupported edges at exterior walls.

Installation of plywood subflooring

9.23.14.4. Plywood subflooring shall be installed with the surface grain at right angles to the joists and with joints parallel to floor joists staggered.

Subfloor thickness

9.23.14.5.(1) Subfloors shall conform to Table 9.23.14.A.

TABLE 9.23.14.A.
Forming Part of Sentence 9.23.14.5.(1).

THICKNESS OF SUBFLOORING			
Maximum Joist Spacing, in.	Minimum Plywood Thickness, in.	Minimum Particle-board Thickness, in.	Minimum Lumber Thickness, in.
16	1/2	5/8	11/16
20	5/8	3/4	3/4
24	3/4	1	3/4
Column 1	2	3	4

(2) Where the maximum joist spacing in column 1 in Table 9.23.14.A. is 20 in. and 24 in. o.c., the minimum plywood thickness may be 1/2-in. and the minimum particleboard thickness may be 5/8-in. provided the finish flooring consists of matched wood strip flooring not less than 3/4-in. thick laid at right angles to the joists.

(3) Lumber boards in column 4 in Table 9.23.14.A. shall be of uniform thickness and not more than 8-in. wide.

Nails in plywood subflooring

9.23.14.6. When resilient flooring is to be applied directly to the plywood subfloor, the plywood shall be installed with annular grooved nails.

9.23.14.7. Lumber subflooring shall be laid at an angle of not less than 45 deg. to the joists and shall be fully supported at the ends on solid bearing.

Laying angle of subflooring

Subsection 9.23.15. Roof Sheathing

9.23.15.1. Plywood used for roof sheathing shall be exterior type plywood conforming to CSA O121-1973, "Douglas Fir Plywood," CSA O151-1974, "Canadian Softwood Plywood," or CSA O153-1963, "Poplar Plywood." Particleboard for roof sheathing shall conform to Type 1 board in CSA O188-1968, "Mat-Formed Wood Particleboard," all as revised to 1 May, 1975.

Plywood and particleboard specifications

9.23.15.2. Plywood roof sheathing shall be installed with the surface grain at right angles to the roof framing and with the end joints staggered.

Application

9.23.15.3. Particleboard and plywood roof sheathing shall be installed with at least a 1/16-in. gap between sheets.

9.23.15.4.(1) Where panel-type roof sheathing requires edge support, the support shall be not less than 2-in. by 2-in. blocking securely nailed between framing members or metal H clips.

Supports of edges

(2) The supports referred to in Sentence (1) are not required when tongued-and-grooved edged plywood is used.

9.23.15.5. The thickness of roof sheathing on a flat roof used as a walking deck shall conform to the requirements in Table 9.23.14.A. for subfloors. The thickness of roof sheathing on a roof not used as a walking deck shall conform to Table 9.23.15.A. and lumber listed in column 5 in Table 9.23.15.A. shall not be wider than 12-in.

Thickness of roof sheathing

TABLE 9.23.15.A.
Forming Part of Article 9.23.15.5.

THICKNESS OF ROOF SHEATHING				
Joist or Rafter Spacing, in.	Minimum Plywood Thickness, in.		Minimum Particleboard Thickness, Edges Supported, in.	Minimum Lumber Thickness, in.
	Edges Supported	Edges Unsupported		
12	5/16	5/16	3/8	11/16
16	5/16	3/8	3/8	11/16
20	3/8	1/2	7/16	3/4
24	3/8	1/2	7/16	3/4
Column 1	2	3	4	5

9.23.15.6. Asphalt-coated or asphalt-impregnated fibreboard at least 7/16-in. thick conforming to CSA A247.2-1969, "Insulating Fibreboard Sheathing," as revised to 1 May, 1975 may be used as a roof sheathing over supports spaced not more than 16-in. o.c. provided the roofing consists of a continuous sheet of galvanized steel of at least 0.013-in. in thickness or a continuous sheet of aluminum of at least 0.024-in. in thickness and all edges of such sheathing shall be supported by blocking or framing.

Subsection 9.23.16. Wall Sheathing

9.23.16.1. Exterior walls and gable ends shall be sheathed when the exterior cladding requires intermediate fastening between supports or if the exterior cladding requires solid backing.

Wall sheathing

9.23.16.2. Where wall sheathing is required, it shall conform to Table 9.23.16.A.

Wall sheathing thickness and specifications

TABLE 9.23.16.A.

Forming Part of Article 9.23.16.2.

WALL SHEATHING THICKNESS AND SPECIFICATIONS			
Type of Sheathing	Minimum Thickness, in.		Material Standards
	With Supports 16 in. o.c.	With Supports 24 in. o.c.	
Lumber	11/16	11/16	See Table 9.3.3.A
Fibreboard (insulating)	3/8	7/16	CSA A247.2-1969
Gypsum board	3/8	1/2	CSA A82.28-1962
Plywood (exterior type)	1/4	5/16	CSA O121-1973
Particleboard	1/4	5/16	CSA O151-1974
			CSA O153-1963
			CSA O188-1968 (Type 1)
			all as revised to 1 May, 1975
Column 1	2	3	4

9.23.16.3.(1) Gypsum board and fibreboard shall not be used for the attachment of siding materials.

(2) Nails used in attaching gypsum board or fibreboard shall be not less than 0.126-in. diam. with a minimum head diameter of 7/16-in.

Application of
lumber and
wall sheathing

9.23.16.4. Lumber wall sheathing shall be applied so that all ends are supported with end joints staggered.

9.23.16.5. Panel-type sheathing board shall be applied so that vertical joints are staggered if the sheathing is applied horizontally and a gap of not less than 1/16-in. shall be left between sheets of plywood, particleboard or fibreboard.

Subsection 9.23.17. Wall Sheathing Paper

9.23.17.1. Sheathing paper shall conform to CGSB 9-GP-2a(1971), "Building Paper: Cellulosic Fibre, Water Repellent, Breather Type," as revised to 1 May, 1975.

Wall sheathing
paper backing
requirements

9.23.17.2. Except as permitted in Article 9.23.17.4., a layer of sheathing paper shall be applied over the sheathing so that the paper is lapped not less than 4-in. at the joints and returned around openings and when applied horizontally the upper sheets shall overlap the lower sheets.

Application

9.23.17.3.(1) Except as permitted in Article 9.23.17.4. 2 layers of sheathing paper shall be applied over the wall framing beneath siding when no sheathing is used.

(2) The sheathing paper shall be applied vertically and joints lapped not less than 4 in. and joints shall occur over studs.

(3) The sheathing paper shall be attached to the framing with roofing nails or staples spaced not more than 3 in. o.c. along the edges of the outer layer of sheathing paper.

(4) Wall sheathing may be used in lieu of 1 layer of paper and such sheathing need not conform to Table 9.23.16.A.

Where
sheathing paper
not required

9.23.17.4.(1) Sheathing paper may be omitted beneath siding where the joints in the siding are formed to effectively prevent the passage of wind and rain.

(2) Where plywood, hard-pressed fibreboard, particleboard or asbestos-cement sheets are used as siding, requirement in Sentence. (1) may be met by having all edges of the sheets directly supported by framing members with joints between adjacent panels caulked

and the vertical joints covered with battens or shiplapped or otherwise matched to provide weathertight joints.

(3) In the case of metal siding where sheet material is used, the requirement in Sentence (1) may be met by the provision of locked seam joints or other similar method.

9.23.17.5. Sheathing paper beneath stucco shall be asphalt type.

Subsection 9.23.18. Bracing

9.23.18.1. Except as provided in Article 9.23.18.2., each exterior wall in each storey shall be braced with at least 1 diagonal brace conforming to Article 9.23.18.3.

9.23.18.2. Bracing is not required where walls have an interior finish conforming to the requirements in Section 9.30., or if the walls are clad with diagonal lumber, panel type sheathing or panel type siding.

9.23.18.3. Where bracing is required, it shall consist of at least 1-in. by 4-in. wood members applied diagonally to the studs at an angle of approximately 45 deg. to the horizontal, extending the full height of the wall on each storey and such bracing shall be nailed to each stud and wall plate by at least two 2½-in. nails.

SECTION 9.24 POST, BEAM AND PLANK CONSTRUCTION

Subsection 9.24.1. Scope

9.24.1.1. This Section applies to wood-frame construction with the loadbearing framing members spaced more than 24 in. apart.

Subsection 9.24.2 General

9.24.2.1. The size and spacing of posts and beams and the span and thickness of floor and roof decking shall be calculated in conformance with Section 4.3., except when specific dimensions are provided in this Subsection.

9.24.2.2. Requirements for nails, lumber, notching and drilling, anchorage and sill plates shall conform to Section 9.23.

9.24.2.3. Lumber shall conform to the requirements in Subsection 9.3.3.

Grades of
lumber

9.24.2.4. Plywood web beams and glued-laminated beams and posts shall conform to Section 4.3.

Subsection 9.24.3. Decking

9.24.3.1. Floor and roof decking shall consist of not less than 2-in. lumber laid on the flat or on edge, or exterior type plywood conforming to CSA O121-1973, "Douglas Fir Plywood", CSA O151-1974, "Canadian Softwood Plywood" or CSA O153-1963, "Poplar Plywood", all as revised to 1 May, 1975.

Specifications
for floor and
roof decking

9.24.3.2. Plank floor decking laid on the flat shall be not more than 8 in. wide and such decking shall be tongued-and-grooved or splined, unless a separate underlay is installed or the flooring consists of wood strips laid at right angles to the decking.

Plank floor
decking

9.24.3.3.(1) Plywood decking that is not tongued-and-grooved shall have edges supported by not less than 2-in. by 4-in. blocking securely nailed between framing members or metal H clips.

Plywood
decking

(2) Plywood roof decking shall be not less than ½-in. thick on supports spaced up to 32-in. o.c., ⅝-in. thick on supports up to 36-in. o.c., ¾-in. thick on supports up to 40-in. o.c., and 7⁄8-in. thick on supports up to 48-in. o.c.

Subsection 9.24.4. Loadbearing Beams

9.24.4.1.(1) Loadbearing beams shall be solid, built-up, glued-laminated or plywood web beams.

(2) Where glued assemblies extend to the exterior, waterproof glue shall be used, except that water-resistant glue may be used where the exposed portion is adequately protected against wetting.

9.24.4.2. Loadbearing roof beams shall be securely connected to the exterior wall framing and to interior loadbearing walls or beams to resist adequately the uplift forces due to wind.

9.24.4.3. The length of end bearings for loadbearing beams shall be determined on the basis of the allowable design stress of the wood but shall not be less than 1½-in.

9.24.4.4. When loadbearing beams are supported by mechanical connectors, the connectors shall be capable of supporting the design loads.

9.24.4.5. Where joints in loadbearing beams do not occur over solid supports, joints shall be designed according to CSA Standard 086-1970, "Code of Recommended Practice for Engineering Design in Timber", as revised to 1 May, 1975.

9.24.4.6. Opposing loadbearing beams shall be tied together at the joints by means of splices or suitable mechanical connectors.

9.24.4.7. Where secondary framing members span between floor beams, the members and connections shall be designed to support the required design loads.

9.24.4.8. Loads from loadbearing walls, columns or other concentrated loads shall be supported by members designed to carry such loads.

Subsection 9.24.5. Posts

Posts 9.24.5.1. Posts shall be solid, built-up or laminated.

Exterior wall posts 9.24.5.2. Where wall sheathing does not provide suitable anchorage, exterior wall posts shall be anchored to the wall plate by not less than 0.047-in.-thick steel angles or other similar anchors.

Built-up posts 9.24.5.3. Solid posts and individual members in built-up posts shall extend in one piece the full height of the wall storey and built-up members shall be fastened together with nails spaced not more than 12-in. o.c. and at least twice as long as the individual member thickness, or with not less than ⅜-in. diam. bolts fitted with washers and spaced not more than 18-in. o.c.

Intermediate studs 9.24.5.4. Intermediate studs or blocking shall be provided between posts in post and beam walls for the support of exterior and interior cladding and intermediate studs shall conform to Section 9.23 for non-loadbearing stud walls.

Subsection 9.24.6. Plank Frame Wall Construction

9.24.6.1. Thickness of plank framing in plank frame walls shall conform to Table 9.24.6.A. and the unsupported height of 2-in. vertical plank non-loadbearing partitions shall not exceed 12 ft.

TABLE 9.24.6.A.
Forming Part of Article 9.24.6.1.

NOMINAL THICKNESS OF PLANK FRAMING	
Supported Load (Including dead load and ceiling)	Minimum Plank Thickness, in.
Roof with or without attic load	2
Roof with or without attic storage plus 1 floor	2
Roof with or without attic storage plus 2 floors	3
Column 1	2

9.24.6.2. Vertical framing in plank frame walls shall consist of not less than 10-in.-wide planks spaced not more than 8 ft o.c.

9.24.6.3. Vertical framing in plank frame walls shall not bear on wood members with the grain at right angles to the vertical framing, except where bearing on sills.

9.24.6.4. Corners of plank frame walls shall be formed by butting and fastening the face and edge of 2 planks.

9.24.6.5.(1) Vertical framing in plank frame walls shall be provided on each side of every opening, except that a window opening not more than 2 ft 6 in. in width may be supported on 1 side only by a vertical member.

(2) Where a vertical member is provided on one side only the opposite jamb of the window or short upright to which it is attached shall bear on the filler wall plank immediately below, which in turn shall be notched into the vertical structural members on each side.

9.24.6.6. Where horizontal planks act as loadbearing lintels or headers, they shall be framed into the vertical members by dovetailing so that not less than a 1½-in. length of bearing is provided.

9.24.6.7. Openings in loadbearing plank frame walls shall be bridged with lintels designed to carry superimposed loads to adjacent vertical members.

9.24.6.8. In buildings of residential occupancy where the spans of supported joists do not exceed 16 ft and the spans of trusses do not exceed 32 ft. the spans for wood lintels shown in Table 9.24.6.B. may be used for plank frame walls.

TABLE 9.24.6.B.
Forming Part of Article 9.24.6.8.

LINTEL SPANS	
Nominal Lintel Size, in.	Maximum Span, ft — in.
2 by 8	5 — 1
2 by 10	6 — 5
2 by 12	7 — 4
3 by 8	6 — 5
3 by 10	7 — 4
Column 1	2

9.24.6.9. Non-loadbearing horizontal members (fillers) in plank frame walls shall be securely fastened to the vertical framing.

9.24.6.10. Sheathing paper for plank frame walls shall be installed over the exterior of the planks when no sheathing is provided, or over the sheathing when sheathing is provided.

9.24.6.11. Sheathing paper shall conform to Section 9.23.

SECTION 9.25 SHEET STEEL STUD WALL FRAMING

Subsection 9.25.1. General

9.25.1.1. This Section applies to sheet steel studs for use in non-loadbearing exterior walls and interior partitions.

9.25.1.2. Where loadbearing steel studs are used, they shall be designed in conformance with Part 4.

9.25.1.3. Steel studs and runners shall conform to ASTM C645-74, "Light-Gauge Steel Studs, Runners and Rigid Furring Channels", and ASTM A525-71, "General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process", both as revised to 1 May, 1975.

9.25.1.4. Screws for the application of cladding materials to steel studs, runners and furring channels shall conform to ASTM C646-72, "Steel Drill Screws for the Application of Gypsum Sheet Material to Light Gauge Steel Studs", as revised to 1 May, 1975.

9.25.1.5. Steel stud framing shall be clad on both sides with lath and plaster or sheet-type material, fastened with screws or other approved fasteners at the appropriate spacing as described in Section 9.30 for interior finishes and screws used for attaching wall finishers shall penetrate at least 3⁄8-in. through the metal.

Subsection 9.25.2 Size of Framing

9.25.2.1. The size and spacing of steel studs for non-loadbearing partitions shall conform to Table 9.25.2.A. and such studs shall have a nominal thickness of not less than 0.018 in., exclusive of galvanizing.

TABLE 9.25.2.A.

Forming Part of Article 9.25.2.1.

STEEL STUDS FOR NON-LOADBEARING PARTITIONS		
Minimum Stud Size, in.	Maximum Stud Spacing, in.	Maximum Wall Height, ft
1¼ × 1⅝	16	10
	24	9
1¼ × 2½	16	13
	24	12
1¼ × 3⅝	16	17
	24	16
Column 1	2	3

9.25.2.2. The size and spacing of non-loadbearing steel studs for exterior walls shall conform to Table 9.25.2.B.

TABLE 9.25.2.B.

Forming Part of Article 9.25.2.2.

STEEL STUDS FOR NON-LOADBEARING EXTERIOR WALLS				
Minimum Stud Size, in.	Nominal Metal Thickness, in. (excluding coating)	Maximum Stud Length, ft		
		Spacing of Studs		
		12 in. o.c.	16 in. o.c.	24 in. o.c.
1 1/4 × 3/8	0.021	10	8	—
1 1/4 × 3/8	0.027	11	9	8
1 1/4 × 3/8	0.033	12	10	9
1 1/4 × 3/8	0.039	13	11	10
Column 1	2	3	4	5

Subsection 9.25.3. Installation

9.25.3.1. Runners having a thickness of at least 0.021-in. exclusive of coatings, and having at least 1-in. flanges shall be provided at the top and bottom of walls and partitions.

(2) The runners referred to in Sentence (1) shall be securely attached to the building at approximately 2 in. from the end of the runner, and at intervals of not more than 24 in. o.c. for interior studs and 12 in. o.c. for exterior studs and shall be attached by fasteners consisting of the equivalent of 2 1/2-in. nails or 1-in. screws.

9.25.3.2. Studs at openings and which are not full wall height shall be supported by a runner at the ends of the studs, securely fastened to the full length studs at the sides of the opening.

9.25.3.3.(1) Steel studs used in walls required to have a fire-resistance rating shall be installed so that there is at least a 1/2-in. clearance between the top of the stud and the top of the runner to allow for expansion in the event of fire.

(2) Except as provided in Article 9.25.3.7., studs in such walls shall not be attached to the runners in a manner that will prevent such expansion.

9.25.3.4. Steel studs shall be installed with webs at right angles to the wall face and, except at openings, shall be continuous for the full wall height.

9.25.3.5. Corners and intersections of walls and partitions shall be constructed to provide support for the cladding materials.

9.25.3.6. Studs shall be doubled on each side of every opening where such openings involve more than 1 stud space, tripled where the openings in exterior walls exceed 8 ft in width and suitably tied together to act as a single structural unit in resisting transverse loads.

9.25.3.7. Studs shall be attached to runners by screws, crimping, welding or other suitable method around wall openings, and elsewhere where necessary to keep the studs in alignment during construction.

SECTION 9.26 THERMAL INSULATION AND VAPOUR BARRIERS

Subsection 9.26.1. Scope

9.26.1.1. This Section applies to the thermal insulation of buildings of residential occupancy.

Subsection 9.26.2. General

Prevention of
moisture
condensation

9.26.2.1. Buildings of residential occupancy shall be provided with sufficient thermal insulation to prevent moisture condensation on the interior surfaces of walls, ceilings and floors during the winter and to ensure comfortable conditions for the occupants.

9.26.2.2. Insulation of heating and ventilating ducts shall conform to Section 9.34.

9.26.2.3. Where insulation is installed so that there is a space between the insulation and the roofing, the roof space or attic shall be ventilated according to Section 9.19.

Subsection 9.26.3. Materials

Insulation
materials

9.26.3.1. Insulation in contact with the ground shall be inert to the action of soil and water and shall be protected from moisture by a moisture barrier so that its insulating properties shall not be effectively reduced.

Specifications

9.26.3.2. Insulating materials shall conform to the following Standards, as revised to 1 May, 1975:

CSA A101-1968, "Mineral Wool Thermal Building Insulation,"

CSA A247.1-1969, "Fibreboard Roof Insulation,"

CSA A247.2-1969, "Insulating Fibreboard Sheathing,"

CGSB 41-GP-14a(1972), "Thermal Insulation, Expanded Polystyrene," or

CGSB 41-GP-16a(1971), "Polyurethane: Rigid, Cellular, for Thermal Insulation and Other Applications."

Vapour
barrier

9.26.3.3.(1) Vapour barriers shall conform to CGSB 70-GP-1a(1970), "Vapor Barrier: Sheet, for Use in Above-Grade Building Construction", as revised to 1 May, 1975.

(2) Type 1 vapour barriers shall be used where a high resistance to vapour movement is required, such as in wall constructions that incorporate exterior cladding or sheathing having a low water vapour permeance.

(3) Type 2 vapour barriers may be used in all other locations.

Subsection 9.26.4. Areas to be insulated and amount of Insulation

Areas to be
insulated

9.26.4.1. Insulation shall be provided between heated and unheated spaces and between heated spaces and the exterior, and around the perimeter of concrete slabs-on-grade.

9.26.4.2. Reflective surfaces of insulating materials shall not be considered in calculating the thermal resistance of building assemblies.

9.26.4.3. Insulation requirements for electrically heated houses shall comply with CSA Standard C273.1-1975 "Standard for Residential Electric Heating".

9.26.4.4. Insulation around concrete slabs-on-grade shall extend not less than 24 in. below exterior ground level and be located so that heat from the building is not restricted from reaching the ground beneath their perimeter where exterior walls are not supported by footings extending below frost level.

9.26.4.5.(1) Except as required in Article 9.26.4.3., thermal resistance of insulation for insulated walls, ceilings, roofs, floors and slabs-on-grade shall comply with Table 9.26.4.A.

(2) Log wall construction and post, beam and plank construction shall have a minimum thermal resistance of R-12 for the total assembly, except that existing log houses that are dismantled and reconstructed are exempt from this requirement.

TABLE 9.26.4.A.
Forming Part of Sentence 9.26.4.5.(1)

MINIMUM THERMAL RESISTANCE OF INSULATION TO BE INSTALLED FOR ALL DEGREE DAY ZONES	
Construction	R-Value Required
Exposed ceiling	28
Exposed roof	20
Exposed walls	12
Foundation walls	
— solid	8
— frame	12
Exposed floors	20
Slabs on grade	
— unheated	8
— heated	10

Notes to Table 9.26.4.A.

- 1. "Exposed" means exposed to outdoor temperature or unheated area.
- 2. "Solid" means brick, blocks or concrete.
- 3. "Frame" means a wood or steel stud frame to which interior and exterior cladding is applied.
- 4. "R-value" shown for slab-on-grade is for rigid insulation.
- 5. Slab on grade—"heated" means a concrete floor containing heating ducts or pipes.
 —"unheated" means a concrete floor not containing heating ducts or pipes.

Subsection 9.26.5. Installation of Insulation

- 9.26.5.1. Insulation shall be installed so that there is a reasonably uniform insulating value over the entire face of the insulated area. Installation of insulation
- 9.26.5.2. Insulation shall be applied to the full width and length of the space between furring or framing. Application of insulation
- 9.26.5.3. Batt-type insulation manufactured with no membrane on either face shall be installed so that at least 1 face is in full and continuous contact with cladding, sheathing or other membrane. Batt-type insulation
- 9.26.5.4. Loose-fill insulation may be used on horizontal surfaces only, except that water-repellent types may be used between the outer and inner wythes of cavity walls, or in masonry voids. Loose-fill insulation
- 9.26.5.5.(1) The upper part of foundation walls enclosing heated space shall be insulated from the underside of the subfloor to not less than 24 in. below the finished ground level. Insulation of heated space
 - (2) If a foundation wall is constructed of hollow masonry units, one or more of the following, shall be used to control convection currents in the core spaces,
 - (a) filling the core spaces;

- (b) laying at, or below grade at least one layer of polyethylene between two courses of blocks;
- (c) at least one row of semi-solid blocks at, or below grade; or
- (d) other similar methods.

9.26.5.6.(1) Insulation for the below-grade portion of the interior of foundation walls shall be protected from moisture by a moisture barrier or be inherently moisture resistant and batt-type insulation shall be additionally protected by a vapour barrier.

(2) Insulation on the inside of such foundation walls shall be installed tightly against the foundation wall and shall be sealed at the top and at the bottom to reduce air circulation.

Insulation
of attics

9.26.5.7. Insulation shall be installed in such a manner so as not to impede the free flow of air between soffit vents and through attic and roof spaces.

Exposed
insulation

9.26.5.8. Where the insulation around concrete slabs-on-grade is exposed to the weather and subject to damage, it shall be protected with not less than $\frac{1}{4}$ -in. asbestos-cement board, or $\frac{1}{2}$ -in. cement parging on wire lath applied to the exposed face and edge.

9.26.5.9. Insulation between a garage and an adjacent dwelling unit shall be protected from mechanical damage by a covering of gypsum board, plywood, particleboard, hard-pressed fibreboard, or other similar protective material.

9.26.5.10.(1) Thermal insulation in exterior steel stud walls shall be in contact with the exterior cladding or sheathing and the adjacent studs and runners.

(2) A space of at least $\frac{1}{2}$ in. shall be provided between the insulation and the interior wall cladding where the exterior cladding or sheathing material has a thermal resistance of less than 1.

9.26.5.11.(1) Except where insulation is installed on a roof deck the required clearance between the underside of the roof deck and the top of insulation shall be at least 6 in. for roof systems,

(a) with a slope of 2 in 12 or less; and

(b) with a slope more than 2 in 12 where the interior finish is applied to the underside of roof framing members that span from ridge to exterior wall plate.

(2) Except where the insulation is installed on the roof deck all roof spaces shall be vented to conform to Subsection 9.19.1.

Subsection 9.26.6 Installation of Vapour Barriers

Installation of
vapour barriers

9.26.6.1. Except as provided in Article 9.26.6.2., vapour barriers shall be installed on the warm side of insulation if the insulation is of a type which, when installed, has a vapour permeance greater than that required for vapour barriers in Article 9.26.3.3.

Lightweight
cellular plastic-
type insulation

9.26.6.2. Lightweight cellular plastic-type insulation may be used without additional vapour barrier protection provided such insulation has a permeance rating of not more than 4 perm-inches, and is installed in continuous contact with masonry or concrete walls.

9.26.6.3. Every vapour barrier shall be installed to protect the entire surface including framing members.

9.26.6.4. Where an interior frame wall meets an exterior wall required to have vapour barrier protection, the vapour barrier protection shall extend between the exterior and interior walls to form continuous protection at the wall intersection.

9.26.6.5. Where an interior frame wall meets a ceiling required to have vapour barrier protection, the vapour barrier protection shall extend over the top of the wall or beneath the top wall plate to form continuous vapour protection for the ceiling.

9.26.6.6. Every vapour barrier joint shall lap not less than 1 in. when located over supporting members, and shall be covered with a strip of vapour barrier which shall extend not less than 4 in. on both sides of the joint where not located over supporting members.

9.26.6.7. Openings such as for electrical boxes and registers shall be cut so that the vapour barrier fits snugly around them.

SECTION 9.27 ROOFING

Subsection 9.27.1 General

9.27.1.1. Roofs shall be protected with roofing, including flashing, installed to shed rain effectively and prevent water due to ice damming from entering the roof. Roof protection

Subsection 9.27.2. Roofing Materials

9.27.2.1. Roofing materials shall conform to the following Standards, as revised to 1 May, 1975: Materials specifications

CGSB 9-GP-2a(1971), "Building Paper: Cellulosic Fiber, Water Repellent, Breather Type,"

CGSB 37-GP-4b(1971), "Cement: Lap, Asphalt Cutback, Fibrated, for Asphalt Roofing,"

CGSB 37-GP-5c(1971), "Cement: Plastic, Cutback Asphalt,"

CGSB 37-GP-8c(1971), "Asphalt, Cutback: Filled, for Roof Coating,"

CGSB 37-GP-9c(1971), "Asphalt Primer for Asphalt Roofing, Damp-proofing and Waterproofing,"

CGSB 37-GP-21c(1971), "Roof Coating: Tar Cutback, Fibrated,"

CGSB 41-GP-6b(1973), "Sheets, Thermosetting Polyester Plastics, Glass Fibre Reinforced,"

CSA A123.1-1964, "Asphalt Shingles Surfaced with Mineral Granules,"

CSA A123.2-1966, "Asphalt Roofing Surfaced with Mineral Granules,"

CSA A123.3-1973, "Asphalt Roofing Surfaced with Fine Mineral Matter,"

CSA A123.4-1965, "Wide Selvage Asphalt Roofing Surfaced with Mineral Granules,"

CSA A123.6-1953, "Asphalt-Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-Up Roofs,"

CSA A123.7-1973, "Asphalt for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems,"

CSA A123.8-1953, "Coal-Tar Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-Up Roofs,"

CSA A123.9-1953, "Asphalt-Saturated Asbestos Felts for Use in Waterproofing and in Constructing Built-Up Roofs,"

CSA A123.10-1953, "Coal-Tar Saturated Asbestos Felts for Use in Waterproofing and in Constructing Built-Up Roofs,"

CSA A123.13-1953, "Coal-Tar Pitch for Roofing, Dampproofing, and Waterproofing,"

CSA A123.17-1963, "Asphalt-Saturated Felted Glass-Fibre Mat for Use in Construction of Built-Up Roofs," or

CSA O118-1960, "Western Red Cedar Shingles, Machine Grooved Shakes, and Handsplit Red Cedar Shakes."

9.27.2.2. Nails used for roofing shall be corrosion-resistant roofing or shingle nails conforming to CSA B111-1974, "Wire Nails, Spikes and Staples", as revised to 1 May, 1975, and shall have sufficient length to penetrate through or $\frac{1}{2}$ in. into roof sheathing; when used with asphalt roofing shall have a head diameter of not less than $\frac{3}{8}$ in. and a Roofing nails

shank thickness of not less than 0.116 in.; and when used with wood shingles or shakes shall have a head diameter of not less than 3/16 in. and a shank thickness of not less than 0.080 in.

- Roofing staples
- 9.27.2.3. Staples used to apply asphalt or wood shingles shall be corrosion-resistant and shall be driven with the crown parallel to the eaves and,

 - (a) when used with wood shingles shall be not less than 1 1/8 in. long, 0.063 in. diam. or thickness, with not less than a 3/8-in. crown; or
 - (b) when used with asphalt shingles shall be not less than 3/4-in. long, 0.063-in. diam., with not less than a 1-in. crown, except that a 7/16-in. crown may be used if the number of staples specified in Article 9.27.7.4. is increased by 1/3.

Subsection 9.27.3. Roof Slope

- Roof slopes
- 9.27.3.1. The roof slopes on which roof coverings may be applied shall conform to Table 9.27.3.A.

TABLE 9.27.3.A.

Forming Part of Article 9.27.3.1.

ROOFING TYPES AND SLOPE LIMITS OF ROOFS		
Type of Roofing	Minimum Slope	Maximum Slope
Built-up Roofing		
Asphalt base (gravelled)	0 in 12	3 in 12
Asphalt base (without gravel)	1/2 in 12	6 in 12
Asphalt base (surfaced with wide selvage asphalt roofing)	2 in 12	no limit
Coal-tar base (gravelled)	0 in 12	1/2 in 12
Cold process	1/2 in 12	9 in 12
Asphalt Shingles		
Normal application	4 in 12	no limit
Low slope application	2 in 12	no limit
Roll Roofing		
Smooth and mineral surfaced	3 in 12	no limit
19-in.-wide selvage asphalt roofing	2 in 12	no limit
Cold application felt	1/4 in 12	9 in 12
Wood Shingles	3 in 12	no limit
Handsplit Shakes	4 in 12	no limit
Asbestos-Cement Shingles	4 in 12	no limit
Asbestos-Cement Corrugated Sheets	3 in 12	no limit
Sheet Metal Roofing	0 in 12	no limit
Corrugated Metal Roofing	3 in 12	no limit
Sheet Metal Shingles	3 in 12	no limit
Slate shingles	6 in 12	no limit
Clay Tile	6 in 12	no limit
Glass Fibre Reinforced Polyester Roofing Panels	3 in 12	no limit
Column 1	2	3

Subsection 9.27.4. Flashing at Intersections

- 9.27.4.1. Sheet metal flashing shall consist of not less than 0.068-in.-thick sheet lead, 0.013-in.-thick galvanized steel, 0.014-in.-thick copper, 0.018-in.-thick zinc or 0.019-in.-thick aluminum.

9.27.4.2. A layer of No. 15 roofing paper or felt shall be provided beneath metal roof flashing.

Underlay for
metal roof
flashing

9.27.4.3. Where sloping surfaces of shingled roofs intersect to form a valley, the valley shall be flashed and closed valleys shall not be used with rigid shingles on slopes of less than 10 in 12.

Valley flashing

9.27.4.4.(1) Open valleys shall be flashed with not less than 1 layer of sheet metal not less than 24 in. wide, or 2 layers of roll roofing.

Open valley
flashing

(2) The bottom layer shall consist of not less than 55-lb smooth surface roll roofing or 90-lb mineral surface roll roofing (mineral surface down) not less than 18-in. wide, centred in the valley and fastened with nails spaced not more than 18 in. o.c. located 1 in. away from the edges.

(3) The top layer shall consist of not less than 90-lb mineral surface roll roofing (mineral surface up), 36-in. wide, centred in the valley, applied over a 4-in.-wide strip of cement along each edge of the bottom layer, and fastened with a sufficient number of nails to hold it in place until the shingles are applied.

9.27.4.5. Closed valley flashing shall consist of sheet metal, 6-mil polyethylene or 55-lb roll roofing not less than 24 in. wide and nails shall not penetrate the flashing within 3 in. of the top of the valley or 5 in. of the bottom of the valley, measured from the centreline of the valley.

Closed valley
flashing

9.27.4.6.(1) The intersection of shingle roofs and masonry walls or chimneys shall be protected with flashing.

Intersection
flashing

(2) Counter flashing embedded not less than 1 in. in the masonry shall extend not less than 6 in. down the masonry and lap the lower flashing not less than 4 in.

(3) Flashing along the slopes of a roof shall be stepped so that there is not less than a 3-in. head lap in both the lower flashing and counter flashing.

(4) Where the roof slopes upwards from the masonry, the flashing shall extend up the roof slope to a point equal in height to the flashing on the masonry, but not less than 1 1/2 times the shingle exposure.

9.27.4.7. The intersection of shingle roofs and walls clad with other than masonry shall be protected with flashing and such flashing shall be installed so that it,

(a) extends up the wall not less than 3 in. behind the sheathing paper, and extends not less than 3 in. horizontally; and

(b) along the slope of the roof, the flashing shall be stepped with not less than a 3-in. head lap.

9.27.4.8.(1) The intersection of built-up roofs with masonry walls or chimneys shall have a cant strip at the intersection, and a roofing membrane shall be mopped over the cant strip and not less than 6 in. up the wall.

(2) Counter flashing installed over the intersection shall be embedded not less than 1 in. in the masonry, and shall be of sufficient length to extend down not less than 6 in., lapping the membrane on the masonry not less than 4 in.

9.27.4.9.(1) The intersection of built-up roofs with walls clad with other than masonry shall have a cant strip at the intersection and the roofing membrane shall be mopped over the cant strip.

(2) Flashing plies shall extend not less than 6 in. up the wall behind the sheathing paper.

9.27.4.10.(1) Except as otherwise permitted in Article 9.27.4.11., chimney saddles shall be installed where the upper side of a chimney on a sloping roof is more than 30 in. wide.

Requirements
and installation
of chimney
saddles

(2) Chimney saddles shall be covered with sheet metal or roofing material of equivalent weight and quality as the roofing.

(3) Chimney saddles shall be suitably flashed where they intersect the roof.

(4) The intersection of the saddle and the chimney shall be flashed and counterflashed as in Article 9.27.4.6.

9.27.4.11. A chimney saddle need not be installed if the intersection between the chimney and roof is protected by sheet metal flashing that extends up the chimney to a height equal to not less than $1/6$ the width of the chimney, but not less than 6 in., and up the roof slope to a point equal in height to the flashing on the chimney, but not less than $1\frac{1}{2}$ times the shingle exposure and such flashing at the chimney shall be counterflashed as required by Article 9.27.4.6.

Subsection 9.27.5. Eave Protection for Shingles and Shakes

Required eave
protection

9.27.5.1. Except as provided in Article 9.27.5.3., eave protection shall be provided on shingle, shake or tile roofs, extending from the edge of the roof a minimum distance of 3 ft up the roof slope to a line not less than 12 in. inside the inner face of the exterior wall.

9.27.5.2.(1) Eave protection shall consist of not less than 6-mil polyethylene laid as a continuous sheet without the use of cement, or No. 15 asphalt-saturated felt laid in two plies lapped 19 in. and cemented together with lap cement, or 45-lb roll roofing or asbestos felt specified in Sentence 9.27.6.3.(1) when used as an underlayment for wood shingles and shakes.

(2) Roll roofing shall be laid with not less than 4 in. head and end laps cemented together with lap cement.

Eave protection
not required

9.27.5.3. Eave protection is not required over unheated garages, carports and porches, or where the roof overhang exceeds 3 ft measured along the roof slope from the edge of the roof to the inner face of the exterior wall, or where low slope shingles are used.

Subsection 9.27.6 Underlay Beneath Shingles

Weight of
underlay

9.27.6.1. Except as provided in Sentence 9.27.6.3.(1), when underlay is used beneath shingles, it shall be asphalt-saturated sheathing paper weighing not less than 4 lb per square, or No. 15 plain or perforated asphalt-saturated felt or 2-mil polyethylene, except that underlayment used beneath wood shingles shall be breather type.

Installation of
underlay

9.27.6.2. When used with shingles, underlay,

- (a) shall be installed parallel to the eaves with head and end lap of not less than 2 in. and the top edge of each strip shall be fastened with sufficient nails to hold it in place until the shingles are applied; and
- (b) shall overlap the eave protection by not less than 4 in. (see Article 9.27.10.3. for underlay beneath wood shakes).

9.27.6.3.(1) Wood roof shingles and handsplit roof shakes used on roof slopes pitched at an angle of less than 60° to the horizontal shall be underlaid with,

- (a) asbestos felt weighing not less than fourteen (14) pounds per one hundred (100) sq. ft. installed in accordance with Article 9.27.6.2.; or
- (b) gypsum wallboard with water and fungus resistant paper covering not less than $\frac{1}{2}$ in. in thickness, placed under the solid or spaced decking (see Article 9.27.10.3. for interlay between wood shakes).

Subsection 9.27.7. Asphalt Shingles on Slopes of 4 in 12 or Greater

- 9.27.7.1. Coverage shall be not less than 2 thicknesses of shingle over the entire roof, disregarding cutouts. Coverage
- 9.27.7.2.(1) Subject to Sentence (3) a starter strip shall be installed along the lower edge of the roof so that it extends approximately $\frac{1}{2}$ in. beyond the eaves and rake of the roof and fastened along the bottom edge with nails spaced not more than 12 in. o.c. Starter strip
- (2) Starter strips referred to in Sentence (1) shall be not less than 85-lb mineral-surfaced roll roofing not less than 12 in. wide, or shingles of the same weight and quality as those used as a roof covering with tabs facing up the roof slope.
- (3) The starter strips required by Sentence (1) may be omitted where eave protection of not less than 85-lb mineral-surfaced roll roofing is provided.
- 9.27.7.3. Shingles shall have a head lap of not less than 2 in. Minimum head lap
- 9.27.7.4. Shingles shall be fastened with at least 4 nails or staples for 36 in.-wide shingles so that no nails or staples are exposed and fasteners may be reduced for narrower shingles in proportion to the width of the shingle or when shingles incorporating interlocking devices are used. Fastening
- 9.27.7.5. Fasteners shall be located 1 in. to $1\frac{1}{2}$ in. from each end of each strip shingle with the other fasteners equally spaced between them and such fasteners shall be located not less than $\frac{1}{2}$ in. above the tops of the cutouts. Location of fasteners
- 9.27.7.6. Shingle tabs shall be secured by a 1 in.-diameter spot of plastic cement under the centre of each tab. or by interlocking devices or selfsealing strips. Shingle tabs fastening
- 9.27.7.7. Shingles on hips and ridges shall be applied so they extend not less than 4 in. on either side of the hip or ridge, and shall be lapped not less than 6 in. and shall be fastened with nails or staples on each side located not more than 1 in. from the edge and 1 in. above the butt of the overlying shingle. Shingle application on hips and ridges
- 9.27.7.8. Eave protection shall conform to Subsection 9.27.5. Eave protection
- 9.27.7.9. Flashing shall conform to Subsection 9.27.4. Flashing

Subsection 9.27.8. Asphalt Shingles on Slopes of less than 4 in 12

- 9.27.8.1. Except for the first 2 courses, coverage shall be not less than 3 thicknesses of shingle over the entire roof, disregarding cutouts. Coverage
- 9.27.8.2. A starter strip shall be installed as in Article 9.27.7.2. and such starter strip shall be laid in a continuous band of cement not less than 8 in. wide. Starter strip
- 9.27.8.3. Shingle tabs shall be secured with cold application cement applied at the rate of not less than 1 gal. per 100 sq ft of cemented area, or hot application asphalt applied at the rate of 20 lb per 100 sq ft of cemented area. Tabs fastening
- 9.27.8.4. The first course of shingles shall be secured by a continuous band of cement along the eaves applied so that the width of the band equals the shingle exposure plus 4 in. and the band is located not less than 4 in. above the butt of the overlying course of shingles. Application of first course of shingles
- 9.27.8.5. The succeeding courses of shingles shall be secured by a continuous band of cement applied so that the width of the band equals the shingle exposure plus 2 in. and such band shall be located not less than 1 in. nor more than 2 in. above the butt of the overlying course of shingles. Succeeding courses of shingles
- 9.27.8.6. Shingles on hips and ridges shall be not less than 12 in. wide applied to provide triple coverage and such shingles shall be cemented to the roof shingles and to Shingle application on hips and ridges

each other with a coat of cement 1 in. from the edges of the shingles and fastened with nails or staples located 1½ in. above the butt of the overlying shingle and 2 in. from each edge.

Flashing 9.27.8.7. Flashing shall conform to Subsection 9.27.4.

Fastening 9.27.8.8. Shingles shall be fastened in accordance with Articles 9.27.7.4. and 9.27.7.5.

Subsection 9.27.9. Wood Roof Shingles

Grade 9.27.9.1. Shingles shall be not less than No. 2 grade.

Decking 9.27.9.2. Decking for wood shingled roofs may be continuous or spaced.

Size 9.27.9.3. Wood shingles shall be not less than 16 in. long and not less than 3 in. nor more than 14 in. wide.

Spacing 9.27.9.4. Shingles shall be spaced approximately ¼ in. apart and offset at the joints in adjacent courses not less than 1½ in. so that joints in alternate courses are staggered.

Fastening 9.27.9.5. Shingles shall be fastened with at least 2 nails or staples located approximately ¾ in. from the sides of the shingle and 1½ in. above the exposure line.

Exposure 9.27.9.6. The exposure of wood roof shingles shall conform to Table 9.27.9.A.

TABLE 9.27.9.A.

Forming Part of Article 9.27.9.6.

EXPOSURE OF WOOD ROOF SHINGLES			
Roof Slope	Maximum Shingle Exposure, in.		
	16-in. Shingles	18-in. Shingles	24-in. Shingles
4 in 12 or less	3¾	4¼	5¾
over 4 in 12	5	5½	7½
Column 1	2	3	4

Flashing 9.27.9.7. Flashing shall conform to Subsection 9.27.4.

Eave protection 9.27.9.8. Eave protection shall conform to Subsection 9.27.5.

Subsection 9.27.10. Handsplit Roof Shakes

Decking for shakes 9.27.10.1.(1) Solid roof decking at least ½ in. thick shall be used on roof of slopes of less than 60° to the horizontal except that spaced roof decking may be used when underlaid with gypsum wall board as described in Clause 9.27.6.3.(1)(b).

(2) Spaced roof decking may be used on roof slopes of 60° or more to the horizontal provided the shakes are underlaid with breather type underlay as required in Article 9.27.10.3. but such underlay need not comply with the requirements of Clause 9.27.6.3.(1) (a).

Size of shakes 9.27.10.2. Shakes shall be not less than 18 in. long and not less than 4 in. nor more than 14 in. wide with a butt thickness of not more than 1¼ in.

Interlay 9.27.10.3.(1) A breather type interlay complying with the requirements of Clause 9.27.6.3.(1)(a) shall be provided between roof shakes used on roof slopes of less than 60° to the horizontal.

(2) An underlay of the same material shall be laid as a strip not less than 36 in. wide along eaves and 12 in. wide along hips and ridges.

(3) Interlay shall be laid as a strip not less than 18 in. wide between each course of shakes with bottom edge of the interlay positioned above the butt line, a distance equal to double the exposure of the shakes.

(4) On roof slopes of 60° or more to the horizontal, interlay between shakes is not required where solid roof decking or spaced roof decking underlaid with gypsum wall board conforming to Clause 9.27.6.3.(1)(b) is used.

9.27.10.4. Shakes shall be spaced approximately ¼ in. apart and offset at the joints in adjacent courses not less than 1½ in. so that joints in alternate courses are staggered.

Spacing of shakes

9.27.10.5. Shakes shall be fastened with nails located approximately ¾ in. from the sides of the shakes and 1½ in. above the exposure line.

Fastening of shakes

9.27.10.6. The exposure of wood shakes shall conform to Table 9.27.10.A.

Exposure of shakes

TABLE 9.27.10.A.

Forming Part of Article 9.27.10.6.

EXPOSURE OF HANDSPLIT WOOD SHAKES		
Minimum Length of Shakes, in.	Limiting Minimum Butt Thickness, in.	Maximum Exposure, in.
18	3⁄8	7½
24	3⁄8	10
Column 1	2	3

9.27.10.7. Flashing shall conform to Subsection 9.27.4.

Flashing

9.27.10.8. Eave protection shall conform to Subsection 9.27.5.

Eave protection

Subsection 9.27.11. Built-Up Roofs

9.27.11.1. Coal-tar products and asphalt products shall not be used together in built-up roof construction.

Built-up roof construction

9.27.11.2. Aggregate used for surfacing shall be clean durable gravel, crushed stone or air-cooled blast furnace slag and shall be dry and uniformly graded in particle size from ¼ in. to 5⁄8 in.

Aggregate

9.27.11.3. Bitumen roofing felts shall be not less than No. 15.

Roofing felts

9.27.11.4.(1) In hot mix applications mopped-on layers of bitumen-saturated felt shall be laid while the bitumen is still hot, with each layer overlapping the previous one.

Hot mix application

(2) The full width under each lap shall be mopped with bitumen so that in no place does felt touch felt.

(3) Mopping shall be from 3 to 5 ft ahead of each roll of felt as it is laid.

(4) The felt shall be laid free of wrinkles and shall be rolled directly into the hot bitumen and broomed forward and outward from the centre to ensure complete adhesion.

9.27.11.5. Flashing shall conform to Subsection 9.27.4.

Flashing

9.27.11.6.(1) Bituminous materials, aggregate surfacing and roofing felts shall conform to Table 9.27.11.A.

Materials

TABLE 9.27.11.A.

Forming Part of Sentence 9.27.11.6.(1)

MATERIAL COMBINATIONS FOR BUILT-UP ROOFS						
Type of Roof	Amount of Bitumen per 100 sq ft of Roof Surface		Number of Plies of Dry Sheathing, Roofing Felts			Minimum Amount of Aggregate Surfacing per 100 sq ft of Roof Surface
	Mopping Coats Between Plies	Flood Coat	Wood Board or Plywood Deck		All other Decks	
			Dry Sheathing	Roofing Felts	Roofing Felts	
Asphalt and aggregate	20 lb	60 lb	1	4	3	400 lb gravel or crushed rock or 300 lb slag on level roof; 300 lb gravel or crushed rock or 225 lb slag on 3 in 12 slope. Proportional weights for intermediate roof slopes
Coal-tar pitch and aggregate	25 lb	75 lb	1	4	3	
Glass felt and aggregate	25 lb	60 lb	—	3	2	
Asphalt—smoothsurface	20 lb	25 lb	1	4	3	—
Glass felt—smooth surface	20 lb	20 lb	—	3	3	—
Cold process roofing	1.5 gal. Cold process cement	4 gal. Cold process top coating	—	2	—	—
Column 1	2	3	4	5	6	7

(2) Except as provided in Sentences (3) and (4) all layers of felt or glass felt shall be mopped between plies and flood coated as described in columns 2 and 3 in Table 9.27.11.A.

(3) Where “4 plies” of roofing felt are shown in column 5 in Table 9.27.11.A., 2 plies shall be laid dry over the sheathing and 2 plies shall be mopped with bitumen, OR where the deck consists of plywood or particleboard, no dry felts or dry sheathing paper need to be provided when the joints in the plywood or the particleboard are taped, the plywood or particleboard deck is primed with asphalt, and 3 plies of asphalt paper are laid and mopped between plies with asphalt.

(4) Where “3 plies” of glass felt are shown in column 5 in Table 9.27.11.A., one ply shall be laid dry and 2 plies shall be mopped with bitumen.

Gravel stop

9.27.11.7. A gravel stop or a cant strip shall be provided at the edges of roofs and shall be cemented to the roofing membranes and flashing shall extend over the edge of the roof to form a drip.

Subsection 9.27.12. Salvage Roofing

Selvage asphalt roofing

9.27.12.1. Wide selvage asphalt roofing shall provide double coverage over the entire roof surface.

9.27.12.2. Plies of selvage roofing shall be cemented together with bitumen applied at not less than 20 lb per 100 sq ft of roof surface.

Subsection 9.27.13. Asbestos-Cement Shingles

- 9.27.13.1.(1) Asbestos-cement shingles shall weigh not less than 250 lb per 100 sq ft of roof surface.
- (2) Flashing of valleys, hips and ridges shall be of sheet metal as described in Subsection 9.27.4.

Subsection 9.27.14. Sheet Metal Roofing

- 9.27.14.1. Sheet metal roofing shall be not less than 0.013 in.-thick galvanized steel, 0.014 in.-thick copper, 0.018 in.-thick zinc or 0.019 in.-thick aluminum.

Subsection 9.27.15. Glass Reinforced Polyester Roofing

- 9.27.15.1. Where glass reinforced polyester roofing panels are not supported by roof decking, but span between spaced supports, the spacings between the supports shall be relative to the thickness and profile of the roofing panels and shall support the design roof loads.

Subsection 9.27.16. Downspouts and Roof Drains

- 9.27.16.1. Where downspouts are provided and are not connected to a sewer, extensions shall be provided to carry rainwater away from the building in a manner which will prevent soil erosion. Downspouts and roof drains
- 9.27.16.2. When roof drains are provided they shall conform to Part 7. Design

SECTION 9.28 SIDING

Subsection 9.28.1. Scope

- 9.28.1.1. This Section applies to exterior wall coverings of lumber, wood shingles, shakes, asbestos-cement shingles and sheets, plywood, particleboard, hard-pressed fibreboard, aluminum and steel including trim, soffits and flashing. Exterior wall coverings
- 9.28.1.2. Requirements for stucco shall conform to Section 9.29 and requirements for masonry veneer shall conform to Section 9.20.

Subsection 9.28.2 General

- 9.28.2.1. Exterior walls shall be protected with siding, including flashing, trim and other special purpose accessory pieces required for the siding system being used, to restrict the entry of rain and snow into the wall assembly. Protection
- 9.28.2.2. Not less than an 8-in. clearance shall be provided between the finished ground level and siding that is adversely affected by moisture such as wood, plywood, particleboard and hard-pressed fibreboard. Clearance from finished grade
- 9.28.2.3. Not less than a 2 in. clearance shall be provided between a roof surface and siding that is adversely affected by moisture such as wood, plywood, particleboard and hard-pressed fibreboard.
- 9.28.2.4. Insulating asphalt siding shall be ventilated by not less than a 3⁄8 in. air space behind the siding, (See Article 9.26.3.3.).

Subsection 9.28.3. Flashing

- 9.28.3.1. Flashing shall consist of not less than 0.068 in.-thick sheet lead, 0.013 in.-thick galvanized steel, 0.014 in.-thick copper, 0.018 in.-thick zinc or 0.019 in.-thick aluminum.
- 9.28.3.2. Flashing shall be installed at every horizontal junction between 2 different exterior finishes, except where the upper finish overlaps the lower finish. Flashing installation

Flashing
over exterior
wall openings

9.28.3.3. Except as provided in Article 9.28.3.5., flashing shall be applied over exterior wall openings where the vertical distance from the bottom of the eave to the top of the trim is more than $\frac{1}{4}$ of the horizontal overhang of the eave.

9.28.3.4. Flashing shall be installed so that it extends upwards not less than 2 in. behind the sheathing paper and forms a drip on the outside edge.

9.28.3.5. Where a window or exterior door is designed to be installed without head flashing, the exterior flange of the window or door frame shall be bedded into a non-hardening type caulking material and the exterior flange screwed down over the caulking material to the wall framing to form a waterproof joint.

Subsection 9.28.4. Caulking

Caulking

9.28.4.1. Caulking shall be provided where required to prevent the entry of water into the structure.

9.28.4.2. Caulking shall be provided between masonry and siding and between door sills and siding unless the sill is completely protected from the wind and rain.

Specifications

9.28.4.3. Caulking shall conform to one of the following Standards, as revised to 1 May, 1975:

CGSB 19-GP-3b(1972), "Sealing Compound: Two Component, Polysulphide Base, Chemical Curing,"

CGSB 19-GP-5b(1971), "Sealing Compound: One Component, Acrylic Base, Solvent Curing,"

CGSB 19-GP-9b(1971), "Sealing Compound: One Component, Silicone Base, Chemical Curing,"

CGSB 19-GP-13a(1973), "Sealing Compound: One Component, Polysulphide Base, Chemical Curing,"

CGSB 19-GP-14(1970), "Sealing Compound: One Component, Butyl-Polyisobutylene Base, Solvent Curing,"

CGSB 19-GP-15a(1971), "Sealing Compound: Multicomponent, Polyurethane Base, Chemical Curing," or

CGSB 19-GP-16a(1971), "Sealing Compound: One Component, Polyurethane Base, Chemical Curing,"

Subsection 9.28.5. Attachment of Siding

Nailing of
siding

9.28.5.1. Except as permitted in Articles 9.28.5.4. to 9.28.5.8., siding shall be nailed to the framing members, furring members or to blocking between the framing members.

Blocking of
siding

9.28.5.2. Blocking for the attachment of siding shall be not less than 2 in. by 2 in. lumber securely nailed to the framing and spaced not more than 24 in. o.c.

Furring for
siding

9.28.5.3.(1) Except as permitted in Articles 9.28.5.7. and 9.28.5.8., furring for the attachment of siding shall,

(a) when applied over sheathing be not less than 1 in. by 2 in. lumber; or

(b) when applied without sheathing be not less than 1 in. by 3 in. lumber on supports spaced not more than 16 in. o.c. and 1 in. by 4 in. on supports spaced not more than 24 in. o.c. Such furring shall be securely fastened to the framing and shall be spaced not more than 24 in. o.c.

9.28.5.4. Vertical lumber and stucco lath or reinforcing may be attached to sheathing only, where the sheathing consists of not less than $\frac{9}{16}$ -in. lumber, $\frac{1}{2}$ -in. plywood or $\frac{5}{8}$ in. particleboard.

Vertical metal
siding
attachment

9.28.5.5. Vertically applied metal siding and wood shingles and shakes may be attached to the sheathing only, where the sheathing consists of not less than $\frac{9}{16}$ -in. lumber, $\frac{5}{16}$ -in. plywood or $\frac{5}{16}$ -in. particleboard.

9.28.5.6. Asbestos-cement shingles may be attached to the sheathing only, when the sheathing consists of not less than 9/16-in. lumber, 3/8-in. plywood, or 1/2-in. particleboard.

Asbestos-cement shingles siding attachment

9.28.5.7. Where wood shingles or shakes are applied to sheathing which is not suitable for attaching the shingles or shakes, the shingles or shakes may be attached to a wood lath not less than 2-in. by 3/8-in. thick securely nailed to the framing, and applied as described in Article 9.28.7.5.

Wood shingles and shakes siding attachment

9.28.5.8. Where asbestos-cement shingles are applied to sheathing that is not suitable for attaching the shingles, the shingles may be fastened to a wood lath not less than 4 in. by 3/8 in. thick securely nailed to the framing and such lath shall be applied so that it overlaps the preceding shingle course by not less than 3/4 in.

9.28.5.9. Nails for the attachment of sidings and wood trim shall be corrosion-resistant and shall be compatible with the siding material and nail size and spacing shall conform to Table 9.28.5.A.

Nails for attachment

TABLE 9.28.5.A.
Forming Part of Article 9.28.5.9.

NAILING OF SIDING			
Type of Siding	Min. Nail Length, in.	Min. No. of Nails	Maximum Nail Spacing
Wood trim	2 ⁽¹⁾	—	24 in. o.c.
Lumber siding or horizontal siding made from sheet material	2 ⁽¹⁾	—	24 in. o.c.
Metal siding	1 1/2 ⁽¹⁾	—	24 in. o.c. (nailed to framing) 16 in. o.c. (nailed to sheathing only)
Handsplitted wood shakes	2 ⁽²⁾	2 ⁽²⁾	—
Wood shingles and machine grooved shakes	1 1/4 ⁽²⁾	2 ⁽²⁾	—
Asbestos-cement shingles	1 1/4 ⁽²⁾	2	—
Panel or sheet type siding up to 1/4 in. thick	1 1/2 ⁽¹⁾	—	6 in. o.c. along edges
Panel or sheet type siding greater than 1/4 in. thick	2 ⁽¹⁾	—	12 in. o.c. along intermediate supports
Column 1	2	3	4

Notes to Table 9.28.5.A.:

⁽¹⁾Shall penetrate through the nail-holding base or not less than 1 in. into the framing. Staples of the same length as required for nails may also be used provided the staples are corrosion-resistant and compatible with the siding material and positioned to permit expansion and contraction of the siding.

⁽²⁾Shall penetrate through the nail-holding base or not less than 3/4 in. into the framing.

⁽³⁾Shingles or shakes over 8 in. in width shall be fastened with no fewer than 3 nails.

Subsection 9.28.6. Lumber Siding

9.28.6.1. Lumber siding shall be sound, free of knot holes, loose knots, through checks or splits.

Quality

Thickness	9.28.6.2. Drop, rustic, novelty, lapped board and vertical wood siding shall be not less than 9/16 in. thick and not more than 12 in. wide.
Bevel siding	9.28.6.3. Bevel siding shall be not less than 3/16 in. thick at the top and 15/32 in. thick at the butt for sidings 8 in. or less in width and 9/16 in. thick at the butt for sidings wider than 8 in. Bevel siding shall be not more than 12 in. wide.
Prevention of water penetration	<p>9.28.6.4.(1) Lumber siding shall prevent water from entering at the joints by the use of lapped or matched joints or by vertical wood battens and such siding shall overlap not less than 1/16 in. per in. width of lumber, but not less than,</p> <p>(a) 3/8 in. for matched siding;</p> <p>(b) 1 in. for lapped bevel siding; or</p> <p>(c) 1/2 in. for vertical battens.</p>

Subsection 9.28.7. Wood Shingles and Machine Grooved Shakes

Grading	9.28.7.1. Shingles and shakes shall conform to CSA O118-1960, "Western Red Cedar Shingles, Machine Grooved Shakes, and Handsplit Red Cedar Shakes," as revised to 1 May, 1975, and shakes shall be not less than No. 1 grade and shingles not less than No. 2 grade, except that No. 3 grade may be used for undercoursing.
Shingles and shakes width	9.28.7.2. Shingles and shakes shall be not less than 2 1/2 in. nor more than 14 in. wide.
Fastening for shingles and shakes	9.28.7.3. Shingles or shakes shall be fastened with nails located approximately 3/4 in. from each edge and not less than 1 in. above the exposure line for single-course applications, or approximately 2 in. above the butt for double-course applications.
Single and double shingle application	<p>9.28.7.4.(1) In single-course application, joints in succeeding courses shall be offset at least 1 1/2 in. so that joints in any 2 of 3 consecutive courses are staggered.</p> <p>(2) In double-course application, joints in the outer course shall be offset from joints in the undercourse by not less than 1 1/2 in. and joints in succeeding courses shall be offset not less than 1 1/2 in.</p>
Shingles and shakes application	<p>9.28.7.5.(1) When lath is used with double-course application (see Article 9.28.5.7.), it shall be spaced according to the exposure and securely fastened to the framing.</p> <p>(2) The butts of the under-course shall rest on the top edge of the lath.</p> <p>(3) The outer course shall be fastened to the lath with nails of sufficient length to penetrate through the lath.</p> <p>(4) The butts of the shingles or shakes shall be so located that they project not less than 1/2 in. below the bottom edge of the lath.</p> <p>(5) If wood lath is not used, the butts of the under-course shingles or shakes shall be located 1/2 in. above the butts of the outer course.</p>
Exposure and butt thickness	9.28.7.6. The exposure and butt thickness of shingles and shakes shall conform to Table 9.28.7.A.

TABLE 9.28.7.A.

Forming Part of Article 9.28.7.6.

EXPOSURE AND THICKNESS OF WOOD SHINGLES AND MACHINE GROOVED SHAKES			
Shake or Shingle Length, in.	Maximum Exposure		Minimum Butt Thickness, in.
	Single Coursing, in.	Double Coursing, in.	
16	7½	12	2/5
18	8½	14	9/20
24	11½	16	½
Column 1	2	3	4

Subsection 9.28.8. Asbestos-Cement Shingles and Sheets

9.28.8.1. Asbestos-cement shingles and sheets shall conform to one of the following Standards, as revised to 1 May, 1975:

Asbestos-cement shingles and sheets specifications

- CGSB 34-GP-4b(1970), "Siding: Asbestos Cement, Shingles and Clapboards,"
- CGSB 34-GP-5c(1970), "Sheets: Asbestos Cement, Corrugated,"
- CGSB 34-GP-14a(1969), "Sheets: Asbestos Cement, Decorative,"
- CGSB 34-GP-16b(1970), "Sheets: Asbestos Cement, Flat, Fully Compressed,"
- CGSB 34-GP-17c(1970), "Sheets: Asbestos Cement, Flat, Semicompressed," or
- CGSB 34-GP-21a(1970), "Sheets: Sandwich, Asbestos Cement and Fibreboard."

9.28.8.2.(1) Asbestos-cement shingles shall weight not less than 165 lb per square.

Asbestos-cement shingles and sheets thickness

(2) Asbestos-cement sheet shall be not less than 3/16 in. thick where applied to studs spaced not more than 16 in. o.c., nor less than ¼ in. thick where applied to studs spaced not more than 24 in. o.c. and where applied over sheathing, thickness shall be not less than ⅛ in.

9.28.8.3. Asbestos-cement shingles shall be fastened with nails located not less than 1-in. above the exposure line.

Fastening

9.28.8.4.(1) Asbestos-cement shingles shall be installed so that vertical joints in succeeding courses are staggered.

Installation

(2) Asphalt-coated backer strips shall be installed behind each vertical joint and the shingles shall have not less than a 1-in. head lap.

9.28.8.5. Vertical joints of asbestos-cement panels shall be protected with batten strips, caulking or other suitable method.

Vertical joints

9.28.8.6. Horizontal joints shall be lapped, flashed, caulked or otherwise suitably protected.

Horizontal joints

Subsection 9.28.9. Plywood

9.28.9.1. Plywood siding shall be exterior type conforming to CSA O115-1967, "Hardwood Plywood," CSA O121-1973, "Douglas Fir Plywood," CSA O151-1974, "Canadian Softwood Plywood," or CSA O153-1963, "Poplar Plywood," all as revised to 1 May, 1975.

Plywood specification

Plywood siding thickness

9.28.9.2. Plywood siding shall be not less than ¼-in. thick when applied directly to sheathing and when applied directly to framing or over furring strips, plywood thickness shall conform to Table 9.28.9.A.

TABLE 9.28.9.A.
Forming Part of Article 9.28.9.2.

PLYWOOD THICKNESS, EXTERIOR WALL FINISH				
Spacing of Supports in.	Minimum Siding Thickness With Sheathing (over furring)		Minimum Siding Thickness Without Sheathing	
	Face Grain Parallel to Supports, in.	Face Grain Right Angles to Supports, in.	Face Grain Parallel to Supports, in.	Face Grain Right Angles to Supports, in.
16	¼	¼	⅜	⅜
20	⅜	¼	½	⅜
24	⅜	¼	½	⅜
Column 1	2	3	4	5

9.28.9.3. The edges of plywood siding shall be treated with a suitable paint or sealer.

Edge support

9.28.9.4.(1) Plywood applied in panels shall have all edges supported, and

- (a) not less than 1/16-in. gap shall be provided between sheets;
- (b) when the plywood joints are not matched, vertical joints in such siding shall be protected with batten strips or caulking; and
- (c) horizontal joints shall be lapped not less than 1-in. or shall be flashed.

Lapping

9.28.9.5.(1) Plywood applied in horizontal lapped strips shall have not less than a 1/16-in. gap provided at the butted ends, which shall be caulked. The horizontal joints shall be lapped not less than 1-in.

(2) When horizontal lapped plywood is applied without sheathing, wedges shall be inserted under all vertical butt joints and at all corners.

Subsection 9.28.10. Hard-Pressed Fibreboard

Hard-pressed fibreboard specification

9.28.10.1. Hard-pressed fibreboard siding shall conform to CGSB 11-GP-5(1972), "Precoated Hardboard, for Exterior Use," as revised to 1 May, 1975.

Thickness

9.28.10.2. Hard-pressed fibreboard siding shall be not less than ¼-in. thick where applied over sheathing, and 5/16-in. thick where applied without sheathing on supports not more than 16-in. o.c.

Edge support

9.28.10.3.(1) Hard-pressed fibreboard siding applied in panels shall have all edges supported and not less than a 3/16-in. gap shall be provided between sheets.

(2) Vertical joints in such siding shall be protected with batten strips or caulking when the joints are not matched and horizontal joints shall be lapped not less than 1-in. or shall be suitably flashed.

Horizontal lapped strips

9.28.10.4.(1) Hard-pressed fibreboard applied in horizontal lapped strips shall have not less than a 3/16-in. gap provided at the butted ends, which shall be caulked or otherwise protected with suitable mouldings.

- (2) The horizontal joints shall be lapped not less than 1 in.

Subsection 9.28.11. Particleboard

9.28.11.1. Particleboard siding shall conform to Type 1 board in CSA O188-1968, "Mat-Formed Wood Particleboard," as revised to 1 May, 1975. Particleboard siding

9.28.11.2.(1) Particleboard shall be not less than 5/16-in. thick where applied directly to sheathing. Thickness

(2) Where applied directly to framing or over furring strips, particleboard shall be not less than 3/8-in. thick on supports spaced not more than 16-in. o.c. and 1/2-in. thick on supports spaced not more than 24-in. o.c.

9.28.11.3.(1) Particleboard applied in panels shall have all edges supported and not less than a 1/8-in. gap shall be provided between sheets. Edge support

(2) Vertical joints in such siding shall be protected with batten strips and horizontal joints shall be lapped not less than 1-in. or shall be suitably flashed.

Subsection 9.28.12. Metal Siding

9.28.12.1. Steel siding, including flashing and trim accessories, shall conform to CGSB 93-GP-4(1971), "Siding, Soffits and Fascia: Steel, Zinc Coated, (Galvanized), Prefinished, Standard Duty for Residential Buildings," as revised to 1 May, 1975. Steel siding

9.28.12.2. Aluminum siding, including flashing and trim accessories shall conform to CGSB 93-GP-2(1970), "Siding, Soffits and Fascia: Aluminum, Coated, Standard Duty," as revised to 1 May, 1975. Aluminum siding

9.28.12.3. Aluminum siding in contact with masonry or concrete shall be effectively coated or separated from the masonry or concrete by an impervious membrane. Aluminum siding over masonry or concrete

Subsection 9.28.13. Vinyl Siding

9.28.13.1. Vinyl siding, including flashing and trim accessories, shall conform to CGSB 41-GP-24(1972), "Siding, Soffits and Fascia, Rigid Vinyl," as revised to 1 May, 1975.

9.28.13.2. The attachment of vinyl siding shall conform to the requirements in Subsection 9.28.5. for metal siding.

9.28.13.3. Vinyl siding shall be applied over sheathing or other backing that will provide continuous support for the siding.

SECTION 9.29 STUCCO

Subsection 9.29.1. General

9.29.1.1. Except as permitted in Article 9.29.4.2., sheathing shall be provided beneath stucco applied over wood-frame walls and such sheathing shall conform to Subsection 9.23.16.

9.29.1.2.(1) Stucco lath or reinforcing shall be used to attach stucco to wood-frame construction and such lath or reinforcing shall also be used to attach stucco to masonry where the masonry is soft-burned tile or brick of less strength than the stucco or if the masonry surface is not sound, clean and sufficiently rough to provide a good key.

(2) Stucco applied over masonry chimneys shall be reinforced.

9.29.1.3. Stucco finish shall not be applied over concrete masonry units less than 1 month old unless the units have been cured by the autoclave process. Stucco finish

9.29.1.4. Stucco shall be not less than 8-in. above finished ground level except when it is applied over concrete or masonry.

9.29.1.5. Flashing for stucco shall conform to Section 9.28, except that if aluminum flashing is used, it shall be separated from the stucco by an impervious membrane or coating.

Subsection 9.29.2. Stucco Materials

Specification

9.29.2.1. Portland cement shall conform to CSA A5-1971, "Portland Cements", as revised to 1 May, 1975.

Aggregate

9.29.2.2. Aggregate shall be clean, well-graded natural sand or sand manufactured from crushed stone, gravel or air-cooled blast furnace slag, and shall contain no significant amounts of deleterious material and aggregate grading shall conform to Table 9.29.2.A.

TABLE 9.29.2.A.

Forming Part of Article 9.29.2.2.

AGGREGATE GRADING FOR STUCCO		
Sieve Sizes	Per Cent Passing	
	Maximum	Minimum
No. 4	—	100
8	—	90
16	90	60
30	60	45
50	30	10
100	5	—
Column 1	2	3

Hydrated lime specification

9.29.2.3. Hydrated lime shall conform to CSA A82.44-1950, "Normal Finishing Hydrated Lime," as revised to 1 May, 1975.

Water for stucco

9.29.2.4. Water shall be clean and free of significant amounts of deleterious material.

Subsection 9.29.3. Fasteners

Stucco fasteners

9.29.3.1. Fasteners for stucco lath or reinforcing shall be corrosion-resistant and of a material other than aluminum.

Nails for stucco lath

9.29.3.2.(1) Nails for stucco lath or reinforcing shall be not less than 0.126-in. diam. with a head diameter of not less than 7/16-in.

(2) Staples shall be not less than 0.078-in. diam. or thickness.

Staples for stucco lath

9.29.3.3. Staples and nails for attaching stucco lath or reinforcing to vertical surfaces shall be of sufficient length to penetrate 1-in. into framing members or to the full depth of the sheathing where the sheathing is used for attachment, and on horizontal surfaces nails shall be not less than 1½-in. long.

Subsection 9.29.4. Stucco Lath

Stucco lath

9.29.4.1.(1) Rib lath or expanded metal stucco mesh shall be copper-alloy steel coated with rust-inhibitive paint after fabrication or shall be galvanized.

(2) Woven or welded wire mesh shall be galvanized.

9.29.4.2. Sheathing need not be provided beneath stucco where not less than 0.047-in.-diam. galvanized wire is applied horizontally to the framing at vertical intervals not exceeding 6-in., or where paper-backed welded wire metal lath is used.

Stucco sheathing

9.29.4.3.(1) Stucco lath shall conform to Table 9.29.4.A.

(2) In addition to types of lath in column 2 in the Table, paper-backed welded wire lath may be used on horizontal surfaces.

TABLE 9.29.4.A.

Forming Part of Article 9.29.4.3.

STUCCO LATH				
Location	Type of Lath	Min. Diam. of Wire, in.	Max. Mesh Opening	Min. Wt. per sq. yd
Vertical surfaces	Welded or woven wire	0.047 0.053 0.063	1 in. 1 1/2 in. 2 in.	— — —
	Stucco mesh reinforcing (expanded metal)	—	4 sq in.	1.8 lb
Horizontal surfaces	3/8-in. rib lath	—	—	3.4 lb
	Cedar lath	—	—	—
Column 1	2	3	4	5

9.29.4.4. Stucco lath shall be held not less than 1/4-in. away from the backing by means of suitable self-furring devices.

Furring for stucco lath

9.29.4.5.(1) Stucco lath shall be applied with the long dimension horizontal, and

Application

- (a) horizontal and vertical joints shall be lapped not less than 2-in.;
- (b) end joints shall be staggered and shall occur over framing members; and
- (c) external corners shall be reinforced with a vertical strip of lath or reinforcing extending,
 - (i) not less than 6-in. on both sides of the corner, or
 - (ii) not less than 6-in. around corners.

9.29.4.6. Stucco lath shall be fastened in conformance with Subsection 9.28.5.

Fastening

9.29.4.7.(1) Fasteners on vertical surfaces shall be spaced not more than,

Spacing of fasteners on vertical surface

- (a) 6-in. o.c. vertically and 16-in. o.c. horizontally; or
- (b) 4-in. o.c. vertically and 24-in. o.c. horizontally, and other nailing patterns may be used provided there are not fewer than 16 fasteners per square yard of wall surface.

9.29.4.8. Fasteners on horizontal surfaces shall be spaced not more than 6-in. o.c. along the framing members when members are spaced not more than 16-in. o.c., and 4-in. o.c. along members when members are spaced not more than 24-in. o.c.

Spacing of fasteners on horizontal surface

Subsection 9.29.5. Stucco Mixes

Stucco
mixes

9.29.5.1. Stucco mixes shall conform to Table 9.29.5.A.

TABLE 9.29.5.A.
Forming Part of Article 9.29.5.1.

STUCCO MIXES (by volume)			
Portland Cement	Masonry Cement Type H	Lime	Aggregate
1 1	— 1	¼ to 1 —	¾ to 4 parts per part of cementitious material
Column 1	2	3	4

Pigment for
stucco

9.29.5.2. Pigment if used shall consist of pure mineral oxides inert to the action of sun, lime and cement and pigment shall not exceed 6 per cent of the portland cement by weight.

Mixing

9.29.5.3. Materials shall be thoroughly mixed before and after water is added and stucco shall be applied not later than 3 hr after the initial mixing.

Subsection 9.29.6. Stucco Application

Stucco
application
temperature

9.29.6.1. The base for stucco shall be maintained above freezing and stucco shall be maintained at a temperature of not less than 50°F during application, and for not less than 48 hr afterwards.

Application

9.29.6.2. Stucco shall be applied with not less than 2 base coats and 1 finish coat, providing a total thickness of at least 5⁄8-in., measured from the face of the lath or face of the masonry where no lath is used.

Stucco (1st
coat)

9.29.6.3. The first coat shall be not less than ¼-in. thick, measured from the face of the lath or masonry, fully embedding the lath and the surface shall be scored to provide a key with the second coat.

Stucco (2nd
coat)

9.29.6.4. The second coat shall be not less than ¼-in. thick and the surface shall be lightly roughened to provide a key with the finish coat if the finish coat is other than stone dash.

Stucco (finish
coat)

9.29.6.5. When the finish coat is other than stone dash, the base shall be dampened but not saturated before the finish coat is applied and the thickness of the finish coat shall be not less than ⅛-in.

Stone dash
finish

9.29.6.6. When a stone dash finish is used, the stone shall be partially embedded in the second coat before the second coat starts to set or stiffen.

SECTION 9.30 INTERIOR WALL AND CEILING FINISHES

Subsection 9.30.1. General

Interior wall
and ceiling
finishes

9.30.1.1.(1) The requirements for plastering in this Section apply to the application of plaster to gypsum or metal lath attached to wood furring or framing.

(2) Plastering applications and plaster mixes not described in this Section and requirements for metal framing and metal furring shall conform to CSA A82.30-1965, "Interior Furring, Lathing and Gypsum Plastering," as revised to 1 May, 1975.

(3) Flame-spread requirements are contained in Subsection 9.10.17.

9.30.1.2. Where an assembly is permitted to be of combustible construction, foamed plastics shall not be used as an interior wall or ceiling finish, but shall be protected on the interior surface by one of the finishes described in this Section.

9.30.1.3.(1) In an assembly required to be of non-combustible construction, foamed plastics shall be protected on the interior surface by not less than ½-in.-thick gypsum board, lath and plaster or other material that when subjected to the standard fire exposure described in ULC-S101-1975, "Standard Methods of Fire Endurance Tests of Building Construction and Materials", will not exceed a temperature rise of 250F° on the unexposed face after a period of 10 min.

(2) Protective finishes described in Sentence (1) shall be mechanically fastened to the supporting structure unless it can be demonstrated on the basis of fire tests that such fasteners are not necessary.

Subsection 9.30.2. Waterproof Wall Finish

9.30.2.1. Waterproof finish shall be provided to a height of not less than 6 ft above the floor in shower stalls, 46-in. above the rims of bathtubs equipped with showers and 16-in. above the rims of bathtubs not equipped with showers.

Waterproofing
of interior
finishes

9.30.2.2. Waterproof finish shall consist of ceramic, plastic or metal tile, sheet vinyl, tempered hard-pressed fibreboard, laminated thermosetting decorative sheets or linoleum.

Waterproof
finish

Subsection 9.30.3. Wood Furring

9.30.3.1. Wood furring for the attachment of wall finishes shall be not less than ⅝-in. by 2-in. where applied to solid backing such as masonry or to supports spaced not more than 16-in. o.c., and ⅝-in. by 4-in. where applied to supports spaced not more than 24-in. o.c.

Wood furring

9.30.3.2. Furring shall be fastened to the framing or to wood blocks with not less than 2-in. nails.

Nails for
furring

Subsection 9.30.4. Gypsum Lath

9.30.4.1. Gypsum lath shall conform to CSA A82-24-1962, "Gypsum Lath," as revised to 1 May, 1975.

Specification

9.30.4.2. Gypsum lath shall be not less than ⅛-in. thick on supports not more than 16-in. o.c., and ½-in. thick on supports not more than 24-in. o.c.

Thickness

9.30.4.3. Gypsum lath shall be applied so that vertical joints do not occur at jamb studs above or below openings.

9.30.4.4.(1) Gypsum lath shall be fastened at each support with no fewer than 4 uniformly spaced fasteners where 16-in.-wide lath is used on vertical supports spaced not more than 16-in. o.c.

Fastening
method

(2) Such lath shall be fastened with no fewer than 5 fasteners per support for all other conditions.

(3) Lath 24-in. wide shall be fastened with no fewer than 6 fasteners per support.

(4) Lath need not be nailed to the framing at inside corners.

9.30.4.5. Nails for fastening gypsum lath shall be not less than 1¼-in. long, with at least 0.090-in. shank diam. and 19/64-in. head diam. blued steel wire nails.

Nails for
gypsum lath

9.30.4.6. Staples for fastening gypsum lath shall be,

Staples for
gypsum lath

(a) not less than 1-in. long for ⅜-in.-thick lath;

(b) 1 ⅛-in. long for ½-in. lath; and

(c) not less than 0.063-in. diam. or thickness with not less than a ¾-in. crown.

Subsection 9.30.5. Metal Lath

9.30.5.1. Metal lath shall consist of galvanized metal or copper-bearing steel treated with a suitable rust-inhibitive coating after manufacture.

Metal lath

9.30.5.2.(1) The weight of metal lath shall conform to Table 9.30.5.A.

Weight of metal
lath

TABLE 9.30.5.A.

Forming Part of Sentence 9.30.5.2.(1)

MINIMUM WEIGHT OF METAL LATH			
Type of Lath	Min. Weight, lb per sq yd	Max. Spacing of Wood Supports, in.	
		Walls	Ceilings
Diamond mesh	2.5	12	12
	3.0	16	12
Flat rib	2.5	16	12
	3.0	16	16
3/8-in. rib	2.5	16	16
	3.0	20	20
	3.5	24	24
Paper-backed welded wire	1.4	16	16
	1.95	24	24
Column 1	2	3	4

(2) Paper-backed welded wire weighing 1.4 lb per sq yd shall not be less than 0.063-in. diam. wire.

(3) Paper-backed welded wire weighing 1.95 lb per sq yd shall be not less than 0.063-in. diam. wire and every third back wire at right angles to support shall be not less than 0.114-in. diam.

Nails for metal lath

9.30.5.3. Nails for the attachment of metal lath shall be not less than 0.126-in. diam. large-head roofing nails not less than 1½-in. long for ceiling supports and 1-in. long for wall supports and such nails shall be spaced not more than 6-in. o.c.

Staples for metal lath

9.30.5.4. Staples for the attachment of metal lath shall be not less than 0.078-in. diam. or thickness nor less than 1½-in. long with a ¾-in. crown and such staples shall be spaced not more than 6 in. o.c.

Application

9.30.5.5.(1) Metal lath shall be applied at right angles to the supports, and

- (a) end joints shall be lapped not less than 1-in.;
- (b) side joints of diamond mesh lath shall be lapped not less than ½-in.;
- (c) side joints of rib lath shall be lapped so that the adjacent side ribs nest;
- (d) end joints shall be staggered; and
- (e) end laps that occur between supports shall be tied.

Furring for metal lath

9.30.5.6. When metal lath is applied over a continuous surface, it shall be held not less than ¼-in. from the back-up by means of furring strips, self-furring nails or self-furring lath.

Subsection 9.30.6. Corner Reinforcement for Plaster

Corner reinforcement

9.30.6.1. Material for corner reinforcement shall have at least the same corrosion resistance as metal plaster lath.

9.30.6.2. All internal corners of walls and ceilings shall be reinforced with metal lath or wire fabric having not less than 2-in.-wide legs and corner beads shall be installed at all external corners.

9.30.6.3. Corners of openings shall be reinforced with a strip of metal lath not less than 6-in. by 18-in. long installed at an angle of 45 deg. to the horizontal.

Corner reinforcement for openings

9.30.6.4. All plaster reinforcement shall be fastened to the lath and not to the framing.

Fastening of plaster reinforcement

Subsection 9.30.7. Plastering

9.30.7.1. Materials used in plastering shall conform to the following Standards, all as revised to 1 May, 1975:

Plastering material specification

CSA A82.21-1950, "Gypsum",

CSA A82.22-1963, "Gypsum Plasters",

CSA A82.26-1950, "Keene's Cement",

CSA A82.42-1950, "Quicklime for Structural Purposes",

CSA A82.44-1950, "Normal Finishing Hydrated Lime",

CSA A82.46-1962, "Special Finishing Hydrated Lime", or

CSA A82.57-1954, "Inorganic Aggregates for Use in Interior Plaster".

9.30.7.2. Grounds shall be installed to ensure even and uniform plaster thickness.

Grounds

9.30.7.3.(1) Plaster shall be not less than $\frac{3}{8}$ -in. thick at any point, measured from the face of the lath.

Plaster thickness

(2) Where electric cables for heating are embedded in the plaster, there shall be not less than $\frac{3}{8}$ -in. of plaster covering the cables.

9.30.7.4. Plaster shall be applied in 3 coats consisting of a scratch coat, brown coat and finish coat, except that where the base consists of gypsum lath or unit masonry other than concrete masonry, a 2-coat application may be used in which a brown coat is doubled back over the scratch coat.

9.30.7.5.(1) When plaster is applied over concrete or concrete masonry, a special bond coat shall be used as the first coat or a liquid bonding agent shall be applied before application of the first coat of plaster.

Plaster over concrete or masonry

(2) Normal finishing hydrated lime shall not be used in plaster applied to exterior masonry or concrete walls.

9.30.7.6. Plaster to embed cables used for electric heating shall not incorporate lightweight aggregate.

Plaster for electric heating

9.30.7.7.(1) When 3-coat plaster is used,

Plaster mixes

(a) the first or scratch coat shall consist of 1 part gypsum plaster to 2 parts sand by weight;

(b) the second or brown coat shall consist of 1 part gypsum plaster to 3 parts sand by weight; and

(c) the finish coat shall consist of 1 part gypsum plaster to 3 parts lime by volume.

9.30.7.8.(1) When 2-coat plaster is used,

(a) the first coat shall consist of 1 part gypsum plaster to $2\frac{1}{2}$ parts sand by weight; and

(b) the finish coat shall consist of 1 part gypsum plaster to 3 parts lime by volume.

9.30.7.9. The finish coat shall be trowelled to a smooth hard finish unless a special decorative finish is used conforming to CSA A82.22-1963, "Gypsum Plasters", as revised to 1 May, 1975.

9.30.7.10. In cold weather plaster shall be applied at from 50°F to 70°F and maintained at this temperature range for not less than 96 hr, and above freezing thereafter and ventilation shall be provided for the proper drying of the plaster.

Subsection 9.30.8. Gypsum Board Finish (Taped Joints)

- Gypsum board specification

9.30.8.1. Gypsum board shall conform to CSA A82.27-1972, "Gypsum Wallboard," as revised to 1 May, 1975.
- Application

9.30.8.2.(1) Gypsum board applied as a single layer shall be not less than 3⁄8-in. thick on supports not more than 16-in. o.c., and 1⁄2-in. thick on supports not more than 24-in. o.c.

(2) When gypsum board is applied as 2 layers, each layer shall be not less than 3⁄8-in. thick on supports not more than 24-in. o.c.
- Fasteners

9.30.8.3. The length of fasteners for gypsum board shall conform to Table 9.30.8.A.

TABLE 9.30.8.A.
Forming Part of Article 9.30.8.3.

FASTENER PENETRATION INTO WOOD SUPPORTS		
Required Fire-Resistance Rating of Assembly, hr	Min. Fastener Penetration Into Wood Supports, in.	
	Walls	Ceilings
Fire-resistance rating not required	3⁄4 ⁽¹⁾	3⁄4 ⁽¹⁾
3⁄4	3⁄4 ⁽²⁾	1 1⁄8 ⁽²⁾
1	3⁄4 ⁽²⁾	1 7⁄8 ⁽²⁾
1 1⁄2	3⁄4 ⁽²⁾	2 1⁄2 ⁽²⁾
Column 1	2	3

Notes to Table 9.30.8.A.:

- (1)May be reduced to 5⁄8 in. for screws.
- (2)Where the exposed layer of wallboard is attached with a heat-resistant adhesive to an underlying layer of gypsum board, the fasteners for the underlying layer shall penetrate not less than 3⁄4 in. into the supports where nails are used and 5⁄8 in. where screws are used.

9.30.8.4. Nails for fastening gypsum board to wood supports shall be not less than 0.090-in.-shank diameter annular grooved nails with a head diameter of 7/32-in.

- Gypsum board single-layer application

9.30.8.5.(1) For a single-layer application nails shall be spaced not more than 7-in. o.c. on ceiling supports and not more than 8-in. apart along vertical wall supports, except that nails may be spaced in pairs about 2-in. apart every 12-in. along such wall or ceiling supports.

(2) Where the ceiling sheets are supported by the wall sheets around the perimeter of the ceiling, this support may be considered as equivalent to nailing at this location.

(3) The uppermost wall nails shall be not more than 8-in. below the ceiling and nails shall be located not less than 3⁄8-in. from the side or edge of the board.

(4) Nails shall be driven so that the heads are below the plane of the board surface but do not puncture the paper.

9.30.8.6. For double-layer applications,

Gypsum board
double-layer
application

(a) the first layer shall be fastened as in Article 9.30.8.5; and

(b) the second layer shall be fastened with nailing as set out in Article 9.30.8.5. or with adhesive.

(2) Where adhesive is used, the second layer shall be held in place by temporary shoring or bracing or by nails until the adhesive has set, and such nails shall be spaced about 12-in. o.c. on ceilings and 16-in. o.c. on walls and may be removed when the adhesive sets.

9.30.8.7. Where strip laminated method of application is used, strips of gypsum board not less than $\frac{3}{8}$ -in.-thick and 6-in. wide shall be nailed to the framing members with nailing conforming to Article 9.30.8.5. and the finish layer of gypsum board shall be attached by means of a suitable adhesive to these strips as described in Article 9.30.8.6.

Strip laminated
application
method

9.30.8.8. Where gypsum board is applied with drywall screws, the screws shall be spaced not more than 12-in. o.c. along supports, except that on vertical surfaces the screws may be spaced 16-in. o.c. where the supports are not more than 16-in. o.c.

Drywall screws

9.30.8.9. In cold weather the taping and finishing of gypsum board shall be carried out at a temperature of not less than 50°F.

Temperature
for finishing
gypsum board

9.30.8.10. Nail heads and screw heads shall be covered with a suitable filler.

Filler for
nail heads

9.30.8.11.(1) Surfaces to receive tape shall be clean, and torn paper or loose material shall be removed.

(2) Openings greater than $\frac{1}{8}$ -in. shall be filled with patching plaster that is allowed to dry before joint tape cement is applied.

9.30.8.12. External corners shall be protected with corrosion-resistant metal corner beads or wood mouldings.

Metal corner

9.30.8.13. A band of joint cement about 5-in. wide shall be applied along the joints to embed the tape and such tape shall be smoothed out and excess cement removed with a suitable spreader tool.

9.30.8.14. After the cement has dried, a second layer of cement shall be applied so that it completely covers the tape and the edges of the cement shall be feathered to provide a band about 8-in. wide where the joints are recessed and 10-in. wide where the joints are not recessed.

9.30.8.15. After the second layer is dry, a third layer of cement shall be applied and feathered to provide a band about 10-in. wide where the joints are recessed and 16-in. wide where the joints are not recessed.

9.30.8.16. After the third layer of cement has dried, all rough and uneven areas shall be sanded to provide a smooth even surface.

Subsection 9.30.9. Plywood Finish

9.30.9.1. The minimum thickness of plywood interior finish shall conform to Table 9.30.9.A., except that no minimum thickness is required when the plywood is applied over solid backing.

Plywood finish
thickness

TABLE 9.30.9.A.
Forming Part of Article 9.30.9.1.

MINIMUM THICKNESS OF INTERIOR PLYWOOD FINISH		
Maximum Spacing of Supports, in. o.c.	On Supports with no Horizontal Blocking, in.	On Supports with Blocking at Vertical Intervals not Exceeding 4 ft, in.
16	3/16	5/32
24	3/8	3/16
Column 1	2	3

9.30.9.2. Where plywood for interior finish is grooved, the grooves shall not extend through the face ply and into the plies below the face ply unless the groove is supported by framing or furring, or if the grain of the face ply is at right angles to the supporting members, unless the thickness of the plywood exceeds the value shown in Table 9.30.9.A. by an amount equal to at least the depth of penetration of the grooves into the plies below the face ply.

Nails for
plywood finish

9.30.9.3. Nails for attaching plywood finishes shall be not less than 1½-in. casing or finishing nails spaced not more than 6-in. o.c. along edge supports and 12-in. o.c. along intermediate supports, except that staples providing equivalent lateral resistance may also be used.

Edges

9.30.9.4. All plywood edges shall be supported by furring, blocking or framing.

Subsection 9.30.10. Hard-pressed Fibreboard Finish

Hard-pressed
fibreboard
specification

9.30.10.1. Hard-pressed fibreboard shall conform to CGSB 11-GP-3b (1972), “Hard-board,” as revised to 1 May, 1975.

Thickness

9.30.10.2. Hard-pressed fibreboard shall be not less than ⅛-in. thick where applied over continuous back-up, ¼-in. thick where applied to supports spaced not more than 16-in. o.c., and ⅜-in. thick where applied to supports spaced not more than 24-in. o.c.

Nails

9.30.10.3. Nails for fastening hard-pressed fibreboard shall be casing or finishing nails not less than 1½-in. long, spaced not more than 6-in. o.c. along edge supports and 12-in. o.c. along intermediate supports.

Edges

9.30.10.4. All hard-pressed fibreboard edges shall be supported by furring, blocking or framing where the back-up is not continuous.

Subsection 9.30.11. Insulating Fibreboard Finish

Insulating
fibreboard

9.30.11.1. Insulating fibreboard shall conform to CSA A247.3-1969, “Fibreboard Used in Interior Application,” as revised to 1 May, 1975.

Thickness

9.30.11.2.(1) Insulating fibreboard sheets shall be not less than 7/16-in. thick on supports not more than 16-in. o.c.

(2) Insulating fibreboard tile shall be not less than ½-in. thick on supports spaced not more than 16-in. o.c.

Nails and nail
spacing

9.30.11.3. Nails for fastening fibreboard sheets shall be not less than 0.102-in. shank diameter casing or finishing nails of sufficient length to penetrate at least ¾-in. into the supports and nails shall be spaced not more than 4-in. o.c. along edge supports and 8-in. o.c. along intermediate supports.

Edge support

9.30.11.4. All fibreboard edges shall be supported by blocking, furring or framing.

Subsection 9.30.12. Particleboard Finish

9.30.12.1. Particleboard finish shall conform to CSA O188-1968, "Mat-Formed Wood Particleboard," as revised to 1 May, 1975.	Particleboard finish
9.30.12.2. Particleboard shall be not less than ¼-in. thick on supports not more than 16-in. o.c., and not less than ⅜-in. thick on supports not more than 24-in. o.c., except that in walls where blocking is provided at mid-wall height, particleboard shall have a thickness of not less than ¼-in. on supports not more than 24-in. o.c.	Thickness
9.30.12.3. Nails for fastening particleboard shall be not less than 1½-in. casing or finishing nails spaced not more than 6-in. o.c. along edge supports and 12-in. o.c. along intermediate supports.	Nails and nail spacing
9.30.12.4. All particleboard edges shall be supported by furring, blocking or framing.	Edge support

Subsection 9.30.13. Wall Tile

9.30.13.1. Ceramic tile shall be set in a mortar base or applied with an adhesive. Plastic tile shall be applied with an adhesive.	Wall tile base and adhesive
9.30.13.2.(1) When ceramic tile is applied to a mortar base the cementitious material,	Mortar for ceramic tile
(a) shall consist of 1 part portland cement to not more than ¼ part lime by volume; and	
(b) shall be mixed with not less than 3 nor more than 5 parts of aggregate per part of cementitious material by volume.	
(2) Mortar shall be applied over metal lath or masonry.	
(3) Ceramic tile applied to a mortar base shall be thoroughly soaked and pressed into place forcing the mortar into the joints while the tile is wet.	
9.30.13.3. Adhesives to attach ceramic or plastic tile shall be applied to the finish coat or brown coat of plaster that has been steel-trowelled to an even surface or to gypsum board or to masonry provided the masonry has an even surface.	Adhesive for ceramic tile
9.30.13.4. The joints between wall tiles and a bathtub shall be suitably caulked with material conforming to CGSB 19-GP-3b(1972), "Sealing Compound: Two Component, Polysulphide Base, Chemical Curing" or CGSB 19-GP-9b(1971), "Sealing Compound: One Component, Silicone Base, Chemical Curing," both as revised to 1 May, 1975.	Caulking compounds for wall tiles

SECTION 9.31 FLOORING

Subsection 9.31.1. General

9.31.1.1. Finished flooring shall be provided in all dwelling units, public and private entrances, corridors, stair landings and all public areas.	Flooring
9.31.1.2. Finished flooring in bathrooms, kitchens, public entrance halls, laundry and general storage areas shall consist of resilient flooring, felted-synthetic-fibre floor coverings, concrete, terrazzo, ceramic tile, mastic or other types of flooring providing similar degrees of water resistance.	Finished flooring materials
9.31.1.3. Wood sleepers supporting finished flooring over a concrete base on ground shall be not less than 1-in. by 2-in. and shall be treated with a soaking coat of wood preservative.	Wood sleepers
9.31.1.4. Finished flooring shall have a surface that is smooth, even and free from roughness or open defects.	

Subsection 9.31.2. Panel-Type Underlay

Panel-type underlay

9.31.2.1. A panel-type underlay shall be provided under resilient flooring, parquet flooring, ceramic tile, felted-synthetic-fibre floor coverings or carpeting laid over lumber subflooring. (See Article 9.31.3.3.)

9.31.2.2. A panel-type underlay shall be provided under resilient flooring, parquet flooring, felted-synthetic-fibre floor coverings, carpeting or ceramic tile on panel-type subflooring whose edges are unsupported. (See Article 9.23.14.3.)

Panel-type underlay specifications

9.31.2.3. Panel-type underlay shall be not less than ¼-in. thick and shall conform to one of the following Standards, as revised to 1 May, 1975:

- CSA O115-1967, "Hardwood Plywood,"
- CSA O121-1973, "Douglas Fir Plywood,"
- CSA O151-1974, "Canadian Softwood Plywood,"
- CSA O153-1963, "Poplar Plywood,"
- CSA O188-1968, "Mat-Formed Particleboard," or
- CGSB 11-GP-3b(1972), "Hardboard."

Fastening

9.31.2.4. Panel-type underlay shall be fastened to the subfloor with staples or annular grooved flooring nails, spaced not more than 6-in. o.c. along the edges and 8-in. o.c. both ways at other locations.

Nails for underlay

9.31.2.5.(1) Nails for panel-type underlay shall be not less than ¾-in. long for ¼-in.-thick underlay and 7⁄8-in. long for 5⁄16-in.-thick underlay.

(2) Staples for panel-type underlay shall have not less than a 0.047-in. shank diameter or thickness with a ¾-in. crown and shall be not less than 7⁄8-in. long for ¼-in. underlay and 1 1⁄8-in. long for 5⁄16-in. and 3⁄8-in. underlay.

9.31.2.6. Where panel-type underlay is required to be installed over plywood or particleboard, the joints in the underlay shall be offset at least 8-in. from the parallel joints in the underlying subfloor.

Underlay for resilient or ceramic floors

9.31.2.7. Underlay beneath resilient or ceramic floors applied with an adhesive shall have all holes or open defects on the surface patched so that the defects will not be transmitted to the finished surface.

Subsection 9.31.3. Wood Strip Flooring

Dimensions

9.31.3.1. The thickness of wood strip flooring shall conform to Table 9.31.3.A.

TABLE 9.31.3.A.
Forming Part of Article 9.31.3.1.

WOOD STRIP FLOORING			
Type of Flooring	Maximum Joist Spacing, in.	Minimum Actual Thickness of Flooring, in.	
		With Subfloor	No Subfloor
Matched hardwood (interior use only)	16	5⁄16	¾
	24	5⁄16	1-5⁄16
Matched softwood (interior or exterior use)	16	¾	¾
	24	¾	1 1⁄4
Square edge softwood (exterior use only)	16	—	1
	24	—	1 1⁄2
Column 1	2	3	4

- 9.31.3.2. Wood strip flooring shall not be laid parallel to lumber subflooring unless a separate underlay is provided.

9.31.3.3.(1) If wood strip flooring is applied without a subfloor, it shall be laid at right angles to the joists so that the end joints are staggered and occur over supports or are end matched.

(2) If the flooring is end matched, it shall be laid so that no 2 adjoining strips break joints in the same space between supports and each strip bears on no fewer than 2 supports.

9.31.3.4.(1) Wood strip flooring shall be toe nailed or face nailed with at least 1 nail per strip at the spacings shown in Table 9.31.3.B., except that face nailed strips of more than 1-in. in width shall have no fewer than 2 nails per strip.

(2) Face nails shall be countersunk and the holes filled with suitable filler.
- Underlay
- Laying of wood strip flooring
- Nailing

TABLE 9.31.3.B.

Forming Part of Article 9.31.3.4.

NAILING OF WOOD STRIP FLOORING		
Finish Floor Thickness, in.	Minimum Length of Flooring Nails, in.	Maximum Spacing of Flooring Nails, in.
5/16	1 ½ ⁽¹⁾	8
7/16	2	12
¾	2 ¼	16
1	2 ½	16
1 ¼	2 ¾	24
1 ½	3 ¼	24
Column 1	2	3

Note to Table 9.31.3.B.:

⁽¹⁾Staples not less than 1¼ in. long with 0.047-in. shank diameter or thickness and with 3/16-in. crowns may be used in lieu of nails.

9.31.3.5. Wood strip flooring shall be sanded so that the surface is smooth, even, and free from roughness or open defects.

Wood strip flooring

Subsection 9.31.4. Parquet Flooring

- 9.31.4.1. Adhesive used to attach parquet block flooring shall be suitable for bonding wood to the applicable subfloor material.

9.31.4.2. Hardwood parquet block flooring shall be finished so that the surface is smooth, even, and free from roughness or open defects.
- Adhesive for parquet flooring
- Parquet flooring

Subsection 9.31.5. Resilient Flooring

- 9.31.5.1.(1) Resilient flooring used on concrete slabs supported on ground shall consist of asphalt, rubber, vinyl-asbestos, unbacked vinyl or vinyl with an inorganic type backing and such flooring shall be attached to the base with a suitable waterproof and alkali-resistant adhesive.

(2) Other similar types of resilient flooring may be used on slabs-on-ground.

9.31.5.2. Resilient floor shall conform to one of the following Standards, as revised to 1 May, 1975:
- Type of resilient flooring
- Resilient flooring specifications

CSA A100-1962, "Asphalt Floor Tile,"
CSA A146-1965, "Linoleum Products,"
CSA A126.1-1967, "Vinyl Asbestos Floor Tile,"
CSA A145-1959, "Rubber Floor Tile,"
FS-L-F00450A(1970), "Flooring, Vinyl Plastic."

Subsection 9.31.6. Ceramic Tile

Ceramic tile

9.31.6.1. Ceramic tile shall be set in a mortar bed or applied to a sound smooth base with a suitable adhesive.

9.31.6.2.(1) When ceramic tile is set in mortar bed, the bed shall be not less than 1¼-in. thick and asphalt sheathing paper, felt or polyethylene film shall be applied under the mortar bed when the mortar is applied over wood subfloors.

(2) The mortar shall consist, by volume of

1	part portland cement
1/5 to 1/2	part hydrated lime
4	parts sand
1	part water.

(3) The tile shall be soaked before installation and pressed firmly into place while the mortar is still plastic.

(4) The mortar shall be compressed into the tile joints and joints tooled the same day the tile is installed and where no spacers are provided, the joints shall not exceed 1/16-in. in width.

9.31.6.3.(1) Ceramic tile installed with an adhesive shall be applied with a proper notched trowel over a smooth base of concrete or over a panel-type underlay as described in Subsection 9.31.2., except that particleboard shall be limited to Type 1 particleboard as in CSA O188-1968, "Mat-Formed Wood Particleboard," as revised to 1 May, 1975.

(2) The adhesive used in the installation of ceramic tile shall be applied to both the base and the tile and a "dry cure grout" mixed with water to a paste consistency shall be forced into the tile joints and all excess grout removed.

Subsection 9.31.7. Carpeting

9.31.7.1. When carpeting is used it shall be laid over concrete or panel-type subflooring or over lumber subflooring covered with a panel-type underlay conforming to Subsection 9.31.2.

Subsection 9.31.8. Felted-Synthetic-Fibre Floor Coverings

Felted-
synthetic-fibre
floor covering

9.31.8.1. Felted-synthetic-fibre floor coverings may be used in all rooms and spaces and when a felted-synthetic-fibre floor covering is used, it shall be laid over concrete or panel-type subflooring or over lumber subflooring covered with a panel-type underlay conforming to Subsection 9.31.2.

9.31.8.2. A carpet underlay shall not be used beneath felted-synthetic-fibre floor coverings in those areas where excessive amounts of water is likely to be encountered.

SECTION 9.32 PLUMBING FACILITIES

Subsection 9.32.1. Scope

Plumbing

9.32.1.1. This Section applies to the facilities required in plumbing systems within dwelling units.

9.32.1.2. Facilities in plumbing systems other than those required in dwelling units shall conform to Part 3.

Subsection 9.32.2. Administration

9.32.2.1. The construction, extension, alteration, renewal or repair of plumbing systems and sewage disposal systems shall conform to Part 7.

Subsection 9.32.3. Water Supply and Distribution

9.32.3.1. Every dwelling unit shall be supplied with potable water from an approved public or community system when these systems are available. Potable water

9.32.3.2. Where public or community systems are not available, every dwelling unit shall be supplied with an adequate supply of potable water from an approved private source. Cold water storage

9.32.3.3. Where a piped water supply is available, piping for hot and cold water shall be connected to every kitchen sink, lavatory, bathtub, shower, slop sink and laundry area and piping for cold water shall be run to every water closet and hose bib. Piping to facilities

Subsection 9.32.4. Required Facilities

9.32.4.1.(1) A kitchen sink, lavatory, bathtub and water closet shall be provided for every dwelling unit where a piped water supply is available. Required facilities

(2) Where there is no piped water supply, other means of waste disposal shall be provided for every dwelling unit.

9.32.4.2. Laundry facilities or a space for laundry facilities shall be provided in every dwelling unit, or grouped elsewhere in the building in a location conveniently accessible to occupants of every dwelling unit. Laundry space

9.32.4.3. Where a piped water supply is available a hot water supply shall be provided in every dwelling unit. Hot water supply

9.32.4.4. Where gravity drainage to a sewer, drainage ditch or dry well is possible, a floor drain shall be installed in a basement or cellar forming part of a dwelling unit. Floor drain

9.32.4.5. A floor drain shall be provided in a public laundry room, and in a garbage room, incinerator room, boiler or heating room serving more than 1 dwelling unit.

Subsection 9.32.5. Sewage Disposal

9.32.5.1. Except as provided in Article 9.32.4.1., wastes from every plumbing fixture shall be piped to the building sewer. Sewage disposal

9.32.5.2. Building sewers shall discharge into a public sewage system where such system is available. Building sewers discharge

9.32.5.3. Where a public sewage system is not available, the building sewer shall discharge into a private sewage disposal system such as a septic tank and disposal field provided the design and installation is approved. Private sewage disposal system

Subsection 9.32.6. Service Water Heating Facilities

9.32.6.1. Where a hot water supply is required by Article 9.32.4.3., equipment shall be installed to provide to every dwelling unit an adequate supply of service hot water with a temperature range from 140°F to 165°F. Service water heating facilities

9.32.6.2. Service hot water may be distributed from a centrally located heater to supply the entire building or may be supplied by an individual service water heater for each dwelling unit. Distribution of service hot water

9.32.6.3. Every service water heater and its installation shall conform to Part 6. Installation

9.32.6.4. Where storage tanks for service water heaters are of steel, they shall be coated with zinc, vitreous enamel (glass lined), hydraulic cement or other corrosion-resistant material. Storage tanks

Fuel-burning
service water
heaters

9.32.6.5. Fuel-burning service water heaters shall be connected to a chimney flue conforming to Section 9.21.

Heating coils

9.32.6.6. Heating coils of service water heaters shall not be installed in a flue or in a combustion chamber of a building heating boiler or furnace unless such installations are permitted.

SECTION 9.33 VENTILATION

Subsection 9.33.1. Scope

Ventilation

9.33.1.1. This Section applies to the ventilation of rooms and spaces in residential occupancies by natural ventilation and mechanical ventilation where the rated fan capacity does not exceed 4,000 cfm.

Mechanical
ventilation

9.33.1.2. Where the rated fan capacity exceeds 4,000 cfm, mechanical ventilation shall conform to Part 6.

Ventilation of
rooms and
spaces

9.33.1.3. Ventilation of rooms and spaces in other than residential occupancies shall conform to procedures described in Part 6.

Ventilation of
garages

9.33.1.4. A garage for parking more than 5 cars shall be ventilated in accordance with Part 3.

Subsection 9.33.2. General

Ventilation of
residential
occupancies

9.33.2.1. Rooms and spaces in buildings of residential occupancy shall be ventilated by natural means in accordance with Subsection 9.33.3. or by mechanical means in conformance with Subsection 9.33.4.

9.33.2.2. A space that contains a fuel-fired heating appliance shall have natural or mechanical means of supplying the required combustion air.

9.33.2.3. Where the ventilation system forms part of the heating system, Section 9.34 shall also apply.

Air
contaminants

9.33.2.4. Air contaminants released within buildings shall be removed insofar as possible at their points of origin and shall not be permitted to accumulate in unsafe concentrations.

Exhaust venti-
lation system

9.33.2.5. Every building in which dust, fumes, gases, vapour or other contaminants tend to create a fire or explosion hazard shall be provided with an exhaust ventilation system designed to conform to Part 6 and shall be provided with explosion relief devices and vents or other protective measures to conform with Part 3.

Subsection 9.33.3. Natural Ventilation

Minimum
natural ventila-
tion area

9.33.3.1. The unobstructed ventilation area to the outdoors for rooms and spaces in residential buildings ventilated by natural means shall conform to Table 9.33.3.A.

Protection of
openings
supplying
natural
ventilation

9.33.3.2. Openings for natural ventilation other than windows shall be constructed to provide protection from the weather and insects and screening shall be of rust-proof material.

TABLE 9.33.3.A.
Forming Part of Article 9.33.3.1.

NATURAL VENTILATION		
	Location	Minimum Unobstructed Area
Within dwelling units	Bathrooms or water-closet rooms	1 sq ft
	Unfinished basement space	0.2 per cent of the floor area
	Dining rooms, living rooms, ⁽¹⁾ Bedrooms, kitchens, combined rooms, ⁽¹⁾ Dens, recreation rooms and all other finished rooms	3 sq ft ⁽²⁾
Other than within dwelling units	Bathrooms or water-closet rooms	1 sq ft per water-closet
	Sleeping areas	1 ½ sq ft per occupant
	Laundry rooms, kitchens, recreation rooms	4 per cent of the floor area
	Corridors, storage rooms and other similar public rooms or spaces	2 per cent of the floor area
	Unfinished basement space not used on a shared basis	0.2 per cent of the floor area
Column 1	2	3

Notes to Table 9.33.3.A. :
(1)Ventilation to the outdoors may be through a vestibule opening directly off a living or dining room.
(2)Where living, dining or sleeping areas are contained in a single room, the 3 sq ft of minimum unobstructed area shall apply to the entire room.

Subsection 9.33.4. Mechanical Ventilation

9.33.4.1.(1) Where rooms or spaces are mechanically ventilated, the system shall be capable of providing at least 1 air change per hour. Mechanical ventilation

(2) Where a kitchen space is combined with a living area, natural or mechanical ventilation shall be provided in the kitchen area.

9.33.4.2. No air from any dwelling unit shall be circulated directly or indirectly to any other dwelling unit, public corridor or public stairway. Air from dwelling unit

9.33.4.3.(1) Exhaust ducts from rooms containing water closets, urinals, showers, slop sinks or domestic cooking equipment shall not be connected to duct systems serving other areas of a building except at the inlet of the exhaust fan and where such a connection is made, devices shall be installed to prevent the circulation of exhaust air through the dwelling units when the fan is not operating. Exhaust ducts from toilet room and kitchen

(2) Exhaust air provided shall be not less than 50 cfm per sanitary fixture in any washroom.

9.33.4.4. Air intakes shall be located so as to avoid contamination from exhaust outlets or other sources in concentrations greater than normal in the locality in which the building is located. Contamination from exhaust outlets

Exhaust discharge	9.33.4.5. Exhaust ducts shall discharge directly to the outdoors and where the exhaust duct passes through or is adjacent to unheated space, the duct shall be insulated to prevent moisture condensation in the duct in accordance with Sentence 9.34.6.1.(2).
Access to ventilation equipment	9.33.4.6. Ventilation equipment shall be accessible for inspection, maintenance, repair and cleaning and kitchen exhaust ducts shall be designed and installed so that the entire duct can be cleaned where the duct is not equipped with a filter at the intake end.
Air intake shield	9.33.4.7. Outdoor air intake and exhaust outlets shall be shielded from weather and insects and screening shall be of rust-proof material.
Automatic damper	9.33.4.8.(1) Outdoor air intake openings into the cold air return system shall be provided with a manually operated or automatic damper. (2) Air intake openings larger than 5-in. diam. shall be equipped with a manually operated closure if the system is gravity type, or an automatic closure if the system is mechanically operated. 9.33.4.9. Where a duct enters or passes through a wall, floor or ceiling, the space between the duct and surrounding construction shall be closed off with noncombustible material. 9.33.4.10. Except as provided in Article 9.33.4.11., every ventilating duct shall conform to the requirements of Section 9.34 for supply ducts. 9.33.4.11. An exhaust duct that serves only a bathroom or water-closet room and that is contained entirely within a dwelling unit or space that is common to no other dwelling unit, may be of combustible material provided the duct is reasonably air tight and constructed of a material impervious to water. 9.33.4.12. Underground ventilating ducts shall be adequately drained and such ducts shall have no sewer connections and shall be provided with access for inspection and cleaning.

SECTION 9.34 HEATING AND AIR-CONDITIONING

Subsection 9.34.1. Scope

9.34.1.1. This Section applies to the design and installation of heating systems in which the heat input does not exceed 400,000 Btu per hr and to air-conditioning systems in which the rated fan capacity does not exceed 4,000 cfm.

Heat input exceeding 400,000 Btu/hr	9.34.1.2. Where the heat input of a heating system exceeds 400,000 Btu per hr or the rated fan capacity of an air-conditioning system exceeds 4,000 cfm, Part 6 shall apply.
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Subsection 9.34.2. General

Design	9.34.2.1. The design, including heat loss and heat gain calculations, for the construction and installation of heating and air-conditioning systems, shall conform to the procedures described in the ASHRAE Guide and Data Books, the ASHRAE Handbooks, the HRA Digest and the Hydronics Institute Manuals.
Access to equipment	9.34.2.2. Equipment forming part of a heating or air-conditioning system except for concealed or embedded pipes or ducts shall have easy access for inspection, maintenance and cleaning. 9.34.2.3. RESERVED 9.34.2.4. The installation of solid-fuel-burning appliances, including mounting, clearances and requirements for safety devices, shall conform to Part 6.
Temperature in residential buildings	9.34.2.5.(1) Residential buildings intended for use in the winter months on a continuing basis shall be insulated and equipped with heating facilities together capable of maintaining an indoor air temperature of 72°F at the outside winter design temperature, except as provided in Article 9.34.2.6.

(2) All other buildings shall be insulated and equipped with heating facilities both sufficient to maintain the desired indoor air temperature commensurate with the use of the building at the outside winter design temperature.

Temperature in other buildings

(3) Winter design temperatures shall be determined on the basis of the January 2½ per cent design temperature as listed in Section 4.9.

9.34.2.6. Heating facilities shall be provided which shall be capable of maintaining a temperature not less than 65°F in an unfinished basement or cellar in buildings of residential occupancy. Crawl spaces need not be heated.

Temperature in basement or cellar

9.34.2.7. Mechanical equipment and heating terminal devices shall be guarded to prevent injury to persons.

Subsection 9.34.3. Heating Supply Ducts

9.34.3.1. The size of supply ducts shall conform to the procedures described in the ASHRAE Guide and Data Books, the ASHRAE Handbooks, the HRA Digest and the Hydronics Institute Manuals.

9.34.3.2.(1) Except for heating supply ducts serving not more than 1 dwelling unit and encased in concrete slabs-on-ground, heating supply ducts shall be noncombustible or shall be Class 1 ducts installed in conformance with Part 6.

(2) Combustible ducts in concrete slabs-on-ground that are connected to a furnace supply plenum shall be located not closer than 2 ft from that plenum, and not less than 2 ft from its connection to a riser or register.

(3) Ducts in or beneath concrete slabs-on-ground shall be water tight, corrosion-resistant, decay-resistant and mildew-resistant.

9.34.3.3.(1) Galvanized steel, aluminum or tin plate supply ducts shall conform to Table 9.34.3.A. and other metals shall have equivalent strength and durability.

(2) Rectangular panels in plenums and ducts greater than 12-in. wide shall be shaped to provide sufficient stiffness.

TABLE 9.34.3.A.

Forming Part of Sentence 9.34.3.3.(1)

MINIMUM METAL THICKNESS OF DUCTS, in.				
Shape and Location of Duct	Size of Duct, in.	Galvanized Steel	Aluminum	Tin Plate
All round ducts and enclosed rectangular ducts	14 or under	0.013	0.012	0.015
	over 14	0.016	0.016	—
Exposed rectangular ducts	14 or under	0.016	0.016	—
	over 14	0.019	0.019	—
Column 1	2	3	4	5

(3) In systems of exposed rectangular ducts serving a single dwelling unit, thickness may be reduced to 0.013-in. for ducts 14-in. or smaller in size and to 0.016-in. for ducts over 14-in. in size, where the permissible duct clearance is ½-in. or less.

9.34.3.4. Where the installation of heating supply ducts in walls, floors and partitions creates a space between the duct and construction material, the space shall be sealed with noncombustible material at each end.

Vertical ducts
in closets or
rooms

9.34.3.5. Vertical supply ducts located in closets or rooms shall be covered with not less than $\frac{1}{4}$ -in. cellular-asbestos insulation or other noncombustible insulation.

Duct supports

9.34.3.6. Ducts shall be securely supported by metal hangers, straps, lugs or brackets, except that where zero clearance is permitted as in Articles 9.34.3.8. and 9.34.3.9., wooden brackets may be used.

Minimum
clearance of
furnace
plenums

9.34.3.7. The clearance of furnace plenums from combustible material shall conform to Article 6.2.5.5. for solid-fuel-burning furnaces.

Clearance of
supply ducts

9.34.3.8. Supply ducts from warm-air furnaces having a required plenum clearance of 3-in. or less shall maintain this clearance from combustible material where the duct leaves the main plenum and this may be gradually reduced to $\frac{1}{2}$ -in. clearance at a distance of not less than 18-in. from the furnace plenum, and to zero beyond a bend or offset in the duct sufficiently large to shield the remainder of the duct from direct radiation from the furnace heat exchanger.

9.34.3.9. Supply ducts from warm-air furnaces having a required furnace plenum clearance of over 3-in. but not more than 6-in. shall maintain this clearance from combustible material at the main furnace plenum and for a horizontal distance of 6 ft from the furnace plenum and this may be reduced to $\frac{1}{2}$ -in. clearance beyond this point and to zero clearance beyond a bend or offset in the duct sufficiently large to shield the remainder of the duct from direct radiation from the furnace heat exchanger.

9.34.3.10.(1) Supply ducts from warm-air furnaces having a required plenum clearance of more than 6-in. shall have a clearance from combustible material equal to that specified for the furnace plenum and this clearance shall be maintained for a horizontal distance of not less than 3 ft from the furnace plenum.

(2) The clearance may be reduced to 6-in. from a point beyond the 3 ft clearance referred to in Sentence (1) and to a 1-in. clearance at a horizontal distance of 6 ft from the furnace plenum.

(3) The 1-in. clearance may be further reduced to $\frac{5}{16}$ -in. clearance beyond a bend or offset in the duct sufficiently large to shield the remainder of the supply duct from direct radiation from the furnace heat exchanger.

Clearance for
boots and
register boxes

9.34.3.11. Clearance for boots and register boxes shall be as described for supply ducts when the boot or box is not separated from combustible material, except that no clearance is required when not less than $\frac{1}{4}$ -in. of cellular-asbestos insulation is provided.

Register over
pipeless furnace

9.34.3.12. Where a register is installed in a floor directly over a pipeless furnace, a double walled register box with not less than 4-in. between walls, or a register box with the warm-air passage completely surrounded by the cold-air passage, shall be permitted in lieu of the clearances listed in Articles 9.34.3.8. to 9.34.3.10.

Pipe joints

9.34.3.13. All round pipe joints shall be lapped not less than 1-in. and shall have a snug fit without undue crimping or distortion and such joints need not be screw fastened or taped.

Rectangular
duct
connections

9.34.3.14. Rectangular duct connections shall be made with S and drive cleats, or equivalent mechanical connection and such connections need not be taped if reasonably airtight.

Trunk ducts

9.34.3.15. Trunk ducts shall be securely supported by metal hangers, straps, lugs or brackets and shall not be nailed directly to wood members and branch pipes shall be supported at suitable spacing to maintain alignment and prevent sagging.

9.34.3.16. Flexible ducts shall not exceed 14 ft. in length and 20 sq. in. in cross-sectional area and shall conform to ULC S110 (1970) "Air ducts" as revised to 1 December, 1977.

Subsection 9.34.4. Supply Outlets for Warm-air Ducts

Supply outlet
required

9.34.4.1.(1) A warm-air supply outlet shall be provided in each finished room in a dwelling unit.

(2) Except in bathrooms, utility rooms or kitchens where it may not be practical, in rooms located adjacent to an exterior wall, the warm-air supply outlet shall be located so as to bathe at least one exterior wall with warm air.

9.34.4.2. A warm-air supply outlet per 400 sq ft shall be provided in unfinished basements serving dwelling units, located so as to provide adequate distribution of warm air.

Supply outlet
in basement

9.34.4.3. No fewer than 4 supply outlets shall be provided in crawl spaces used as warm-air plenums, and located to direct the air towards the corners of the crawl space and ducts for such outlets shall be not less than 6 ft in length.

Supply outlet in
crawl space

9.34.4.4.(1) Except for pipeless furnaces and floor furnaces, the capacity of warm-air supply outlets serving dwelling units shall be not less than the design heat loss from the area served, and shall not exceed 10,000 Btu per hr per outlet.

Furnace
capacity

(2) In basements and heated crawl spaces, the calculated heat gain from the supply ducts and plenum surfaces may be considered in the calculations.

9.34.4.5. Warm air heating systems for residential buildings shall not be inter-connected with garages.

Registers in
garages

9.34.4.6. The temperature of supply air at the warm-air supply outlets shall not exceed 160°F.

Temperature of
supply air

9.34.4.7.(1) Warm-air supply systems for residential buildings built on concrete slabs-on-grade shall be,

Slab installa-
tion of supply
systems

(a) of the perimeter loop type or radial perimeter type; and

(b) installed in the slab.

Subsection 9.34.5. Registers, Diffusers, Grilles and Fittings for Warm-air Heating

9.34.5.1. The design of fittings for ducts shall conform to CSA B228.1-1968, "Pipes, Ducts and Fittings for Residential Type Air Conditioning Systems," as revised to 1 May, 1975 except that metal thickness requirements shall conform to those in Table 9.34.3.A.

Design of
fittings for
ducts

9.34.5.2. Warm-air supply outlets located in finished areas or on the furnace plenum or extended plenum shall be provided with a diffuser and adjustable opening.

Diffusers for
supply outlets

9.34.5.3. All branch supply ducts that are not fitted with diffusers having an adjustable balance stop shall be supplied with an adjustable damper, and fitted with a device to indicate the position of the damper.

Adjustable
damper

9.34.5.4. Return-air inlets in finished areas shall be supplied with grilles.

Grilles

Subsection 9.34.6. Insulation of Ducts

9.34.6.1.(1) Supply ducts and return ducts in exterior walls shall be insulated to provide an "R" value of not less than 4.

Insulation of
supply ducts

(2) Supply ducts and return ducts in unheated spaces shall be insulated to provide an "R" value of not less than 7.

Subsection 9.34.7. Return-air Systems

9.34.7.1. The return-air system shall be designed to handle the entire air supply.

Return air
system

9.34.7.2. Where any part of a return air duct will be exposed to radiation from the furnace heat exchanger or other heat radiating part within the furnace, the parts of return ducts directly above or within 2 ft of the outside furnace casing shall be noncombustible and return ducts in other locations shall be constructed of material having a surface flame-spread rating of not more than 150.

Fire resistance
of return ducts

Lining of return ducts	9.34.7.3. Combustible return ducts shall be lined with noncombustible material below floor registers, at the bottom of vertical ducts and under furnaces having a bottom return.
Spaces used as return ducts	9.34.7.4. Spaces between studs used as return ducts shall be separated from the unused portions of such spaces by tight-fitting metal stops or wood blocking.
Vertical return ducts	9.34.7.5. A vertical return duct shall have openings to return air on not more than 1 floor.
Return air plenum	9.34.7.6. Public corridors shall not be used as return or exhaust plenums for a heating, ventilating or air conditioning system.
Negative pressure	9.34.7.7. The return-air system shall be designed so that the negative pressure from the circulating fan cannot affect the furnace combustion air supply nor draw combustion products from joints or openings in the furnace or flue pipe.
Return air inlets	9.34.7.8. Return air inlets shall not be located in an enclosed furnace room or in a crawl space where the furnace is installed in the crawl space.
	9.34.7.9. RESERVED.
Recirculation of return air	9.34.7.10. Return air from a dwelling unit shall not be recirculated to any other dwelling unit.
Return air inlets required	9.34.7.11. At least 1 return-air inlet shall be provided per dwelling unit and each return shall serve an area having a design heat loss of not more than 60,000 Btu per hr.
Provisions for the return of air	9.34.7.12. Provision shall be made for the return of air from all rooms by leaving a gap beneath doors, using louvred doors, or installing a return duct inlet.
Ceiling assembly used as plenum	9.34.7.13. Except for return-air plenums located within a dwelling unit, where a ceiling assembly is used as a plenum, the requirements of Part 6 shall apply for such systems.

Subsection 9.34.8. Steam and Hot Water Heating Systems

Steam and hot water heating system	9.34.8.1. Every steam and hot water pipe shall be constructed of noncombustible material having adequate strength and durability.
Insulation of pipes	9.34.8.2. Insulation or other covering for steam or hot water pipes shall be noncombustible, except that combustible insulation may be used, provided such insulation conforms to the requirements in Part 6 for combustible pipe insulation.
Clearance for steam and hot water pipes	9.34.8.3. Clearance between steam or hot water pipes and combustible construction shall be at least $\frac{1}{2}$ -in. measured from insulation for steam or water temperatures greater than 200°F, but not more than 250°F, and at least 1-in. measured from insulation for temperatures over 250°F.
Fire stopping of pipe spaces	9.34.8.4. The space around pipes passing through a wall or floor construction shall be fire stopped with noncombustible material.
Fire-resistance rating of pipe shafts	9.34.8.5. When pipes are run in a vertical shaft, the fire-resistance rating of the shaft shall conform to the requirements contained in Subsection 9.10.12. and such shafts shall have a noncombustible lining where the pipes are not insulated or where the pipes are insulated with combustible pipe insulation.
Design for expansion and contraction	9.34.8.6. Steam and hot water pipes shall be designed to allow for expansion and contraction with changes in temperature.

Subsection 9.34.9. Radiators, Convectors and Heat Exchangers

Heat exchangers	9.34.9.1. Every heat exchanger or unit heater using hot water or low pressure steam shall be installed with sufficient clearance to ensure that the temperature of any combustible material will not exceed its safe limit.
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9.34.9.2. Every steam or hot water radiator or convector attached to a wall or located in a recess or concealed space containing combustible material shall be provided with a noncombustible backing.

Protection from hot water and steam appliances

SECTION 9.35 ELECTRICAL FACILITIES

Subsection 9.35.1. General

9.35.1.1. RESERVED

9.35.1.2. RESERVED

9.35.1.3. Electrical facilities shall have sufficient capacity to provide, without overloading, electrical energy for lighting, appliances, outlets and equipment installed in the building.

Capacity of electrical services

9.35.1.4. Entrance switches, meters, panel boxes, splitter boxes, time clocks and other similar equipment, shall not be located in any public area unless adequate precautions are taken to prevent interference with the equipment.

Protection of electrical equipment

Subsection 9.35.2. Lighting Outlets

9.35.2.1. An exterior lighting outlet with fixture, controlled by a wall switch located within the building, shall be provided at every entrance to buildings of residential occupancy.

Exterior lighting

9.35.2.2. A lighting outlet with fixture, controlled by a wall switch, shall be provided in kitchens, utility rooms, laundry rooms, dining rooms, bathrooms, water-closet rooms, vestibules and hallways in dwelling units.

Requirements for lighting outlets

9.35.2.3. A receptacle controlled by a wall switch, or lighting outlet shall be provided in bedrooms and living rooms in dwelling units.

9.35.2.4. Every stairway shall be lighted. Except as provided in Article 9.35.2.5., 3-way wall switches located at the head and foot of every stairway shall be provided to control at least 1 lighting outlet with fixture for stairways with 4 or more risers in dwelling units.

Lights in stairways

9.35.2.5. The stairway lighting for basements or cellars that do not contain finished space nor lead to an outside entrance or built-in garage and which serve not more than 1 dwelling unit, may be controlled by a single switch located at the head of the stairs.

Switch at head of stairs

9.35.2.6. A lighting outlet with fixture shall be provided for each 300 sq ft, or fraction thereof, of floor area in unfinished basements or cellars and the outlet nearest the stairs shall be controlled by a wall switch located at the head of the stairs.

9.35.2.7. A lighting outlet with fixture shall be provided in storage rooms.

Storage room

9.35.2.8.(1) A lighting outlet with fixture shall be provided for an attached, built-in or detached garage or carport.

Lighting of garages and carports

(2) Such outlet shall be controlled by a wall switch near the doorway where the fixture is ceiling mounted above an area normally occupied by a parked car; otherwise a switched lampholder may be used.

(3) Where a carport is lighted by a light at the entrance to a dwelling unit, additional carport lighting is not required.

9.35.2.9.(1) Every public or service area in buildings shall be provided with lighting outlets with fixtures controlled by a wall switch or panel to illuminate every portion of such areas.

Lighting in public areas

(2) When provided by incandescent lighting, illumination shall conform to Table 9.35.2.A.

(3) When other type of lighting is used, illumination equivalent to that shown in Table 9.35.2.A. shall be provided.

TABLE 9.35.2.A.

Forming Part of Article 9.35.2.9.

MINIMUM LIGHTING FOR PUBLIC AREAS		
Room or Space	Footcandles	Watts per square foot of floor area (Incandescent Lighting)
Storage rooms	5	1/2
Service rooms and laundry rooms	20	2
Storage garages	5	1/2
Public water-closet rooms	10	1
Public corridors and stairways	10	1
Service hallways and stairways	5	—
Recreation rooms	10	1
Column 1	2	3

Subsection 9.35.3. Receptacles

General
requirements
for receptacles

9.35.3.1.(1) Except in kitchens, bathrooms, laundry rooms, water-closet rooms, utility rooms and hallways, wall receptacles shall be installed in every finished room or area in a dwelling unit so that no point along the floor line of any usable wall space is more than 6 ft from an outlet installed in the same room.

(2) For the purposes of Sentence (1) usable wall space shall be considered as wall space not less than 3 ft wide and shall not include doorways, areas occupied by doors when fully opened, windows less than 12-in. above the floor, fireplaces or other permanent installations that would limit the use of the wall space.

9.35.3.2. Where a receptacle controlled by a wall switch is used in lieu of a lighting outlet and fixture as permitted in Article 9.35.2.3., it need not be additional to the requirements in Article 9.35.3.1., provided only half of a duplex receptacle is switched.

9.35.3.3. RESERVED

Additional
receptacles
required

9.35.3.4. When grouped laundry facilities are provided, sufficient outlets shall be provided to serve adequately the equipment to be installed by the building owner or tenants.

Distance
between
receptacles in
dwellings

9.35.3.5. Except for stairs leading to unfinished basements or cellars, no point in a hall or stairway in a dwelling unit shall be more than 15 ft from a receptacle.

9.35.3.6. RESERVED

Receptacles in
public hallways

9.35.3.7. Public corridors and public stairs shall have at least 1 duplex receptacle for each 35-ft length or fraction thereof.

Subsection 9.35.4. Emergency Lighting

Emergency
lighting

9.35.4.1. Emergency lighting shall conform to Subsection 9.9.11.

Subsection 9.35.5. Service Entrance Requirements

9.35.5.1.(1) Except in the case of externally mounted read-outs, each new residential consumer service of 200 amperes or less shall have a meter mounting device located outdoors in an accessible location.

(2) For the purposes of this subsection, the front of the building is the side nearest the utility distribution line.

9.35.5.2. Meter mounting devices shall be installed on the wall of the building so that the midpoint of the meter after installation will be 5 ft. 8 in. plus or minus 4 in. from finished grade, or, where this is not possible, the meter may be installed on a separate support.

9.35.5.3. Meter mounting devices shall be located not more than 10 ft back from the front of the single family and semi-detached homes.

9.35.5.4.(1) For an underground supply, the bottom of the consumer service stand-pipe shall be located not more than 10 ft. from the corner of the building.

(2) For an overhead supply, the top of the consumer service standpipe shall be located not more than 10 ft. from the corner of the building except that where this location does not permit a 15 ft. clearance at the point of attachment of the service conductors to the building, the top of the standpipe may be extended to a point not more than half way along the building.

9.35.5.5.(1) The meter mounting device shall be,

- (a) one hundred ampere capacity except when the service equipment is to be greater;
- (b) standardized for each service size; and
- (c) capable of accepting two-inch IPS conduit of steel, aluminum, copper or PVC if intended for underground service entrance.

9.35.5.6.(1) For consumer services supplied underground,

- (a) a two-inch IPS steel, aluminum, copper or PVC conduit shall be attached to the bottom of the meter-mounting device and shall terminate in the earth at a point at least three feet below grade and a conduit bushing shall be attached to the conduit in the earth;
- (b) the conductors on the line side of the meter and those on the load side of the meter shall not be installed in the same conduit.

SECTION 9.36 GARAGES AND CARPORTS

Subsection 9.36.1. Scope

9.36.1.1. This Section applies to garages and carports serving not more than 1 dwelling unit.

Garages and carports

9.36.1.2. The construction of a garage or carport shall conform to the requirements for other buildings in this Part except as provided in this Section.

Subsection 9.36.2. General

9.36.2.1. Where a roofed enclosure used for the storage or parking of a car or cars has more than 60 per cent of the total perimeter enclosed by walls, doors or windows, the enclosure shall be considered a garage.

Roofed enclosure used as parking for cars

Subsection 9.36.3. Foundations

9.36.3.1. Except as permitted in this Subsection, foundations conforming to Sections 9.12 and 9.15 shall be provided for the support of carport and garages superstructures, including that portion beneath garage doors.

Foundations for carports and garages

9.36.3.2.(1) In clay-type soils subject to significant movement with a change in soil moisture content, the foundation depth of carports or garages connected to a dwelling

Foundation in clay soils

unit by a breezeway shall be approximately the same depth as the main building foundation.

(2) Where slab-on-grade construction is used, a construction joint shall be provided between the main building slab and the garage or breezeway or carport slab.

(3) Except as provided in Section 9.12, foundations for attached unheated garages or carports shall be below frost level.

Wood supports
for detached
garages

9.36.3.3. Detached garages of less than 500 sq ft floor area and not more than 1 storey in height may be supported on wood mud sills provided the garage is not of masonry or masonry veneer construction.

Piers used as
supports

9.36.3.4. Piers for the support of carport columns shall extend not less than 6-in. above grade and such piers shall project not less than 1-in. beyond the base of the column but in no case be less than 8-in. by 8-in. in size.

Subsection 9.36.4. Floors

Garage floors

9.36.4.1. Garage floors shall conform to Article 9.10.6.3.

Subsection 9.36.5. Walls and Columns

Walls and
columns in
garages

9.36.5.1. Interior finish need not be applied to garage and carport walls.

Wood columns

9.36.5.2. Columns for garages and carports shall conform to Section 9.17 except that 4-in. by 4-in. wood columns may be used.

Anchoring
garage and
carports to
foundation

9.36.5.3. Garage or carport walls and columns shall be anchored to the foundation to resist wind uplift.

SECTION 9.37 COTTAGES

Subsection 9.37.1. Scope

Cottages

9.37.1.1. This Section applies to buildings used or intended to be used as cottages at any time of the year.

9.37.1.2. Such buildings shall comply with all the requirements in this Part, except where they are specifically exempted in this Section.

Conversion

9.37.1.3. When a cottage is converted to year-round dwelling purposes, it shall conform to the requirements of this Part for the type of occupancy for which the building is to be used, except for the requirements of Section 9.5. "Room and Space Dimensions."

Subsection 9.37.2. General

9.37.2.1. Except as provided in Article 9.37.3.1. buildings used or intended to be used as cottages need not comply with Sections 9.5 to 9.7 and 9.9 to 9.11.

Flooring

9.37.2.2. Flooring need not comply with Section 9.31, but tight fitting floors shall be provided to support the live and dead loads.

Services and
finishes

9.37.2.3. Thermal insulation, vapour barrier, interior finishes, plumbing, heating, air-conditioning and electrical facilities, need not be provided, but where any of these are provided, they shall comply with the requirements of this Part.

9.37.2.4. Where heating and air-conditioning are provided, Articles 9.34.2.6. and 9.34.2.7. need not be complied with.

Foundations

9.37.2.5.(1) Continuous perimeter foundation walls are not required, but when they are provided, they shall comply with the requirements of this Part.

(2) Where unit masonry columns are used, the height of such columns shall not exceed,

(a) in the case of hollow masonry units, 4 times the least dimension of the units;

- (b) in the case of solid masonry units or hollow units with voids filled with concrete, 10 times the least dimension of the column; or
- (c) where the column is reinforced with at least four $\frac{1}{2}$ in. diameter bars and filled with concrete, 18 times the least dimension of the column.

(3) Columns in excess of the height limitations of clauses (a), (b) or (c) shall be designed in accordance with Section 4.4.

9.37.2.6. Where foundations below ground level and concrete floors on grade are used, they shall comply with Section 9.13. "Waterproofing and Dampproofing."

Waterproofing
and
dampproofing

Subsection 9.37.3. Tourist Accommodation

9.37.3.1. Where buildings are used or intended to be used for seasonal tourist accommodation or for rent, they shall comply with Sections 9.5 to 9.8 in addition to the requirements of this Section.

SECTION 9.38 LOG CONSTRUCTION

Subsection 9.38.1. General

9.38.1.1. Logs which are sound and free of fractures may be used for foundations, beams, posts and similar members providing it can be shown by a structural analysis or accepted tests or previous experience that the strength of the member is adequate for its intended purpose.

9.38.1.2. The portion of any log coming in contact with masonry or concrete at or below grade shall be treated with a preservative.

9.38.1.3. All exterior joints between logs shall be rendered watertight by methods such as machine joints, oakum packing, cement parging, chinking, caulking or a combination of these.

Subsection 9.38.2. Walls

9.38.2.1. Walls may be built of natural or manufactured logs.

9.38.2.2. Walls made of logs in a horizontal position shall have inter-locking intersections which will prevent the collection of water in the joints, or the horizontal logs shall butt to a vertical corner post to which the horizontal logs shall be firmly attached.

9.38.2.3. Each log in a horizontal position shall be scribed as close as possible to its bearer and fastened to the bearer in at least three places, throughout its length, by dowels, continuous machined joints, vertical framing members or interlocking intersections or any combination of these, but in no case shall the distance between fastenings exceed six feet.

9.38.2.4. Each log in a wall built of vertical logs shall be scribed to fit as closely as possible to the adjacent logs.

9.38.2.5. Logs used in a vertical position shall have a plate at the top and a plate at the bottom which plates are at least as wide as the largest end diameter of any of the logs.

Subsection 9.38.3. Lintels

9.38.3.1. Logs placed in vertical position shall be supported over window and door openings by lintels meeting the requirements of Table 9.23.12.A.

9.38.3.2. At every opening in a wall made of logs in a horizontal position where shrinkage can occur there shall be a clearance between the rough buck header and the lintel log of not less than one-half inch in width for each foot of height to allow for settlement.

TABLE I-A

Forming Part of Articles 9.10.4.1. and 9.11.2.3.

FIRE AND SOUND RESISTANCE OF WALLS					
Type of Wall	No.	Description	Finish on Each Side (¹)	Fire-Resistance Rating, hr(²)	Sound Rating (³)
Brick	1	4-in.-thick walls of shale, clay, concrete or sand-lime brick at least 75 per cent solid	None	1	II
	2	4-in.-thick walls of clay or shale brick	A	2	II
	3	6-in.-thick walls of clay or shale brick at least 80 per cent solid	A	4	II
	4	8-in.-thick walls, same as in 1	None	4	I
Hollow tile	5	8-in.-thick clay or shale tile with min. face shell thickness of $\frac{5}{8}$ -in., 2 cells in wall thickness	None	1	III
	6	Same as 5 and at least 37 per cent solid	A	2	II
	7	Same as 5 and at least 47 per cent solid	A	3	II
Hollow Concrete Block	8	4-in.-thick with at least 1-in. face shell with natural stone, gravel or lightweight aggregate with a low proportion of quartz with a total wall weight less than 35 psf	A	1	III
	9	Same as 8 but with a total wall weight of 35 psf or more	A	1	II
	10	6-in. hollow concrete block of expanded slag, expanded clay or shale aggregate concrete, with finish applied over furring strips. Units at least 48 per cent solid	H (at least one side)	1	II
	11	Same as 10 but with units at least 59 per cent solid	H (at least one side)	1½	II
	12	6-in. hollow concrete block of limestone aggregate, units at least 63 per cent solid	A, H or N (at least one side)	1	II
	13	8-in.-thick with at least 1-in. face shell weighing at least 40 psf made of natural stone or gravel aggregate with a low proportion of quartz	A, H or N (at least one side)	1	II
Column 1	2	3	4	5	6

TABLE I-A (Cont'd)

FIRE AND SOUND RESISTANCE OF WALLS					
Type of Wall	No.	Description	Finish on Each Side (¹)	Fire-Resistance Rating, hr(²)	Sound Rating (³)
Hollow Concrete Block (Cont'd)	14	Same as 13 but with light-weight aggregate, units weighing less than 40 psf	None	1½	III
	15	8-in.-thick made with expanded slag aggregate. Units at least 65 per cent solid	A, H, N	3	II
	16	8-in.-thick made with air-cooled slag or cinder aggregate. Units at least 66 per cent solid	A, H, N	2	II
	17	8-in.-thick made with limestone aggregate. Units at least 47 per cent solid	A, H or N (at least one side)	1	II
	18	Same as 17 but with units at least 57 per cent solid	A, H or N (at least one side)	1½	II
	19	Same as 17 but with units at least 66 per cent solid	A, H or N (at least one side)	2	I
Reinforced concrete	20	4-in.-thick weighing at least 35 psf	A, H or N (at least one side)	1	II
Natural stone	21	8-in.-thick	A, H or N (at least one side)	1	I
Brick faced	22	4-in. face brick bonded to 4-in. hollow concrete block or 4-in. hollow clay tile	none	3	II
Cavity walls	23	2 wythes of shale, clay, concrete or sand-lime brick with 2-in. cavity	A, H or N (at least one side)	1	I
	24	2 wythes of 4-in. thick hollow clay tile at least 40 per cent solid, or hollow concrete block at least 62 per cent solid provided the maximum load does not exceed 80 psi	A, H or N (at least one side)	1	I
	25	8-in. wall thickness with two 2-in.-thick wythes of solid gypsum block, 4-in. space, tied together with non-corroding metal ties	Z	3	II
	26	Same as 25 but with 2-in. mineral wool in cavity	Z	3	I
Column 1	2	3	4	5	6

TABLE I-A (Cont'd)

FIRE AND SOUND RESISTANCE OF WALLS					
Type of Wall	No.	Description	Finish on Each Side (¹)	Fire-Resistance Rating, hr(²)	Sound Rating (³)
Gypsum block	27	3-in.-thick hollow gypsum block at least 70 per cent solid	None	1	III
	28	2-in.-thick solid gypsum block	None	1	III
	29	3-in.-thick solid gypsum with resilient clips on one side to attach metal lath	T on one side and Z on other side	2	I
	30	5-in.-thick solid block	Z	4	II
Wood stud	31	Two rows of staggered 2×4 studs with 2×6 top and bottom plates	B, Q	1	III
	32	Same as 31 with 2-in. mineral wool in cavity	B, Q	1	II
	33	Same as 31	D, F, O	1	II
	34	Same as 31, but with mineral wool blanket at least 1-in. thick weighing at least 2.2 lb per cu ft threaded between studs on both sides	I	1	II
	35	Same as 34	J	¾	III
	36	Same as 31 but with at least 2-in. mineral wool batts between studs on at least one side	K, B	1	II
	37	Single row of 2×4 studs	B, D, G, L, K, F, O, Q, U, V, W	1	III
	38	Same as 37 but with resilient fasteners on at least one side and with 2-in. mineral wool in cavity	K	1	II
	39	Same as 37 but with full thick mineral wool batts completely filling the stud spaces	I, J	1	III
	40	Two rows of 2×4 studs with separate wall plates with 2-in. mineral wool in at least one row of studs	K	1	II
Plank wall	41	Two layers of 2×6 lumber placed vertically with joints staggered	H	1	III
Column 1	2	3	4	5	6

TABLE I-A (Cont'd)

FIRE AND SOUND RESISTANCE OF WALLS					
Type of Wall	No.	Description	Finish on Each Side (1)	Fire-Resistance Rating, hr(2)	Sound Rating (3)
3½-in. Sheet steel studs	42	Single row of steel studs 16-in. o.c., non-loadbearing	R	1	III
	43	Same as above but with 2-in. mineral wool in cavity	D, P, R, U, V, W	1	I
	44	Single row of steel studs 24-in. o.c., 2-in. mineral wool in cavity	K	1	II
Column 1	2	3	4	5	6

(Notes for (1), (2) and (3) are to be found following Table C).

TABLE I-B

Forming Part of Articles 9.10.4.1. and 9.11.2.3.

FIRE-RESISTANCE RATING OF EXTERIOR WOOD STUD WALLS				
Type of Wall	No.	Description	Interior Finish(1)	Fire-Resistance Rating hr(2)
Wood stud	1	2 × 4 studs with mineral wool batts with ⅝-in. T & G sheathing or 7/16-in. fibreboard sheathing, or ½-in. gypsum board sheathing or 5/16-in. plywood sheathing, plus building paper and siding, stucco or masonry veneer	D, F, K	1
	2	Same as 1 except ⅜-in. plywood siding without sheathing	D, F, K	1
	3	Same as 1 with mineral wool batts of at least 1.2 psf or glass wool at least 0.6 psf	I	1
	4	Same as 1	B	¾
	5	Same as 3	H	¾
	6	Same as 1 but with mineral wool batts weighing at least 0.86 psf	M	¾
Column 1	2	3	4	5

(Notes for (1), (2) and (3) are to be found following Table C).

TABLE I-C

Forming Part of Articles 9.10.4.1. and 9.11.2.3.

FIRE AND SOUND RESISTANCE OF FLOORS, CEILINGS AND ROOFS ⁽⁴⁾					
Type of Construction	No.	Description	Ceiling Finish ⁽¹⁾	Fire-Resistance Rating, hr ⁽²⁾	Sound Rating ⁽³⁾
Concrete slab	1	5-in. reinforced concrete with $\frac{3}{4}$ -in. minimum cover over reinforcing steel	None	1	I
	2	3½-in. reinforced concrete with $\frac{3}{4}$ -in. minimum cover over reinforcing steel	None	1	II
	3	3-in. reinforced concrete with limestone aggregate having $\frac{5}{8}$ -in. minimum cover over reinforcing steel	None	$\frac{3}{4}$	III
Concrete joists	4	3-in. reinforced concrete (gravel aggregate) on precast concrete joists (expanded shale aggregate) with 1-in. minimum cover over reinforcing steel in joists. Two-inch wood furring wired underside of joists to attach ceiling	J	1	I
Open web steel joists	5	2-in. reinforced concrete on metal lath on open web steel joists with ceiling secured to underside of joists	E	1	I
	6	Same as 5 but ceiling secured by metal screws to $\frac{3}{4}$ -in. furring channels or 1¼-in. nails to $\frac{7}{8}$ -in. nailing channels	K	1	III
Heavy timber	7	1-in. nominal finish flooring or $\frac{5}{8}$ -in. phenolic bonded plywood on nominal 6-in. laminated plank deck	None	$\frac{3}{4}$	—
	8	1-in. nominal finish flooring or $\frac{5}{8}$ -in. phenolic bonded plywood on nominal 3-in. T & G plank or 4-in. laminated plank deck	None	$\frac{3}{4}$	—
	9	1-in. nominal finish flooring or $\frac{5}{8}$ -in. phenolic bonded plywood on 4-in. laminated plank deck treated with fire-retardant chemicals or a heavy coating of fire-retardant compound on underside	None	1	—
Column 1	2	3	4	5	6

TABLE I-C (Cont'd)

FIRE AND SOUND RESISTANCE OF FLOORS, CEILINGS AND ROOFS ⁽⁴⁾					
Type of Con- struction	No.	Description	Ceiling Finish (¹)	Fire- Resistance Rating, hr(²)	Sound Rating (³)
Wood joists	10	1-in. nominal T & G or $\frac{5}{8}$ -in. phenolic bonded plywood on 1- by 3-in. furring strips on asbestos paper weighing at least 14 lb/100 sq ft on $\frac{1}{2}$ -in. soft fibreboard on 1-in. nominal T & G or $\frac{5}{8}$ -in. phenolic bonded plywood subfloor on wood joist at 16-in. o.c., with no nails passing through the fibreboard into the subfloor	C, E, K	1	II
	11	Double wood floor of nominal 1-in. T & G subfloor or $\frac{5}{8}$ -in. phenolic bonded plywood subfloor with asbestos-cement paper weighing at least 14 lb/100 sq ft between, on wood joists 16-in. o.c.	C, K	1	III
	12	same as 11	E, D (I with 1 $\frac{1}{2}$ -in.-long nails spaced 6 in. o.c.)	$\frac{1}{2}$	III
	13	Nominal 1-in. T & G subfloor or $\frac{5}{8}$ -in. phenolic bonded plywood subfloor on wood joists 16 in. o.c.	D, K, S, U, V, X	1	III
	14	Nominal 1-in. T & G lumber or $\frac{5}{8}$ -in.-thick phenolic bonded plywood subflooring on wood joists 16 in. o.c. with ceiling suspended on mild steel hangers with 3-in. mineral wool fill between joists	T	1	III
	15	Nominal 1-in. T & G lumber or $\frac{5}{8}$ -in. phenolic bonded plywood subfloor on wood joists 16 in. o.c. with metal ceiling supports spaced 18 in. o.c., 1 $\frac{1}{2}$ -in. by 3-in. steel channel sections 3 ft o.c. hung with mild steel hangers	$\frac{3}{4}$ in. gypsum and sand plaster on $\frac{3}{8}$ in. gypsum board	1	III
	16	Nominal 1-in. T & G lumber or $\frac{5}{8}$ -in. phenolic bonded plywood subfloor on wood floor joists 16 in. o.c. with separate ceiling joists at least 1 in. below the bottom of the floor joists. With 2-in. insulation between floor or ceiling joists	C, D, E, K	1	II
Column 1	2	3	4	5	6

TABLE I-C (Cont'd)

FIRE AND SOUND RESISTANCE OF FLOORS, CEILINGS AND ROOFS ⁽⁴⁾					
Type of Construction	No.	Description	Ceiling Finish ⁽¹⁾	Fire-Resistance Rating, hr ⁽²⁾	Sound Rating ⁽³⁾
Trussed roof-ceiling	17	Nominal 2-in. framing members spaced not more than 24 in. o.c. with at least 3 in. of mineral wool batts without paper backing, no sheathing on top of framing members	D, E, G, K, R, U, X	¾	—
Ceiling joists	18	Same as 17	D, E, G, K, R, U, X	¾	—
Column 1	2	3	4	5	6

Notes to Tables I-A, I-B, and I-C.:

(¹)The finishes designated by letter in Tables I-A, I-B, and I-C refer to the following: (The finishes shall be nailed in accordance with the requirements contained in this Part unless otherwise specified. Except as otherwise specified, the proportions of plaster mixes are by weight.)

A ⅝-in. gypsum—sand plaster (1 part gypsum to 3 parts sand).

B ½-in. gypsum—sand plaster (1 part gypsum to 2 parts sand) on ⅝-in. perforated gypsum lath or plain gypsum lath with lath pads.

C Same as B but with 3-in-wide strips of expanded metal over all joints.

D ¾-in. gypsum—sand plaster (1 part gypsum to 2 parts sand) over metal lath.

E ¾-in. gypsum—sand plaster (1 part gypsum to 2 parts sand for first coat, 1 part gypsum to 3 parts sand for second coat) over metal lath.

F ⅞-in. portland cement—gypsum plaster (1 part portland cement to 2 parts sand for first coat and 1 part gypsum to 3 parts sand for second coat) over metal lath.

G ⅝-in. gypsum—perlite plaster (100 lb gypsum to 2½ cu ft of aggregate) on ⅝-in. perforated gypsum lath.

H ⅝-in. gypsum board.

I Double layer of ⅝-in. gypsum board, joints staggered.

J ½-in. gypsum board, taped joints.

K ⅝-in. special fire-resistant gypsum wallboard rated by Underwriters' Laboratories Inc. or Underwriters' Laboratories of Canada for 1-hr fire-resistance rating.

L 3/16-in. asbestos-cement board on ⅝-in. gypsum board.

M ½-in. phenolic bonded Douglas fir plywood.

N 2 coats of resin emulsion or other coating providing equivalent seal.

O ⅞-in. portland cement—sand plaster on metal lath with 3 lb asbestos fibre per bag of cement.

P 1-in. portland cement—sand plaster on metal lath with 3 lb asbestos fibre per bag of cement.

Q ⅝-in. gypsum—sand plaster on ⅝-in. gypsum lath.

R ¾-in. gypsum—sand plaster on ⅝-in. gypsum lath.

S ½-in. gypsum—sand plaster on ⅝-in. gypsum lath with 0.063-in.-diam., 1-in. square wire mesh between lath and plaster.

T ⅞-in. gypsum—sand plaster on metal lath.

U ½-in. gypsum—perlite or gypsum—vermiculite plaster on ⅝-in. gypsum lath.

V ¾-in. gypsum—perlite or gypsum—vermiculite plaster on metal lath.

W Double layer of ½-in. gypsum wallboard.

X Double layer of ½-in. gypsum wallboard with 0.063-in.-diam., 1-in. square wire mesh between sheets.

Z ½-in. gypsum—sand plaster (1 part gypsum to 3 parts sand).

(²)The fire-resistance ratings in Tables I-A and I-C were based on tests conducted at a number of fire testing laboratories. The ratings in Table I-B are estimated.

(³)Rating I for airborne sound transmission signifies constructions with a sound transmission class rating of 50 or more and is considered to provide good resistance to transmission of airborne sound.

Rating II for airborne sound transmission signifies constructions with a sound transmission class rating of 45 to 50 and is considered to provide fair resistance to airborne sound. This is the minimum rating that satisfies the requirements in Subsection 9.11.2.

Rating III for airborne sound transmission signifies constructions with a sound transmission class rating of less than 45 and is not acceptable where sound-resistant construction is required.

(⁴)Fire-resistance ratings for floor constructions listed in Table I-C for steel joist or wood-frame assemblies may be applied to roof assemblies having the same ceiling construction. Where wood joists are used, the roof sheathing shall consist of not less than ½-in.-thick phenolic bonded plywood or nominal 1-in.-thick boards. Where steel joists are used, the roof deck shall be at least equivalent in fire-resistance to 2-in. reinforced concrete.

TABLE II-A

Forming Part of Sentence 9.23.4.2.(1)

Steel Beam Spans in Basements, Cellars and Crawl Spaces in Dwellings for one Storey Dwellings ⁽¹⁾ ⁽³⁾ ⁽⁴⁾														
SECTION	WIDTH OF FLOOR TO BE SUPPORTED ⁽²⁾													
	8 FT		10 FT		12 FT		14 FT		16 FT		18 FT		20 FT	
	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.
S4 × 7.7	9-	4	8-	8	8-	2	7-	9	7-	5	7-	2	6-	11
S5 × 10	11-	10	11-	0	10-	4	9-	10	9-	5	9-	0	8-	9
S5 × 14.75	12-	8	11-	9	11-	1	10-	6	10-	1	9-	8	9-	4
S6 × 12.5	14-	4	13-	4	12-	7	11-	11	11-	5	11-	0	10-	7
S6 × 17.25	15-	3	14-	2	13-	4	12-	8	12-	1	11-	7	11-	3
W6 × 15.5	15-	11	14-	9	13-	11	13-	3	12-	8	12-	2	11-	9
S7 × 15.3	16-	10	15-	10	14-	10	14-	1	13-	6	12-	11	12-	6
W6 × 20	17-	9	16-	5	15-	6	14-	9	14-	1	13-	6	13-	1
W10 × 11.5	19-	1	17-	9	16-	8	15-	10	15-	2	14-	7	13-	10
W6 × 25	19-	3	17-	11	16-	10	16-	0	15-	4	14-	8	14-	2
W8 × 17	19-	8	18-	3	17-	2	16-	4	15-	7	15-	0	14-	6
S8 × 18.4	19-	9	18-	4	17-	3	16-	5	15-	8	15-	1	14-	7
S8 × 23	20-	7	19-	1	18-	0	17-	1	16-	4	15-	8	15-	2
W10 × 15	21-	0	19-	6	18-	4	17-	5	16-	8	16-	0	15-	6
W8 × 20	21-	0	19-	6	18-	5	17-	6	16-	8	16-	1	15-	6
W10 × 17	22-	3	20-	8	19-	5	18-	5	17-	8	17-	0	16-	5
W8 × 24	22-	3	20-	8	19-	6	18-	6	17-	8	17-	0	16-	5
W12 × 14	22-	9	21-	2	19-	11	18-	11	18-	1	17-	5	16-	9
W10 × 19	23-	6	21-	9	20-	6	19-	6	18-	8	17-	11	17-	4
W8 × 28	23-	7	21-	11	20-	7	19-	7	18-	9	18-	0	17-	5
W12 × 16.5	24-	2	22-	5	21-	1	20-	1	19-	2	18-	5	17-	10
W10 × 21	24-	4	22-	7	21-	3	20-	2	19-	4	18-	7	17-	11
W8 × 31	24-	6	22-	9	21-	5	20-	4	19-	6	18-	9	18-	1
S10 × 25.4	25-	6	23-	8	22-	4	21-	2	20-	3	19-	6	18-	10
W12 × 19	25-	11	24-	1	22-	8	21-	6	20-	7	19-	10	19-	1
W10 × 25	26-	2	24-	3	22-	10	21-	8	20-	9	19-	11	19-	3
S10 × 35	27-	0	25-	1	23-	7	22-	5	21-	5	20-	7	19-	11
W12 × 22	27-	7	25-	7	24-	1	22-	10	21-	11	21-	0	20-	4
W12 × 27	30-	2	28-	0	26-	4	25-	0	23-	11	23-	0	22-	3
S12 × 31.8	30-	10	28-	7	26-	11	25-	7	24-	6	23-	6	22-	8
S12 × 35	31-	4	29-	1	27-	4	26-	0	24-	10	23-	11	23-	1
W12 × 31	31-	9	29-	6	27-	9	26-	4	25-	3	24-	3	23-	5

Notes to Table II-A:

⁽¹⁾A beam may be considered to be laterally supported if:

- (a) the wood joists bear on its top flange at intervals of 24 in. or less over its entire length,
- (b) the load being applied to this beam is transmitted through the joists, and
- (c) 1-in. × 2-in. wood strips in contact with the top flange are nailed on both sides of the beam to the bottom of the joist supported.

Alternative methods of positive lateral support are acceptable.

⁽²⁾Width of floor supported means $\frac{1}{2}$ the sum of the floor span on both sides of the beam.⁽³⁾For widths of floor intermediate between those shown in the Table, straight line interpolation may be used in determining the maximum beam span.

TABLE II-B

Forming Part of Sentence 9.23.4.2.(1)

Steel Beam Spans in Basements, Cellars and Crawl Spaces in Dwellings for Two Storey Dwellings (1) (2) (3)								
SECTION	WIDTH OF FLOOR TO BE SUPPORTED (2)							
	8 FT		10 FT		12 FT		14 FT	
	ft	in.	ft	in.	ft	in.	ft	in.
S4 × 7.7	7-	9	7-	2	6-	9	6-	5
S5 × 10	9-	10	9-	1	8-	7	8-	2
S5 × 14.75	10-	6	9-	9	9-	2	8-	9
S6 × 12.5	11-	11	11-	1	10-	5	9-	11
S6 × 17.25	12-	8	11-	9	11-	0	10-	6
W6 × 15.5	13-	3	12-	3	11-	7	11-	0
S7 × 15.3	14-	1	13-	1	12-	4	11-	8
W6 × 20	14-	9	13-	8	12-	10	12-	2
W10 × 11.5	15-	10	14-	7	13-	4	12-	4
W6 × 25	16-	0	14-	10	14-	0	13-	3
W8 × 17	16-	4	15-	2	14-	3	13-	6
S8 × 18.4	16-	5	15-	3	14-	4	13-	7
S8 × 23	17-	1	15-	10	14-	11	14-	2
W10 × 15	17-	5	16-	2	15-	3	14-	5
W8 × 20	17-	6	16-	3	15-	3	14-	6
W10 × 17	18-	5	17-	2	16-	1	15-	4
W8 × 24	18-	6	17-	2	16-	2	15-	4
W12 × 14	18-	11	17-	7	16-	6	15-	4
W10 × 19	19-	6	18-	1	17-	0	16-	2
W8 × 28	19-	7	18-	2	17-	1	16-	3
W12 × 16.5	20-	1	18-	7	17-	6	16-	8
W10 × 21	20-	2	18-	9	17-	7	16-	9
W8 × 31	20-	4	18-	11	17-	9	16-	11
S10 × 25.4	21-	2	19-	8	18-	6	17-	7
W12 × 19	21-	6	20-	0	18-	10	17-	10
W10 × 25	21-	8	20-	2	18-	11	18-	0
S10 × 35	22-	5	20-	10	19-	7	18-	7
W12 × 22	22-	10	21-	3	20-	0	19-	0
W12 × 27	25-	0	23-	3	21-	10	20-	9
S12 × 31.8	25-	7	23-	9	22-	4	21-	3
S12 × 35	26-	0	24-	2	22-	9	21-	7
W12 × 31	26-	4	24-	6	23-	0	21-	11

Notes to Table II-B:

(1) A beam may be considered to be laterally supported if:

- (a) the wood joists bear on its top flange at intervals of 24 in. or less over its entire length,
- (b) the load being applied to this beam is transmitted through the joists, and
- (c) 1-in. × 2-in. wood strips in contact with the top flange are nailed on both sides of the beam to the bottom of the joist supported.

Alternative methods of positive lateral support are acceptable.

(2) Width of floor supported means $\frac{1}{2}$ the sum of the floor span on both sides of the beam.

(3) For widths of floor intermediate between those shown in the Table, straight line interpolation may be used in determining the maximum beam span.

TABLE III-A
Forming Part of Article 9.20.5.2.

LOOSE STEEL LINTELS FOR MASONRY — NO. & SIZE OF ANGLES REQUIRED												
Clear Span Span (¹) (²)	Exterior Angles for Brick or Stone		no floor load	Wall Thick- ness	Interior Angles							
	4"	4" + 2" stone facing			Maximum Floor Loads per Foot of Span in lbs. (³) (⁴)							
					None	250	500	750	1,000	1,250	1,500	
4'-0" or less	L-3½ × 3½ × ¼	L-3½ × 5 × 5/16	8	L-3½ × 3½ × ¼	L-3½ × 3½ × ¼	L-3½ × 3½ × 5/16	L-4 × 3½ × 5/16	L-5 × 3½ × 5/16	L-5 × 3½ × ¾	L-5 × 3½ × 7/16		
			12	2Ls-3½ × 3½ × 5/16	2Ls-3½ × 3½ × 5/16	2Ls-3½ × 3½ × 5/16	2Ls-3½ × 3½ × 5/16	2Ls-4 × 3½ × 5/16	2Ls-4 × 3½ × 5/16			
5'-0"	L-3½ × 3½ × 5/16	L-3½ × 5 × 5/16	8	L-3½ × 3½ × 5/16	L-3½ × 3½ × 5/16	L-5 × 3½ × 5/16	L-5 × 3½ × ¾	L-5 × 3½ × 7/16	L-6 × 3½ × ¾	L-7 × 4 × ¾		
			12	2Ls-3½ × 3½ × 5/16	2Ls-3½ × 3½ × 5/16	2Ls-3½ × 3½ × 5/16	2Ls-4 × 3½ × 5/16	2Ls-5 × 3½ × 5/16	2Ls-5 × 3½ × ¾			
6'-0"	L-4 × 3½ × 5/16	L-5 × 5 × 5/16	8	L-4 × 3½ × 5/16	L-5 × 3½ × 5/16	L-5 × 3½ × ¾	L-6 × 3½ × ¾	L-7 × 4 × ¾	L-7 × 4 × 7/16	L-7 × 4 × 7/16		
			12	2Ls-4 × 3½ × 5/16	2Ls-4 × 3½ × 5/16	2Ls-5 × 3½ × 5/16	2Ls-5 × 3½ × 5/16	2Ls-5 × 3½ × ¾	2Ls-6 × 3½ × ¾			
7'-0"	L-4 × 3½ × 5/16	L-5 × 5 × 5/16	8	L-4 × 3½ × 5/16	L-5 × 3½ × ¾	L-6 × 4 × ¾	L-7 × 4 × ¾					
			12	2Ls-4 × 3½ × 5/16	2Ls-5 × 3½ × 5/16	2Ls-5 × 3½ × ¾	2Ls-6 × 3½ × ¾	2Ls-6 × 4 × ¾	2Ls-7 × 4 × ¾			
8'-0"	L-5 × 3½ × 5/16	L-5 × 5 × 5/16	8	L-5 × 3½ × 5/16	L-6 × 3½ × ¾	L-7 × 4 × ¾						
			12	2Ls-5 × 3½ × 5/16	2Ls-5 × 3½ × 5/16	2Ls-6 × 3½ × ¾	2Ls-7 × 4 × ¾	2Ls-7 × 4 × ¾				
9'-0"	L-5 × 3½ × ¾	L-5 × 5 × ¾	8	L-5 × 3½ × ¾	L-7 × 4 × ¾							
			12	2Ls-5 × 3½ × ¾	2Ls-6 × 3½ × ¾	2Ls-7 × 4 × ¾	2Ls-7 × 4 × 7/16					
10'-0"	L-6 × 3½ × ¾	L-5 × 5 × ½	8	L-6 × 3½ × ¾								
			12	2Ls-6 × 3½ × ¾	2Ls-7 × 4 × ¾							

Notes to Table III-A.

(¹)6" min. bearing required for all lintels.

(²)Omit floor load in lintel when distance to bottom of floor construction is greater than width of opening.

(³)Interior and exterior angles in 8" walls and interior angles in 12" walls are bolted together when clear span of opening is over 6'-0".

(⁴)When masonry lighter than brick is used over interior angles floor load may be increased by the difference in weight per sq ft times the width of the opening.

(⁵)Interior angles have been designed for floor load plus brick masonry of height equal to width of opening.

(⁶)Is = 20,000 psi

Deflection maximum = $\frac{1}{700}$ span

(⁷)The figures in the Table indicating wall thickness and angle cross-sections are in inches.

SECTION 9.39 SPAN TABLES FOR WOOD RAFTERS, JOISTS, BEAMS AND ROOF TRUSSES

Subsection 9.39.1. General

9.39.1.1. The spans for wood rafters, joists, beams and trusses in this Regulation apply to buildings covered by the requirements in Section 9.23., "Wood Frame Construction".

9.39.1.2. The spans for roof trusses are applicable to roof trusses having a span of not more than 40 ft and spaced not more than 24-in. o.c. for the species and grades of lumber described in the roof truss Span Tables.

9.39.1.3. Floor joist spans are limited to floors that are not required to be designed to resist concentrated loads as specified in Section 9.4., "Loads," of this Regulation.

9.39.1.4. Wood-beam spans apply to built-up wood beams in basements, cellars or crawl spaces in 1- and 2-storey dwellings.

9.39.1.5. Spans for wood joists, rafters and beams which fall outside the scope of these Span Tables shall be calculated in conformance with CSA 086-1970, "Code of Recommended Practice for Engineering Design in Timber," as revised to 1 May, 1975.

Subsection 9.39.2. Wood Rafters, Joists and Beams

9.39.2.1. Where rafters or roof joists are intended for use in a locality having a higher design roof snow load than shown in the tables, the maximum member spacing may be calculated as the product of the member spacing and snow load shown in the span tables divided by the design roof snow load for the locality being considered.

9.39.2.2. The lumber sizes assumed in the calculation are those dressed to Canadian standard sizes for yard lumber in accordance with CSA 0141-1970, "Softwood Lumber," as revised to 1 May, 1975.

9.39.2.3. These lumber sizes which are based on lumber having a moisture content of 19 per cent, are as follows:

Nominal Size	Dressed Size at 19 per cent M.C.
2 in. × 4 in.	1½ in. × 3½ in.
2 in. × 6 in.	1½ in. × 5½ in.
2 in. × 8 in.	1½ in. × 7¼ in.
2 in. × 10 in.	1½ in. × 9¼ in.
2 in. × 12 in.	1½ in. × 11¼ in.

9.39.2.4. For moisture contents other than 19 per cent, provision is made in CSA 0141-1970, "Softwood Lumber," as revised to 1 May, 1975, to allow for the size variations that occur as a result of changes in lumber moisture content.

9.39.2.5. The allowable spans in the following tables are measured from face or edge of support to face or edge of support.

9.39.2.6.(1) In the case of sloping roof framing members,

- the spans are expressed in terms of the horizontal distance between supports rather than the length of the sloping member;
- the snow loads are also expressed in terms of the horizontal projection of the sloping roof;
- spans for odd size lumber (i.e. 2 in. × 5 in., 2 in. × 7 in., etc.) may be estimated by straight line interpolation in the tables; and

(d) spans for 2-in. \times 5-in. lumber of Construction, Standard or Utility grades may be 30 per cent greater than the spans listed for 2-in. \times 4-in. lumber.

9.39.2.7. The span tables may be used where members support a uniform live load only and where the members are required to be designed to support a concentrated load, the members must be designed in conformance with Section 4.3 of this Regulation.

TABLE IV-A
CEILING JOISTS—ATTIC NOT ACCESSIBLE BY A STAIRWAY
(LIVE LOAD 10 lb per sq ft)

Species	Grade	Nominal Size, <i>in.</i>	LIVE LOAD 10 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>
Douglas Fir Western Larch	Select structural	2 x 4	11	6	10	5	9	8	9	1	13	2	11	11	11	1	10	5
		2 x 6	18	1	16	5	15	3	14	4	20	8	18	10	17	5	16	5
		2 x 8	23	10	21	8	20	1	18	11	27	4	24	10	23	0	21	8
		2 x 10	30	5	27	8	25	8	24	2	34	10	31	8	29	5	27	8
		2 x 12	37	0	33	8	31	3	29	4	42	5	38	6	35	9	33	8
	No. 1	2 x 4	11	6	10	5	9	8	9	1	13	2	11	11	11	1	10	5
		2 x 6	18	1	16	5	15	3	14	4	20	8	18	10	17	5	16	5
		2 x 8	23	10	21	8	20	1	18	11	27	4	24	10	23	0	21	8
		2 x 10	30	5	27	8	25	8	24	2	34	10	31	8	29	5	27	8
		2 x 12	37	0	33	8	31	3	29	4	42	5	38	6	35	9	33	8
	No. 2	2 x 4	11	1	10	1	9	4	8	10	12	8	11	7	10	9	10	1
		2 x 6	17	6	15	10	14	9	13	10	20	0	18	2	16	5	15	0
		2 x 8	23	0	20	11	19	5	18	3	26	4	23	11	21	8	19	9
		2 x 10	29	5	26	8	24	9	23	4	33	8	30	7	27	7	25	2
		2 x 12	35	9	32	6	30	2	28	4	40	11	37	2	33	7	30	8
	No. 3	2 x 4	10	8	9	5	8	5	7	8	10	11	9	5	8	5	7	8
		2 x 6	16	1	13	11	12	5	11	4	16	1	13	11	12	5	11	4
		2 x 8	21	3	18	4	16	5	15	0	21	3	18	4	16	5	15	0
		2 x 10	27	1	23	5	21	0	19	2	27	1	23	5	21	0	19	2
		2 x 12	32	11	28	6	25	6	23	3	32	11	28	6	25	6	23	3
	Con- struction	2 x 4	10	8	9	8	9	0	8	5	12	2	10	9	9	7	8	9
	Standard	2 x 4	9	2	7	11	7	1	6	5	9	2	7	11	7	1	6	5
	Utility	2 x 4	6	5	5	7	5	0	4	7	6	5	5	7	5	0	4	7
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select structural	2 x 4	10	10	9	10	9	2	8	7	12	5	11	3	10	6	9	10
		2 x 6	17	1	15	6	14	4	13	6	19	6	17	9	16	6	15	6
		2 x 8	22	6	20	5	19	0	17	10	25	9	23	5	21	9	20	5
		2 x 10	28	8	26	1	24	2	22	9	32	10	29	10	27	9	26	1
		2 x 12	34	11	31	9	29	5	27	8	40	0	36	4	33	9	31	9
	No. 1	2 x 4	10	10	9	10	9	2	8	7	12	5	11	3	10	6	9	10
		2 x 6	17	1	15	6	14	4	13	6	19	6	17	7	15	9	14	5
		2 x 8	22	6	20	5	19	0	17	10	25	9	23	3	20	9	19	0
		2 x 10	28	8	26	1	24	2	22	9	32	10	29	8	26	6	24	3
		2 x 12	34	11	31	9	29	5	27	8	40	0	36	1	32	3	29	5
	No. 2	2 x 4	10	6	9	6	8	10	8	4	12	0	10	11	9	10	8	11
		2 x 6	16	6	14	11	13	11	12	9	18	1	15	8	14	0	12	9
		2 x 8	21	9	19	9	18	4	16	10	23	11	20	8	18	6	16	10
		2 x 10	27	9	25	2	23	4	21	6	30	6	26	5	23	7	21	6
		2 x 12	33	9	30	8	28	5	26	2	37	1	32	1	28	9	26	2
	No. 3	2 x 4	9	2	7	11	7	1	6	5	9	2	7	11	7	1	6	5
		2 x 6	13	9	11	11	10	8	9	9	13	9	11	11	10	8	9	9
		2 x 8	18	2	15	9	14	1	12	10	18	2	15	9	14	1	12	10
		2 x 10	23	2	20	1	17	11	16	5	23	2	20	1	17	11	16	5
		2 x 12	28	2	24	5	21	10	19	11	28	2	24	5	21	10	19	11
	Con- struction	2 x 4	10	1	9	2	8	2	7	5	10	7	9	2	8	2	7	5
	Standard	2 x 4	7	11	6	10	6	1	5	7	7	11	6	10	6	1	5	7
	Utility	2 x 4	5	3	4	7	4	1	3	8	5	3	4	7	4	1	3	8

Continued on next page

TABLE IV-A (Cont'd)
CEILING JOISTS—ATTIC NOT ACCESSIBLE BY A STAIRWAY
(LIVE LOAD 10 lb per sq ft)

Species	Grade	Nominal Size.	LIVE LOAD 10 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select structural	2 x 4	10	2	9	3	8	7	8	1	11	8	10	7	9	10	9	3
		2 x 6	16	0	14	7	13	6	12	9	18	4	16	8	15	6	14	7
		2 x 8	21	2	19	3	17	10	16	9	24	3	22	0	20	5	19	3
		2 x 10	27	0	24	6	22	9	21	5	30	11	28	1	26	1	24	6
		2 x 12	32	10	29	10	27	8	26	1	37	7	34	2	31	9	29	10
	No. 1	2 x 4	10	2	9	3	8	7	8	1	11	8	10	7	9	10	9	3
		2 x 6	16	0	14	7	13	6	12	9	18	4	16	8	15	1	13	9
		2 x 8	21	2	19	3	17	10	16	9	24	3	22	0	19	11	18	2
		2 x 10	27	0	24	6	22	9	21	5	30	11	28	1	25	5	23	2
		2 x 12	32	10	29	10	27	8	26	1	37	7	34	2	30	11	28	2
	No. 2	2 x 4	9	10	8	11	8	4	7	10	11	3	10	3	9	4	8	7
		2 x 6	15	6	14	1	13	1	12	4	17	7	15	3	13	8	12	5
		2 x 8	20	5	18	7	17	3	16	3	23	3	20	1	18	0	16	5
		2 x 10	26	1	23	9	22	0	20	9	29	8	25	8	23	0	21	0
		2 x 12	31	9	28	10	26	9	25	2	36	1	31	3	27	11	25	6
	No. 3	2 x 4	9	2	7	11	7	1	6	5	9	2	7	11	7	1	6	5
		2 x 6	13	1	11	4	10	2	9	3	13	1	11	4	10	2	9	3
		2 x 8	17	4	15	0	13	5	12	3	17	4	15	0	13	5	12	3
		2 x 10	22	1	19	2	17	1	15	7	22	1	19	2	17	1	15	7
		2 x 12	26	11	23	3	20	10	19	0	26	11	23	3	20	10	19	0
	Con- struction	2 x 4	9	6	8	7	7	11	7	3	10	3	8	10	7	11	7	3
	Standard	2 x 4	7	11	6	10	6	i	5	7	7	11	6	10	6	1	5	7
	Utility	2 x 4	5	3	4	7	4	1	3	8	5	3	4	7	4	1	3	8
Western Red Cedar Red Pine Western White Pine White Pine	Select structural	2 x 4	9	10	8	11	8	3	7	9	11	3	10	3	9	6	8	11
		2 x 6	15	6	14	1	13	0	12	3	17	8	16	1	14	11	14	1
		2 x 8	20	5	18	6	17	2	16	2	23	4	21	3	19	8	18	6
		2 x 10	26	0	23	8	21	11	20	8	29	10	27	1	25	2	23	8
		2 x 12	31	8	28	9	26	9	25	2	36	3	32	11	30	7	28	9
	No. 1	2 x 4	9	10	8	11	8	3	7	9	11	3	10	3	9	6	8	11
		2 x 6	15	6	14	1	13	0	12	3	17	8	16	1	14	9	13	5
		2 x 8	20	5	18	6	17	2	16	2	23	4	21	3	19	5	17	9
		2 x 10	26	0	23	8	21	11	20	8	29	10	27	1	24	10	22	8
		2 x 12	31	8	28	9	26	9	25	2	36	3	32	11	30	2	27	7
	No. 2	2 x 4	9	6	8	7	8	0	7	6	10	10	9	10	9	2	8	4
		2 x 6	14	11	13	6	12	7	11	10	17	1	14	10	13	3	12	1
		2 x 8	19	8	17	10	16	7	15	7	22	6	19	7	17	6	15	11
		2 x 10	25	1	22	9	21	2	19	11	28	8	25	0	22	4	20	4
		2 x 12	30	6	27	8	25	9	24	2	34	11	30	4	27	2	24	9
	No. 3	2 x 4	8	9	7	7	6	9	6	2	8	9	7	7	6	9	6	2
		2 x 6	13	1	11	4	10	2	9	3	13	1	11	4	10	2	9	3
		2 x 8	17	4	15	0	13	5	12	3	17	4	15	0	13	5	12	3
		2 x 10	22	1	19	2	17	1	15	7	22	1	19	2	17	1	15	7
		2 x 12	26	11	23	3	20	10	19	0	26	11	23	3	20	10	19	0
	Con- struction	2 x 4	9	1	8	3	7	8	7	0	9	10	8	7	7	8	7	0
	Standard	2 x 4	7	5	6	5	5	9	5	3	7	5	6	5	5	9	5	3
	Utility	2 x 4	5	3	4	7	4	1	3	8	5	3	4	7	4	1	3	8

Continued on next page

TABLE IV-A (Cont'd)

**CEILING JOISTS—ATTIC NOT ACCESSIBLE BY A STAIRWAY
(LIVE LOAD 10 lb per sq ft)**

Species	Grade	Nominal Size.	LIVE LOAD 10 lb per sq ft											
			Gypsum Board or Plastered Ceiling								Other Ceilings			
			Joist Spacing								Joist Spacing			
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.	
			ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select structural	2 x 4	10	4	9	4	8	8	8	2	11	10	10	9
		2 x 6	16	3	14	9	13	8	12	11	18	7	16	11
		2 x 8	21	5	19	5	18	1	17	0	24	6	22	3
		2 x 10	27	4	24	10	23	1	21	8	31	4	28	5
		2 x 12	33	3	30	3	28	0	26	5	38	1	34	7
	No. 1	2 x 4	10	4	9	4	8	8	8	2	11	10	10	9
		2 x 6	16	3	14	9	13	8	12	11	18	7	16	11
		2 x 8	21	5	19	5	18	1	17	0	24	6	22	3
		2 x 10	27	4	24	10	23	1	21	8	31	4	28	5
		2 x 12	33	3	30	3	28	0	26	5	38	1	34	7
	No. 2	2 x 4	10	0	9	1	8	5	7	11	11	5	10	4
		2 x 6	15	8	14	3	13	3	12	5	17	11	16	4
		2 x 8	20	8	18	9	17	5	16	5	23	8	21	6
		2 x 10	26	5	24	0	22	3	20	11	30	3	27	5
		2 x 12	32	1	29	2	27	1	25	6	36	9	33	7
	No. 3	2 x 4	9	7	8	8	7	11	7	3	10	3	8	10
		2 x 6	15	0	12	11	11	7	10	7	15	0	12	11
		2 x 8	19	9	17	1	15	3	13	11	19	9	17	1
		2 x 10	25	2	21	10	19	6	17	10	25	2	21	10
		2 x 12	30	8	26	7	23	9	21	8	30	8	26	7
	Con- struction	2 x 4	9	7	8	8	8	1	7	7	11	0	10	0
	Standard	2 x 4	8	9	7	7	6	9	6	2	8	9	7	7
	Utility	2 x 4	5	11	5	1	4	7	4	2	5	11	5	1
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select structural	2 x 4	9	11	9	0	8	4	7	11	11	5	10	4
		2 x 6	15	8	14	2	13	2	12	5	17	11	16	3
		2 x 8	20	7	18	9	17	5	16	4	23	7	21	5
		2 x 10	26	4	23	11	22	2	20	11	30	2	27	5
		2 x 12	32	0	29	1	27	0	25	5	36	8	33	4
	No. 1	2 x 4	9	11	9	0	8	4	7	11	11	5	10	4
		2 x 6	15	8	14	2	13	2	12	5	17	11	16	3
		2 x 8	20	7	18	9	17	5	16	4	23	7	21	5
		2 x 10	26	4	23	11	22	2	20	11	30	2	27	5
		2 x 12	32	0	29	1	27	0	25	5	36	8	33	4
	No. 2	2 x 4	9	7	8	9	8	1	7	7	11	0	10	0
		2 x 6	15	1	13	9	12	9	12	0	17	4	15	3
		2 x 8	19	11	18	1	16	10	15	10	22	10	20	1
		2 x 10	25	5	23	1	21	5	20	2	29	2	25	8
		2 x 12	31	0	28	1	26	1	24	7	35	5	31	3
	No. 3	2 x 4	9	2	7	11	7	1	6	5	9	2	7	11
		2 x 6	13	1	11	4	10	2	9	3	13	1	11	4
		2 x 8	17	4	15	0	13	5	12	3	17	4	15	0
		2 x 10	22	1	19	2	17	1	15	7	22	1	19	2
		2 x 12	26	11	23	3	20	10	19	0	26	11	23	3
	Con- struction	2 x 4	9	3	8	4	7	9	7	3	10	3	8	10
	Standard	2 x 4	7	11	6	10	6	1	5	7	7	11	6	10
	Utility	2 x 4	5	3	4	7	4	1	3	8	5	3	4	7

TABLE IV-B

FLOOR JOISTS—LIVING QUARTERS
(LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size, in.	LIVE LOAD 40 lb per sq ft							
			All Ceilings							
			Joist Spacing							
			12 in.		16 in.		20 in.		24 in.	
			ft	in.	ft	in.	ft	in.	ft	in.
Douglas Fir Western Larch	Select structural	2 x 4	7	3	6	7	6	1	5	9
		2 x 6	11	4	10	4	9	7	9	0
		2 x 8	15	0	13	8	12	8	11	11
		2 x 10	19	2	17	5	16	2	15	2
		2 x 12	23	4	21	2	19	8	18	6
		2 x 4	7	3	6	7	6	1	5	9
	No. 1	2 x 6	11	4	10	4	9	7	9	0
		2 x 8	15	0	13	8	12	8	11	11
		2 x 10	19	2	17	5	16	2	15	2
		2 x 12	23	4	21	2	19	8	18	6
	No. 2	2 x 4	7	0	6	4	5	11	5	6
		2 x 6	11	0	10	0	9	3	8	5
		2 x 8	14	6	13	2	12	3	11	2
		2 x 10	18	6	16	10	15	7	14	3
		2 x 12	22	6	20	5	19	0	17	4
		2 x 4	6	2	5	4	4	9	4	4
	No. 3	2 x 6	9	1	7	10	7	0	6	5
		2 x 8	12	0	10	4	9	3	8	6
		2 x 10	15	4	13	3	11	10	10	10
		2 x 12	18	7	16	1	14	5	13	2
	Construction	2 x 4	6	8	6	1	5	5	4	11
	Standard	2 x 4	5	2	4	5	4	0	3	8
	Utility	2 x 4	3	8	3	2	2	10	2	7
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select structural	2 x 4	6	10	6	2	5	9	5	5
		2 x 6	10	9	9	9	9	0	8	6
		2 x 8	14	2	12	10	11	11	11	3
		2 x 10	18	1	16	5	15	3	14	4
		2 x 12	22	0	20	0	18	6	17	5
		2 x 4	6	10	6	2	5	9	5	5
	No. 1	2 x 6	10	9	9	9	8	11	8	1
		2 x 8	14	2	12	10	11	9	10	9
		2 x 10	18	1	16	5	15	0	13	8
		2 x 12	22	0	20	0	18	3	16	9
	No. 2	2 x 4	6	7	6	0	5	6	5	0
		2 x 6	10	3	8	10	7	11	7	3
		2 x 8	13	6	11	8	10	5	9	6
		2 x 10	17	3	14	11	13	4	12	2
		2 x 12	20	11	18	2	16	3	14	10
		2 x 4	5	2	4	5	4	0	3	8
	No. 3	2 x 6	7	9	6	9	6	0	5	6
		2 x 8	10	3	8	10	7	11	7	3
		2 x 10	13	1	11	4	10	2	9	3
		2 x 12	15	11	13	10	12	4	11	3
	Construction	2 x 4	5	11	5	2	4	7	4	2
	Standard	2 x 4	4	5	3	10	3	5	3	2
	Utility	2 x 4	2	11	2	7	2	3	2	1

Continued on next page

TABLE IV-B (Cont'd)

FLOOR JOISTS—LIVING QUARTERS

(LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size, in.	LIVE LOAD 40 lb per sq ft							
			All Ceilings							
			Joist Spacing							
			12 in		16 in.		20 in.		24 in.	
			ft	in.	ft	in.	ft	in.	ft	in.
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select structural	2 x 4	6	5	5	10	5	5	5	1
		2 x 6	10	1	9	2	8	6	8	0
		2 x 8	13	4	12	1	11	3	10	7
		2 x 10	17	0	15	5	14	4	13	6
		2 x 12	20	8	18	9	17	5	16	5
	No. 1	2 x 4	6	5	5	10	5	5	5	1
		2 x 6	10	1	9	2	8	6	7	9
		2 x 8	13	4	12	1	11	3	10	3
		2 x 10	17	0	15	5	14	4	13	1
		2 x 12	20	8	18	9	17	5	15	11
	No. 2	2 x 4	6	2	5	7	5	3	4	10
		2 x 6	9	9	8	7	7	8	7	0
		2 x 8	12	10	11	4	10	2	9	3
		2 x 10	16	5	14	6	13	0	11	10
		2 x 12	20	0	17	8	15	9	14	5
	No. 3	2 x 4	5	2	4	5	4	0	3	8
		2 x 6	7	5	6	5	5	9	5	3
		2 x 8	9	9	8	6	7	7	6	11
		2 x 10	12	6	10	10	9	8	8	10
		2 x 12	15	2	13	2	11	9	10	9
	Construction	2 x 4	5	9	5	0	4	5	4	1
	Standard	2 x 4	4	5	3	10	3	5	3	2
	Utility	2 x 4	2	11	2	7	2	3	2	1
Western Red Cedar Red Pine Western White Pine White Pine	Select structural	2 x 4	6	2	5	7	5	2	4	11
		2 x 6	9	9	8	10	8	2	7	9
		2 x 8	12	10	11	8	10	10	10	2
		2 x 10	16	5	14	11	13	10	13	0
		2 x 12	19	11	18	1	16	10	15	10
	No. 1	2 x 4	6	2	5	7	5	2	4	11
		2 x 6	9	9	8	10	8	2	7	7
		2 x 8	12	10	11	8	10	10	10	0
		2 x 10	16	5	14	11	13	10	12	10
		2 x 12	19	11	18	1	16	10	15	7
	No. 2	2 x 4	5	11	5	5	5	0	4	8
		2 x 6	9	4	8	4	7	6	6	10
		2 x 8	12	4	11	1	9	10	9	0
		2 x 10	15	9	14	1	12	7	11	6
		2 x 12	19	2	17	2	15	4	14	0
	No. 3	2 x 4	4	11	4	3	3	10	3	6
		2 x 6	7	5	6	5	5	9	5	3
		2 x 8	9	9	8	6	7	7	6	11
		2 x 10	12	6	10	10	9	8	8	10
		2 x 12	15	2	13	2	11	9	10	9
	Construction	2 x 4	5	7	4	10	4	4	3	11
	Standard	2 x 4	4	2	3	8	3	3	2	11
	Utility	2 x 4	2	11	2	7	2	3	2	1

Continued on next page

TABLE IV-B (Cont'd)
FLOOR JOISTS—LIVING QUARTERS
(LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size, in.	LIVE LOAD 40 lb per sq ft							
			All Ceilings							
			Joist Spacing							
			12 in.		16 in.		20 in.		24 in.	
			ft	in.	ft	in.	ft	in.	ft	in.
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select structural	2 x 4	6	6	5	11	5	6	5	2
		2 x 6	10	3	9	3	8	7	8	1
		2 x 8	13	6	12	3	11	4	10	8
		2 x 10	17	2	15	8	14	6	13	8
		2 x 12	20	11	19	0	17	8	16	7
	No. 1	2 x 4	6	6	5	11	5	6	5	2
		2 x 6	10	3	9	3	8	7	8	1
		2 x 8	13	6	12	3	11	4	10	8
		2 x 10	17	2	15	8	14	6	13	8
		2 x 12	20	11	19	0	17	8	16	7
	No. 2	2 x 4	6	3	5	8	5	3	5	0
		2 x 6	9	10	8	11	8	4	7	10
		2 x 8	13	0	11	10	11	0	10	4
		2 x 10	16	7	15	1	14	0	13	2
		2 x 12	20	3	18	4	17	0	16	0
	No. 3	2 x 4	5	9	5	0	4	5	4	1
		2 x 6	8	5	7	4	6	6	6	0
		2 x 8	11	2	9	8	8	8	7	10
		2 x 10	14	3	12	4	11	0	10	1
		2 x 12	17	4	15	0	13	5	12	3
	Construction	2 x 4	6	0	5	6	5	0	4	7
	Standard	2 x 4	4	11	4	3	3	10	3	6
	Utility	2 x 4	3	4	2	10	2	7	2	4
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select structural	2 x 4	6	3	5	8	5	3	4	11
		2 x 6	9	10	8	11	8	3	7	10
		2 x 8	13	0	11	9	10	11	10	3
		2 x 10	16	7	15	1	14	0	13	2
		2 x 12	20	2	18	4	17	0	16	0
	No. 1	2 x 4	6	3	5	8	5	3	4	11
		2 x 6	9	10	8	11	8	3	7	9
		2 x 8	13	0	11	9	10	11	10	3
		2 x 10	16	7	15	1	14	0	13	1
		2 x 12	20	2	18	4	17	0	15	11
	No. 2	2 x 4	6	0	5	6	5	1	4	9
		2 x 6	9	6	8	7	7	8	7	0
		2 x 8	12	7	11	4	10	2	9	3
		2 x 10	16	0	14	6	13	0	11	10
		2 x 12	19	6	17	8	15	9	14	5
	No. 3	2 x 4	5	2	4	5	4	0	3	8
		2 x 6	7	5	6	5	5	9	5	3
		2 x 8	9	9	8	6	7	7	6	11
		2 x 10	12	6	10	10	9	8	8	10
		2 x 12	15	2	13	2	11	9	10	9
	Construction	2 x 4	5	9	5	0	4	5	4	1
	Standard	2 x 4	4	5	3	10	3	5	3	2
	Utility	2 x 4	2	11	2	7	2	3	2	1

TABLE IV-C

FLOOR JOISTS—BEDROOMS, AND ATTICS ACCESSIBLE BY A STAIRWAY
(LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size, <i>in.</i>	LIVE LOAD 30 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	
Douglas Fir Western Larch	Select structural	2 x 4	7 11	7 3	6 8	6 4	9 1	8 3	7 8	7 3								
		2 x 6	12 6	11 4	10 7	9 11	14 4	13 0	12 1	11 4								
		2 x 8	16 6	15 0	13 11	13 1	18 11	17 2	15 11	15 0								
		2 x 10	21 1	19 2	17 9	16 9	24 2	21 11	20 4	19 2								
		2 x 12	25 8	23 4	21 8	20 4	29 4	26 8	24 9	23 4								
	No. 1	2 x 4	7 11	7 3	6 8	6 4	9 1	8 3	7 8	7 3								
		2 x 6	12 6	11 4	10 7	9 11	14 4	13 0	11 8	10 7								
		2 x 8	16 6	15 0	13 11	13 1	18 11	17 2	15 4	14 0								
		2 x 10	21 1	19 2	17 9	16 9	24 2	21 11	19 7	17 11								
		2 x 12	25 8	23 4	21 8	20 4	29 4	26 8	23 10	21 9								
	No. 2	2 x 4	7 8	7 0	6 6	6 1	8 10	8 0	7 2	6 6								
		2 x 6	12 1	11 0	10 2	9 7	13 7	11 9	10 6	9 7								
		2 x 8	15 11	14 6	13 5	12 8	17 11	15 6	13 10	12 8								
		2 x 10	20 4	18 6	17 2	16 2	22 10	19 9	17 8	16 2								
		2 x 12	24 9	22 6	20 11	19 7	27 9	24 1	21 6	19 7								
	No. 3	2 x 4	6 11	6 0	5 5	4 11	6 11	6 0	5 5	4 11								
		2 x 6	10 3	8 11	7 11	7 3	10 3	8 11	7 11	7 3								
		2 x 8	13 7	11 9	10 6	9 7	13 7	11 9	10 6	9 7								
		2 x 10	17 4	15 0	13 5	12 3	17 4	15 0	13 5	12 3								
		2 x 12	21 1	18 3	16 4	14 11	21 1	18 3	16 4	14 11								
	Con- struction	2 x 4	7 4	6 8	6 1	5 7	7 11	6 10	6 1	5 7								
	Standard	2 x 4	5 10	5 1	4 6	4 1	5 10	5 1	4 6	4 1								
	Utility	2 x 4	4 1	3 7	3 2	2 11	4 1	3 7	3 2	2 11								
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select structural	2 x 4	7 6	6 10	6 4	5 11	8 7	7 10	7 3	6 9								
		2 x 6	11 10	10 9	9 11	9 4	13 6	12 2	10 11	9 11								
		2 x 8	15 7	14 2	13 2	12 4	17 10	16 1	14 4	13 1								
		2 x 10	19 11	18 1	16 9	15 9	22 9	20 6	18 4	16 9								
		2 x 12	24 2	22 0	20 5	19 2	27 8	24 11	22 4	20 4								
	No. 1	2 x 4	7 6	6 10	6 4	5 11	8 7	7 9	6 11	6 4								
		2 x 6	11 10	10 9	9 11	9 2	13 0	11 3	10 1	9 2								
		2 x 8	15 7	14 2	13 2	12 2	17 2	14 10	13 4	12 2								
		2 x 10	19 11	18 1	16 9	15 6	21 11	19 0	17 0	15 6								
		2 x 12	24 2	22 0	20 5	18 10	26 8	23 1	20 8	18 10								
	No. 2	2 x 4	7 3	6 7	6 1	5 9	8 1	7 0	6 3	5 9								
		2 x 6	11 5	10 0	9 0	8 2	11 7	10 0	9 0	8 2								
		2 x 8	15 1	13 3	11 10	10 10	15 3	13 3	11 10	10 10								
		2 x 10	19 2	16 11	15 1	13 9	19 6	16 11	15 1	13 9								
		2 x 12	23 4	20 7	18 4	16 9	23 9	20 7	18 4	16 9								
	No. 3	2 x 4	5 10	5 1	4 6	4 1	5 10	5 1	4 6	4 1								
		2 x 6	8 10	7 7	6 10	6 3	8 10	7 7	6 10	6 3								
		2 x 8	11 7	10 1	9 0	8 2	11 7	10 1	9 0	8 2								
		2 x 10	14 10	12 10	11 6	10 6	14 10	12 10	11 6	10 6								
		2 x 12	18 1	15 7	14 0	12 9	18 1	15 7	14 0	12 9								
	Con- struction	2 x 4	6 9	5 10	5 3	4 9	6 9	5 10	5 3	4 9								
	Standard	2 x 4	5 1	4 4	3 11	3 7	5 1	4 4	3 11	3 7								
	Utility	2 x 4	3 4	2 11	2 7	2 4	3 4	2 11	2 7	2 4								

Continued on next page

TABLE IV-C (Cont'd)
FLOOR JOISTS—BEDROOMS, AND ATTICS ACCESSIBLE BY A STAIRWAY
(LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size, <i>in.</i>	LIVE LOAD 30 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select structural	2 x 4	7	1	6	5	5	11	5	7	8	1	7	4	6	10	6	5
		2 x 6	11	1	10	1	9	4	8	10	12	9	11	7	10	6	9	7
		2 x 8	14	8	13	4	12	4	11	7	16	9	15	3	13	10	12	8
		2 x 10	18	9	17	0	15	9	14	10	21	5	19	6	17	8	16	2
		2 x 12	22	9	20	8	19	2	18	1	26	1	23	8	21	6	19	7
	No. 1	2 x 4	7	1	6	5	5	11	5	7	8	1	7	4	6	8	6	1
		2 x 6	11	1	10	1	9	4	8	10	12	6	10	9	9	8	8	10
		2 x 8	14	8	13	4	12	4	11	7	16	5	14	3	12	9	11	7
		2 x 10	18	9	17	0	15	9	14	10	21	0	18	2	16	3	14	10
		2 x 12	22	9	20	8	19	2	18	1	25	6	22	1	19	9	18	1
	No. 2	2 x 4	6	10	6	2	5	9	5	5	7	9	6	8	6	0	5	5
		2 x 6	10	9	9	9	8	9	7	11	11	3	9	9	8	9	7	11
		2 x 8	14	2	12	10	11	6	10	6	14	10	12	10	11	6	10	6
		2 x 10	18	1	16	5	14	8	13	5	19	0	16	5	14	8	13	5
		2 x 12	22	0	20	0	17	11	16	4	23	1	20	0	17	11	16	4
	No. 3	2 x 4	5	10	5	1	4	6	4	1	5	10	5	1	4	6	4	1
		2 x 6	8	5	7	3	6	6	5	11	8	5	7	3	6	6	5	11
		2 x 8	11	1	9	7	8	7	7	10	11	1	9	7	8	7	7	10
		2 x 10	14	2	12	3	10	11	10	0	14	2	12	3	10	11	10	0
		2 x 12	17	2	14	11	13	4	12	2	17	2	14	11	13	4	12	2
	Con- struction	2 x 4	6	6	5	8	5	1	4	7	6	6	5	8	5	1	4	7
	Standard	2 x 4	5	1	4	4	3	11	3	7	5	1	4	4	3	11	3	7
	Utility	2 x 4	3	4	2	11	2	7	2	4	3	4	2	11	2	7	2	4
Western Red Cedar Red Pine Western White Pine White Pine	Select structural	2 x 4	6	10	6	2	5	9	5	5	7	9	7	1	6	7	6	2
		2 x 6	10	9	9	9	9	0	8	6	12	3	11	2	10	3	9	5
		2 x 8	14	2	12	10	11	11	11	2	16	2	14	8	13	7	12	5
		2 x 10	18	0	16	5	15	3	14	4	20	8	18	9	17	4	15	10
		2 x 12	21	11	19	11	18	6	17	5	25	2	22	10	21	1	19	3
	No. 1	2 x 4	6	10	6	2	5	9	5	5	7	9	7	1	6	5	5	10
		2 x 6	10	9	9	9	9	0	8	6	12	2	10	6	9	5	8	7
		2 x 8	14	2	12	10	11	11	11	2	16	1	13	11	12	5	11	4
		2 x 10	18	0	16	5	15	3	14	4	20	6	17	9	15	11	14	6
		2 x 12	21	11	19	11	18	6	17	5	24	11	21	7	19	4	17	8
	No. 2	2 x 4	6	7	5	11	5	6	5	2	7	6	6	6	5	10	5	4
		2 x 6	10	4	9	4	8	6	7	9	10	11	9	6	8	6	7	9
		2 x 8	13	7	12	4	11	2	10	2	14	5	12	6	11	2	10	2
		2 x 10	17	4	15	9	14	3	13	0	18	5	16	0	14	3	13	0
		2 x 12	21	2	19	2	17	5	15	10	22	5	19	5	17	5	15	10
No. 3	2 x 4	5	7	4	10	4	4	3	11	5	7	4	10	4	4	3	11	
	2 x 6	8	5	7	3	6	6	5	11	8	5	7	3	6	6	5	11	
	2 x 8	11	1	9	7	8	7	7	10	11	1	9	7	8	7	7	10	
	2 x 10	14	2	12	3	10	11	10	0	14	2	12	3	10	11	10	0	
	2 x 12	17	2	14	11	13	4	12	2	17	2	14	11	13	4	12	2	
Con- struction	2 x 4	6	4	5	5	4	11	4	5	6	4	5	5	4	11	4	5	
Standard	2 x 4	4	9	4	1	3	8	3	4	4	9	4	1	3	8	3	4	
Utility	2 x 4	3	4	2	11	2	7	2	4	3	4	2	11	2	7	2	4	

Continued on next page

TABLE IV-C (Cont'd)

FLOOR JOISTS—BEDROOMS, AND ATTICS ACCESSIBLE BY A STAIRWAY
(LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size,	LIVE LOAD 30 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select structural	2 x 4	7	2	6	6	6	0	5	8	8	2	7	5	6	11	6	6
		2 x 6	11	3	10	3	9	6	8	11	12	11	11	8	10	10	10	3
		2 x 8	14	10	13	6	12	6	11	9	17	0	15	5	14	4	13	6
		2 x 10	18	11	17	2	16	0	15	0	21	8	19	8	18	3	17	2
		2 x 12	23	1	20	11	19	5	18	3	26	5	24	0	22	3	20	11
	No. 1	2 x 4	7	2	6	6	6	0	5	8	8	2	7	5	6	11	6	6
		2 x 6	11	3	10	3	9	6	8	11	12	11	11	8	10	10	9	11
		2 x 8	14	10	13	6	12	6	11	9	17	0	15	5	14	4	13	1
		2 x 10	18	11	17	2	16	0	15	0	21	8	19	8	18	3	16	9
		2 x 12	23	1	20	11	19	5	18	3	26	5	24	0	22	3	20	4
	No. 2	2 x 4	6	11	6	3	5	10	5	6	7	11	7	2	6	8	6	2
		2 x 6	10	10	9	10	9	2	8	7	12	5	11	0	9	10	9	0
		2 x 8	14	4	13	0	12	1	11	4	16	5	14	7	13	0	11	11
		2 x 10	18	3	16	7	15	5	14	6	20	11	18	7	16	7	15	2
		2 x 12	22	3	20	3	18	9	17	8	25	6	22	7	20	3	18	5
	No. 3	2 x 4	6	6	5	8	5	1	4	7	6	6	5	8	5	1	4	7
		2 x 6	9	7	8	3	7	5	6	9	9	7	8	3	7	5	6	9
		2 x 8	12	8	10	11	9	9	8	11	12	8	10	11	9	9	8	11
		2 x 10	16	2	14	0	12	6	11	5	16	2	14	0	12	6	11	5
		2 x 12	19	7	17	0	15	2	13	10	19	7	17	0	15	2	13	10
	Con- struction	2 x 4	6	8	6	0	5	7	5	2	7	4	6	4	5	8	5	2
	Standard	2 x 4	5	7	4	10	4	4	3	11	5	7	4	10	4	4	3	11
	Utility	2 x 4	3	9	3	3	2	11	2	8	3	9	3	3	2	11	2	8
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select structural	2 x 4	6	10	6	3	5	10	5	5	7	11	7	2	6	8	6	3
		2 x 6	10	10	9	10	9	2	8	7	12	5	11	3	10	5	9	7
		2 x 8	14	3	13	0	12	1	11	4	16	4	14	10	13	9	12	8
		2 x 10	18	3	16	7	15	5	14	6	20	11	19	0	17	7	16	2
		2 x 12	22	2	20	2	18	9	17	7	25	5	23	1	21	5	19	7
	No. 1	2 x 4	6	10	6	3	5	10	5	5	7	11	7	2	6	8	6	1
		2 x 6	10	10	9	10	9	2	8	7	12	5	10	9	9	8	8	10
		2 x 8	14	3	13	0	12	1	11	4	16	4	14	3	12	9	11	7
		2 x 10	18	3	16	7	15	5	14	6	20	11	18	2	16	3	14	10
		2 x 12	22	2	20	2	18	9	17	7	25	5	22	1	19	9	18	1
	No. 2	2 x 4	6	8	6	0	5	7	5	3	7	7	6	8	6	0	5	5
		2 x 6	10	6	9	6	8	9	7	11	11	3	9	9	8	9	7	11
		2 x 8	13	10	12	7	11	6	10	6	14	10	12	10	11	6	10	6
		2 x 10	17	8	16	0	14	8	13	5	19	0	16	5	14	8	13	5
		2 x 12	21	5	19	6	17	11	16	4	23	1	20	0	17	11	16	4
	No. 3	2 x 4	5	10	5	1	4	6	4	1	5	10	5	1	4	6	4	1
		2 x 6	8	5	7	3	6	6	5	11	8	5	7	3	6	6	5	11
		2 x 8	11	1	9	7	8	7	7	10	11	1	9	7	8	7	7	10
		2 x 10	14	2	12	3	10	11	10	0	14	2	12	3	10	11	10	0
		2 x 12	17	2	14	11	13	4	12	2	17	2	14	11	13	4	12	2
	Con- struction	2 x 4	6	5	5	8	5	1	4	7	6	6	5	8	5	1	4	7
	Standard	2 x 4	5	1	4	4	3	11	3	7	5	1	4	4	3	11	3	7
	Utility	2 x 4	3	4	2	11	2	7	2	4	3	4	2	11	2	7	2	4

TABLE IV-D
ROOF JOISTS—SUPPORTING CEILING
(LIVE LOAD 50 lb per sq ft)

Species	Grade	Nominal Size, in.	LIVE LOAD 50 lb per sq ft							
			Gypsum Board or Plastered Ceiling				Other Ceilings			
			Joist Spacing				Joist Spacing			
			12 in.	16 in.	20 in.	24 in.	12 in.	16 in.	20 in.	24 in.
			ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
Douglas Fir Western Larch	Select structural	2 x 4	6 8	6 1	5 8	5 4	7 8	7 0	6 6	6 1
		2 x 6	10 7	9 7	8 11	8 4	12 1	11 0	10 2	9 7
		2 x 8	13 11	12 8	11 9	11 1	15 11	14 6	13 5	12 8
		2 x 10	17 9	16 2	15 0	14 1	20 4	18 6	17 2	16 2
		2 x 12	21 8	19 8	18 3	17 2	24 9	22 6	20 11	19 8
	No. 1	2 x 4	6 8	6 1	5 8	5 4	7 8	7 0	6 6	6 1
		2 x 6	10 7	9 7	8 11	8 4	12 1	11 0	10 1	9 2
		2 x 8	13 11	12 8	11 9	11 1	15 11	14 6	13 3	12 1
		2 x 10	17 9	16 2	15 0	14 1	20 4	18 6	16 11	15 6
		2 x 12	21 8	19 8	18 3	17 2	24 9	22 6	20 7	18 10
	No. 2	2 x 4	6 6	5 11	5 5	5 2	7 5	6 9	6 2	5 8
		2 x 6	10 2	9 3	8 7	8 1	11 8	10 2	9 1	8 3
		2 x 8	13 5	12 3	11 4	10 8	15 5	13 5	12 0	10 11
		2 x 10	17 2	15 7	14 6	13 7	19 8	17 1	15 3	13 11
		2 x 12	20 11	19 0	17 7	16 7	23 11	20 9	18 7	17 0
	No. 3	2 x 4	6 0	5 2	4 8	4 3	6 0	5 2	4 8	4 3
		2 x 6	8 11	7 8	6 10	6 3	8 11	7 8	6 10	6 3
		2 x 8	11 9	10 2	9 1	8 3	11 9	10 2	9 1	8 3
		2 x 10	15 0	13 0	11 7	10 7	15 0	13 0	11 7	10 7
		2 x 12	18 3	15 9	14 1	12 10	18 3	15 9	14 1	12 10
	Con- struction	2 x 4	6 3	5 8	5 3	4 10	6 10	5 11	5 3	4 10
	Standard	2 x 4	5 0	4 4	3 11	3 7	5 0	4 4	3 11	3 7
	Utility	2 x 4	3 7	3 1	2 9	2 6	3 7	3 1	2 9	2 6
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select structural	2 x 4	6 4	5 9	5 4	5 0	7 3	6 7	6 1	5 9
		2 x 6	9 11	9 0	8 5	7 11	11 3	10 4	9 5	8 7
		2 x 8	13 2	11 11	11 1	10 5	15 0	13 8	12 5	11 4
		2 x 10	16 9	15 3	14 2	13 4	19 2	17 5	15 10	14 6
		2 x 12	20 5	18 6	17 2	16 2	23 4	21 3	19 3	17 7
	No. 1	2 x 4	6 4	5 9	5 4	5 0	7 3	6 7	6 0	5 5
		2 x 6	9 11	9 0	8 5	7 11	11 3	9 9	8 8	7 11
		2 x 8	13 2	11 11	11 1	10 5	14 10	12 10	11 6	10 6
		2 x 10	16 9	15 3	14 2	13 4	18 11	16 5	14 8	13 5
		2 x 12	20 5	18 6	17 2	16 2	23 1	20 0	17 10	16 4
	No. 2	2 x 4	6 1	5 6	5 2	4 10	7 0	6 1	5 5	4 11
		2 x 6	9 7	8 8	7 9	7 1	10 0	8 8	7 9	7 1
		2 x 8	12 8	11 5	10 3	9 4	13 2	11 5	10 3	9 4
		2 x 10	16 2	14 7	13 1	11 11	16 10	14 7	13 1	11 11
		2 x 12	19 8	17 9	15 11	14 6	20 6	17 9	15 11	14 6
	No. 3	2 x 4	5 0	4 4	3 11	3 7	5 0	4 4	3 11	3 7
		2 x 6	7 7	6 7	5 11	5 4	7 7	6 7	5 11	5 4
		2 x 8	10 0	8 8	7 9	7 1	10 0	8 8	7 9	7 1
		2 x 10	12 10	11 1	9 11	9 1	12 10	11 1	9 11	9 1
		2 x 12	15 7	13 6	12 1	11 0	15 7	13 6	12 1	11 0
	Con- struction	2 x 4	5 10	5 0	4 6	4 1	5 10	5 0	4 6	4 1
	Standard	2 x 4	4 4	3 9	3 4	3 1	4 4	3 9	3 4	3 1
	Utility	2 x 4	2 11	2 6	2 3	2 0	2 11	2 6	2 3	2 0

Continued on next page

TABLE IV-D (Cont'd)

ROOF JOISTS—SUPPORTING CEILING
(LIVE LOAD 50 lb per sq ft)

Species	Grade	Nominal Size.	LIVE LOAD 50 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
<i>in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>			
Spruce (all species) Balsam Fir Alpine Pine Lodgepole Pine Ponderosa Pine	Select structural	2 x 4	5 11	5 5	5 0	4 9	6 10	6 2	5 9	5 5	6 10	6 2	5 9	5 5	6 10	6 2	5 9	5 5
		2 x 6	9 4	8 6	7 11	7 5	10 9	9 9	9 0	8 3	10 9	9 9	9 0	8 3	10 9	9 9	9 0	8 3
		2 x 8	12 4	11 3	10 5	9 10	14 2	12 10	11 11	10 11	14 2	12 10	11 11	10 11	14 2	12 10	11 11	10 11
		2 x 10	15 9	14 4	13 4	12 6	18 1	16 5	15 3	13 11	18 1	16 5	15 3	13 11	18 1	16 5	15 3	13 11
		2 x 12	19 2	17 5	16 2	15 3	22 0	20 0	18 6	17 0	22 0	20 0	18 6	17 0	22 0	20 0	18 6	17 0
	No. 1	2 x 4	5 11	5 5	5 0	4 9	6 10	6 2	5 9	5 3	6 10	6 2	5 9	5 3	6 10	6 2	5 9	5 3
		2 x 6	9 4	8 6	7 11	7 5	10 9	9 9	9 4	7 7	10 9	9 9	9 4	7 7	10 9	9 9	9 4	7 7
		2 x 8	12 4	11 3	10 5	9 10	14 2	12 10	11 0	10 0	14 2	12 10	11 0	10 0	14 2	12 10	11 0	10 0
		2 x 10	15 9	14 4	13 4	12 6	18 1	15 8	14 1	12 10	15 8	14 1	14 1	12 10	15 8	14 1	14 1	12 10
		2 x 12	19 2	17 5	16 2	15 3	22 0	19 1	17 1	15 7	22 0	19 1	17 1	15 7	22 0	19 1	17 1	15 7
	No. 2	2 x 4	5 9	5 3	4 10	4 7	6 7	5 9	5 2	4 9	6 7	5 9	5 2	4 9	6 7	5 9	5 2	4 9
		2 x 6	9 1	8 3	7 6	6 10	9 9	8 5	7 6	6 10	9 9	8 5	7 6	6 10	9 9	8 5	7 6	6 10
		2 x 8	11 11	10 10	9 11	9 1	12 10	11 1	9 11	9 1	12 10	11 1	9 11	9 1	12 10	11 1	9 11	9 1
		2 x 10	15 3	13 10	12 8	11 7	16 5	14 2	12 8	11 7	16 5	14 2	12 8	11 7	16 5	14 2	12 8	11 7
		2 x 12	18 7	16 10	15 5	14 1	20 0	17 3	15 5	14 1	20 0	17 3	15 5	14 1	20 0	17 3	15 5	14 1
	No. 3	2 x 4	5 0	4 4	3 11	3 7	5 0	4 4	3 11	3 7	5 0	4 4	3 11	3 7	5 0	4 4	3 11	3 7
		2 x 6	7 3	6 3	5 7	5 1	7 3	6 3	5 7	5 1	7 3	6 3	5 7	5 1	7 3	6 3	5 7	5 1
		2 x 8	9 7	8 3	7 5	6 9	9 7	8 3	7 5	6 9	9 7	8 3	7 5	6 9	9 7	8 3	7 5	6 9
		2 x 10	12 3	10 7	9 5	8 8	12 3	10 7	9 5	8 8	12 3	10 7	9 5	8 8	12 3	10 7	9 5	8 8
		2 x 12	14 10	12 10	11 6	10 6	14 10	12 10	11 6	10 6	14 10	12 10	11 6	10 6	14 10	12 10	11 6	10 6
	Construction	2 x 4	5 6	4 11	4 4	4 0	5 8	4 11	4 4	4 0	5 8	4 11	4 4	4 0	5 8	4 11	4 4	4 0
	Standard	2 x 4	4 4	3 9	3 4	3 1	4 4	3 9	3 4	3 1	4 4	3 9	3 4	3 1	4 4	3 9	3 4	3 1
	Utility	2 x 4	2 11	2 6	2 3	2 0	2 11	2 6	2 3	2 0	2 11	2 6	2 3	2 0	2 11	2 6	2 3	2 0
Western Red Cedar Red Pine Western White Pine White Pine	Select structural	2 x 4	5 9	5 2	4 10	4 6	6 7	6 0	5 6	5 2	6 7	6 0	5 6	5 2	6 7	6 0	5 6	5 2
		2 x 6	9 0	8 2	7 7	7 2	10 4	9 5	8 9	8 1	10 4	9 5	8 9	8 1	10 4	9 5	8 9	8 1
		2 x 8	11 11	10 10	10 0	9 5	13 8	12 5	11 6	10 8	12 5	11 6	10 8	10 8	12 5	11 6	10 8	10 8
		2 x 10	15 3	13 10	12 10	12 1	17 5	15 10	14 8	13 8	15 10	14 8	13 8	13 8	15 10	14 8	13 8	13 8
		2 x 12	18 6	16 10	15 7	14 8	21 2	19 3	17 10	16 8	21 2	19 3	17 10	16 8	21 2	19 3	17 10	16 8
	No. 1	2 x 4	5 9	5 2	4 10	4 6	6 7	6 0	5 6	5 0	6 7	6 0	5 6	5 0	6 7	6 0	5 6	5 0
		2 x 6	9 0	8 2	7 7	7 2	10 4	9 1	8 2	7 5	10 4	9 1	8 2	7 5	10 4	9 1	8 2	7 5
		2 x 8	11 11	10 10	10 0	9 5	13 8	12 0	10 9	9 10	12 0	10 9	9 8	9 10	12 0	10 9	9 8	9 10
		2 x 10	15 3	13 10	12 10	12 1	17 5	15 4	13 9	12 6	15 4	13 9	12 4	11 3	15 4	13 9	12 4	11 3
		2 x 12	18 6	16 10	15 7	14 8	21 2	18 8	16 8	15 3	21 2	18 8	16 8	15 3	21 2	18 8	16 8	15 3
	No. 2	2 x 4	5 6	5 0	4 8	4 4	6 4	5 8	5 0	4 7	6 4	5 8	5 0	4 7	6 4	5 8	5 0	4 7
		2 x 6	8 8	7 11	7 4	6 8	9 6	8 2	7 4	6 8	9 6	8 2	7 4	6 8	9 6	8 2	7 4	6 8
		2 x 8	11 6	10 5	9 8	8 10	12 6	10 10	9 8	8 10	12 6	10 10	9 8	8 10	12 6	10 10	9 8	8 10
		2 x 10	14 8	13 4	12 4	11 3	15 11	13 10	12 4	11 3	15 11	13 10	12 4	11 3	15 11	13 10	12 4	11 3
		2 x 12	17 10	16 2	15 0	13 8	19 5	16 10	15 0	13 8	19 5	16 10	15 0	13 8	19 5	16 10	15 0	13 8
	No. 3	2 x 4	4 10	4 2	3 9	3 5	4 10	4 2	3 9	3 5	4 10	4 2	3 9	3 5	4 10	4 2	3 9	3 5
		2 x 6	7 3	6 3	5 7	5 1	7 3	6 3	5 7	5 1	7 3	6 3	5 7	5 1	7 3	6 3	5 7	5 1
		2 x 8	9 7	8 3	7 5	6 9	9 7	8 3	7 5	6 9	9 7	8 3	7 5	6 9	9 7	8 3	7 5	6 9
		2 x 10	12 3	10 7	9 5	8 8	12 3	10 7	9 5	8 8	12 3	10 7	9 5	8 8	12 3	10 7	9 5	8 8
		2 x 12	14 10	12 10	11 6	10 6	14 10	12 10	11 6	10 6	14 10	12 10	11 6	10 6	14 10	12 10	11 6	10 6
	Construction	2 x 4	5 4	4 9	4 3	3 10	5 5	4 9	4 3	3 10	5 5	4 9	4 3	3 10	5 5	4 9	4 3	3 10
	Standard	2 x 4	4 1	3 7	3 2	2 11	4 1	3 7	3 2	2 11	4 1	3 7	3 2	2 11	4 1	3 7	3 2	2 11
	Utility	2 x 4	2 11	2 6	2 3	2 0	2 11	2 6	2 3	2 0	2 11	2 6	2 3	2 0	2 11	2 6	2 3	2 0

Continued on next page

TABLE IV-D (Cont'd)
ROOF JOISTS—SUPPORTING CEILING
(LIVE LOAD 50 lb per sq ft)

Species	Grade	Nominal Size,	LIVE LOAD 50 lb per sq ft											
			Gypsum Board or Plastered Ceiling						Other Ceilings					
			Joist Spacing						Joist Spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.	
			ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select structural	2 x 4	6	0	5	6	5	1	4	9	6	11	6	3
		2 x 6	9	6	8	7	8	0	7	6	10	10	9	10
		2 x 8	12	6	11	4	10	7	9	11	14	4	13	0
		2 x 10	16	0	14	6	13	6	12	8	18	3	16	7
		2 x 12	19	5	17	8	16	5	15	5	22	3	20	3
	No. 1	2 x 4	6	0	5	6	5	1	4	9	6	11	6	3
		2 x 6	9	6	8	7	8	0	7	6	10	10	9	10
		2 x 8	12	6	11	4	10	7	9	11	14	4	13	0
		2 x 10	16	0	14	6	13	6	12	8	18	3	16	7
		2 x 12	19	5	17	8	16	5	15	5	22	3	20	3
	No. 2	2 x 4	5	10	5	3	4	11	4	7	6	8	6	0
		2 x 6	9	2	8	4	7	9	7	3	10	6	9	6
		2 x 8	12	1	11	0	10	2	9	7	12	7	11	3
		2 x 10	15	5	14	0	13	0	12	3	17	8	16	0
		2 x 12	18	9	17	0	15	10	14	11	21	6	19	6
	No. 3	2 x 4	5	7	4	11	4	4	4	0	5	8	4	11
		2 x 6	8	3	7	2	6	5	5	10	8	3	7	2
		2 x 8	10	11	9	5	8	5	7	8	10	11	9	5
		2 x 10	13	11	12	1	10	9	9	10	13	11	12	1
		2 x 12	17	0	14	8	13	2	12	0	17	0	14	8
	Con- struction	2 x 4	5	7	5	1	4	8	4	5	6	4	5	6
	Standard	2 x 4	4	10	4	2	3	9	3	5	4	10	4	2
	Utility	2 x 4	3	3	2	10	2	6	2	3	3	3	2	10
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select structural	2 x 4	5	10	5	3	4	11	4	7	6	8	6	0
		2 x 6	9	2	8	3	7	8	7	3	10	5	9	6
		2 x 8	12	1	10	11	10	2	9	7	13	9	12	6
		2 x 10	15	5	14	0	13	0	12	2	17	7	16	0
		2 x 12	18	9	17	0	15	9	14	10	21	5	19	6
	No. 1	2 x 4	5	10	5	3	4	11	4	7	6	8	6	0
		2 x 6	9	2	8	3	7	8	7	3	10	5	9	4
		2 x 8	12	1	10	11	10	2	9	7	13	9	12	4
		2 x 10	15	5	14	0	13	0	12	2	17	7	15	8
		2 x 12	18	9	17	0	15	9	14	10	21	5	19	1
	No. 2	2 x 4	5	7	5	1	4	9	4	5	6	5	5	9
		2 x 6	8	10	8	0	7	5	6	10	9	9	8	5
		2 x 8	11	8	10	7	9	10	9	1	12	10	11	1
		2 x 10	14	10	13	6	12	6	11	7	16	5	14	2
		2 x 12	18	1	16	5	15	3	14	1	20	0	17	3
	No. 3	2 x 4	5	0	4	4	3	11	3	7	5	0	4	4
		2 x 6	7	3	6	3	5	7	5	1	7	3	6	3
		2 x 8	9	7	8	3	7	5	6	9	9	7	8	3
		2 x 10	12	3	10	7	9	5	8	8	12	3	10	7
		2 x 12	14	10	12	10	11	6	10	6	14	10	12	10
	Con- struction	2 x 4	5	4	4	11	4	4	4	0	5	8	4	11
	Standard	2 x 4	4	4	3	9	3	4	3	1	4	4	3	9
	Utility	2 x 4	2	11	2	6	2	3	2	0	2	11	2	6

TABLE IV-E

ROOF JOISTS—SUPPORTING CEILING
(LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size, <i>in.</i>	LIVE LOAD 40 lb per sq ft											
			Gypsum Board or Plastered Ceiling								Other Ceilings			
			Joist Spacing								Joist Spacing			
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.	
			<i>ft.</i>	<i>in.</i>	<i>ft.</i>	<i>in.</i>	<i>ft.</i>	<i>in.</i>	<i>ft.</i>	<i>in.</i>	<i>ft.</i>	<i>in.</i>	<i>ft.</i>	<i>in.</i>
Douglas Fir Western Larch	Select structural.	2 x 4	7	3	6	7	6	1	5	9	8	3	7	6
		2 x 6	11	4	10	4	9	7	9	0	13	0	11	10
		2 x 8	15	0	13	8	12	8	11	11	17	2	15	7
		2 x 10	19	2	17	5	16	2	15	2	21	11	19	11
		2 x 12	23	4	21	2	19	8	18	6	26	8	24	3
	No. 1	2 x 4	7	3	6	7	6	1	5	9	8	3	7	6
		2 x 6	11	4	10	4	9	7	9	0	13	0	11	10
		2 x 8	15	0	13	8	12	8	11	11	17	2	15	7
		2 x 10	19	2	17	5	16	2	15	2	21	11	19	11
		2 x 12	23	4	21	2	19	8	18	6	26	8	24	3
	No. 2	2 x 4	7	0	6	4	5	11	5	6	8	0	7	3
		2 x 6	11	0	10	0	9	3	8	9	12	7	11	1
		2 x 8	14	6	13	2	12	3	11	6	16	7	14	8
		2 x 10	18	6	16	10	15	7	14	8	21	2	18	9
		2 x 12	22	6	19	5	19	0	17	10	25	9	22	9
	No. 3	2 x 4	6	7	5	8	5	1	4	8	6	7	5	8
		2 x 6	9	9	8	5	7	6	6	10	9	9	8	5
		2 x 8	12	10	11	1	9	11	9	1	12	10	11	1
		2 x 10	16	5	14	2	12	8	11	7	16	5	14	2
		2 x 12	20	0	17	3	15	5	14	1	20	0	17	3
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select structural	2 x 4	6	10	6	2	5	9	5	5	7	10	7	1
		2 x 6	10	9	9	9	9	0	8	6	12	3	11	2
		2 x 8	14	2	12	10	11	11	11	3	16	2	14	9
		2 x 10	18	1	16	5	15	3	14	4	20	8	18	9
		2 x 12	22	0	20	0	18	6	17	5	25	2	22	10
	No. 1	2 x 4	6	10	6	2	5	9	5	5	7	10	7	1
		2 x 6	10	9	9	9	9	0	8	6	12	3	11	2
		2 x 8	14	2	12	10	11	11	11	3	16	2	14	1
		2 x 10	18	1	16	5	15	3	14	4	20	8	18	0
		2 x 12	22	0	20	0	18	6	17	5	25	2	21	10
	No. 2	2 x 4	6	7	6	0	5	6	5	3	7	6	6	8
		2 x 6	10	4	9	5	8	6	7	9	11	0	9	6
		2 x 8	13	8	12	5	11	2	10	3	14	6	12	6
		2 x 10	17	5	15	10	14	4	13	1	18	6	16	0
		2 x 12	21	3	19	3	17	5	15	11	22	6	19	5
	No. 3	2 x 4	5	6	4	9	4	3	3	11	5	6	4	9
		2 x 6	8	4	7	3	6	5	5	11	8	4	7	3
		2 x 8	11	0	9	6	8	6	7	9	11	0	9	6
		2 x 10	14	1	12	2	10	10	9	11	14	1	12	2
		2 x 12	17	1	14	10	13	3	12	1	17	1	14	10
	Con- struction	2 x 4	6	4	5	6	4	11	4	6	6	5	5	6
	Standard	2 x 4	4	9	4	2	3	8	3	4	4	9	4	2
	Utility	2 x 4	3	2	2	9	2	5	2	3	3	2	2	9

Continued on next page

TABLE IV-E (Cont'd)
ROOF JOISTS—SUPPORTING CEILING
(LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size.	LIVE LOAD 40 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
		in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select structural	2 x 4	6	5	5	10	5	5	5	1	7	4	6	8	6	2	5	10
		2 x 6	10	1	9	2	8	6	8	0	11	7	10	6	9	9	9	1
		2 x 8	13	4	12	1	11	3	10	7	15	3	13	10	12	10	12	0
		2 x 10	17	0	15	5	14	4	13	6	19	6	17	8	16	5	15	3
		2 x 12	20	8	18	9	17	5	16	5	23	8	21	6	20	0	18	7
	No. 1	2 x 4	6	5	5	10	5	5	5	1	7	4	6	8	6	2	5	9
		2 x 6	10	1	9	2	8	6	8	0	11	7	10	6	9	9	8	4
		2 x 8	13	4	12	1	11	3	10	7	15	3	13	6	12	1	11	0
		2 x 10	17	0	15	5	14	4	13	6	19	6	17	3	15	5	14	1
		2 x 12	20	8	18	9	17	5	16	5	23	8	20	11	18	9	17	1
	No. 2	2 x 4	6	2	5	7	5	3	4	11	7	1	6	4	5	8	5	2
		2 x 6	9	9	8	10	8	3	7	6	10	8	9	3	9	2	7	6
		2 x 8	12	10	11	8	10	10	9	11	14	1	12	2	10	11	9	11
		2 x 10	16	5	14	11	13	10	12	8	18	0	15	7	13	11	12	8
		2 x 12	20	0	18	2	16	10	15	5	21	10	18	11	16	11	15	5
	No. 3	2 x 4	5	6	4	9	4	3	3	11	5	6	4	9	4	3	3	11
		2 x 6	7	11	6	10	6	2	5	7	7	11	6	10	8	3	5	7
		2 x 8	10	6	9	1	8	1	7	5	10	6	9	1	8	1	7	5
		2 x 10	13	5	11	7	10	4	9	5	13	5	11	7	10	4	9	5
		2 x 12	16	4	14	1	12	7	11	6	16	4	14	1	12	7	11	6
	Con- struction	2 x 4	5	11	5	4	4	9	4	4	6	2	5	4	4	9	4	4
	Standard	2 x 4	4	9	4	2	3	8	3	4	4	9	4	2	3	8	3	4
	Utility	2 x 4	3	2	2	9	2	5	2	3	3	2	2	9	2	5	2	3
Western Red Cedar Red Pine Western White Pine White Pine	Select structural	2 x 4	6	2	5	7	5	2	4	11	7	1	6	5	6	0	5	7
		2 x 6	9	9	8	10	8	2	7	9	11	2	10	1	9	5	8	10
		2 x 8	12	10	11	8	10	10	10	2	14	8	13	4	12	5	11	8
		2 x 10	16	5	14	11	13	10	13	0	18	9	17	1	15	10	14	11
		2 x 12	19	11	18	1	16	10	15	10	22	10	20	9	19	3	18	1
	No. 1	2 x 4	6	2	5	7	5	2	4	11	7	1	6	5	6	0	5	6
		2 x 6	9	9	8	10	8	2	7	9	11	2	10	0	8	11	8	2
		2 x 8	12	10	11	8	10	10	10	2	14	8	13	2	11	9	10	9
		2 x 10	16	5	14	11	13	10	13	0	18	9	16	10	15	0	13	9
		2 x 12	19	11	18	1	16	10	15	10	22	10	20	6	18	4	16	8
	No. 2	2 x 4	5	11	5	5	5	0	4	9	6	10	6	2	5	6	5	0
		2 x 6	9	4	8	6	7	11	7	4	10	4	9	0	8	0	7	4
		2 x 8	12	4	11	3	10	5	9	8	13	8	11	10	10	7	9	8
		2 x 10	15	9	14	4	13	4	12	4	17	6	15	1	13	6	12	4
		2 x 12	19	2	17	5	16	2	15	0	21	3	18	5	16	5	15	0
	No. 3	2 x 4	5	3	4	7	4	1	3	9	5	3	4	7	4	1	3	9
		2 x 6	7	11	6	10	6	2	5	7	7	11	6	10	6	2	5	7
		2 x 8	10	6	9	1	8	1	7	5	10	6	9	1	8	1	7	5
		2 x 10	13	5	11	7	10	4	9	5	13	5	11	7	10	4	9	5
		2 x 12	16	4	14	1	12	7	11	6	16	4	14	1	12	7	11	6
	Con- struction	2 x 4	5	9	5	2	4	7	4	3	6	0	5	2	4	7	4	3
	Standard	2 x 4	4	6	3	11	3	6	3	2	4	6	3	11	3	6	3	2
	Utility	2 x 4	3	2	2	9	2	5	2	3	3	2	2	9	2	5	2	3

Continued on next page

TABLE IV-E (Cont'd)

ROOF JOISTS—SUPPORTING CEILING
(LIVE LOAD 40 lb per sq ft)

Species	Grade	Nominal Size.	LIVE LOAD 40 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
<i>in.</i>		<i>ft. in.</i>		<i>ft. in.</i>		<i>ft. in.</i>		<i>ft. in.</i>		<i>ft. in.</i>		<i>ft. in.</i>		<i>ft. in.</i>		<i>ft. in.</i>		
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select structural	2 x 4	6	6	5	11	5	6	5	2	7	5	6	9	6	3	5	11
		2 x 6	10	3	9	3	8	7	8	1	11	8	10	7	9	10	9	3
		2 x 8	13	6	12	3	11	4	10	8	15	5	14	0	13	0	12	3
		2 x 10	17	2	15	8	14	6	13	8	19	8	17	11	16	7	15	8
	2 x 12	20	11	19	0	17	8	16	7	24	0	21	9	20	3	19	0	
	No. 1	2 x 4	6	6	5	11	5	6	5	2	7	5	6	9	6	3	5	11
		2 x 6	10	3	9	3	8	7	8	1	11	8	10	7	9	10	9	3
		2 x 8	13	6	12	3	11	4	10	8	15	5	14	0	13	0	12	3
		2 x 10	17	2	15	8	14	6	13	8	19	8	17	11	16	7	15	8
	2 x 12	20	11	19	0	17	8	16	7	24	0	21	9	20	3	19	0	
	No. 2	2 x 4	6	3	5	8	5	3	5	0	7	2	6	6	6	0	5	8
		2 x 6	9	10	8	11	8	4	7	10	11	4	10	3	9	4	8	6
		2 x 8	13	0	11	10	11	0	10	4	14	11	13	6	12	4	11	3
		2 x 10	16	7	15	1	14	0	13	2	19	0	17	3	15	9	14	4
2 x 12	20	3	18	4	17	0	16	0	23	2	21	0	19	2	17	6		
No. 3	2 x 4	6	0	5	4	4	9	4	4	6	2	5	4	4	9	4	4	
	2 x 6	9	1	7	10	7	0	6	5	9	1	7	10	7	0	6	5	
	2 x 8	12	0	10	4	9	3	8	5	12	0	10	4	9	3	8	5	
	2 x 10	15	3	13	3	11	10	10	9	15	3	13	3	11	10	10	9	
2 x 12	18	7	16	1	14	5	13	2	18	7	16	1	14	5	13	2		
Con- struction	2 x 4	6	0	5	6	5	1	4	9	6	11	6	0	5	5	4	11	
Standard	2 x 4	5	3	4	7	4	0	3	9	5	3	4	7	4	0	3	9	
Utility	2 x 4	3	7	3	1	2	9	2	6	3	7	3	1	2	9	2	6	
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select structural	2 x 4	6	3	5	8	5	3	4	11	7	2	6	6	6	0	5	8
		2 x 6	9	10	8	11	8	3	7	10	11	3	10	3	9	6	8	11
		2 x 8	13	0	11	9	10	11	10	3	14	10	13	6	12	6	11	9
		2 x 10	16	7	15	1	14	0	13	2	19	0	17	3	16	0	15	1
		2 x 12	20	2	18	4	17	0	16	0	23	1	21	0	19	6	18	4
	No. 1	2 x 4	6	3	5	8	5	3	4	11	7	2	6	6	6	0	5	8
		2 x 6	9	10	8	11	8	3	7	10	11	3	10	3	9	2	8	4
		2 x 8	13	0	11	9	10	11	10	3	14	10	13	6	12	1	11	0
		2 x 10	16	7	15	1	14	0	13	2	19	0	17	3	15	5	14	1
		2 x 12	20	2	18	4	17	0	16	0	23	1	20	11	18	9	17	1
	No. 2	2 x 4	6	0	5	6	5	1	4	9	6	11	6	3	5	8	5	2
		2 x 6	9	6	8	8	8	0	7	6	10	8	9	3	8	3	7	6
		2 x 8	12	7	11	5	10	7	9	11	14	1	12	2	10	11	9	11
		2 x 10	16	0	14	7	13	6	12	8	18	0	15	7	13	11	12	8
2 x 12		19	6	17	8	16	5	15	5	21	10	18	11	16	11	15	5	
No. 3	2 x 4	5	6	4	9	4	3	3	11	5	6	4	9	4	3	3	11	
	2 x 6	7	11	6	10	6	2	5	7	7	11	6	10	6	2	5	7	
	2 x 8	10	6	9	1	8	1	7	5	10	6	9	1	8	1	7	5	
	2 x 10	13	5	11	7	10	4	9	5	13	5	11	7	10	4	9	5	
2 x 12	16	4	14	1	12	7	11	6	16	4	14	1	12	7	11	6		
Con- struction	2 x 4	5	10	5	3	4	9	4	4	6	2	5	4	4	9	4	4	
Standard	2 x 4	4	9	4	2	3	8	3	4	4	9	4	2	3	8	3	4	
Utility	2 x 4	3	2	2	9	2	5	2	3	3	2	2	9	2	5	2	3	

TABLE IV-F
ROOF JOISTS—SUPPORTING CEILING
(LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size, in.	LIVE LOAD 30 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.
Douglas Fir Western Larch	Select structural	2 x 4	7	11	7	3	6	8	6	4	9	1	8	3	7	8	7	3
		2 x 6	12	6	11	4	10	7	9	11	14	4	13	0	12	1	11	4
		2 x 8	16	6	15	0	13	11	13	1	18	11	17	2	15	11	15	0
		2 x 10	21	1	19	2	17	9	16	9	24	2	21	11	20	4	19	2
	No. 1	2 x 12	25	8	23	4	21	8	20	4	29	4	26	8	24	9	23	4
		2 x 4	7	11	7	3	6	8	6	4	9	1	8	3	7	8	7	3
		2 x 6	12	6	11	4	10	7	9	11	14	4	13	0	12	1	11	3
		2 x 8	16	6	15	0	13	11	13	1	18	11	17	2	15	11	14	10
	No. 2	2 x 10	21	1	19	2	17	9	16	9	24	2	21	11	20	4	18	11
		2 x 12	25	8	23	4	21	8	20	4	29	4	26	8	24	9	23	1
		2 x 4	7	8	7	0	6	6	6	1	8	10	8	0	7	5	6	11
		2 x 6	12	1	11	0	10	2	9	7	13	10	12	5	11	1	10	2
	No. 3	2 x 8	15	11	14	6	13	5	12	8	18	3	16	5	14	8	13	5
		2 x 10	20	4	18	6	17	2	16	2	23	4	20	11	18	9	17	1
		2 x 12	24	2	22	6	20	11	19	8	28	4	25	6	22	9	20	9
		2 x 4	7	4	6	4	5	8	5	2	7	4	6	4	5	8	5	2
	Con- struction	2 x 6	10	11	9	5	8	5	7	8	10	11	9	5	8	5	7	8
		2 x 8	14	4	12	5	11	1	10	2	14	4	12	5	11	1	10	2
		2 x 10	18	4	15	11	14	2	13	0	18	4	15	11	14	2	13	0
		2 x 12	22	4	19	4	17	3	15	9	22	4	19	4	17	3	15	9
	Standard	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
	Utility	2 x 4	4	4	3	9	3	4	3	1	4	4	3	9	3	4	3	1
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select structural	2 x 4	7	6	6	10	6	4	5	11	8	7	7	10	7	3	6	10
		2 x 6	11	10	10	9	9	11	9	4	13	6	12	3	11	5	10	6
		2 x 8	15	7	14	2	13	2	12	4	17	10	16	2	15	0	13	11
		2 x 10	19	11	18	1	16	9	15	9	22	9	20	8	19	2	17	9
	No. 1	2 x 12	24	2	22	0	20	5	19	2	27	8	25	2	23	4	21	7
		2 x 4	7	6	6	10	6	4	5	11	8	7	7	10	7	3	6	8
		2 x 6	11	10	10	9	9	11	9	4	13	6	11	11	10	8	9	9
		2 x 8	15	7	14	2	13	2	12	4	17	10	15	9	14	1	12	10
	No. 2	2 x 10	19	11	18	1	16	9	15	9	22	9	20	1	18	0	16	5
		2 x 12	23	4	21	3	19	5	17	9	25	2	21	9	19	5	17	9
		2 x 4	7	3	6	7	6	1	5	9	8	4	7	5	6	8	6	1
		2 x 6	11	5	10	4	9	6	8	8	12	3	10	7	9	6	8	8
	No. 3	2 x 8	15	1	13	8	12	6	11	5	16	2	14	0	12	6	11	5
		2 x 10	19	2	17	5	16	0	14	7	20	8	17	11	16	0	14	7
		2 x 12	23	4	21	3	19	5	17	9	25	2	21	9	19	5	17	9
		2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
	Con- struction	2 x 6	9	4	8	1	7	3	6	7	9	4	8	1	7	3	6	7
		2 x 8	12	4	10	8	9	6	8	8	12	4	10	8	9	6	8	8
		2 x 10	15	8	13	7	12	2	11	1	15	8	13	7	12	2	11	1
		2 x 12	19	1	16	7	14	10	13	6	19	1	16	7	14	10	13	6
	Standard	2 x 4	5	4	4	8	4	2	3	9	5	4	4	8	4	2	3	9
	Utility	2 x 4	3	7	3	1	2	9	2	6	3	7	3	1	2	9	2	6

Continued on next page

TABLE IV-F (Cont'd)
ROOF JOISTS—SUPPORTING CEILING
(LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size, in.	LIVE LOAD 30 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select structural	2 x 4	7	1	6	5	5	11	5	7	8	1	7	4	6	10	6	5
		2 x 6	11	1	10	1	9	4	8	10	12	9	11	7	10	9	10	1
		2 x 8	14	8	13	4	12	4	11	7	16	9	15	3	14	2	13	4
		2 x 10	18	9	17	0	15	9	14	10	21	5	19	6	18	1	17	0
		2 x 12	22	9	20	8	19	2	18	1	26	1	23	8	22	0	20	8
	No. 1	2 x 4	7	1	6	5	5	11	5	7	8	1	7	4	6	10	6	5
		2 x 6	11	1	10	1	9	4	8	10	12	9	11	5	10	3	9	4
		2 x 8	14	8	13	4	12	4	11	7	16	9	15	1	13	6	12	4
		2 x 10	18	9	17	0	15	9	14	10	21	5	19	3	17	3	15	8
		2 x 12	22	9	20	8	19	2	18	1	26	1	23	5	20	11	19	1
	No. 2	2 x 4	6	10	6	2	5	9	5	5	7	10	7	1	6	4	5	9
		2 x 6	10	9	9	9	9	1	8	5	11	11	10	4	9	3	8	5
		2 x 8	14	2	12	10	11	11	11	1	15	9	13	8	12	2	11	1
		2 x 10	18	1	16	5	15	3	14	2	20	1	17	5	15	7	14	2
		2 x 12	22	0	20	0	18	7	17	3	24	6	21	2	18	11	17	3
	No. 3	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
		2 x 6	8	11	7	8	6	10	6	3	8	11	7	8	6	10	6	3
		2 x 8	11	9	10	2	9	1	8	3	11	9	10	2	9	1	8	3
		2 x 10	15	0	13	0	11	7	10	7	15	0	13	0	11	7	10	7
		2 x 12	18	3	15	9	14	1	12	10	18	3	15	9	14	1	12	10
	Con- struction	2 x 4	6	7	5	11	5	4	4	11	6	11	6	0	5	4	4	11
	Standard	2 x 4	5	4	4	8	4	2	3	9	5	4	4	8	4	2	3	9
	Utility	2 x 4	3	7	3	1	2	9	2	6	3	7	3	1	2	9	2	6
Western Red Cedar Red Pine Western White Pine White Pine	Select structural	2 x 4	6	10	6	2	5	9	5	5	7	9	7	1	6	7	6	2
		2 x 6	10	9	9	9	9	0	8	6	12	3	11	2	10	4	9	1
		2 x 8	14	2	12	10	11	11	11	2	16	2	14	8	13	8	12	10
		2 x 10	18	0	16	5	15	3	14	4	20	8	18	9	17	5	16	5
		2 x 12	21	11	19	11	18	6	17	5	25	2	22	10	21	2	19	11
	No. 1	2 x 4	6	10	6	2	5	9	5	5	7	9	7	1	6	7	6	2
		2 x 6	10	9	9	9	9	0	8	6	12	3	11	2	10	0	9	1
		2 x 8	14	2	12	10	11	11	11	2	16	2	14	8	13	2	12	0
		2 x 10	18	0	16	5	15	3	14	4	20	8	18	9	16	10	15	4
		2 x 12	21	11	19	11	18	6	17	5	25	2	22	10	20	6	18	8
	No. 2	2 x 4	6	7	5	11	5	6	5	2	7	6	6	10	6	2	5	8
		2 x 6	10	4	9	4	8	8	8	2	11	7	10	0	9	0	8	2
		2 x 8	13	7	12	4	11	6	10	9	15	4	13	3	11	10	10	10
		2 x 10	17	4	15	9	14	8	13	9	19	6	16	11	15	1	13	10
		2 x 12	21	2	19	2	17	10	16	9	23	9	20	7	18	5	16	10
	No. 3	2 x 4	5	11	5	1	4	7	4	2	5	11	5	1	4	7	4	2
		2 x 6	8	11	7	8	6	10	6	3	8	11	7	8	6	10	6	3
		2 x 8	11	9	10	2	9	1	8	3	11	9	10	2	9	1	8	3
		2 x 10	15	0	13	0	11	7	10	7	15	0	13	0	11	7	10	7
		2 x 12	18	3	15	9	14	1	12	10	18	3	15	9	14	1	12	10
	Con- struction	2 x 4	6	4	5	9	5	2	4	9	6	8	5	9	5	2	4	9
	Standard	2 x 4	5	0	4	4	3	11	3	7	5	0	4	4	3	11	3	7
	Utility	2 x 4	3	7	3	1	2	9	2	6	3	7	3	1	2	9	2	6

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TABLE IV-F (Cont'd)
 ROOF JOISTS—SUPPORTING CEILING
 (LIVE LOAD 30 lb per sq ft)

Species	Grade	Nominal Size, in.	LIVE LOAD 30 lb per sq ft											
			Gypsum Board or Plastered Ceiling						Other Ceilings					
			Joist Spacing						Joist Spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.	
			ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select structural	2 x 4	7	2	6	6	6	0	5	8	8	2	7	5
		2 x 6	11	3	10	3	9	6	8	11	12	11	11	8
		2 x 8	14	10	13	6	12	6	11	9	17	0	15	5
		2 x 10	18	11	17	2	16	0	15	0	21	8	18	3
		2 x 12	23	1	20	11	19	5	18	3	26	5	24	0
	No. 1	2 x 4	7	2	6	6	6	0	5	8	8	2	7	5
		2 x 6	11	3	10	3	9	6	8	11	12	11	11	8
		2 x 8	14	10	13	6	12	6	11	9	17	0	15	5
		2 x 10	18	11	17	2	16	0	15	0	21	8	18	3
		2 x 12	23	1	20	11	19	5	18	3	26	5	24	0
	No. 2	2 x 4	6	11	6	3	5	10	5	6	7	11	7	2
		2 x 6	10	10	9	10	9	2	8	7	12	5	11	4
		2 x 8	14	4	13	0	12	1	11	4	16	5	14	11
		2 x 10	18	3	16	7	15	5	14	6	20	11	19	0
		2 x 12	22	3	20	3	18	9	17	8	25	6	23	2
	No. 3	2 x 4	6	8	6	0	5	4	4	11	6	11	6	0
		2 x 6	10	2	8	9	7	10	7	2	10	2	8	9
		2 x 8	13	5	11	7	10	4	9	5	13	5	11	7
		2 x 10	17	1	14	9	13	3	12	1	17	1	14	9
		2 x 12	20	9	18	0	16	1	14	8	20	9	18	0
	Con- struction	2 x 4	6	8	6	0	5	7	5	3	7	7	6	9
	Standard	2 x 4	5	11	5	1	4	7	4	2	5	11	5	1
	Utility	2 x 4	4	0	3	5	3	1	2	10	4	0	3	5
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select structural	2 x 4	6	10	6	3	5	10	5	5	7	11	7	2
		2 x 6	10	10	9	10	9	2	8	7	12	5	11	3
		2 x 8	14	3	13	0	12	1	11	4	16	4	14	10
		2 x 10	18	3	16	7	15	5	14	6	20	11	19	0
		2 x 12	22	2	20	2	18	9	17	7	25	5	23	1
	No. 1	2 x 4	6	10	6	3	5	10	5	5	7	11	7	2
		2 x 6	10	10	9	10	9	2	8	7	12	5	11	3
		2 x 8	14	3	13	0	12	1	11	4	16	4	14	10
		2 x 10	18	3	16	7	15	5	14	6	20	11	19	0
		2 x 12	22	2	20	2	18	9	17	7	25	5	23	1
	No. 2	2 x 4	6	8	6	0	5	7	5	3	7	7	6	11
		2 x 6	10	6	9	6	8	10	8	4	11	11	10	4
		2 x 8	13	10	12	7	11	8	10	11	15	9	13	8
		2 x 10	17	8	16	0	14	10	14	0	20	1	17	5
		2 x 12	21	5	19	6	18	1	17	0	24	6	21	2
	No. 3	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4
		2 x 6	8	11	7	8	6	10	6	3	8	11	7	8
		2 x 8	11	9	10	2	9	1	8	3	11	9	10	2
		2 x 10	15	0	13	0	11	7	10	7	15	0	13	0
		2 x 12	18	3	15	9	14	1	12	10	18	3	15	9
	Con- struction	2 x 4	6	5	5	10	5	4	4	11	6	11	6	0
	Standard	2 x 4	5	4	4	8	4	2	3	9	5	4	4	8
	Utility	2 x 4	3	7	3	1	2	9	2	6	3	7	3	1

TABLE IV-G

ROOF JOISTS—SUPPORTING CEILING

(LIVE LOAD 20 lb per sq ft)

Species	Grade	Nominal Size.	LIVE LOAD 20 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	<i>ft</i>	<i>in.</i>	
Douglas Fir Western Larch	Select structural	2 x 4	9	1	8	3	7	8	7	3	10	5	9	6	8	10	8	3
		2 x 6	14	4	13	0	12	1	11	4	16	5	14	11	13	10	13	0
		2 x 8	18	11	17	2	15	11	15	0	21	8	19	8	18	3	17	2
		2 x 10	24	2	21	11	20	4	19	2	27	8	25	1	23	4	21	11
		2 x 12	29	4	26	8	24	9	23	4	33	8	30	7	28	4	26	8
	No. 1	2 x 4	9	1	8	3	7	8	7	3	10	5	9	6	8	10	8	3
		2 x 6	14	4	13	0	12	1	11	4	16	5	14	11	13	10	13	0
		2 x 8	18	11	17	2	15	11	15	0	21	8	19	8	18	3	17	2
		2 x 10	24	2	21	11	20	4	19	2	27	8	25	1	23	4	21	11
		2 x 12	29	4	26	8	24	9	23	4	33	8	30	7	28	4	26	8
	No. 2	2 x 4	8	10	8	0	7	5	7	0	10	1	9	2	8	6	8	0
		2 x 6	13	10	12	7	11	8	11	0	15	10	14	4	12	10	11	9
		2 x 8	18	3	16	7	15	5	14	6	20	11	18	11	16	11	15	5
		2 x 10	23	4	21	2	19	8	18	6	24	2	21	7	19	9	19	9
		2 x 12	28	4	25	9	23	11	22	6	32	6	29	5	26	4	24	0
	No. 3	2 x 4	8	5	7	4	6	7	6	0	8	6	7	4	6	7	6	0
		2 x 6	12	7	10	11	9	9	8	11	12	7	10	11	9	9	8	11
		2 x 8	16	7	14	4	12	10	11	9	16	7	14	4	12	10	11	9
		2 x 10	21	2	18	4	16	5	15	0	21	2	18	4	16	5	15	0
		2 x 12	25	9	22	4	20	0	18	3	25	9	22	4	20	0	18	3
	Con- struction	2 x 4	8	5	7	8	7	1	6	8	9	8	8	5	7	6	6	10
	Standard	2 x 4	7	2	6	2	5	6	5	0	7	2	6	2	5	6	5	0
	Utility	2 x 4	5	0	4	4	3	11	3	7	5	0	4	4	3	11	3	7
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select structural	2 x 4	8	7	7	10	7	3	6	10	9	10	8	11	8	4	7	10
		2 x 6	13	6	12	3	11	5	10	9	15	6	14	1	13	1	12	2
		2 x 8	17	10	16	2	15	0	14	2	20	5	18	7	17	3	16	0
		2 x 10	22	9	20	8	19	2	18	1	26	1	23	8	22	0	20	6
		2 x 12	27	8	25	2	23	4	22	0	31	9	28	10	26	9	24	11
	No. 1	2 x 4	8	7	7	10	7	3	6	10	9	10	8	11	8	4	7	9
		2 x 6	13	6	12	3	11	5	10	9	15	6	13	9	12	4	11	3
		2 x 8	17	10	16	2	15	0	14	2	20	5	18	2	16	3	14	10
		2 x 10	22	9	20	8	19	2	18	1	26	1	23	3	20	9	18	11
		2 x 12	27	8	25	2	23	4	22	0	31	9	28	3	25	3	23	1
	No. 2	2 x 4	8	4	7	6	7	0	6	7	9	6	8	7	7	8	7	0
		2 x 6	13	1	11	10	11	0	10	0	14	2	12	3	11	0	10	0
		2 x 8	17	3	15	8	14	6	13	2	18	8	16	2	14	6	13	2
		2 x 10	22	0	20	0	18	6	16	10	23	10	20	8	18	6	16	10
		2 x 12	26	9	24	4	22	6	20	6	29	0	25	2	22	6	20	6
	No. 3	2 x 4	7	2	6	2	5	6	5	0	7	2	6	2	5	6	5	0
		2 x 6	10	9	9	4	8	4	7	7	10	9	9	4	8	4	7	7
		2 x 8	14	3	12	4	11	0	10	0	14	3	12	4	11	0	10	0
		2 x 10	18	2	15	8	14	1	12	10	18	2	15	8	14	1	12	10
		2 x 12	22	1	19	1	17	1	15	7	22	1	19	1	17	1	15	7
	Con- struction	2 x 4	8	0	7	2	6	5	5	10	8	3	7	2	6	5	5	10
	Standard	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
	Utility	2 x 4	4	1	3	7	3	2	2	11	4	1	3	7	3	2	2	11

Continued on next page

TABLE IV-G (Cont'd)
ROOF JOISTS—SUPPORTING CEILING
(LIVE LOAD 20 lb per sq ft)

Species	Grade	Nominal Size.	LIVE LOAD 20 lb per sq ft															
			Gypsum Board or Plastered Ceiling								Other Ceilings							
			Joist Spacing								Joist Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select structural	2 x 4	8	1	7	4	6	10	6	5	9	3	8	5	7	10	7	4
		2 x 6	12	9	11	7	10	9	10	1	14	7	13	3	12	3	11	7
		2 x 8	16	9	15	3	14	2	13	4	19	3	17	5	16	2	15	3
		2 x 10	21	5	19	6	18	1	17	0	24	6	22	3	20	8	19	6
		2 x 12	26	1	23	8	22	0	20	3	29	10	27	1	25	2	23	8
	No. 1	2 x 4	8	1	7	4	6	10	6	5	9	3	8	5	7	10	7	4
		2 x 6	12	9	11	7	10	9	10	1	14	7	13	2	11	10	10	9
		2 x 8	16	9	15	3	14	2	13	4	19	3	17	5	15	7	14	3
		2 x 10	21	5	19	6	18	1	17	0	24	6	22	3	19	11	18	2
		2 x 12	26	1	23	8	22	0	20	8	29	10	27	1	24	2	22	1
	No. 2	2 x 4	7	10	7	1	6	7	6	2	8	11	8	2	7	4	6	8
		2 x 6	12	4	11	2	10	4	9	9	13	9	11	11	10	8	9	9
		2 x 8	16	3	14	9	13	8	12	10	18	2	15	9	14	1	12	10
		2 x 10	20	9	18	10	17	6	16	5	23	3	20	1	18	0	16	5
		2 x 12	25	2	22	11	21	3	20	0	28	3	24	6	21	10	20	0
	No. 3	2 x 4	7	2	6	2	5	6	5	0	7	2	6	2	5	6	5	0
		2 x 6	10	3	8	11	7	11	7	3	10	3	8	11	7	11	7	3
		2 x 8	13	7	11	9	10	6	9	7	13	7	11	9	10	6	9	7
		2 x 10	17	4	15	0	13	5	12	3	17	4	15	0	13	5	12	3
		2 x 12	21	1	18	3	16	4	14	10	21	1	18	3	16	4	14	10
	Con- struction	2 x 4	7	6	6	10	6	2	5	8	8	0	6	11	6	2	5	8
	Standard	2 x 4	6	2	5	4	4	9	4	4	6	2	5	4	4	9	4	4
	Utility	2 x 4	4	1	3	7	3	2	2	11	4	1	3	7	3	2	2	11
Western Red Cedar Red Pine Western White Pine White Pine	Select structural	2 x 4	7	9	7	1	6	7	6	2	8	11	8	1	7	6	7	1
		2 x 6	12	3	11	2	10	4	9	9	14	1	12	9	11	10	11	2
		2 x 8	16	2	14	8	13	8	12	10	18	6	16	10	15	7	14	8
		2 x 10	20	8	18	9	17	5	16	5	23	8	21	6	19	11	18	9
		2 x 12	25	2	22	10	21	2	19	11	28	9	26	2	24	3	22	10
	No. 1	2 x 4	7	9	7	1	6	7	6	2	8	11	8	1	7	6	7	1
		2 x 6	12	3	11	2	10	4	9	9	14	1	12	9	11	6	10	6
		2 x 8	16	2	14	8	13	8	12	10	18	6	16	10	15	3	13	11
		2 x 10	20	8	18	9	17	5	16	5	23	8	21	6	19	5	17	9
		2 x 12	25	2	22	10	21	2	19	11	28	9	26	2	23	8	21	7
	No. 2	2 x 4	7	6	6	10	6	4	5	11	8	7	7	10	7	2	6	6
		2 x 6	11	10	10	9	9	11	9	4	13	5	11	7	10	4	9	6
		2 x 8	15	7	14	2	13	2	12	4	17	8	15	4	13	8	12	6
		2 x 10	19	11	18	1	16	9	15	9	22	7	19	6	17	6	15	11
		2 x 12	24	2	22	0	20	5	19	2	27	5	23	9	21	3	19	5
	No. 3	2 x 4	6	10	5	11	5	3	4	10	6	10	5	11	5	3	4	10
		2 x 6	10	3	8	11	7	11	7	3	10	3	8	11	7	11	7	3
		2 x 8	13	7	11	9	10	6	9	7	13	7	11	9	10	6	9	7
		2 x 10	17	4	15	0	13	5	12	3	17	4	15	0	13	5	12	3
		2 x 12	21	1	18	3	16	4	14	10	21	1	18	3	16	4	14	10
	Con- struction	2 x 4	7	3	6	7	6	0	5	5	7	9	6	8	6	0	5	5
	Standard	2 x 4	5	10	5	0	4	6	4	1	5	10	5	0	4	6	4	1
	Utility	2 x 4	4	1	3	7	3	2	2	11	4	1	3	7	3	2	2	11

Continued on next page

TABLE IV-G (Cont'd)

ROOF JOISTS—SUPPORTING CEILING
(LIVE LOAD 20 lb per sq ft)

Species	Grade	Nominal Size, <i>in.</i>	LIVE LOAD 20 lb per sq ft											
			Gypsum Board or Plastered Ceiling						Other Ceilings					
			Joist Spacing						Joist Spacing					
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.	
			<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>	<i>ft in.</i>
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select structural	2 x 4	8 2	7 5	6 11	6 6	9 4	8 6	7 11	7 5	12 5	12 5	11 8	11 8
		2 x 6	12 11	11 8	10 10	10 3	14 9	13 5	12 5	11 8	16 5	15 5	15 5	15 5
		2 x 8	17 0	15 5	14 4	13 6	19 5	17 8	16 5	15 5	20 11	19 8	19 8	19 8
		2 x 10	21 8	19 8	18 3	17 2	24 10	22 7	20 11	19 8	25 6	24 0	24 0	24 0
		2 x 12	26 5	24 0	22 3	20 11	30 3	27 5	25 6	24 0				
	No. 1	2 x 4	8 2	7 5	6 11	6 6	9 4	8 6	7 11	7 5	12 5	12 5	11 8	11 8
		2 x 6	12 11	11 8	10 10	10 3	14 9	13 5	12 5	11 8	16 5	15 5	15 5	15 5
		2 x 8	17 0	15 5	14 4	13 6	19 5	17 8	16 5	15 5	20 11	19 8	19 8	19 8
		2 x 10	21 8	19 8	18 3	17 2	24 10	22 7	20 11	19 8	25 6	24 0	24 0	24 0
		2 x 12	26 5	24 0	22 3	20 11	30 3	27 5	25 6	24 0				
	No. 2	2 x 4	7 11	7 2	6 8	6 3	9 1	8 3	7 7	7 2	12 0	11 0	11 0	11 0
		2 x 6	12 5	11 4	10 6	9 10	14 3	12 11	12 0	11 0	15 10	14 6	14 6	14 6
		2 x 8	16 5	14 11	13 10	13 0	18 9	17 1	15 10	14 6	20 3	18 7	18 7	18 7
		2 x 10	20 11	19 0	17 8	16 7	24 0	21 9	20 3	18 7	25 6	24 0	24 0	24 0
		2 x 12	25 6	23 2	21 6	20 3	29 2	26 6	24 0	22 7				
	No. 3	2 x 4	7 7	6 11	6 2	5 8	8 0	6 11	6 2	5 8	12 0	11 0	11 0	11 0
		2 x 6	11 9	10 2	9 1	8 3	11 9	10 2	9 1	8 3	15 3	14 0	14 0	14 0
		2 x 8	15 5	13 5	12 0	10 11	15 5	13 5	12 0	11 0	18 7	17 0	17 0	17 0
		2 x 10	19 9	17 1	15 3	13 11	19 9	17 1	15 3	13 11	24 0	22 7	22 7	22 7
		2 x 12	24 0	20 9	18 7	17 0	24 0	20 9	18 7	17 0				
	Con- struction	2 x 4	7 7	6 11	6 5	6 0	8 8	7 9	7 0	6 4				
	Standard	2 x 4	6 10	5 11	5 3	4 10	6 10	5 11	5 3	4 10				
	Utility	2 x 4	4 7	4 0	3 7	3 3	4 7	4 0	3 7	3 3				
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select structural	2 x 4	7 11	7 2	6 8	6 3	9 0	8 2	7 7	7 2	12 0	11 0	11 0	11 0
		2 x 6	12 5	11 3	10 5	9 10	14 2	12 11	12 0	11 0	15 10	14 10	14 10	14 10
		2 x 8	16 4	14 10	13 9	13 0	18 9	17 0	15 10	14 10	20 2	19 0	19 0	19 0
		2 x 10	20 11	19 0	17 7	16 7	23 11	21 9	20 2	19 0	25 6	24 0	24 0	24 0
		2 x 12	25 5	23 1	21 5	20 2	29 1	26 5	24 0	22 7				
	No. 1	2 x 4	7 11	7 2	6 8	6 3	9 0	8 2	7 7	7 2	12 0	11 0	11 0	11 0
		2 x 6	12 5	11 3	10 5	9 10	14 2	12 11	12 0	11 0	15 10	14 10	14 10	14 10
		2 x 8	16 4	14 10	13 9	13 0	18 9	17 0	15 10	14 10	20 2	19 0	19 0	19 0
		2 x 10	20 11	19 0	17 7	16 7	23 11	21 9	20 2	19 0	25 6	24 0	24 0	24 0
		2 x 12	25 5	23 1	21 5	20 2	29 1	26 5	24 0	22 7				
	No. 2	2 x 4	7 7	6 11	6 5	6 0	8 9	7 11	7 4	6 8	12 0	11 0	11 0	11 0
		2 x 6	12 0	10 11	10 1	9 6	13 9	11 11	10 8	9 9	15 9	14 1	12 10	12 10
		2 x 8	15 10	14 4	13 4	12 7	18 1	15 9	14 1	12 10	20 3	18 7	18 7	18 7
		2 x 10	20 2	18 4	17 0	16 0	23 1	20 1	18 0	16 5	24 0	22 7	22 7	22 7
		2 x 12	24 7	22 4	20 9	19 6	28 1	24 6	21 10	20 0				
	No. 3	2 x 4	7 2	6 2	5 6	5 0	7 2	6 2	5 6	5 0	12 0	11 0	11 0	11 0
		2 x 6	10 3	8 11	7 11	7 3	10 3	8 11	7 11	7 3	15 3	14 0	14 0	14 0
		2 x 8	13 7	11 9	10 6	9 7	13 7	11 9	10 6	9 7	18 7	17 0	17 0	17 0
		2 x 10	17 4	15 0	13 5	12 3	17 4	15 0	13 5	12 3	21 1	18 3	18 3	18 3
		2 x 12	21 1	18 3	16 4	14 10	21 1	18 3	16 4	14 10				
	Con- struction	2 x 4	7 4	6 8	6 2	5 8	8 0	6 11	6 2	5 8				
	Standard	2 x 4	6 2	5 4	4 9	4 4	6 2	5 4	4 9	4 4				
	Utility	2 x 4	4 1	3 7	3 2	2 11	4 1	3 7	3 2	2 11				

TABLE IV-H

RAFTERS—NOT SUPPORTING CEILING
(LIVE LOADS 50 AND 40 lb per sq ft)

Species	Grade	Nominal Size.	LIVE LOAD 50 lb per sq ft								LIVE LOAD 40 lb per sq ft							
			Rafter Spacing								Rafter Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.
Douglas Fir Western Larch	Select structural	2 x 4	8	5	7	8	7	1	6	8	9	1	8	3	7	8	7	3
		2 x 6	13	4	12	1	11	3	10	4	14	4	13	0	12	1	11	4
		2 x 8	17	7	15	11	14	10	13	8	18	11	17	2	15	11	15	0
		2 x 10	22	5	20	4	18	11	17	5	24	2	21	11	20	4	19	2
		2 x 12	27	3	24	9	23	0	21	3	29	4	26	8	24	9	23	4
	No. 1	2 x 4	8	5	7	8	7	1	6	6	9	1	8	3	7	8	7	2
		2 x 6	13	4	11	8	10	5	9	6	14	4	12	10	11	6	10	6
		2 x 8	17	7	15	4	13	9	12	6	18	11	17	0	15	2	13	10
		2 x 10	22	5	19	7	17	7	16	0	24	2	21	8	19	4	17	8
		2 x 12	27	3	23	10	21	4	19	6	29	4	26	8	23	7	21	6
	No. 2	2 x 4	8	2	7	2	6	5	5	10	8	10	7	11	7	1	6	5
		2 x 6	12	2	10	6	9	5	8	7	13	5	11	7	10	4	9	5
		2 x 8	16	0	13	10	12	5	11	4	17	8	15	3	13	8	12	6
		2 x 10	20	5	17	8	15	10	14	5	22	6	19	6	17	5	15	11
		2 x 12	24	10	21	6	19	3	17	7	27	5	23	9	21	3	19	5
	No. 3	2 x 4	6	3	5	5	4	10	4	5	6	10	5	11	5	4	4	10
		2 x 6	9	2	8	0	7	1	6	6	10	2	8	9	7	10	7	2
		2 x 8	12	2	10	6	9	5	8	7	13	5	11	7	10	4	9	6
		2 x 10	15	6	13	5	12	0	10	11	17	1	14	10	13	3	12	1
		2 x 12	18	10	16	4	14	7	13	4	20	10	18	0	16	1	14	8
	Con- struction	2 x 4	7	1	6	2	5	6	5	0	7	10	6	9	6	1	5	6
	Standard	2 x 4	5	3	4	6	4	0	3	8	5	9	5	0	4	5	4	1
	Utility	2 x 4	3	8	3	2	2	10	2	7	4	1	3	6	3	2	2	10
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select structural	2 x 4	8	0	7	3	6	7	6	0	8	7	7	10	7	3	6	8
		2 x 6	12	7	10	11	9	9	8	11	13	6	12	0	10	9	9	10
		2 x 8	16	7	14	4	12	10	11	9	17	10	15	10	14	2	12	11
		2 x 10	21	2	18	4	16	5	15	0	22	9	20	3	18	1	16	6
		2 x 12	25	9	22	4	20	0	18	3	27	8	24	8	22	0	20	1
	No. 1	2 x 4	8	0	6	11	6	2	5	8	8	7	7	8	6	10	6	3
		2 x 6	11	8	10	1	9	0	8	3	12	10	11	2	9	11	9	1
		2 x 8	15	4	13	4	11	11	10	10	17	0	14	8	13	2	12	0
		2 x 10	19	7	17	0	15	2	13	10	21	8	18	9	16	9	15	4
		2 x 12	23	10	20	8	18	6	16	10	26	4	22	10	20	5	18	7
	No. 2	2 x 4	7	3	6	3	5	7	5	1	8	0	6	11	6	2	5	8
		2 x 6	10	4	9	0	8	0	7	4	11	5	9	11	8	10	8	1
		2 x 8	13	8	11	10	10	7	9	8	15	1	13	1	11	8	10	8
		2 x 10	17	5	15	1	13	6	12	4	19	3	16	8	14	11	13	7
		2 x 12	21	3	18	5	16	5	15	0	23	5	20	3	18	2	16	7
	No. 3	2 x 4	5	3	4	6	4	0	3	8	5	9	5	0	4	5	4	1
		2 x 6	7	10	6	10	6	1	5	7	8	8	7	6	6	9	6	2
		2 x 8	10	5	9	0	8	0	7	4	11	6	9	11	8	10	8	1
		2 x 10	13	3	11	6	10	3	9	4	14	8	12	8	11	4	10	4
		2 x 12	16	2	14	0	12	6	11	5	17	10	15	5	13	10	12	7
	Con- struction	2 x 4	6	0	5	3	4	8	4	3	6	8	5	9	5	2	4	8
	Standard	2 x 4	4	6	3	11	3	6	3	2	5	0	4	4	3	10	3	6
	Utility	2 x 4	3	0	2	7	2	4	2	1	3	4	2	10	2	7	2	4

Continued on next page

TABLE IV-H (Cont'd)

RAFTERS—NOT SUPPORTING CEILING
(LIVE LOADS 50 AND 40 lb per sq ft)

Species	Grade	Nominal Size, in.	LIVE LOAD 50 lb per sq ft								LIVE LOAD 40 lb per sq ft							
			Rafter Spacing								Rafter Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select structural	2 x 4	7	6	6	10	6	4	5	10	8	1	7	4	6	10	6	5
		2 x 6	11	10	10	6	9	5	8	7	12	9	11	7	10	4	9	5
		2 x 8	15	7	13	10	12	5	11	4	16	9	15	3	13	8	12	6
		2 x 10	19	11	17	8	15	10	14	5	21	5	19	6	17	5	15	11
		2 x 12	24	2	21	6	19	3	17	7	26	1	23	8	21	3	19	5
	No. 1	2 x 4	7	6	6	8	5	11	5	5	8	1	7	4	6	7	6	0
		2 x 6	11	2	9	8	8	8	7	10	12	4	10	8	9	6	8	8
		2 x 8	14	9	12	9	11	5	10	5	16	3	14	1	12	7	11	6
		2 x 10	18	9	16	3	14	6	13	3	20	9	17	11	16	1	14	8
		2 x 12	22	10	19	9	17	8	16	2	25	3	21	10	19	6	17	10
	No. 2	2 x 4	6	11	6	0	5	4	4	11	7	8	6	7	5	11	5	5
		2 x 6	10	1	8	9	7	10	7	11	11	2	9	8	8	7	7	10
		2 x 8	13	4	11	6	10	4	9	5	14	8	12	9	11	4	10	4
		2 x 10	17	0	14	8	13	2	12	0	18	9	16	3	14	6	13	3
		2 x 12	20	8	17	11	16	0	14	7	22	10	19	9	17	8	16	1
	No. 3	2 x 4	5	3	4	6	4	0	3	8	5	9	5	0	4	5	4	1
		2 x 6	9	6	6	6	5	10	5	10	8	3	7	2	6	5	5	10
		2 x 8	11	8	7	7	7	8	7	0	10	11	9	6	8	6	7	9
		2 x 10	12	8	10	11	9	9	8	11	14	0	12	1	10	10	9	10
		2 x 12	15	5	13	4	11	11	10	10	17	0	14	8	13	2	12	0
	Con- struction	2 x 4	5	10	5	1	4	6	4	1	6	5	5	7	5	0	4	7
	Standard	2 x 4	4	6	3	11	3	6	3	2	5	0	4	4	3	10	3	6
	Utility	2 x 4	3	0	2	7	2	4	2	1	3	4	2	10	2	7	2	4
Western Red Cedar Red Pine Western White Pine White Pine	Select structural	2 x 4	7	3	6	7	6	1	5	8	7	9	7	1	6	7	6	2
		2 x 6	11	5	10	3	9	2	8	5	12	3	11	2	10	2	9	3
		2 x 8	15	0	13	7	12	2	11	1	16	2	14	8	13	5	12	3
		2 x 10	19	2	17	4	15	6	14	2	20	8	18	9	17	1	15	7
		2 x 12	23	4	21	1	18	10	17	3	25	2	22	10	20	10	19	0
	No. 1	2 x 4	7	3	6	5	5	9	5	3	7	9	7	1	6	4	5	9
		2 x 6	10	11	9	5	8	5	7	8	12	0	10	5	9	4	8	6
		2 x 8	14	4	12	5	11	1	10	2	15	10	13	9	12	3	11	2
		2 x 10	18	4	15	11	14	2	13	0	20	3	17	6	15	8	14	4
		2 x 12	22	4	19	4	17	3	15	9	24	8	21	4	19	1	17	5
	No. 2	2 x 4	5	9	5	10	5	3	4	9	7	5	6	5	5	9	5	3
		2 x 6	9	10	8	6	7	7	6	11	10	10	9	4	8	4	7	8
		2 x 8	12	11	11	2	10	0	9	2	14	3	12	4	11	1	10	1
		2 x 10	16	6	14	3	12	9	11	8	18	3	15	9	14	1	12	10
		2 x 12	20	1	17	5	15	7	14	2	22	2	19	2	17	2	15	8
	No. 3	2 x 4	5	0	4	4	3	10	3	6	5	6	4	9	4	3	3	11
		2 x 6	7	6	6	6	5	10	5	4	8	3	7	2	6	5	5	10
		2 x 8	9	11	8	7	7	8	7	0	10	11	9	6	8	6	7	9
		2 x 10	12	8	10	11	9	9	8	11	14	0	12	1	10	10	9	10
		2 x 12	15	5	13	4	11	11	10	10	17	0	14	8	13	2	12	0
	Con- struction	2 x 4	5	8	4	11	4	4	4	0	6	3	5	5	4	10	4	5
	Standard	2 x 4	4	3	3	8	3	3	3	0	4	8	4	1	3	8	3	4
	Utility	2 x 4	3	0	2	7	2	4	2	1	3	4	2	10	2	7	2	4

Continued on next page

TABLE IV-H (Cont'd)

RAFTERS—NOT SUPPORTING CEILING
(LIVE LOADS 50 AND 40 lb per sq ft)

Species	Grade	Nominal Size, in.	LIVE LOAD 50 lb per sq ft								LIVE LOAD 40 lb per sq ft							
			Rafter Spacing								Rafter Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select structural	2 x 4	7	7	6	11	6	5	6	0	8	2	7	5	6	11	6	6
		2 x 6	11	11	10	10	10	1	9	6	12	11	11	8	10	10	10	3
		2 x 8	15	9	14	4	13	4	12	6	17	0	15	5	14	4	13	6
		2 x 10	20	2	18	3	17	0	16	0	21	8	19	8	18	3	17	2
		2 x 12	24	6	22	3	20	8	19	5	26	5	24	0	22	3	20	11
	No. 1	2 x 4	7	7	6	11	6	5	6	0	8	2	7	5	6	11	6	6
		2 x 6	11	11	10	10	9	9	8	11	12	11	11	8	10	9	9	10
		2 x 8	15	9	14	4	12	10	11	9	17	0	15	5	14	2	12	11
		2 x 10	20	2	18	3	16	5	15	0	21	8	19	8	18	1	16	6
		2 x 12	24	6	22	3	20	0	18	3	26	5	24	0	22	0	20	1
	No. 2	2 x 4	7	4	6	8	6	1	5	6	7	11	7	2	6	8	6	1
		2 x 6	11	5	9	10	8	10	8	1	12	5	10	11	9	9	8	11
		2 x 8	15	1	13	0	11	8	10	8	16	5	14	4	12	10	11	9
		2 x 10	19	2	16	8	14	10	13	7	20	11	18	4	16	5	15	0
		2 x 12	24	3	20	3	18	1	16	6	25	5	22	4	20	0	18	3
	No. 3	2 x 4	5	10	5	1	4	6	4	1	6	5	5	7	5	0	4	7
		2 x 6	8	7	7	5	6	7	6	1	9	5	8	2	7	4	6	8
		2 x 8	11	4	9	9	8	9	8	0	12	6	10	10	9	8	8	10
		2 x 10	14	5	12	6	11	2	10	2	15	11	13	9	12	4	11	3
		2 x 12	17	7	15	2	13	7	12	5	19	5	16	9	15	0	13	8
	Con- struction	2 x 4	6	7	5	8	5	1	4	8	7	3	6	3	5	7	5	1
	Standard	2 x 4	5	0	4	4	3	10	3	6	5	6	4	9	4	3	3	11
	Utility	2 x 4	3	4	2	11	2	7	2	4	3	8	3	2	2	10	2	7
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select structural	2 x 4	7	4	6	8	6	2	5	10	7	11	7	2	6	8	6	3
		2 x 6	11	6	10	5	9	5	8	7	12	5	11	3	10	4	9	5
		2 x 8	15	2	13	9	12	5	11	4	16	4	14	10	13	8	12	6
		2 x 10	19	5	17	7	15	10	14	5	20	11	19	0	17	5	15	11
		2 x 12	23	7	21	5	19	3	17	7	25	5	23	1	21	3	19	5
	No. 1	2 x 4	7	4	6	8	5	11	5	5	7	11	7	2	6	7	6	0
		2 x 6	11	2	9	8	8	8	7	10	12	4	10	8	9	6	8	8
		2 x 8	14	9	12	9	11	5	10	5	16	3	14	1	12	7	11	6
		2 x 10	18	9	16	3	14	6	13	3	20	9	17	11	16	1	14	8
		2 x 12	22	10	19	9	17	8	16	2	25	3	21	10	19	6	17	10
	No. 2	2 x 4	6	11	6	0	5	4	4	11	7	7	6	7	5	11	5	5
		2 x 6	10	1	8	9	7	10	7	1	11	2	9	8	8	7	7	10
		2 x 8	13	4	11	6	10	4	9	5	14	8	12	9	11	4	10	4
		2 x 10	17	0	14	8	13	2	12	0	18	9	16	3	14	6	13	3
		2 x 12	20	8	17	11	16	0	14	7	22	10	19	9	17	8	16	1
	No. 3	2 x 4	5	3	4	6	4	0	3	8	5	9	5	0	4	5	4	1
		2 x 6	7	6	6	6	5	10	5	4	8	3	7	2	6	5	5	10
		2 x 8	9	11	8	7	7	8	7	0	10	11	9	6	8	6	7	9
		2 x 10	12	8	10	11	9	9	8	11	14	0	12	1	10	10	9	10
		2 x 12	15	5	13	4	11	11	10	10	17	0	14	8	13	2	12	0
	Con- struction	2 x 4	5	10	5	1	4	6	4	1	6	5	5	7	5	0	4	7
	Standard	2 x 4	4	6	3	11	3	6	3	2	5	0	4	4	3	10	3	6
	Utility	2 x 4	3	0	2	7	2	4	2	1	3	4	2	10	2	7	2	4

TABLE IV-I

RAFTERS—NOT SUPPORTING CEILING
(LIVE LOADS 30 AND 20 lb per sq ft)

Species	Grade	Nominal Size.	LIVE LOAD 30 lb. per sq. ft.				LIVE LOAD 20 lb. per sq. ft.			
			Rafter Spacing				Rafter Spacing			
			12 in.	16 in.	20 in.	24 in.	12 in.	16 in.	20 in.	24 in.
			ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
Douglas Fir Western Larch	Select structural	2 x 4	10 0	9 1	8 5	7 11	11 6	10 5	9 8	9 1
		2 x 6	15 9	14 4	13 4	12 6	18 1	16 5	15 3	14 4
		2 x 8	20 10	18 11	17 7	16 6	23 10	21 8	20 1	18 11
		2 x 10	26 7	24 2	22 5	21 1	30 5	27 8	25 8	24 2
		2 x 12	32 4	29 4	27 3	25 8	37 0	33 8	31 3	29 4
	No. 1	2 x 4	10 0	9 1	8 5	7 11	11 6	10 5	9 8	9 1
		2 x 6	15 9	14 4	13 0	11 10	18 1	16 5	15 3	14 0
		2 x 8	20 10	18 11	17 2	15 8	23 10	21 8	20 1	18 5
		2 x 10	26 7	24 2	21 11	20 0	30 5	27 8	25 8	23 6
		2 x 12	32 4	29 4	26 8	24 4	37 0	33 8	31 3	28 7
	No. 2	2 x 4	9 8	8 10	8 0	7 4	11 1	10 1	9 4	8 7
		2 x 6	15 2	13 1	11 9	10 8	17 6	15 5	13 9	12 7
		2 x 8	20 0	17 3	15 5	14 1	23 0	20 4	18 2	16 7
		2 x 10	25 6	22 1	19 9	18 0	29 5	26 0	23 3	21 2
		2 x 12	31 0	26 10	24 0	21 11	35 9	31 7	28 3	25 9
	No. 3	2 x 4	7 9	6 9	6 0	5 6	9 2	7 11	7 1	6 5
		2 x 6	11 6	9 11	8 11	8 1	13 6	11 8	10 6	9 7
		2 x 8	15 2	13 1	11 9	10 8	17 10	15 5	13 10	12 7
		2 x 10	19 4	16 9	15 0	13 8	22 9	19 9	17 8	16 1
		2 x 12	23 6	20 5	18 3	16 8	27 8	24 0	21 5	19 7
	Con- struction	2 x 4	8 10	7 8	6 10	6 3	10 5	9 0	8 1	7 4
	Standard	2 x 4	6 6	5 8	5 0	4 7	7 8	6 8	5 11	5 5
	Utility	2 x 4	4 7	4 0	3 7	3 3	5 5	4 8	4 2	3 10
Pacific Coast Hemlock Amabilis Fir Grand Fir	Select structural	2 x 4	9 6	8 7	8 0	7 6	10 10	9 10	9 2	8 7
		2 x 6	14 11	13 6	12 2	11 1	17 1	15 6	14 4	13 1
		2 x 8	19 8	17 10	16 0	14 8	22 6	20 5	18 11	17 3
		2 x 10	25 1	22 9	20 6	18 8	28 8	26 1	24 1	22 0
		2 x 12	30 6	27 8	24 11	22 9	34 11	31 9	29 4	26 9
	No. 1	2 x 4	9 6	8 7	7 9	7 1	10 10	9 10	9 1	8 4
		2 x 6	14 6	12 7	11 3	10 3	17 1	14 10	13 3	12 1
		2 x 8	19 2	16 7	14 10	13 7	22 6	19 7	17 6	15 11
		2 x 10	24 6	21 2	18 11	17 4	28 8	24 11	22 4	20 4
		2 x 12	29 9	25 9	23 1	21 1	34 11	30 4	27 2	24 9
	No. 2	2 x 4	9 0	7 10	7 0	6 5	10 6	9 3	8 3	7 6
		2 x 6	12 11	11 2	10 0	9 2	15 3	13 2	11 9	10 9
		2 x 8	17 1	14 9	13 2	12 1	20 1	17 5	15 7	14 2
		2 x 10	21 9	18 10	16 10	15 5	25 8	22 2	19 10	18 1
		2 x 12	26 6	22 11	20 6	18 9	31 2	27 0	24 2	22 0
	No. 3	2 x 4	6 6	5 8	5 0	4 7	7 8	6 8	5 11	5 5
		2 x 6	9 10	8 6	7 7	6 11	11 7	10 0	8 11	8 2
		2 x 8	13 0	11 3	10 0	9 2	15 3	13 3	11 10	10 9
		2 x 10	16 7	14 4	12 10	11 8	19 6	16 11	15 1	13 9
		2 x 12	20 2	17 5	15 7	14 3	23 9	20 6	18 4	16 9
	Con- struction	2 x 4	7 6	6 6	5 10	5 4	8 10	7 8	6 10	6 3
	Standard	2 x 4	5 8	4 11	4 4	4 0	6 8	5 9	5 2	4 8
	Utility	2 x 4	3 9	3 3	2 11	2 8	4 5	3 10	3 5	3 1

Continued on next page

TABLE IV-I (Cont'd)
 RAFTERS—NOT SUPPORTING CEILING
 (LIVE LOADS 30 AND 20 lb per sq ft)

Species	Grade	Nominal Size.	LIVE LOAD 30 lb. per sq. ft.								LIVE LOAD 20 lb. per sq. ft.							
			Rafter Spacing								Rafter Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.
Spruce (all species) Balsam Fir Alpine Fir Lodgepole Pine Ponderosa Pine	Select structural	2 x 4	8	11	8	1	7	6	7	1	10	2	9	3	8	7	8	1
		2 x 6	14	0	12	9	11	9	10	8	16	0	14	7	13	6	12	7
		2 x 8	18	6	16	9	15	5	14	1	21	2	19	3	17	10	16	7
		2 x 10	23	7	21	5	19	9	18	0	27	0	24	6	22	9	21	2
		2 x 12	28	8	26	1	24	0	21	11	32	10	29	10	27	8	25	9
	No. 1	2 x 4	8	11	8	1	7	5	6	9	10	2	9	3	8	7	8	0
		2 x 6	13	11	12	1	10	9	9	10	16	0	14	2	12	8	11	7
		2 x 8	18	4	15	11	14	3	13	0	21	2	18	9	16	9	15	3
		2 x 10	23	5	20	3	18	2	16	7	27	0	23	11	21	4	19	6
		2 x 12	28	6	24	8	22	1	20	2	32	10	29	1	26	0	23	9
	No. 2	2 x 4	8	7	7	6	6	8	6	1	9	10	8	10	7	10	7	2
		2 x 6	12	7	10	11	9	9	8	11	14	10	12	10	11	6	10	6
		2 x 8	16	7	14	4	12	10	11	9	19	7	16	11	15	2	13	10
		2 x 10	21	2	18	4	16	5	15	0	24	11	21	7	19	4	17	8
		2 x 12	25	9	22	4	20	0	18	3	30	4	26	3	23	6	21	5
	No. 3	2 x 4	6	6	5	8	5	0	4	7	7	8	6	8	5	11	5	5
		2 x 6	9	4	8	1	7	3	6	7	11	0	9	7	8	6	7	9
		2 x 8	12	4	10	8	9	7	8	9	14	7	12	7	11	3	10	3
		2 x 10	15	9	13	8	12	3	11	2	18	7	16	1	14	5	13	2
		2 x 12	19	3	16	8	14	10	13	7	22	7	19	7	17	6	16	0
	Con- struction	2 x 4	7	4	6	4	5	8	5	2	8	7	7	5	6	8	6	1
	Standard	2 x 4	5	8	4	11	4	4	4	0	6	8	5	9	5	2	4	8
	Utility	2 x 4	3	9	3	3	2	11	2	8	4	5	3	10	3	5	3	1
Western Red Cedar Red Pine Western White Pine White Pine	Select structural	2 x 4	8	7	7	9	7	3	6	10	9	10	8	11	8	3	7	9
		2 x 6	13	6	12	3	11	5	10	6	15	6	14	1	13	0	12	3
		2 x 8	17	10	16	2	15	0	13	10	20	5	18	6	17	2	16	2
		2 x 10	22	9	20	8	19	2	17	8	26	0	23	8	21	11	20	8
		2 x 12	27	8	25	2	23	4	21	6	31	8	28	9	26	9	25	2
	No. 1	2 x 4	8	7	7	9	7	2	6	6	9	10	8	11	8	3	7	8
		2 x 6	13	6	11	9	10	6	9	7	15	6	13	10	12	5	11	4
		2 x 8	17	10	15	6	13	11	12	8	20	5	18	3	16	4	14	11
		2 x 10	22	9	19	10	17	9	16	2	26	0	23	4	20	10	19	1
		2 x 12	27	8	24	1	21	7	19	8	31	8	28	5	25	5	23	2
	No. 2	2 x 4	8	3	7	4	6	6	5	11	9	6	8	7	7	8	7	0
		2 x 6	12	3	10	7	9	6	8	8	14	5	12	6	11	2	10	2
		2 x 8	16	2	14	0	12	6	11	5	19	0	16	5	14	8	13	5
		2 x 10	20	7	17	10	15	11	14	7	24	3	21	0	18	9	17	2
		2 x 12	25	1	21	8	19	5	17	8	29	6	25	6	22	10	20	10
	No. 3	2 x 4	6	3	5	5	4	10	4	5	7	4	6	4	5	8	5	2
		2 x 6	9	4	8	1	7	3	6	7	11	0	9	7	8	6	7	9
		2 x 8	12	4	10	8	9	7	8	9	14	7	12	7	11	3	10	3
		2 x 10	15	9	13	8	12	3	11	2	18	7	16	1	14	5	13	2
		2 x 12	19	3	16	8	14	10	13	7	22	7	19	7	17	6	16	0
	Con- struction	2 x 4	7	1	6	1	5	5	5	0	8	4	7	2	6	5	5	10
	Standard	2 x 4	5	4	4	7	4	1	3	9	6	3	5	5	4	10	4	5
	Utility	2 x 4	3	9	3	3	2	11	2	8	4	5	3	10	3	5	3	1

Continued on next page

TABLE IV-I (Cont'd)

RAFTERS—NOT SUPPORTING CEILING
(LIVE LOADS 30 AND 20 lb per sq ft)

Species	Grade	Nominal Size, in.	LIVE LOAD 30 lb. per sq. ft.								LIVE LOAD 20 lb. per sq. ft.							
			Rafter Spacing								Rafter Spacing							
			12 in.		16 in.		20 in.		24 in.		12 in.		16 in.		20 in.		24 in.	
			ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	Select structural	2 x 4	9	0	8	2	7	7	7	2	10	4	9	4	8	8	8	2
		2 x 6	14	2	12	11	11	11	11	3	16	3	14	9	13	8	12	11
		2 x 8	18	8	17	0	15	9	14	10	21	5	19	5	18	1	17	0
		2 x 10	23	10	21	8	20	2	18	11	27	4	24	10	23	1	21	8
	No. 1	2 x 4	9	0	8	2	7	7	7	2	10	4	9	4	8	8	8	2
		2 x 6	14	2	12	11	11	11	11	1	16	3	14	9	13	8	12	11
		2 x 8	18	8	17	0	15	9	14	8	21	5	19	5	18	1	17	0
		2 x 10	23	10	21	8	20	2	18	8	27	4	24	10	23	1	21	8
	No. 2	2 x 4	8	8	7	11	7	4	6	11	10	0	9	1	8	5	7	11
		2 x 6	13	8	12	4	11	0	10	1	15	8	14	3	13	0	11	10
		2 x 8	18	1	16	3	14	6	13	3	20	8	18	9	17	0	15	7
		2 x 10	23	1	20	9	18	7	16	11	26	5	24	0	21	10	19	11
	No. 3	2 x 4	7	4	6	4	5	8	5	2	8	7	7	5	6	8	6	1
		2 x 6	10	8	9	3	8	3	7	7	12	7	10	11	9	9	8	11
		2 x 8	14	1	12	3	10	11	10	0	16	7	14	4	12	10	11	9
		2 x 10	18	0	15	7	13	11	12	9	21	2	18	4	16	5	15	0
	Con- struction	2 x 12	21	11	19	0	17	0	15	6	25	9	22	4	20	0	18	3
		2 x 4	8	3	7	1	6	4	5	10	9	7	8	4	7	6	6	10
	Standard	2 x 4	6	3	5	5	4	10	4	5	7	4	6	4	5	8	5	2
	Utility	2 x 4	4	2	3	8	3	3	2	11	4	11	4	3	3	10	3	6
Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	Select structural	2 x 4	8	8	7	11	7	4	6	10	9	11	9	0	8	4	7	11
		2 x 6	13	8	12	5	11	6	10	8	15	8	14	2	13	2	12	5
		2 x 8	18	0	16	4	15	2	14	1	20	7	18	9	17	5	16	4
		2 x 10	23	0	20	11	19	5	18	0	26	4	23	11	22	2	20	11
	No. 1	2 x 4	8	8	7	11	7	4	6	9	9	11	9	0	8	4	7	11
		2 x 6	13	8	12	1	10	9	9	10	15	8	14	2	12	8	11	7
		2 x 8	18	0	15	11	14	3	13	0	20	7	18	9	16	9	15	3
		2 x 10	23	0	20	3	18	2	16	7	26	4	23	11	21	4	19	6
	No. 2	2 x 4	8	8	7	11	7	4	6	9	9	11	9	0	8	4	7	11
		2 x 6	12	7	10	11	9	9	8	11	14	10	12	10	11	6	10	6
		2 x 8	16	7	14	4	12	10	11	9	19	7	16	11	15	2	13	10
		2 x 10	21	2	18	4	16	5	15	0	24	11	21	7	19	4	17	8
	No. 3	2 x 4	8	8	7	11	7	4	6	9	9	11	9	0	8	4	7	11
		2 x 6	12	7	10	11	9	9	8	11	14	10	12	10	11	6	10	6
		2 x 8	16	7	14	4	12	10	11	9	19	7	16	11	15	2	13	10
		2 x 10	21	2	18	4	16	5	15	0	24	11	21	7	19	4	17	8
	Con- struction	2 x 12	25	9	22	4	20	0	18	3	30	4	26	3	23	6	21	5
		2 x 4	6	6	5	8	5	0	4	7	7	8	6	8	5	11	5	5
	Standard	2 x 6	9	4	8	1	7	3	6	7	11	0	9	7	8	6	7	9
		2 x 8	12	4	10	8	9	7	8	9	14	7	12	7	11	3	10	3
	Utility	2 x 10	15	9	13	8	12	3	11	2	18	7	16	1	14	5	13	2
		2 x 12	19	3	16	8	14	10	13	7	22	7	19	7	17	6	16	0
	Con- struction	2 x 4	7	4	6	4	5	8	5	2	8	7	7	5	6	8	6	1
	Standard	2 x 4	5	8	4	11	4	4	4	0	6	8	5	9	5	2	4	8
	Utility	2 x 4	3	9	3	3	2	11	2	8	4	5	3	10	3	5	3	1

TABLE IV-J

**MAXIMUM SPANS FOR BUILT-UP WOOD BEAMS IN BASEMENTS,
CELLARS AND CRAWL SPACES, ONE-STORY HOUSES⁽²⁾, ⁽⁵⁾**

Species	Grade (1)	Supported Joist Length, ft ⁽³⁾ (4)	Size of Built-Up Beam, in. ⁽⁶⁾ , (7), (8)							
			3-2 x 8		4-2 x 8		3-2 x 10		4-2 x 10	
			ft	in.	ft	in.	ft	in.	ft	in.
Douglas Fir Western Larch	No. 1	8	12	0	13	10	15	4	17	8
		10	10	9	12	5	13	8	15	10
		12	9	9	11	4	12	6	14	5
		14	8	10	10	5	11	4	13	4
		16	7	11	9	9	10	1	12	6
	No. 2	8	10	10	12	6	13	9	15	11
		10	9	8	11	2	12	4	14	3
		12	8	10	10	2	11	3	13	0
		14	8	2	9	5	10	5	12	0
		16	7	7	8	10	9	9	11	3
Pacific Coast Hemlock Amabilis Fir Grand Fir	No. 1	8	10	4	12	0	13	3	15	4
		10	9	3	10	9	11	10	13	8
		12	8	6	9	9	10	10	12	6
		14	7	7	9	1	9	8	11	7
		16	6	9	8	6	8	8	10	10
	No. 2	8	9	3	10	8	11	9	13	7
		10	8	3	9	6	10	6	12	2
		12	7	6	8	8	9	7	11	1
		14	7	0	8	1	8	11	10	3
		16	6	6	7	6	8	4	9	7
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	No. 1	8	11	2	12	11	14	4	16	6
		10	10	0	11	7	12	10	14	9
		12	9	2	10	7	11	8	13	6
		14	8	5	9	9	10	9	12	6
		16	7	6	9	2	9	7	11	8
	No. 2	8	10	2	11	9	13	0	15	0
		10	9	1	10	6	11	7	13	5
		12	8	3	9	7	10	7	12	3
		14	7	8	8	10	9	9	11	11
		16	7	2	8	3	9	2	10	7
Balsam Fir Lodgepole Pine Ponderosa Pine Spruce (all species) Alpine Fir Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	No. 1	8	9	11	11	6	12	8	14	8
		10	8	4	10	3	10	8	13	1
		12	7	2	9	2	9	2	11	8
		14	6	4	8	0	8	0	10	3
		16	5	8	7	2	7	3	9	2
	No. 2	8	9	0	10	4	11	6	13	3
		10	8	0	9	3	10	3	11	10
		12	7	2	8	6	9	2	10	10
		14	6	4	7	10	8	0	10	0
		16	5	8	7	2	7	3	9	2
Western Red Cedar Red Pine Western White Pine White Pine	No. 1	8	9	8	11	2	12	5	14	4
		10	8	8	10	0	11	1	12	10
		12	7	8	9	2	9	9	11	8
		14	6	9	8	6	8	7	10	10
		16	6	0	7	8	7	8	9	9
	No. 2	8	8	9	10	1	11	2	12	10
		10	7	10	9	0	10	0	11	6
		12	7	1	8	3	9	1	10	6
		14	6	7	7	7	8	5	9	9
		16	6	0	7	1	7	8	9	1

Notes to Table IV-J:

- (1) Graded in conformance with 1970 "NLGA Standard Grading Rules for Canadian Lumber," published by the National Lumber Grades Authority, Vancouver.
- (2) These tables provide maximum allowable spans for main beams or girders which are built up from nominal 2-in. members in the species, sizes and grades indicated. Allowable spans for solid wood beams, glued-laminated wood beams or built-up beams in sizes or grades other than shown shall be determined from standard engineering formulae.
- (3) Supported joist length means $\frac{1}{2}$ the sum of the joist spans on both sides of the beam.
- (4) For supported joist lengths intermediate between those shown in the tables, straight line interpolation may be used in determining the maximum beam span.
- (5) Beams for $1\frac{1}{2}$ -storey houses shall be taken from the table for 2-storey houses.
- (6) The 2-in. members shall be laid on edge and fastened together with a double row of common nails not less than $3\frac{1}{2}$ -in. in length. Nails shall be spaced not more than 18 in. apart in each row with the end nails placed 4 in. to 6 in. from the end of each piece.
- (7) Where built-up wood beams are employed over a single span, the length of each individual piece used to fabricate the beam shall equal the length of the beam.
- (8) Where built-up wood beams are continued over more than 1 span, and where lengths of individual pieces are less than the total length of the complete beam, the location of butt joints shall conform to Subsection 9.23.8.

TABLE IV-K

**MAXIMUM SPANS FOR BUILT-UP WOOD BEAMS IN BASEMENTS,
CELLARS AND CRAWL SPACES, TWO-STOREY HOUSES⁽²⁾ ⁽⁵⁾**

Species	Grade (1)	Supported Joist Length, ft. (3), (4)	Size of Built-Up Beam, in. (6), (7), (8)							
			3-2 x 8		4-2 x 8		3-2 x 10		4-2 x 10	
			ft.	in.	ft.	in.	ft.	in.	ft.	in.
Douglas Fir Western Larch	No. 1	8	8	10	10	5	11	4	13	4
		10	7	4	9	4	9	4	11	11
		12	6	4	8	0	8	0	10	3
		14	5	7	7	0	7	1	9	0
		16	5	0	6	4	6	5	8	0
	No. 2	8	8	2	9	5	10	5	12	0
		10	7	3	8	5	9	4	10	9
		12	6	4	7	8	8	0	9	10
		14	5	7	7	0	7	1	9	0
		16	5	0	6	4	6	5	8	0
Pacific Coast Hemlock Amabilis Fir Grand Fir	No. 1	8	7	7	9	1	9	8	11	7
		10	6	4	8	0	8	0	10	3
		12	5	5	6	10	6	11	8	9
		14	4	10	6	1	6	2	7	9
		16	4	4	5	5	5	7	6	11
	No. 2	8	7	0	8	1	8	11	10	3
		10	6	3	7	2	7	11	9	2
		12	5	5	6	7	6	11	8	5
		14	4	10	6	1	6	2	7	9
		16	4	4	5	5	5	7	6	11
Pacific Coast Yellow Cedar Tamarack Jack Pine Eastern Hemlock	No. 1	8	8	5	9	9	10	9	12	6
		10	7	0	8	9	8	11	11	2
		12	6	0	7	7	7	8	9	9
		14	5	4	6	8	6	10	8	7
		16	4	10	6	0	6	2	7	8
	No. 2	8	7	8	8	10	9	9	11	4
		10	6	10	7	11	8	9	10	1
		12	6	0	7	3	7	8	9	3
		14	5	4	6	8	6	10	8	6
		16	4	10	6	0	6	2	7	8
Balsam Fir Lodgepole Pine Ponderosa Pine Spruce (all species) Alpine Fir Aspen Poplar Large Toothed Aspen Poplar Balsam Poplar	No. 1	8	6	4	8	0	8	0	10	3
		10	5	3	6	8	6	9	8	6
		12	4	7	5	9	5	10	7	4
		14	4	1	5	1	5	3	6	6
		16	3	9	4	7	4	9	5	10
	No. 2	8	6	4	7	10	8	0	10	0
		10	5	3	6	8	6	9	8	6
		12	4	7	5	9	5	10	7	4
		14	4	1	5	1	5	3	6	6
		16	3	9	4	7	4	9	5	10
Western Red Cedar Red Pine Western White Pine White Pine	No. 1	8	6	9	8	6	8	7	10	10
		10	5	7	7	1	7	2	9	1
		12	4	10	6	1	6	3	7	10
		14	4	4	5	5	5	7	6	11
		16	3	11	4	10	5	1	6	3
	No. 2	8	6	7	7	7	8	5	9	9
		10	5	7	6	10	7	2	8	8
		12	4	10	6	1	6	3	7	10
		14	4	4	5	5	5	7	6	11
		16	3	11	4	10	5	1	6	3

Notes to Table IV-K:

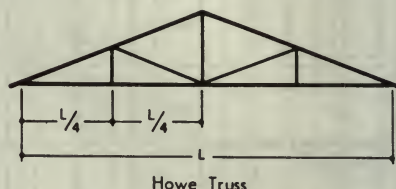
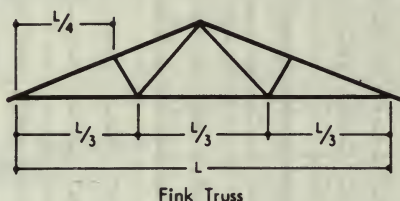
- (1) Graded in conformance with 1970 "NLGA Standard Grading Rules for Canadian Lumber," published by the National Lumber Grades Authority, Vancouver.
- (2) These tables provide maximum allowable spans for main beams or girders which are built up from nominal 2-in. members in the species, sizes and grades indicated. Allowable spans for solid wood beams, glued-laminated wood beams or built-up beams in sizes or grades other than shown shall be determined from standard engineering formulae.
- (3) Supported joist length means $\frac{1}{2}$ the sum of the joist spans on both sides of the beam.
- (4) For supported joist lengths intermediate between those shown in the tables, straight line interpolation may be used in determining the maximum beam span.
- (5) Beams for $1\frac{1}{2}$ -storey houses shall be taken from the table for 2-storey houses.
- (6) The 2-in. members shall be laid on edge and fastened together with a double row of common nails not less than $3\frac{1}{2}$ in. in length. Nails shall be spaced not more than 18 in. apart in each row with the end nails placed 4 in. to 6 in. from the end of each piece.
- (7) Where built-up wood beams are employed over a single span, the length of each individual piece used to fabricate the beam shall equal the length of the beam.
- (8) Where built-up wood beams are continued over more than 1 span, and where lengths of individual pieces are less than the total length of the complete beam, the location of butt joints shall conform to Subsection 9.23.8.

Subsection 9.39.3. Wood Roof Trusses

9.39.3.1.(1) In the tables,

- (a) the term "Fink" truss refers to the common "W" type truss; and
- (b) the term "Howe" truss refers to the type which has a vertical member extending from the peak of the truss.

9.39.3.2. Schematic drawings of the simplest version of each type are shown in the following diagrams and each type may have web members additional to those shown, so that the distances between panel points are decreased in these cases.



9.39.3.3.(1) The span tables,

- (a) have been calculated for wood species equivalent in strength to Spruce, Balsam Fir, Lodgepole Pine, Ponderosa Pine and Alpine Fir, and the spans can be safely used for the stronger species such as Douglas Fir, Western Larch, Pacific Coast Hemlock, Amabilis Fir, Grand Fir, Pacific Coast Yellow Cedar, Tamarack, Jack Pine and Eastern Hemlock; and
- (b) shall not be used for the weaker species, which include Western Red Cedar, Red Pine, Western White Pine, Eastern White Pine, Poplar and Eastern White Cedar.

9.39.3.4. The spans are not intended to be the only spans permissible for Fink and Howe type trusses and spans for such trusses may be designed in conformance with accepted timber design practices or be shown to be capable of conforming to the criteria described in Article 9.23.13.16. of this Regulation.

9.39.3.5. When the span tables are used, the connecting plates shall be designed in conformance with the requirements in CSA O86-1970, "Code of Recommended Practice for Engineering Design in Timber," as revised to 1 May, 1975.

9.39.3.6. The minimum web member sizes indicated in the notes to the span tables may be reduced provided such reductions can be justified on the basis of calculations.

9.39.3.7. The span tables for wood roof trusses have been calculated for 20, 30, 40 and 50 psf design roof snow loads assuming the design roof snow load to be 60 per cent of the ground snow load, and are designed to meet the performance criteria in Article 9.23.13.16.

9.39.3.8. Where wood roof trusses are intended for use in a locality having a design roof snow load higher than shown in the tables, the maximum truss spacing may be calculated as the product of the truss spacing and snow load in the span tables divided by the design snow load for the locality where the trusses are to be used.

9.39.3.9. Where wood roof trusses are to be used in an area where the design roof snow load falls between the values shown in tables, the spans may be interpolated between the spans shown in the tables.

9.39.3.10.(1) The truss spans in the tables,

- (a) are valid only where the design live load on the lower chord does not exceed 10 psf of ceiling area and this applies to trusses in buildings whose attics have limited access and not to attics that are accessible by stairways;

- (b) do not apply to trusses which may be subject to concentrated loads such as those required to support hoisting equipment; and
- (c) are valid only if the top members of trusses are constructed to prevent lateral buckling by the provision of roof sheathing or by bracing.

TABLE V-A

MAXIMUM SPANS⁽¹⁾ FOR WOOD FINK TRUSSES
WITH 2-in. BY 4-in. BOTTOM MEMBER SIZE
FOR
SPECIES LISTED IN NOTE(2) AND WITH TRUSSES SPACED 24 in. o.c.

Lumber Grade	Top Member Size, in. ^{(3), (4)}	Roof Slope	Roof Snow Load, psf			
			20 ft in.	30 ft in.	40 ft in.	50 ft in.
No. 1	2 x 4	2½/12	22 — 2	16 — 0	—	—
		3/12	31 — 5	26 — 8	19 — 9	14 — 11
		4/12	31 — 6	29 — 0	25 — 0	22 — 2
		5/12	32 — 2	29 — 8	25 — 7	22 — 9
	2 x 5	2½/12	26 — 2	19 — 5	13 — 0	—
		3/12	31 — 5	28 — 5	23 — 7	18 — 3
		4/12	34 — 7	32 — 0	28 — 11	26 — 2
		5/12	36 — 9	32 — 6	31 — 8	29 — 2
	2 x 6	2½/12	29 — 2	22 — 1	15 — 6	—
		3/12	31 — 5	28 — 5	25 — 0	20 — 10
		4/12	34 — 7	32 — 0	28 — 11	26 — 2
		5/12	36 — 9	34 — 5	31 — 8	29 — 2
No. 2	2 x 4	2½/12	19 — 2	13 — 2	—	—
		3/12	26 — 4	23 — 5	17 — 0	12 — 5
		4/12	29 — 3	25 — 3	21 — 8	19 — 2
		5/12	29 — 11	25 — 10	22 — 3	19 — 9
	2 x 5	2½/12	22 — 10	16 — 6	—	—
		3/12	26 — 4	23 — 6	20 — 6	15 — 8
		4/12	29 — 5	26 — 11	24 — 0	21 — 7
		5/12	31 — 5	29 — 3	26 — 7	24 — 4
	2 x 6	2½/12	24 — 3	19 — 1	12 — 8	—
		3/12	26 — 4	23 — 6	20 — 6	18 — 0
		4/12	29 — 5	26 — 11	24 — 0	21 — 7
		5/12	31 — 5	29 — 3	26 — 7	24 — 4

Notes to Table V-A:

- (1) Spans are measured as the clear span between the interior wall faces of the exterior wall supports.
- (2) Spans apply to all species except Poplar, Eastern White Pine, Western White Pine, Red Pine, Western Red Cedar and Eastern White Cedar.
- (3) Where the length of compression web members exceeds 6 ft, such web members shall be provided with continuous bracing to prevent buckling. Such bracing shall consist of not less than 1-in. by 4-in. lumber nailed at right angles to the web members near their centres with at least two 2½-in. nails for each member. Web members shall be at least 2-in. by 4-in. lumber of not less than No. 2 grade.
- (4) Where a roof truss supports a ceiling and the unsupported length of the bottom members between the truss panel points exceeds 10 ft, the members shall be at least 2 in. by 5 in., and when the unsupported length of the bottom member exceeds 12 ft between panel points, the member shall be at least 2 in. by 6 in. in size.

TABLE V-B

MAXIMUM SPANS⁽¹⁾ FOR WOOD FINK TRUSSES
WITH 2-in. BY 5-in. BOTTOM MEMBER SIZE
FOR
SPECIES LISTED IN NOTE(2) AND WITH TRUSSES SPACED 24 in. o.c.

Lumber Grade	Top Member Size, in. ^{(3), (4)}	Roof Slope	Roof Snow Load, psf			
			20 ft in.	30 ft in.	40 ft in.	50 ft in.
No. 1	2 x 4	2½/12	25 — 5	18 — 10	12 — 5	—
		3/12	30 — 5	28 — 0	23 — 2	18 — 0
		4/12	31 — 6	29 — 0	25 — 0	22 — 2
		5/12	32 — 2	29 — 8	25 — 7	22 — 9
	2 x 5	2½/12	30 — 5	22 — 11	16 — 3	10 — 10
		3/12	39 — 1	33 — 7	27 — 10	21 — 11
		4/12	40 — 0	34 — 11	30 — 0	28 — 5
		5/12	40 — 0	35 — 9	30 — 10	29 — 3
	2 x 6	2½/12	34 — 4	26 — 2	19 — 0	13 — 11
		3/12	40 — 0	36 — 6	31 — 7	25 — 1
		4/12	40 — 0	40 — 0	36 — 8	32 — 6
		5/12	40 — 0	40 — 0	37 — 8	33 — 5
No. 2	2 x 4	2½/12	22 — 2	15 — 11	—	—
		3/12	28 — 2	24 — 2	20 — 2	15 — 4
		4/12	29 — 3	25 — 3	21 — 8	19 — 2
		5/12	29 — 11	25 — 10	22 — 3	19 — 9
	2 x 5	2½/12	26 — 8	19 — 10	13 — 5	—
		3/12	33 — 10	30 — 4	24 — 5	19 — 0
		4/12	35 — 3	30 — 4	27 — 10	24 — 7
		5/12	36 — 1	31 — 2	28 — 7	25 — 5
	2 x 6	2½/12	30 — 3	22 — 10	16 — 2	10 — 9
		3/12	33 — 11	30 — 4	26 — 4	21 — 11
		4/12	37 — 9	34 — 7	30 — 11	27 — 9
		5/12	40 — 0	37 — 7	32 — 9	31 — 0

Notes to Table V-B:

- (1) Spans are measured as the clear span between the interior wall faces of the exterior wall supports.
- (2) Spans apply to all species except Poplar, Eastern White Pine, Western White Pine, Red Pine, Western Red Cedar and Eastern White Cedar.
- (3) Where the length of compression web members exceeds 6 ft, such web members shall be provided with continuous bracing to prevent buckling. Such bracing shall consist of not less than 1-in. by 4-in. lumber nailed at right angles to the web members near their centres with at least two 2½-in. nails for each member. Web members shall be at least 2-in. by 4-in. lumber of not less than No. 2 grade.
- (4) Where a roof truss supports a ceiling and the unsupported length of the bottom members between the truss panel points exceeds 10 ft, the members shall be at least 2 in. by 5 in., and when the unsupported length of the bottom member exceeds 12 ft between panel points, the member shall be at least 2 in. by 6 in. in size.

TABLE V-C

**MAXIMUM SPANS⁽¹⁾ FOR WOOD FINK TRUSSES
WITH 2-in. BY 6-in. BOTTOM MEMBER SIZE
FOR
SPECIES LISTED IN NOTE (2) AND WITH TRUSSES SPACED 24 in. o.c.**

Lumber Grade	Top Member Size, in. ⁽³⁾	Roof Slope	Roof Snow Load, psf			
			20 ft in.	30 ft in.	40 ft in.	50 ft in.
No. 1	2 x 4	2½/12	27 — 11	20 — 10	14 — 5	—
		3/12	30 — 5	28 — 0	23 — 11	19 — 4
		4/12	31 — 6	29 — 0	25 — 0	22 — 2
		5/12	32 — 2	29 — 8	25 — 7	22 — 9
	2 x 5	2½/12	33 — 7	25 — 7	18 — 6	13 — 5
		3/12	39 — 1	33 — 7	29 — 11	23 — 9
		4/12	40 — 0	34 — 11	30 — 0	28 — 5
		5/12	40 — 0	35 — 9	30 — 10	29 — 3
	2 x 6	2½/12	38 — 4	29 — 5	21 — 8	16 — 5
		3/12	40 — 0	40 — 0	34 — 3	27 — 4
		4/12	40 — 0	40 — 0	36 — 8	32 — 6
		5/12	40 — 0	40 — 0	37 — 8	33 — 5
No. 2	2 x 4	2½/12	24 — 5	17 — 11	11 — 5	—
		3/12	28 — 2	24 — 2	20 — 8	16 — 8
		4/12	29 — 3	25 — 3	21 — 8	19 — 2
		5/12	29 — 11	25 — 10	22 — 3	19 — 9
	2 x 5	2½/12	29 — 7	22 — 3	15 — 8	—
		3/12	33 — 10	31 — 1	26 — 5	20 — 8
		4/12	35 — 3	31 — 1	27 — 10	24 — 7
		5/12	36 — 1	31 — 2	28 — 7	25 — 5
	2 x 6	2½/12	33 — 11	25 — 9	18 — 8	13 — 7
		3/12	40 — 0	35 — 6	30 — 3	24 — 0
		4/12	40 — 0	37 — 1	31 — 9	30 — 1
		5/12	40 — 0	38 — 1	32 — 9	31 — 0

Notes to Table V-C:

- (1) Spans are measured as the clear span between the interior wall faces of the exterior wall supports.
- (2) Spans apply to all species except Poplar, Eastern White Pine, Western White Pine, Red Pine, Western Red Cedar and Eastern White Cedar.
- (3) Where the length of compression web members exceeds 6 ft, such web members shall be provided with continuous bracing to prevent buckling. Such bracing shall consist of not less than 1-in. by 4-in. lumber nailed at right angles to the web members near their centres with at least two 2½-in. nails for each member. Web members shall be at least 2-in. by 4-in. lumber of not less than No. 2 grade.

TABLE V-D

MAXIMUM SPANS⁽¹⁾ FOR WOOD HOWE TRUSSES
WITH 2-in. BY 4-in. BOTTOM MEMBER SIZE
FOR
SPECIES LISTED IN NOTE ⁽²⁾ AND WITH TRUSSES SPACED 24 in. o.c.

Lumber Grade	Top Member Size, in. ⁽³⁾	Roof Slope	Roof Snow Load, psf			
			20 ft. in.	30 ft. in.	40 ft. in.	50 ft. in.
	2 × 4	2½/12 3/12 4/12 5/12	31 — 0 31 — 0 31 — 5 32 — 1	24 — 0 27 — 11 29 — 0 29 — 8	18 — 0 23 — 11 24 — 11 25 — 7	13 — 11 21 — 1 22 — 1 22 — 9
No. 1	2 × 5	2½/12 3/12 4/12 5/12	33 — 5 36 — 9 40 — 0 40 — 0	27 — 2 32 — 4 34 — 11 35 — 9	20 — 7 27 — 9 30 — 0 30 — 9	16 — 2 24 — 1 28 — 5 29 — 2
	2 × 6	2½/12 3/12 4/12 5/12	33 — 5 36 — 9 40 — 0 40 — 0	28 — 8 32 — 4 37 — 8 40 — 0	22 — 8 27 — 9 33 — 2 37 — 3	17 — 11 24 — 1 29 — 5 33 — 5
	2 × 4	2½/12 3/12 4/12 5/12	27 — 3 28 — 1 29 — 2 29 — 10	21 — 2 24 — 2 25 — 2 25 — 10	15 — 8 20 — 7 21 — 7 22 — 3	11 — 11 18 — 2 19 — 2 19 — 9
	2 × 5	2½/12 3/12 4/12 5/12	27 — 5 30 — 5 34 — 11 36 — 0	23 — 6 26 — 6 30 — 3 31 — 1	18 — 0 22 — 5 27 — 2 28 — 7	14 — 0 19 — 4 23 — 11 25 — 4
	2 × 6	2½/12 3/12 4/12 5/12	27 — 5 30 — 5 34 — 11 38 — 1	23 — 6 26 — 6 31 — 3 34 — 9	19 — 7 22 — 5 27 — 2 30 — 10	15 — 7 19 — 4 23 — 11 27 — 7

Notes to Table V-D:

⁽¹⁾ Spans are measured as the clear span between the interior wall faces of the exterior wall supports.

⁽²⁾ Spans apply to all species except Poplar, Eastern White Pine, Western White Pine, Red Pine, Western Red Cedar and Eastern White Cedar.

⁽³⁾ Where the length of compression web members exceeds 6 ft. such web members shall be provided with continuous bracing to prevent buckling. Such bracing shall consist of not less than 1-in. by 4-in. lumber nailed at right angles to the web members near their centres with at least two 2½-in. nails for each member. Web members shall be at least 2-in. by 4-in. lumber of not less than No. 2 grade.

TABLE V-E

MAXIMUM SPANS⁽¹⁾ FOR WOOD HOWE TRUSSES
WITH 2-in. BY 5-in. BOTTOM MEMBER SIZE
FOR
SPECIES LISTED IN NOTE (2) AND WITH TRUSSES SPACED 24 in. o.c.

Lumber Grade	Top Member Size, in. ⁽³⁾	Roof Slope	Roof Snow Load, psf			
			20 ft in.	30 ft in.	40 ft in.	50 ft in.
No. 1	2 x 4	2½/12	31 — 7	26 — 9	20 — 3	15 — 10
		3/12	31 — 7	27 — 11	23 — 11	21 — 1
		4/12	31 — 7	29 — 0	24 — 11	22 — 1
		5/12	32 — 1	29 — 8	25 — 7	22 — 9
	2 x 5	2½/12	37 — 10	30 — 9	23 — 5	18 — 7
		3/12	39 — 0	33 — 6	30 — 9	27 — 2
		4/12	40 — 0	34 — 11	30 — 9	28 — 5
		5/12	40 — 0	35 — 9	30 — 9	29 — 2
	2 x 6	2½/12	40 — 0	33 — 10	25 — 11	20 — 8
		3/12	40 — 0	40 — 0	35 — 1	30 — 11
		4/12	40 — 0	40 — 0	36 — 8	32 — 6
		5/12	40 — 0	40 — 0	37 — 7	33 — 5
No. 2	2 x 4	2½/12	27 — 3	23 — 4	17 — 9	13 — 9
		3/12	28 — 1	24 — 2	20 — 7	18 — 2
		4/12	29 — 2	25 — 2	21 — 7	19 — 2
		5/12	29 — 10	25 — 10	22 — 3	19 — 9
	2 x 5	2½/12	32 — 8	27 — 3	20 — 7	16 — 2
		3/12	33 — 9	31 — 0	26 — 6	23 — 4
		4/12	35 — 2	31 — 0	27 — 9	24 — 7
		5/12	36 — 0	31 — 1	28 — 7	25 — 4
	2 x 6	2½/12	35 — 3	30 — 1	22 — 10	18 — 1
		3/12	39 — 1	34 — 1	28 — 10	24 — 11
		4/12	40 — 0	37 — 0	31 — 9	30 — 1
		5/12	40 — 0	38 — 0	32 — 8	31 — 0

Notes to Table V-E:

- (1) Spans are measured as the clear span between the interior wall faces of the exterior wall supports.
- (2) Spans apply to all species except Poplar, Eastern White Pine, Western White Pine, Red Pine, Western Red Cedar and Eastern White Cedar.
- (3) Where the length of compression web members exceeds 6 ft, such web members shall be provided with continuous bracing to prevent buckling. Such bracing shall consist of not less than 1-in. by 4-in. lumber nailed at right angles to the web members near their centres with at least two 2½-in. nails for each member. Web members shall be at least 2-in. by 4-in. lumber of not less than No. 2 grade.

TABLE V-F

**MAXIMUM SPANS⁽¹⁾ FOR WOOD HOWE TRUSSES
WITH 2-in. BY 6-in. BOTTOM MEMBER SIZE
FOR
SPECIES LISTED IN NOTE (2) AND WITH TRUSSES SPACED 24 in. o.c.**

Lumber Grade	Top Member Size, in. ⁽³⁾	Roof Slope	Roof Snow Load, psf			
			20 ft in.	30 ft in.	40 ft in.	50 ft in.
No. 1	2 x 4	2½/12	31 — 7	27 — 1	23 — 1	18 — 6
		3/12	31 — 7	27 — 11	23 — 11	21 — 1
		4/12	31 — 7	29 — 0	24 — 11	22 — 1
		5/12	32 — 1	29 — 8	25 — 7	22 — 9
	2 x 5	2½/12	37 — 10	32 — 6	27 — 5	21 — 11
		3/12	39 — 0	33 — 6	30 — 9	27 — 2
		4/12	40 — 0	34 — 11	30 — 9	28 — 5
		5/12	40 — 0	35 — 9	30 — 9	29 — 2
	2 x 6	2½/12	40 — 0	39 — 8	30 — 8	24 — 8
		3/12	40 — 0	40 — 0	35 — 1	30 — 11
		4/12	40 — 0	40 — 0	36 — 8	32 — 6
		5/12	40 — 0	40 — 0	37 — 7	33 — 5
No. 2	2 x 4	2½/12	27 — 3	23 — 4	19 — 10	16 — 2
		3/12	28 — 1	24 — 2	20 — 7	18 — 2
		4/12	29 — 2	25 — 2	21 — 7	19 — 2
		5/12	29 — 10	25 — 10	22 — 3	19 — 9
	2 x 5	2½/12	32 — 8	30 — 0	24 — 3	19 — 3
		3/12	33 — 9	31 — 0	26 — 6	23 — 4
		4/12	35 — 2	31 — 0	27 — 9	24 — 7
		5/12	36 — 0	31 — 1	28 — 7	25 — 4
	2 x 6	2½/12	39 — 11	34 — 2	27 — 3	21 — 9
		3/12	40 — 0	35 — 5	30 — 2	28 — 6
		4/12	40 — 0	37 — 0	31 — 9	30 — 1
		5/12	40 — 0	38 — 0	32 — 8	31 — 0

Notes to Table V-F:

- (1) Spans are measured as the clear span between the interior wall faces of the exterior wall supports.
- (2) Spans apply to all species except Poplar, Eastern White Pine, Western White Pine, Red Pine, Western Red Cedar and Eastern White Cedar.
- (3) Where the length of compression web members exceeds 6 ft, such web members shall be provided with continuous bracing to prevent buckling. Such bracing shall consist of not less than 1-in. by 4-in. lumber nailed at right angles to the web members near their centres with at least two 2½-in. nails for each member. Web members shall be at least 2-in. by 4-in. lumber of not less than No. 2 grade.

REGULATION 88

under the Business Corporations Act

NAMES

1. In this Regulation "trade mark" means a trade mark as defined in the *Trade Marks Act* (Canada). O. Reg. 586/79, s. 1.

2.—(1) For the purposes of clause 7 (1) (b) of the Act and the regulations, the meaning of the expression "if the use of that name would be likely to deceive" shall include,

- (a) a name that would lead to the inference that the business or activities carried on or intended to be carried on by the corporation under the name, and the business or activities carried on by any other person, are one business or one activity, whether or not the nature of the business or activity of each is generally the same;
- (b) a name that would lead to the inference that the corporation bearing the name or proposed name is, or would be, associated or affiliated with a person, if the corporation and such person are not, or will not be, associated or affiliated; or
- (c) a name whose similarity to a person would lead to the inference that the name would cause someone who had an interest in dealing, or reason to deal, with the person, to deal with the corporation bearing the name in the belief that he was dealing with the person.

(2) For the purposes of subsection (1),

- (a) "person" means the name of a known,
 - (i) body corporate,
 - (ii) trust,
 - (iii) association,
 - (iv) partnership,
 - (v) sole proprietorship, or
 - (vi) individual,

whether in existence or not, and includes the known name or known trade mark under which any of them carry on business or identify themselves;

- (b) "use" means actual use by a person that carries on business in Canada or elsewhere. O. Reg. 586/79, s. 2.

3. A corporation may have a name similar to that of another body corporate where the corporation is not or will not be affiliated with the body corporate if,

- (a) that corporate name relates to a corporation that is the successor to the business of the body corporate and the body corporate has ceased or will cease to carry on business under that name;
- (b) the body corporate undertakes in writing to dissolve forthwith or to change its name before the corporation proposing to use the name commences to carry on business; and
- (c) the corporate name sets out in numerals the year of acquisition of the name in parenthesis immediately before the word "limited", "incorporated", "corporation", or corresponding abbreviation thereof or words, numerals, or initials are added, deleted or substituted, as the case may be, or the final word of the name is varied by substituting one of the other two final words required under subsection 8 (1) of the Act or their corresponding abbreviations. O. Reg. 267/80, s. 1.

4. A corporation may have a name similar to that of another body corporate where the corporation is affiliated with that body corporate. O. Reg. 586/79, s. 4.

5. A proposed name under section 3 or 4 shall not be the same as that of the other body corporate, unless the body corporate is incorporated under the laws of a jurisdiction outside Canada, and has never carried on any activities or identified itself in Canada. O. Reg. 586/79, s. 5.

6. For the purpose of sections 5 and 19, the addition or deletion of punctuation marks does not make a name different, but a name is not the same for the purposes of those sections if words, numerals, or initials are added, deleted or substituted, as the case may be, or the final word of the name is varied by substituting one of the other two final words required under subsection 8 (1) of the Act or their corresponding abbreviations. O. Reg. 586/79, s. 6.

7. A corporation may have a name similar to that of a known,

- (a) trust;

- (b) association;
- (c) partnership; or

(d) sole proprietorship,

or a known name under which any of them carry on business or identify themselves if,

- (e) the corporate name relates to a proposed corporation that is the successor to the business carried on under the name and the user of the name has ceased or will cease to carry on business under the name; or
- (f) the known trust, association, partnership or sole proprietor undertakes in writing to dissolve forthwith or to change its name before the corporation proposing to use the name commences to use it. O. Reg. 586/79, s. 7.

8. Where a body corporate has not carried on business in the immediately preceding two years, a proposed name that would otherwise be prohibited under clause 7 (1) (b) of the Act because of the name of the body corporate is permitted if,

- (a) the body corporate consents in writing to the proposed name; and
- (b) the body corporate undertakes in writing to dissolve forthwith or to change its name to some dissimilar name before the corporation proposing to use the name commences to use it. O. Reg. 586/79, s. 8.

9. Where two or more corporations amalgamate, the name of the amalgamated corporation may be the same as one of the amalgamating corporations, if such name is not a number name. O. Reg. 267/80, s. 3.

10.—(1) A corporate name shall not be,

- (a) too general;
- (b) only descriptive, in any language, of the quality, function or other characteristics of the goods or services in which the corporation deals or intends to deal;
- (c) primarily or only a single name or surname used alone of an individual who is living or has died within thirty years preceding the date of filing the articles;
- (d) primarily or only a geographic name used alone,

unless the proposed corporate name has been in continuous use for at least twenty years prior to the date of filing the articles or the proposed corporate name has through use acquired a meaning which renders the name distinctive.

(2) A corporate name shall not be primarily or only a combination of punctuation marks or other marks that are permitted under section 19. O. Reg. 267/80, s. 4.

11.—(1) A corporate name shall not contain a word or expression, an element of which is the family name of an individual whether or not preceded by his given name or initials, unless the individual, his heir, executor, administrator, assigns or guardian consents in writing to the use of his name and the individual has had or will have a material interest in the corporation.

(2) Subsection (1) does not apply where the corporation that will use the proposed name is the successor or affiliate of a body corporate that has, as an element of its name, the family name, provided that,

- (a) such body corporate consents in writing to the use of the name; and
- (b) if the proposed name would contravene clause 7 (1) (b) of the Act, such body corporate undertakes in writing to dissolve forthwith or change its name to some name that complies with clause 7 (1) (b) of the Act before the corporation proposing to use the name commences to use it. O. Reg. 586/79, s. 12.

12. No word or expression that is obscene or connotes a business that is scandalous, obscene or immoral, or that is otherwise objectionable on public grounds, shall be used in a corporate name. O. Reg. 586/79, s. 13.

13. No word, expression, or abbreviation thereof, the use of which is prohibited or restricted under an Act or regulation of the Parliament of Canada or a province or territory of Canada, unless such restriction is satisfied, shall be used in a corporate name. O. Reg. 586/79, s. 14.

14. The following words and expressions shall not be used in a corporate name:

1. "Amalgamated", unless the corporation is an amalgamated corporation resulting from the amalgamation of two or more corporations.
2. "Association".
3. "Club", unless the corporation carries on a sporting or athletic business and there is no inference that a member of the public may become a member of the corporation.
4. "College", "institute" or "university" if the word would lead to the inference that the corporation is a university, college of applied arts and technology or other post-secondary educational institution.

5. "Condominium" or any abbreviation or derivation thereof.
 6. "Co-operative" or any abbreviation or derivation thereof.
 7. Digits or words that would lead to the inference that the name is a number name.
 8. "Engineer" or "engineering" or any variation thereof, except with the consent in writing of the Association of Professional Engineers of the Province of Ontario.
 9. "Housing" unless the corporation is sponsored by or connected with the Government of Canada or the Government of Ontario.
 10. "Veteran" or any abbreviation or derivation thereof, unless there has been continuous use of the name for a period of at least twenty years prior to the acquisition of the name.
 11. Numerals indicating the year of incorporation, unless clause 3 (1) (c) applies, or it is a year of amalgamation of the corporation.
 12. Any word or expression that would lead to the inference that the corporation is not a business corporation to which the Act applies. O. Reg. 586/79, s. 15.
- 15.—(1) No word or expression that suggests that a corporation,
- (a) is connected with the Crown or the Government of Canada, or the government of a municipality or any province or territory of Canada, or any department, Ministry, branch, bureau, service, board, agency, commission, or activity of any such government or municipality;
 - (b) is sponsored or controlled by, or is associated or affiliated with a university or an association of accountants, architects, engineers, lawyers, physicians, surgeons or any other professional association recognized by the laws of Canada or a province or territory of Canada; or
 - (c) carries on the business of a bank, loan company, insurance company, trust company, other financial intermediary or a stock exchange that is regulated by a law of Canada or a province or territory of Canada,

shall be used in a corporate name without the consent in writing of the appropriate authority, university or professional association, as the case may be.

- (2) No word or expression that suggests that a corporation is connected with a political party or

leader of a political party, where the objects for which the corporation is to be incorporated are of a political nature, shall be used in a corporate name. O. Reg. 586/79, s. 16.

16. No word or expression that misdescribes, in any language,

- (a) the business, goods or services in association with which the corporate name is proposed to be used;
- (b) the conditions under which goods or services will be produced or supplied or the persons to be employed in the production or supply of these goods or services; or
- (c) the place of origin of the goods or services produced or supplied by the corporation,

shall be used in a corporate name. O. Reg. 586/79, s. 17.

17.—(1) The following documents shall accompany any articles or a statement of scheme referred to in section 186 of the Act containing a proposed name for a corporation or a change of corporate name:

1. An original Ontario biased or weighted computer printed search report from the automated name search system maintained by the Department of Consumer and Corporate Affairs, Canada dated not more than ninety days prior to the submission of the articles or scheme.
2. Any consent or consent and undertaking required under the Act or this Regulation, and, if applicable, in the Form prescribed by section 36.

(2) Subsection (1) applies to an application for revival under section 242 of the Act. O. Reg. 586/79, s. 18.

(3) No name that is identified in a computer printed search report as "Ontario proposed" shall be used as a corporate name by a person other than the one who proposed the name unless a consent in writing has been obtained from the person who first proposed the name. O. Reg. 267/80, s. 5.

18. Where through the filing of articles, other than articles of amalgamation, or a statement, the authorized capital of a corporation is decreased by the cancellation or consolidation of issued shares and a number of the share certificates of the corporation are in the hands of the public and may not be promptly surrendered, the name of the corporation shall be changed to a different name. O. Reg. 586/79, s. 19.

19. For the purposes of subsection 8 (3) of the Act, the following punctuation marks and other marks are

the only ones permitted as part of the name of a corporation:

! " # \$ % & ' () * + , -
 . / : ; < = > ? [] \ ^ .

O. Reg. 586/79, s. 20.

20. The name of a corporation shall,

- (a) not exceed 120 characters in length, including punctuation marks and spaces; and
- (b) be set out in articles filed with the Minister in block capital letters. O. Reg. 586/79, s. 21.

21. A name set out in the articles pursuant to subsection 8 (2) of the Act shall be a direct translation of the corporate name and minor changes may be made to ensure that the name is idiomatically correct. O. Reg. 586/79, s. 22.

22. For the purpose of section 11 of the Act, the matters the Minister may consider when determining whether a name is contrary to section 7 include,

- (a) the distinctiveness of the whole or any elements of any name or trade mark and the extent to which the name or trade mark has become known;
- (b) the length of time the trade mark or name has been in use;
- (c) the nature of the goods or services associated with the trade mark or the nature of the business carried on under or associated with a name, including the likelihood of any competition among businesses using such a trade mark or name;
- (d) the nature of the trade with which a trade mark or name is associated, including the nature of the products or services and the means by which they are offered or distributed;
- (e) the degree of similarity between the corporate name and any trade mark or name in appearance or sound or in the ideas suggested by them; and
- (f) the geographic area in Ontario in which the corporate name is likely to be used. O. Reg. 586/79, s. 23; O. Reg. 267/80, s. 6.

CAPITAL

23. Where special shares of a class have attached thereto conditions, restrictions, limitations or prohib-

itions on the right to vote, the preferences, rights, conditions, restrictions, limitations or prohibitions attaching to that class of special shares shall provide that the holders of that class are entitled to notice of meetings of shareholders called for the purpose of authorizing the dissolution of the corporation or the sale of its undertaking or a substantial part thereof. O. Reg. 586/79, s. 24.

FORM OF DOCUMENTS

24—(1) All documents delivered to or filed with the Minister or filed in the office of the Minister, including all affidavits, applications, assurances, balance sheets, by-laws, consents, dissents, notices and statements shall be printed, typewritten or reproduced legibly, in a manner suitable for photographing on microfilm, upon one side of good quality white paper that is,

- (a) 210 millimetres by 297 millimetres with a margin of 30 millimetres on the left-hand side; or
- (b) 8½ inches by 11 inches, with a margin of 1¼ inches on the left-hand side.

O. Reg. 586/79, s. 25 (1); O. Reg. 267/80, s. 7 (1).

(2) A document consisting of two or more pages shall have no backing or binding, shall be stapled in the upper left-hand corner and each page shall be numbered consecutively. O. Reg. 267/80, s. 7 (2).

(3) Where forms are provided by the Minister they shall be used or a facsimile of them reproduced on good quality white paper of the size prescribed in subsection (1) that is capable of being endorsed by the Minister without smudging. O. Reg. 586/79, s. 25 (3).

FORMS

25.—(1) Articles of incorporation shall be in Form 1.

(2) A consent to act as first director, where required under subsection 4 (4) of the Act, shall be in Form 2. O. Reg. 586/79, s. 26.

26. Articles, applications or statements filed with the Minister requiring the signature of one or more persons shall be signed manually by each such person and not by an agent, attorney or other representative. O. Reg. 267/80, s. 8.

27. A statement concerning a series of shares under subsection 30 (1) of the Act shall be in Form 3. O. Reg. 586/79, s. 27.

28. Articles of amendment under subsection 181 (1) of the Act shall be in Form 4. O. Reg. 586/79, s. 28.

29. Restated articles of incorporation under section 183 of the Act shall be in Form 5. O. Reg. 586/79, s. 29.

30. Articles of amalgamation under subsection 188 (1) of the Act shall be in Form 6. O. Reg. 586/79, s. 30.

31.—(1) Articles of dissolution under subsection 239 (1) or (2) of the Act shall be in Form 7 or 8, as the case may be.

(2) Articles of dissolution shall be accompanied by a consent of the Corporations Tax Branch of the Ministry of Revenue to the dissolution of the corporation. O. Reg. 586/79, s. 31.

32. A statement of a scheme of arrangement under subsection 185 (1) of the Act shall be in Form 13. O. Reg. 586/79, s. 32.

33. An application for the authorization of the Minister under subsection 190 (1) of the Act shall be in Form 14. O. Reg. 586/79, s. 33.

34. Articles of continuation under subsection 189 (1) of the Act shall be in Form 15. O. Reg. 586/79, s. 34.

35.—(1) A consent given by or on behalf of an individual pursuant to subsection 11 (1) shall be in Form 16.

(2) A consent or consent and undertaking given by a body corporate, partnership, sole proprietorship, trust or association pursuant to subsection 3 (1), section 7, section 8 and subsection 11 (2) shall be in Form 17. O. Reg. 586/79, s. 35.

36.—(1) An application under subsection 154 (3) of the Act to permit the removal of records from the head office of the corporation shall be in Form 9.

(2) Where an application under subsection (1) is to remove the records of the corporation to a place outside Ontario, it shall be accompanied by,

(a) a bond of a guarantee company within the meaning of the *Guarantee Companies Securities Act* to the Treasurer of Ontario in Form 10; and

(b) a power of attorney duly executed under the seal of the corporation appointing a resident of Ontario, or a body corporate having its head office in Ontario, to be the attorney and representative in Ontario of the corporation and the consent of the attorney in Form 11. O. Reg. 586/79, s. 36.

37. An application for an order rescinding an order made under subsection 154 (4) of the Act to remove records from the head office of the corporation shall be in Form 17. O. Reg. 586/79, s. 37.

REVIVAL OF CORPORATION

38.—(1) An application for an order of revival under subsection 242 (4) of the Act shall be in Form 12.

(2) An application under subsection (1) shall be accompanied by,

(a) a consent from the Corporations Tax Branch of the Ministry of Revenue to the revival of the corporation; and

(b) a statement in writing by the Public Trustee that he has no objection to the revival of the corporation; and

(c) the consent of the Ontario Securities Commission where the corporation was dissolved by order of the Minister under subsection 242 (2) of the Act. O. Reg. 586/79, s. 38.

INFORMATION CIRCULAR

39.—(1) An information circular shall contain the information prescribed in Form 18.

(2) The information required by Form 18 shall be given as of a specified date not more than thirty days prior to the date upon which the information circular is first sent to any of the shareholders of the corporation.

(3) The information contained in an information circular shall be clearly presented and the statements made therein shall be divided into groups according to subject-matter and the various groups of statements shall be preceded by appropriate headings.

(4) The order of items set out in Form 18 need not be followed.

(5) Where practicable and appropriate, information required by Form 18 shall be presented in tabular form.

(6) All amounts required by Form 18 shall be stated in figures.

(7) Information required by more than one applicable item in Form 18 need not be repeated.

(8) No statement need be made in response to any item in Form 18 that is inapplicable and negative answers to any item may be omitted.

(9) Information that is not known to the person on whose behalf the solicitation is to be made and that is not reasonably within the power of the person to ascertain or procure may be omitted if a brief statement is made in the information circular of the circumstances rendering the information unavailable.

(10) There may be omitted from the information circular any information contained in any other information circular, notice of meeting or form of proxy sent to the persons whose proxies were solicited in connection with the same meeting if reference is made to the particular document containing the information. O. Reg. 586/79, s. 39.

FILING INFORMATION CIRCULARS AND PROXIES

40. Every person that sends or delivers an information circular or proxy to shareholders under section 116 of the Act and section 118 of the Act that is in respect of a meeting of shareholders of a reporting issuer, as defined in paragraph 38 of subsection 1 (1) of the *Securities Act*, shall forthwith file with the Commission a copy of the information circular, proxy and all other material sent or delivered by such person in connection with such meeting. O. Reg. 586/79, s. 40.

DELEGATION OF MINISTERIAL DUTIES

41. The Executive Director, the Senior Legal Officer, the Director, Companies Services Branch, the Controller of Records or the Assistant Controller of Records of the Companies Division of the Ministry may sign any certificate required or authorized by the Act. O. Reg. 586/79, s. 41.

FEES

42.—(1) The fees set out in the Schedule to this section shall be paid to the Treasurer of Ontario upon the filing, examination, or copying of the document or before the Minister takes the action for which the fee is prescribed, as the case may be.

Schedule
FEES

- 1. On delivery of articles of,
 - i. incorporation, for filing and endorsing a certificate\$200
 - ii. amalgamation or continuation for filing and endorsing a certificate and for an authorization by the Minister under section 190 of the Act 200
- 2. On delivery of restated articles of incorporation, for filing and endorsing a certificate. 50
- 3. On delivery of,
 - i. articles of amendment for filing and endorsing a certificate 50
 - ii. a statement under section 30 of the Act, for filing and endorsing a certificate .. 50
- 4. On delivery of a statement under section 186 of the Act, for filing and endorsing a certificate 200
- 5. On an application for an order,
 - i. under subsection 154 (3) of the Act ... 50
 - ii. under subsection 154 (4) of the Act ... 10

iii. under subsection 242 (4) of the Act ...\$200

- 6. i. For searches in person or by letter to determine if any documents are on file with the Minister under the Act or a predecessor thereof, including purchase of a diazo or microfilm copy of the contents of all such documents, if any, for each corporation 2
- ii. Where a fee has been paid pursuant to subparagraph i for searches in person, the Minister may, in his discretion, produce for examination the original documents on file with him without additional charge, in which case no diazo or microfilm copy will be supplied.
- 7. i. For copies of the contents of papers, articles and orders on file under the Act or any predecessor thereof in the Ministry, 50 cents a page with a minimum fee of \$2 in respect of each corporation.
- ii. For certification of,
 - A. copies of the contents of papers, articles and orders, \$10 in respect of each corporation; or
 - B. a diazo or microfilm copy of the contents of papers, articles and orders, \$10 in respect of each corporation.
- 8. For a certificate in respect of a corporation\$ 10
- 9. For an application to the Commission for orders under subsection 1 (8) or subsection 117 (2) of the Act 100
- (2) Where a cheque is tendered in payment of a fee set out in the Schedule, the name of the corporation or the Ontario corporation number in respect of which the cheque is tendered shall be entered on the face of the cheque. O. Reg. 586/79, s. 42.
- 43. No fee is payable on delivery of articles of dissolution under section 239 of the Act for filing and endorsing a certificate by the Minister. O. Reg. 586/79, s. 43.
- 44. No fee is payable in respect of a search under paragraph 6 or in respect of a copy of a document under paragraph 7 of the Schedule to section 42 by,
 - (a) any department of the Government of Ontario, or any agency, board or commission thereof, including the offices of sheriff and land registrar;
 - (b) any department of the Government of any other province of Canada having reciprocal

arrangements or any agency, board or commission thereof;

(c) any department of the Government of Canada or any agency, board or commission thereof; or

(d) the police department or fire department of any municipality in Ontario. O. Reg. 586/79, s. 44.

REFUNDS

45. Where a fee has been paid on delivery of articles or a statement or on an application for an authorization or an order under the Act, and the articles, statement or application for an authorization or order are abandoned, refused or withdrawn, as the case may be, the sum of \$50 shall be retained and the balance, if any, repaid to the person who paid it or his legal representative. O. Reg. 586/79, s. 45.

Form 1

Business Corporations Act

FOR MINISTRY USE ONLY

ONTARIO CORPORATION NUMBER

1.

Trans
Code
A
18

Line No. 0

Stat	0
------	---

Comp
Type
A
29

Method
Incorp.
3
30

Share
S
31

Notice
Req'd
N
32

Jurisdiction

ONTARIO

ARTICLES OF INCORPORATION

1. THE NAME OF THE CORPORATION IS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	5
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2. THE ADDRESS OF THE HEAD OFFICE IS

(Street & Number or R.R. Number & if Multi-Office Building give Room No.)

(Name of Municipality or Post Office)

(Postal Code)

(Name of Municipality, Geographical Township) *in the* (County, District, Regional Municipality)

3. THE NUMBER OF DIRECTORS IS

4. THE FIRST DIRECTOR(S) IS/ARE

NAME IN FULL, INCLUDING
ALL GIVEN NAMESRESIDENCE ADDRESS, GIVING STREET & NO. OR R.R. NO.
& MUNICIPALITY OR POST OFFICE AND POSTAL CODE

5. THE OBJECTS FOR WHICH THE CORPORATION IS INCORPORATED ARE

6. THE AUTHORIZED CAPITAL IS

7. THE DESIGNATIONS, PREFERENCES, RIGHTS, CONDITIONS, RESTRICTIONS, LIMITATIONS OR PROHIBITIONS ATTACHING TO THE SPECIAL SHARES, IF ANY, ARE

8. THE RESTRICTIONS, IF ANY, ON THE ALLOTMENT, ISSUE OR TRANSFER OF SHARES ARE

9. THE SPECIAL PROVISIONS, IF ANY, ARE

7.

10. THE SHARES, IF ANY, TO BE TAKEN BY THE INCORPORATORS ARE

INCORPORATORS FULL NAMES, INCLUDING ALL GIVEN NAMES	NUMBER OF SHARES	CLASS DESIGNATION	AMOUNT TO BE PAID \$

11. THE NAMES AND RESIDENCE ADDRESSES OF THE INCORPORATORS ARE

FULL NAMES, INCLUDING ALL GIVEN NAMES	FULL RESIDENCE ADDRESS GIVING STREET & NO. OR R.R. NO., MUNICIPALITY OR POST OFFICE AND POSTAL CODE

THESE ARTICLES ARE EXECUTED IN DUPLICATE FOR DELIVERY TO THE MINISTER

SIGNATURES OF INCORPORATORS

Form 2

Business Corporations Act

CONSENT TO ACT AS A FIRST DIRECTOR

I, _____
(NAME IN FULL, INCLUDING ALL GIVEN NAMES)

RESIDING AT _____
(STREET & NO. R.R.NO. , MUNICIPALITY OR POST OFFICE)

HEREBY CONSENT TO ACT AS A FIRST DIRECTOR OF

(NAME OF CORPORATION)

DATED _____ DAY OF _____ 19

(Signature of Witness)

(Signature of the Consenting Person)

2.

7. THE OBJECTS FOR WHICH THE CORPORATION IS INCORPORATED ARE

3.

8. THE AUTHORIZED CAPITAL IS

4.

9. THE DESIGNATIONS, PREFERENCES, RIGHTS, CONDITIONS, RESTRICTIONS, LIMITATIONS OR PROHIBITIONS ATTACHING TO THE SPECIAL SHARES, IF ANY, ARE

5.

10. THE RESTRICTIONS, IF ANY, ON THE ALLOTMENT, ISSUE OR TRANSFER OF SHARES ARE

6.

11. THE SPECIAL PROVISIONS, IF ANY, ARE

7.

THESE ARTICLES ARE EXECUTED IN DUPLICATE FOR DELIVERY TO THE MINISTER.

(NAME OF CORPORATION)

BY:

(SIGNATURE)

(DESCRIPTION OF OFFICE)

(CORPORATE SEAL)

(SIGNATURE)

(DESCRIPTION OF OFFICE)

Form 7

Business Corporations Act

FOR MINISTRY USE ONLY

ONTARIO CORPORATION NUMBER

1.

TRANS
CODE

Stat

C

D

1828

ARTICLES OF DISSOLUTION

1. THE NAME OF THE CORPORATION IS
-
2. DATE OF INCORPORATION/AMALGAMATION (DAY, MONTH AND YEAR)
3. THE DISSOLUTION HAS BEEN DULY AUTHORIZED UNDER CLAUSE 238 (A) OR (B) (AS APPLICABLE) OF THE BUSINESS CORPORATIONS ACT.
4. THE CORPORATION HAS

(A) NO DEBTS, OBLIGATIONS OR LIABILITIES;

(B) DULY PROVIDED FOR ITS DEBTS, OBLIGATIONS OR LIABILITIES IN ACCORDANCE WITH SUBSECTION 239 (3) OF THE BUSINESS CORPORATIONS ACT;

OR

(C) OBTAINED CONSENT TO ITS DISSOLUTION FROM ITS CREDITORS OR OTHER PERSONS HAVING INTERESTS IN ITS DEBTS, OBLIGATIONS OR LIABILITIES.
5. AFTER SATISFYING THE INTERESTS OF CREDITORS IN ALL ITS DEBTS, OBLIGATIONS AND LIABILITIES, IF ANY, THE CORPORATION HAS

(A) NO PROPERTY TO DISTRIBUTE AMONG ITS SHAREHOLDERS; OR

(B) DISTRIBUTED ITS REMAINING PROPERTY RATEABLY AMONG ITS SHAREHOLDERS ACCORDING TO THEIR RIGHTS AND INTERESTS IN THE CORPORATION OR IN ACCORDANCE WITH SUBSECTION 239 (4) OF THE BUSINESS CORPORATIONS ACT WHERE APPLICABLE.
6. THERE ARE NO PROCEEDINGS PENDING IN ANY COURT AGAINST THE CORPORATION.
7. THE CORPORATION HAS GIVEN NOTICE OF ITS INTENTION TO DISSOLVE BY PUBLICATION ONCE IN THE ONTARIO GAZETTE AND ONCE IN "A NEWSPAPER HAVING GENERAL CIRCULATION IN THE PLACE WHERE THE CORPORATION HAS ITS HEAD OFFICE.
8. THE CORPORATION HAS OBTAINED THE CONSENT OF THE CORPORATIONS TAX BRANCH OF THE MINISTRY OF REVENUE TO THE DISSOLUTION AND HAS FILED ALL NOTICES REQUIRED UNDER THE CORPORATIONS INFORMATION ACT.

THESE ARTICLES ARE EXECUTED IN DUPLICATE FOR DELIVERY TO THE MINISTER.

(NAME OF CORPORATION)

BY:

(SIGNATURE)

(DESCRIPTION OF OFFICE)

(CORPORATE SEAL)

Form 8

Business Corporations Act

FOR MINISTRY USE ONLY

ONTARIO CORPORATION NUMBER

1.

TRANS
CODE

Siat

3

D

18

28

ARTICLES OF DISSOLUTION

1. THE NAME OF THE CORPORATION IS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	5
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2. DATE OF INCORPORATION/AMALGAMATION _____
(DAY, MONTH AND YEAR)
3. *THE CORPORATION HAS NOT COMMENCED BUSINESS.*
4. *NONE OF THE SHARES OF THE CORPORATION HAS BEEN ISSUED.*
5. *THE DISSOLUTION HAS BEEN DULY AUTHORIZED UNDER CLAUSE 238 (c) OF THE BUSINESS CORPORATIONS ACT.*
6. *THE CORPORATION HAS NO DEBTS, OBLIGATIONS OR LIABILITIES.*
7. *AFTER SATISFYING THE INTERESTS OF CREDITORS IN ALL ITS DEBTS, OBLIGATIONS AND LIABILITIES, IF ANY, THE CORPORATION*
(A) HAS NO PROPERTY TO DISTRIBUTE; OR
(B) HAS DISTRIBUTED ITS REMAINING PROPERTY TO THE PERSONS ENTITLED THERETO.
8. *THERE ARE NO PROCEEDINGS PENDING IN ANY COURT AGAINST THE CORPORATION.*
9. *THE CORPORATION HAS GIVEN NOTICE OF ITS INTENTION TO DISSOLVE BY PUBLICATION ONCE IN THE ONTARIO GAZETTE AND ONCE IN "*
_____ "A NEWSPAPER HAVING GENERAL CIRCULATION IN
THE PLACE WHERE THE CORPORATION HAS ITS HEAD OFFICE.
10. *THE CORPORATION HAS OBTAINED THE CONSENT OF THE CORPORATIONS TAX BRANCH OF THE MINISTRY OF REVENUE TO THE DISSOLUTION AND HAS FILED ALL NOTICES REQUIRED UNDER THE CORPORATIONS INFORMATION ACT.*

THESE ARTICLES ARE EXECUTED IN DUPLICATE FOR DELIVERY TO THE MINISTER.

SIGNATURES AND FULL NAMES OF ALL OF THE INCORPORATORS OR THEIR
PERSONAL REPRESENTATIVES.

Form 9

Business Corporations Act

FOR MINISTRY USE ONLY

UNITARIO CORPORATION NUMBER

1.

TO THE MINISTER OF CONSUMER
AND COMMERCIAL RELATIONS

APPLICATION FOR AN ORDER PERMITTING REMOVAL OF RECORDS FROM HEAD OFFICE.

1. NAME OF THE APPLICANT CORPORATION:

[illegible]

2. DATE OF INCORPORATION/AMALGAMATION

3. THE CORPORATION IS NOT IN DEFAULT
IN FILING NOTICES REQUIRED UNDER
THE CORPORATIONS INFORMATION ACT.

4. IT IS REQUESTED THAT AN ORDER UNDER SUBSECTION 154 (3) OF THE BUSINESS CORPORATIONS ACT, BE MADE PERMITTING THE CORPORATION TO REMOVE THE RECORDS MENTIONED IN SECTIONS 150 AND 151 OF THE ACT FROM ITS HEAD OFFICE AND TO KEEP THEM AT THE FOLLOWING ADDRESS:

OR AT SUCH OTHER ADDRESS WITHIN THE SAME LOCALE AS MAY BE DETERMINED BY THE BOARD OF DIRECTORS OF THE CORPORATION, A NOTICE OF WHICH SHALL BE FILED, WITHIN 10 DAYS AFTER IT HAS BEEN PASSED, WITH THE MINISTER.

5. THE NECESSITY THEREFOR IS AS FOLLOWS:

2.

6. THIS APPLICATION HAS BEEN DULY AUTHORIZED

(A) BY A RESOLUTION APPROVED BY A MAJORITY OF THE VOTES CAST AT A GENERAL MEETING OF THE SHAREHOLDERS OF THE CORPORATION DULY CALLED FOR THAT PURPOSE AND HELD ON _____ ;
OR

(B) BY THE CONSENT IN WRITING OF ALL THE SHAREHOLDERS OF THE CORPORATION ENTITLED TO VOTE AT SUCH MEETING.

7. IT WILL BE A CONDITION OF THE ORDER THAT

(A) IF REQUESTED BY THE MINISTER, THE CORPORATION WILL RETURN FORTHWITH TO ITS HEAD OFFICE OR SOME OTHER PLACE IN ONTARIO DESIGNATED BY THE MINISTER, SUCH OF THE RECORDS AS MAY BE REMOVED.

(B) SUCH RECORDS WILL BE OPEN FOR EXAMINATION, AT THE HEAD OFFICE OF THE CORPORATION OR SOME OTHER PLACE IN ONTARIO DESIGNATED BY THE MINISTER, BY ANY PERSON WHO IS ENTITLED TO EXAMINE THEM AND WHO HAS APPLIED TO THE MINISTER FOR SUCH EXAMINATION.

DATED THIS _____ DAY OF _____ 19 _____

(NAME OF CORPORATION)

BY: _____
(SIGNATURE) (DESCRIPTION OF OFFICE)

(CORPORATE SEAL)

(SIGNATURE) (DESCRIPTION OF OFFICE)

Form 10

Business Corporations Act

BOND OF A GUARANTEE COMPANY

WHEREAS _____

(NAME OF CORPORATION)

(HEREINAFTER CALLED THE "CORPORATION") HAS APPLIED TO THE MINISTER OF CONSUMER AND COMMERCIAL RELATIONS FOR AN ORDER UNDER SUBSECTION 154 (3) OF THE BUSINESS CORPORATIONS ACT.

AND WHEREAS THE MINISTER OF CONSUMER AND COMMERCIAL RELATIONS HAS DIRECTED THAT, AS A CONDITION OF MAKING THE SAID ORDER, THESE PRESENTS BE EXECUTED:

NOW THEREFORE THESE PRESENTS WITNESS THAT _____

(NAME OF SURETY)

IS HELD AND FIRMLY BOUND UNTO THE TREASURER OF ONTARIO FOR THE TIME BEING IN THE PENAL SUM OF \$10,000, TO BE PAID TO THE TREASURER OF ONTARIO FOR THE TIME BEING OR TO ANY PERSON WHO MAY BE ENTITLED UPON ASSIGNMENT FROM THE TREASURER OF ONTARIO FOR THE TIME BEING TO RECOVER THE SUM HEREBY SECURED FOR WHICH PAYMENT WELL AND TRULY TO BE MADE _____

(NAME OF SURETY)

BINDS ITSELF, ITS SUCCESSORS AND ASSIGNS FIRMLY BY THESE PRESENTS.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT IF _____

(NAME OF CORPORATION)

DOETH AT ALL PROPER TIMES ALLOW THE RECORDS MENTIONED IN SECTIONS 157 AND 158 OF THE BUSINESS CORPORATIONS ACT, TO BE INSPECTED AT THE HEAD OFFICE OF THE SAID CORPORATION BY ANY PERSON ENTITLED THERETO AS THE MINISTER OF CONSUMER AND COMMERCIAL RELATIONS MAY DIRECT FROM TIME TO TIME BY DUE NOTICE TO THE SAID CORPORATION, AFTER APPLICATION TO HIM BY SUCH PERSON FOR SUCH INSPECTION, AND IF THE AUDITORS OF THE SAID CORPORATION ARE AT ALL TIMES PERSONS WHO ARE LICENSED BY THE PUBLIC ACCOUNTANTS COUNCIL FOR THE PROVINCE OF ONTARIO OR WHO ARE MEMBERS IN GOOD STANDING IN AN INSTITUTE OR ASSOCIATION OF ACCOUNTANTS INCORPORATED UNDER THE AUTHORITY OF THE LEGISLATURE OF ANY PROVINCE OF CANADA, THEN THIS OBLIGATION IS TO BE VOID, OTHERWISE TO REMAIN IN FULL FORCE AND EFFECT.

PROVIDED THAT, IF THE SAID SURETY AT ANY TIME GIVES TWO CALENDAR MONTHS' NOTICE IN WRITING TO THE TREASURER OF ONTARIO OF INTENTION TO TERMINATE THIS SURETYSHIP, THEN THIS OBLIGATION SHALL CEASE AND DETERMINE AS OF THE DATE OF SUCH TERMINATION EXCEPT AS TO ANY CLAIM HEREUNDER ARISING PRIOR TO SUCH LAST-MENTIONED DATE. NOTICE OF ANY CLAIM HEREUNDER SHALL BE MADE UPON THE SURETY WITHIN ONE YEAR FOLLOWING THE DATE OF TERMINATION AS HEREIN PROVIDED.

IN WITNESS WHEREOF _____ HAS CAUSED

(NAME OF SURETY)

ITS CORPORATE SEAL TO BE AFFIXED HERETO BY THE HANDS OF ITS PROPER OFFICERS IN THAT

BEHALF THIS _____ DAY OF _____, 19 _____

(NAME OF SURETY)

BY: _____

(SIGNATURE)

(DESCRIPTION OF OFFICE)

(CORPORATE SEAL)

(SIGNATURE)

(DESCRIPTION OF OFFICE)

Form 11

Business Corporations Act

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS THAT

(NAME OF APPOINTING CORPORATION)

(HEREINAFTER CALLED THE "CORPORATION")

HEREBY NOMINATES, CONSTITUTES AND APPOINTS

(NAME OF ATTORNEY IN FULL)

(BUSINESS ADDRESS OF THE ATTORNEY INCLUDING STREET NUMBER AND MUNICIPALITY)

ONTARIO, ITS TRUE AND LAWFUL ATTORNEY, TO ACT AS SUCH, AND AS SUCH TO SUE AND BE SUE, PLEAD AND BE IMPEALED IN ANY COURT IN ONTARIO, AND GENERALLY ON BEHALF OF THE CORPORATION WITHIN ONTARIO TO ACCEPT SERVICE OF PROCESS AND TO RECEIVE ALL LAWFUL NOTICES AND, FOR THE PURPOSES OF THE CORPORATION TO DO ALL ACTS AND TO EXECUTE ALL DEEDS AND OTHER INSTRUMENTS RELATING TO THE MATTERS WITHIN THE SCOPE OF THIS POWER OF ATTORNEY. UNTIL DUE LAWFUL NOTICE OF THE APPOINTMENT OF ANOTHER AND SUBSEQUENT ATTORNEY HAS BEEN GIVEN TO AND ACCEPTED BY THE MINISTER OF CONSUMER AND COMMERCIAL RELATIONS, SERVICE OF PROCESS OR OF PAPERS AND NOTICES UPON THE SAID

(NAME OF ATTORNEY IN FULL)

SHALL BE ACCEPTED BY THE CORPORATION AS SUFFICIENT SERVICE.

DATED THIS _____ DAY OF _____, 19____

(NAME OF CORPORATION)

(CORPORATE SEAL)

BY:

(SIGNATURE)

(DESCRIPTION OF OFFICE)

(SIGNATURE)

(DESCRIPTION OF OFFICE)

CONSENT TO ACT AS ATTORNEY

I, _____ OF _____

(NAME OF ATTORNEY IN FULL)

(BUSINESS ADDRESS INCLUDING STREET

NUMBER AND MUNICIPALITY)

, ONTARIO, HEREBY CONSENT TO ACT AS THE

ATTORNEY IN THE PROVINCE OF ONTARIO OF _____

(NAME OF CORPORATION)

PURSUANT TO THE POWER OF ATTORNEY IN THAT BEHALF EXECUTED BY THE SAID CORPORATION ON THE _____ DAY OF _____, 19____, AUTHORIZING ME TO ACCEPT SERVICE OF PROCESS AND NOTICES ON ITS BEHALF.

DATED THIS _____ DAY OF _____, 19____

(SIGNATURE OF WITNESS)

(SIGNATURE OF THE CONSENTING PERSON OR CORPORATION)

Form 12

Business Corporations Act

FOR MINISTRY USE ONLY

ONTARIO CORPORATION NUMBER

1.

TRANS
CODE

Stat

C
18

28

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57

APPLICATION FOR REVIVAL OF CORPORATION – SECTION 251(4) OF THE BUSINESS CORPORATIONS ACT.

1. NAME OF DISSOLVED CORPORATION:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	5
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2. DATE OF INCORPORATION/AMALGAMATION:

3. DATE OF DISSOLUTION:

4. ADDRESS FOR MAILING NOTICES UNDER THE CORPORATIONS INFORMATION ACT:

5. THE FOLLOWING TERMS AND CONDITIONS HAVE BEEN COMPLIED WITH:

- (A) ALL NOTICES REQUIRED TO BE FILED BY THE CORPORATION UNDER THE CORPORATIONS INFORMATION ACT HAVE BEEN FILED AND ALL OTHER DEFAULTS OF THE CORPORATION TO THE DATE OF DISSOLUTION HAVE BEEN REMEDIED.
- (B) THE CONSENT OF THE CORPORATIONS TAX BRANCH OF THE MINISTRY OF REVENUE TO THE REQUESTED REVIVAL HAS BEEN OBTAINED.
- (C) THE CONSENT OF THE PUBLIC TRUSTEE TO THE REQUESTED REVIVAL HAS BEEN OBTAINED.
- (D) THE CONSENT OF THE ONTARIO SECURITIES COMMISSION TO THE REQUESTED REVIVAL HAS BEEN OBTAINED.

6. IMMEDIATELY BEFORE DISSOLUTION THE INTEREST OF THE APPLICANT IN THE CORPORATION WAS

2.

7. THE REASONS FOR REQUESTING REVIVAL OF THE CORPORATION ARE

DATED THIS _____ DAY OF _____ 19____

FULL NAME AND SIGNATURE OF APPLICANT

Form 13

Business Corporations Act

FOR MINISTRY USE ONLY

ONTARIO CORPORATION NUMBER

1.

TRANS

CODE

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18

STATEMENT OF A SCHEME OF ARRANGEMENT

1. THE NAME OF THE CORPORATION IS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	5
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2. THE NEW NAME OF THE CORPORATION IF CHANGED BY THE SCHEME:

[illegible]

3. DATE OF INCORPORATION/AMALGAMATION _____ (DAY, MONTH AND YEAR)

4. THE SCHEME HAS BEEN APPROVED BY THE SHAREHOLDERS OF THE CORPORATION, OR OF THE CLASS OR CLASSES AFFECTED, AS THE CASE MAY BE, IN ACCORDANCE WITH SUBSECTION 185 (4) OF THE BUSINESS CORPORATIONS ACT.

5. A CERTIFIED COPY OF THE SCHEME IS ATTACHED TO THIS STATEMENT AS EXHIBIT "A".

6. THE SCHEME HAS BEEN APPROVED BY THE COURT ON _____ (DAY, MONTH, YEAR)

AND A CERTIFIED COPY OF THE ORDER OF THE COURT IS ATTACHED TO THIS STATEMENT AS EXHIBIT "B".

2.

7. THE TERMS AND CONDITIONS TO WHICH THE SCHEME IS MADE SUBJECT BY THE ORDER HAVE BEEN COMPLIED WITH.

THIS STATEMENT IS MADE UNDER SECTION 186 OF THE BUSINESS CORPORATIONS ACT
AND IS EXECUTED IN DUPLICATE FOR DELIVERY TO THE MINISTER.

(NAME OF CORPORATION)

(SIGNATURE AND TITLE OF THE
SIGNING OFFICER)

CORPORATE SEAL

(SIGNATURE AND TITLE OF THE
SIGNING OFFICER)

Form 14

Business Corporations Act

FOR MINISTRY USE ONLY

ONTARIO CORPORATION NUMBER

1.

APPLICATION FOR AUTHORIZATION TO TRANSFER TO ANOTHER JURISDICTION

TO THE MINISTER OF CONSUMER AND COMMERCIAL RELATIONS

1. THE NAME OF THE CORPORATION IS

[illegible]

2. DATE OF INCORPORATION/AMALGAMATION _____ (DAY, MONTH AND YEAR)

3. THE CORPORATION IS/IS NOT OFFERING SECURITIES TO THE PUBLIC WITHIN THE MEANING OF SUBSECTION 1 (8) OF THE BUSINESS CORPORATIONS ACT.

4. THE CORPORATION IS NOT IN DEFAULT IN FILING NOTICES UNDER THE CORPORATIONS INFORMATION ACT.

5. **THERE ARE NO ACTIONS, SUITS OR PROCEEDINGS PENDING AGAINST THE CORPORATION AND NO UNSATISFIED JUDGEMENTS OR ORDERS OUTSTANDING AGAINST THE CORPORATION, EXCEPT AS FOLLOWS:**

2.

6. IT IS REQUESTED THAT THE CORPORATION BE AUTHORIZED UNDER SUBSECTION 190 (1) OF THE BUSINESS CORPORATIONS ACT TO APPLY TO THE PROPER OFFICER FOR AN INSTRUMENT OF CONTINUATION CONTINUING THE CORPORATION AS IF IT HAD BEEN INCORPORATED UNDER THE LAWS OF _____
7. THE LAWS OF THE JURISDICTION WHERE THE CORPORATION WILL BE APPLYING FOR AN INSTRUMENT OF CONTINUATION PERMIT CORPORATIONS INCORPORATED UNDER THE LAWS OF THE PROVINCE OF ONTARIO TO BE SO CONTINUED.
8. THE NECESSITY THEREFOR IS AS FOLLOWS:

9. THIS APPLICATION HAS BEEN AUTHORIZED BY A SPECIAL RESOLUTION.

10. THE CONSENT OF

- (A) THE CORPORATIONS TAX BRANCH OF THE MINISTRY OF REVENUE
AND
(B) THE ONTARIO SECURITIES COMMISSION TO MAKE THIS APPLICATION, (DELETE IF NOT APPLICABLE)
- ACCOMPANY THIS APPLICATION.

(NAME OF CORPORATION)

(SIGNATURE)

(DESCRIPTION OF OFFICE)

(CORPORATE SEAL)

(SIGNATURE)

(DESCRIPTION OF OFFICE)

Form 15

Business Corporations Act

FOR MINISTRY USE ONLY

ONTARIO CORPORATION NUMBER

1.

**TRANS
CODE**

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Comp
Type

A

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**Method
Incorp.**

3

34

Share

8

3

**Notice
Req'd**

N

32

Jurisdiction

ONTARIO

33

Incorporation Date
Day Month Year

19			
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48 52

ARTICLES OF CONTINUATION IN ONTARIO

1. THE NAME OF THE CORPORATION IS

[illegible]

2. THE CORPORATION IS TO BE CONTINUED UNDER THE NAME (IF DIFFERENT FROM 1):

[illegible]

3. NAME OF JURISDICTION THE CORPORATION IS LEAVING:

(NAME OF JURISDICTION)

4. DATE OF INCORPORATION/AMALGAMATION

(DAY, MONTH AND YEAR)

5. THE ADDRESS OF THE HEAD OFFICE IS

(STREET & NUMBER OR R.R. NUMBER & IF MULTI-OFFICE BUILDING GIVE ROOM NUMBER)

(NAME OF MUNICIPALITY OR POST OFFICE)

POSTAL CODE

MUNICIPALITY, GEOGRAPHICAL TOWNSHIP

COUNTY, DISTRICT

6. THE NUMBER OF DIRECTORS IS

2.

7. THE DIRECTORS OF THE CORPORATION ARE

NAMES IN FULL	RESIDENCE ADDRESSES

8. THE OBJECTS FOR WHICH THE CORPORATION IS CONTINUED ARE

3.

9. THE AUTHORIZED CAPITAL IS

4.

10. THE DESIGNATIONS, PREFERENCES, RIGHTS, CONDITIONS, RESTRICTIONS, LIMITATIONS OR PROHIBITIONS ATTACHING TO THE SPECIAL SHARES, IF ANY, ARE

5.

11. THE RESTRICTIONS, IF ANY, ON THE ALLOTMENT ISSUE ON TRANSFER OF SHARES ARE

7.

12. SPECIAL PROVISIONS (IF ANY) ARE

8.

13. THE CONTINUATION OF THE CORPORATION UNDER THE LAWS OF THE PROVINCE OF ONTARIO HAS BEEN PROPERLY AUTHORIZED UNDER THE LAWS OF THE JURISDICTION IN WHICH THE CORPORATION WAS INCORPORATED/AMALGAMATED OR PREVIOUSLY CONTINUED.

9.

14. THE CORPORATION IS TO BE CONTINUED UNDER SECTION 189 OF THE BUSINESS CORPORATIONS ACT TO THE SAME EXTENT AS IF IT HAD BEEN INCORPORATED UNDER THIS ACT.

THESE ARTICLES ARE EXECUTED IN DUPLICATE FOR DELIVERY TO THE MINISTER.

(NAME OF CORPORATION)

BY: _____

(SIGNATURE & DESCRIPTION OF OFFICE)

(CORPORATE SEAL)

(SIGNATURE & DESCRIPTION OF OFFICE)

Form 16

Business Corporations Act

CONSENT BY INDIVIDUAL

TO: Companies Services Branch
Ministry of Consumer and Commercial Relations
555 Yonge Street
Toronto, Ontario
M7A 2H6

1. _____
(name of consenting individual; or name of personal representative "on behalf of (insert name of individual)")

(residence address, giving street, number,

municipality and postal code)

HEREBY CONSENTS TO THE FOLLOWING NAME FOR USE BY A CORPORATION:

(proposed name of corporation)

2. THE INDIVIDUAL ABOVE NAMED HAS, HAD, OR WILL HAVE A MATERIAL INTEREST IN THE CORPORATION.

DATED: _____
(day, month, year)

(signature of individual or personal representative
"on behalf of (insert name of individual)")

O. Reg. 586/79, Form 16.

Form 17

*Business Corporations Act*CONSENT AND UNDERTAKING BY BODY CORPORATE,
PARTNERSHIP, TRUST, ASSOCIATION, ETC.

TO: Companies Services Branch
Ministry of Consumer and Commercial Relations
555 Yonge Street
Toronto, Ontario
M7A 2H6

1. _____
(name of consenting body corporate, partnership, trust, association, etc.)

(address giving street, number and

municipality including postal code)

HEREBY CONSENTS TO THE FOLLOWING NAME FOR USE BY A CORPORATION:

(proposed name of corporation)

*2. _____
(name of consenting body corporate, partnership, trust, association, etc.)

FURTHER UNDERTAKES TO DISSOLVE FORTHWITH OR TO CHANGE ITS NAME TO
SOME DISSIMILAR NAME BEFORE THE SAID CORPORATION PROPOSING TO USE THE
NAME COMMENCES TO USE IT.

DATED: _____
(day, month, year)

(name of body corporate, partnership, trust,
association, etc.)

(AFFIX CORPORATE SEAL
HERE IF A CORPORATION)

BY: _____
(signature of authorized official)

(title of the authorized official)

*strike out if does not apply

Form 18

Business Corporations Act

INFORMATION CIRCULAR

ITEM 1 Revocability of Proxy

State whether the person giving the proxy has the power to revoke it. If any right of revocation is limited or is subject to compliance with any formal procedure, briefly describe the limitation or procedure.

ITEM 2 Persons Making the Solicitation

- (a) If solicitation is made by or on behalf of the management of the corporation, so state. Give the name of any director of the corporation who has informed the management in writing that he intends to oppose any action intended to be taken by the management and indicate the action that he intends to oppose.
- (b) If a solicitation is made otherwise than by or on behalf of the management of the corporation so state and give the name of the person by whom or on whose behalf it is made.
- (c) If the solicitation is to be made otherwise than by mail, describe the method to be employed. If the solicitation is to be made by specially engaged employees or soliciting agents, state,
 - (i) the material features of any contract or arrangement for the solicitation and identify the parties to the contract or arrangement, and
 - (ii) the cost or anticipated cost thereof.
- (d) State the name of the person by whom the cost of soliciting has been or will be borne, directly or indirectly.

ITEM 3 Interest of Certain Persons in Matters to be Acted Upon

Give brief particulars of any material interest, direct or indirect, by way of beneficial ownership of securities or otherwise, of each of the following persons in any matter to be acted upon other than the election of directors or the appointment of auditors:

- (a) if the solicitation is made by or on behalf of the management of the corporation each person who has been a director or senior officer of the corporation at any time since the beginning of the last financial year of the corporation;
- (b) if the solicitation is made otherwise than by or on behalf of the management of the corporation each person on whose behalf, directly or indirectly, the solicitation is made;
- (c) each proposed nominee for election as a director of the corporation;
- (d) each associate or affiliate of any of the foregoing persons.

Instructions:

1. In this item "associate", where used to indicate a relationship with any person means,
 - i. any body corporate of which such person beneficially owns, directly or indirectly, voting securities carrying more than 10 per cent of the voting rights attached to all voting securities of the body corporate for the time being outstanding,
 - ii. any partner of that person,
 - iii. any trust or estate in which such person has a substantial beneficial interest or as to which such person serves as trustee or in a similar capacity,
 - iv. any relative of such person, including his spouse, or of his spouse who has the same home as such person.

2. The following persons shall be deemed to be persons by whom or on whose behalf the solicitation is made:

- (a) any member of a committee or group that solicits proxies, and any person whether or not named as a member who, acting alone or with one or more other persons, directly or indirectly takes the initiative or engages in organizing, directing or financing any such committee or group;
- (b) any person who finances or joins with another to finance the solicitations of proxies except a person who contributes not more than \$250 and who is not otherwise a person by whom or on whose behalf the solicitation is made; or
- (c) any person who lends money, provides credit or enters into any other arrangements, pursuant to any contract or understanding with a person by whom or on whose behalf a solicitation is made, for the purpose of financing or otherwise inducing the purchase, sale, holding or voting of securities of the corporation provided that this clause does not include a bank or other lending institution or a dealer that, in the ordinary course of business, lends money or executes orders for the purchase or sale of securities and who is not otherwise a person on whose behalf a solicitation is made.

3. The following persons shall be deemed not to be persons by whom or on whose behalf a solicitation is made:

- (a) any person retained or employed by a person by whom or on whose behalf a solicitation is made to solicit proxies and who is not otherwise a person by whom or on whose behalf a solicitation is made or any person who merely transmits proxy-soliciting material or performs ministerial or clerical duties;
- (b) any person employed or retained by a person by whom or on whose behalf a solicitation is made in the capacity of lawyer, accountant, or advertising, public relations or financial adviser and whose activities are limited to the performance of his duties in the course of the employment or retainer;
- (c) any person regularly employed as an officer or employee of the corporation or any of its affiliates who is not otherwise a person by whom or on whose behalf a solicitation is made; or
- (d) any officer or director of, or any person regularly employed by, any other person by whom or on whose behalf a solicitation is made, if the officer, director or employee is not otherwise a person by whom or on whose behalf a solicitation is made.

ITEM 4 Voting Shares and Principal Holders of Voting Shares

- (a) State as to each class of equity shares of the corporation entitled to be voted at the meeting, the number of shares outstanding and the particulars of voting rights for each share of each such class.
- (b) Give the record date as of which the shareholders entitled to vote at the meeting will be determined or particulars as to the closing of the share transfer register, as the case may be, and, if the right to vote is not limited to shareholders of record as of a specified record date, indicate the conditions under which shareholders are entitled to vote.
- (c) If, to the knowledge of the directors or senior officers of the corporation, any person beneficially owns, directly or indirectly, or exercises control or direction over, equity shares carrying more than 10 per cent of the voting rights attached to any class of equity shares of the corporation name each such person or company, state the approximate number of the shares beneficially owned, directly or indirectly, or over which control or direction is exercised, by each such person and the percentage of the class of outstanding equity shares of the corporation represented by the number of equity shares so owned, controlled or directed.

ITEM 5 Election of Directors

- (a) If directors are to be elected, provide the following information, in tabular form to the extent practicable, for each person proposed to be nominated for election as a director and each other person whose term of office as a director will continue after the meeting:

- (i) Name and identify as such each proposed director of the corporation and name each director of the corporation whose term of office will continue after the meeting.
 - (ii) State when the term of office for each director and proposed director will expire.
 - (iii) State whether the corporation has an executive committee of its Board of Directors or is required to have an audit committee and, if so, name those directors who are members of each such committee.
 - (iv) Where a director or officer has held more than one position in the corporation parent or subsidiary thereof, state only the first and last position held.
 - (v) State the present principal occupation, business or employment of each director and proposed director. Give the name and principal business of any person in which any such employment is carried on. Furnish similar information as to all of the principal occupations, businesses or employments of each proposed director within the five preceding years, unless he is now a director and was elected to his present term of office by a vote of shareholders at a meeting, the notice of which was accompanied by an information circular.
 - (vi) If the proposed director is or has been a director of the corporation state the period or periods during which he has served as such.
 - (vii) State the number of shares of each class of equity shares of the corporation or of any subsidiary of the corporation beneficially owned, directly or indirectly or over which control or direction is exercised by each proposed director.
 - (viii) If equity shares carrying more than 10 per cent of the voting rights attached to all equity shares of the corporation or of a subsidiary of the corporation are beneficially owned, directly or indirectly, or controlled or directed by any proposed director and his associates or affiliates, state the number of shares of each class of equity shares beneficially owned, directly or indirectly, or controlled or directed by the associates or affiliates, naming each associate or affiliate whose shareholdings are 10 per cent or more.
- (b) If any proposed director is to be elected pursuant to any arrangement or understanding between the nominee and any other person except the directors and senior officers of the corporation acting solely in such capacity, name the other person and describe briefly the arrangement or understanding.

Instructions:

In this item "associate" has the same meaning as in item 3.

ITEM 6 Directors' and Officers' Remuneration

If action is to be taken with respect to:—

- the election of directors,
- any bonus, profit sharing or other plan of remuneration, contract or arrangement in which any director or officer of the corporation will participate,
- any pension or retirement plan of the corporation in which any director or officer of the corporation will participate, or
- the granting to any director or officer of the corporation of any option or right to purchase any shares other than rights issued rateably to all shareholders or to all shareholders resident in Canada.

Table
REMUNERATION OF DIRECTORS
AND OFFICERS

NATURE OF REMUNERATION

From Office, Employment and Employer Contributions (Aggregate)	Cost Pension Benefits (Aggregate)	Other (Aggregate)
See Instruction #1		Last Completed Financial Year Future Years
\$	\$	\$
See Instruction #2		Last Completed Financial Year Future Years
\$	\$	\$
See Instruction #1		Last Completed Financial Year Future Years
\$	\$	\$

(I) DIRECTORS
(Total Number:...)

(A) From issuer and
wholly-owned
subsidiaries:

(B) From partially-
owned subsi-
diaries
(Provide Names):

TOTAL

(II) FIVE SENIOR OFFICERS:

(A) From issuer and
wholly-owned
subsidiaries:

(B) From partially-
owned subsi-
diaries
(Provide Names):

TOTAL

(III) OFFICERS WITH
REMUNERATION OVER
\$50,000
(Total Number:...)

(A) From issuer and
wholly owned
subsidiaries

(B) From partially-
owned subsi-
diaries
(Provide Names):

TOTAL

- (a) State in the form of the table shown above separately for each of the following the aggregate remuneration paid or payable by the corporation and its subsidiaries in respect of the corporation's last completed financial year to:
- (i) the directors of the corporation in their capacity as directors of the corporation and any of its subsidiaries,
 - (ii) the five senior officers of the corporation in receipt of the largest amounts of remuneration, in their capacity as officers or employees of the corporation and any of its subsidiaries, and
 - (iii) the officers of the corporation including those in (ii) who received in their capacity as officers or employees of the corporation and any of its subsidiaries aggregate remuneration in excess of \$50,000 in that year, provided that this disclosure shall not be required where the corporation has less than seven such officers.
- (b) State, where practicable, the estimated aggregate cost to the corporation and its subsidiaries in or in respect of the last completed financial year of all benefits proposed to be paid under any pension or retirement plan upon retirement at normal retirement age to persons to whom paragraph (a) applies, or in the alternative, the estimated aggregate amount of all such benefits proposed to be paid upon retirement at normal retirement age to those persons.
- (c) State, where practicable, the aggregate of all remuneration payments other than those of the type referred to in paragraphs (a) and (b) made in or in respect of the corporation's last completed financial year and, as a separate amount, proposed to be made in the future by the corporation or any of its subsidiaries pursuant to an existing plan to persons to whom paragraph (a) applies.

Instructions:

1. For the purpose of clauses (i) and (iii) of paragraph (a), "remuneration" means amounts required to be reported as income under the *Income Tax Act* (Canada).
 2. For the purpose of clause (ii) of paragraph (a), "remuneration" means remuneration as defined in instruction 1 plus the value of benefits (other than those benefits provided to a broad category of employees on a basis which does not discriminate in favour of officers or directors) not included in income and derived from contributions made by the employer to or under a group sickness or accident insurance plan, private health service plan, supplementary unemployment benefit plan, deferred profit sharing plan or group term life insurance policy.
 3. If any portion of any of the amounts to be disclosed under paragraph (a) was paid by one or more subsidiaries of the corporation other than wholly-owned subsidiaries, the amount paid by each such subsidiary shall be separately disclosed together with the names of the subsidiaries. For this purpose, a wholly-owned subsidiary means a subsidiary all of the outstanding shares of which (other than shares whose participation in the profits of the issuer is limited to a fixed or determinable entitlement to dividends) are owned by or for the corporation or by or for other bodies corporate in a like relationship with the corporation.
 4. For the purpose of paragraph (c), "plan", includes all plans, contracts, authorizations or arrangements, whether or not contained in any formal document or authorized by a resolution of the directors of the corporation or any of its subsidiaries but does not include the Canada Pension Plan or a similar government plan.
 5. For the purposes of paragraph (c), "remuneration payments" include payments under a deferred profit sharing plan, deferred compensation benefits, retirement benefits or other benefits, except those paid or to be paid under a pension or retirement plan of the corporation or any of its subsidiaries.
 6. For the purposes of paragraph (c), if it is impracticable to state the amount of proposed remuneration payments, the aggregate amount accrued to date in respect of such payments may be stated, with an explanation of the basis of future payments.
- (d) State as to all options to purchase securities of the corporation or any of its subsidiaries that, since the commencement of the corporation's last financial year, were granted to directors or senior officers of the corporation, the following particulars:
- (i) the description and number of securities included,
 - (ii) the dates of grant, the prices, expiration dates and other material provisions,

- (iii) the consideration received for the granting thereof, and
 - (iv) where reasonably ascertainable, a summary showing the price range of the securities in the thirty-day period preceding the date of the grant and where not reasonably ascertainable, a statement to that effect.
- (e) As to all options to purchase securities of the corporation or any of its subsidiaries that were exercised by directors or senior officers of the corporation since the commencement of the corporation's last financial year, state the following particulars:
- (i) the description and number of securities purchased,
 - (ii) the purchase price, and
 - (iii) where reasonably ascertainable, a summary showing the price range of the securities in the thirty-day period preceding the date of purchase and, where not reasonably ascertainable, a statement to that effect.

Instructions:

1. In this item "options" includes all options, share purchase warrants or rights other than those issued to all shareholders of the same class or to all shareholders of the same class resident in Canada on a pro rata basis.
2. An extension of an option shall be deemed to be a granting of an option.
3. Information with respect to the option price of the securities may be given in the form of price ranges for each calendar quarter during which options were granted or exercised.
4. Where the price of the securities is not meaningful, it is permissible to state in lieu of the price the formula by which the price of the securities under option will be determined.

ITEM 7. Indebtedness of Directors and Senior Officers:

In regard to,

- (i) each director and each senior officer of the corporation;
- (ii) each proposed nominee for election as a director of the corporation; and
- (iii) each associate or affiliate of any such director, senior officer or proposed nominee,

who is or has been indebted to the corporation or its subsidiaries at any time since the beginning of the last completed financial year of the corporation, state with respect to each such body corporate or subsidiary the largest aggregate amount of indebtedness outstanding at any time during the last completed financial year, the nature of the indebtedness and of the transaction in which it was incurred, the amount thereof presently outstanding, and the rate of interest paid or charged thereon, but no disclosure need be made of routine indebtedness.

1. In this item "routine indebtedness" means indebtedness described in any of the following clauses:
 - (a) if a corporation makes loans to employees generally whether or not in the ordinary course of business then loans shall be considered to be routine indebtedness if made on terms, including those as to interest or collateral, no more favourable to the borrower than the terms on which loans are made by the issuer to employees generally, but the amount at any time remaining unpaid under such loans to any one director, senior officer or proposed nominee together with his associates or affiliates that are treated as routine indebtedness under this clause (a) shall not exceed \$25,000;
 - (b) whether or not the corporation makes loans in the ordinary course of business, a loan to a director or senior officer shall be considered to be routine indebtedness if,
 - (i) the borrower is a full-time employee of the corporation,
 - (ii) the loan is fully secured against the residence of the borrower, and
 - (iii) the amount of the loan does not exceed the annual salary of the borrower;

- (c) where the corporation makes loans in the ordinary course of business, a loan shall be considered to be routine indebtedness if made to a person other than a full-time employee of the corporation and if the loan,
 - (i) is made on substantially the same terms, including those as to interest rate and collateral, as were available when the loan was made to other customers of the corporation with comparable credit ratings, and
 - (ii) involves no more than usual risks of collectibility; and
- (d) indebtedness arising by reason of purchases made on usual trade terms or of ordinary travel or expense advances, or for similar reasons shall be considered to be routine indebtedness if the repayment arrangements are in accord with usual commercial practice.

2. State the name and home address in full or, alternatively, solely the municipality of residence or postal address of each person whose indebtedness is described.

Instructions:

In this item "associate" has the same meaning as in item 3.

ITEM 8 Interest of Insiders in Material Transactions

Where not previously disclosed in an information circular, describe briefly, and where practicable, state the approximate amount of any material interest, direct or indirect, of any insider of the corporation, any proposed nominee for election as a director of the corporation or any *associate or affiliate* of such insider or proposed nominee in any transaction since the commencement of the corporation's last financial year or in any proposed transaction which has materially affected or would materially affect the corporation or any of its subsidiaries.

Instructions:

In this item,

- 1. (a) "associate" has the same meaning as in item 3;
- (b) "insider" or "insider of a corporation" in this item means,
 - (i) every director or senior officer of a corporation,
 - (ii) every director or senior officer of a body corporate that is itself an insider or subsidiary of a corporation,
 - (iii) any person who beneficially owns, direct or indirectly, equity shares of a corporation or who exercises control or direction over equity shares of a corporation or a combination of both carrying more than 10 per cent of the voting rights attached to all equity shares held by the person as underwriter in the course of a distribution, and
 - (iv) a corporation where it has purchased, redeemed or otherwise acquired any of its shares, for so long as it holds any of its shares.

2. Give a brief description of the material transaction. State the name and address of each person whose interest in any transaction is described and the nature of the relationship by reason of which the interest is required to be described.

3. As to any transaction involving the purchase or sale of assets by or to the corporation or any subsidiary, otherwise than in the ordinary course of business, state the cost of the assets to the purchaser and the cost of the assets to the seller if acquired by the seller within two years prior to the transaction.

4. This item does not apply to any interest arising from the ownership of securities of the corporation where the security holder receives no extra or special benefit or advantage not shared on a pro rata basis by all holders of the same class of securities who are resident in Canada.

5. Information shall be included as to any material underwriting discounts or commissions upon the sale of securities by the corporation where any of the specified persons was or is to be an underwriter who was or is to be in

contractual relationship with the corporation with respect to securities of the corporation or is an associate or affiliate of a person that was or is to be such an underwriter within the meaning of the *Securities Act*.

6. No information need be given in answer to this item as to any transaction or any interest therein where,
- (a) the rates or charges involved in the transaction are fixed by laws or determined by competitive bids;
 - (b) the interest of the specified person in the transaction is solely that of a director of another person that is a party to the transaction;
 - (c) the transaction involves services as a chartered bank or other depository of funds, transfer agent, registrar, trustee under a trust indenture or other similar services; or
 - (d) the transaction does not directly or indirectly, involve remuneration for services, and
 - (i) the interest of the specified person arose from the beneficial ownership, direct or indirect, of less than 10 per cent of any class of voting securities of another person that is a party to the transaction,
 - (ii) the transaction is in the ordinary course of business of the corporation or its subsidiaries, and
 - (iii) the amount of the transaction or series of transactions is less than 10 per cent of the total sales or purchases, as the case may be, of the corporation and its subsidiaries for the last financial year.

7. Information shall be furnished in answer to this item with respect to transactions not excluded above which involve remuneration, directly or indirectly, to any of the specified persons for services in any capacity unless the interest of the person arises solely from the beneficial ownership, direct or indirect, of less than 10 per cent of any class of equity shares of another person furnishing the services to the corporation or its subsidiaries.

ITEM 9 Appointment of Auditor

If action is to be taken with respect to the appointment of an auditor, name the auditor of the corporation. If the auditor was first appointed within the last five years, state the date when the auditor was first appointed.

ITEM 10 Management Contracts

Where management functions of the corporation or any subsidiary are to any substantial degree performed by a person other than the directors or senior officers of the corporation or subsidiary:

- (i) give details of the agreement or arrangement under which the management functions are performed, including the name and address of any person who is a party to the agreement or arrangement or who is responsible for performing the management functions;
- (ii) give the names and home addresses in full or, alternatively, solely the municipality of residence or postal address of the insiders of any person with which the corporation or subsidiary has any such agreement or arrangement and, if the following information is known to the directors or senior officers of the corporation, give the names and addresses of any person with which the corporation or subsidiary has any such agreement or arrangement if the person were a corporation;
- (iii) with respect to any person named in answer to paragraph (i) state the amounts paid or payable by the corporation and its subsidiaries to the person since the commencement of the last financial year and give particulars; and
- (iv) with respect to any person named in answer to paragraph (i) or (ii) and their associates or affiliates, give particulars of,
 - (a) any indebtedness of the person, associate or affiliate to the corporation or its subsidiaries that was outstanding, and
 - (b) any transaction or arrangement of the person, associate or affiliate with the corporation or subsidiary,

at any time since the commencement of the corporation's last financial year.

Instructions:

In this item,

1. (a) "associate" has the same meaning as in item 3;
(b) "insider" has the same meaning as in item 8.
2. In giving the information called for by this item, it is not necessary to refer to any matter that in all the circumstances is of relative insignificance.
3. In giving particulars of indebtedness, state the largest aggregate amount of indebtedness outstanding at any time during the period, the nature of the indebtedness and of the transaction in which it was incurred, the amount of the indebtedness presently outstanding and the rate of interest paid or charged on the indebtedness.
4. It is not necessary to include as indebtedness amounts due from the particular person for purchases subject to usual trade terms, for ordinary travel and expense advances and for other like transactions.

ITEM 11 Particulars of Matters to be Acted Upon

If action is to be taken on any matter to be submitted to the meeting of shareholders other than the approval of financial statements, the substance of the matter, or related groups of matters, should be briefly described, except to the extent described pursuant to the foregoing items, in sufficient detail to permit shareholders to form a reasoned judgment concerning the matter. Without limiting the generality of the foregoing, such matters include alterations of share capital, charter amendments, property acquisitions or dispositions, amalgamations, mergers or reorganizations. Where a reorganization or similar restructuring is involved, reference should be made to a prospectus form or issuer bid form for guidance as to what is material.

If the matter is one that is not required to be submitted to a vote of shareholders, the reasons for submitting it to shareholders should be given and a statement should be made as to what action is intended to be taken by management in the event of a negative vote by the shareholders.

Instructions:

1. The prospectus form or issuer bid form referred to in this item shall mean the corresponding form or forms under the *Securities Act*.

Form 19

FOR MINISTRY USE ONLY

Business Corporations Act

ONTARIO CORPORATION NUMBER

APPLICATION FOR AN ORDER RESCINDING ORDER PERMITTING REMOVAL
OF RECORDS FROM HEAD OFFICE

1. Name of Corporation: _____

2. Date of Incorporation/Amalgamation _____

3. The corporation is not in default in filing any notice required under the *Corporations Information Act*. _____4. By an order dated _____, under Subsection 154 (3) of the *Business Corporations Act* it was permitted to keep the records mentioned in Sections 150 and 151 of the said Act at _____

(City/Town)

(Province or State (name of country if not Canada)) _____

5. The corporation has returned to the head office all records removed from the head office of the corporation. The records are now located at the head office of the corporation at _____

(Street & Number or R.R. Number & if Multi-Office Building give Room No.) _____

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(Name of Municipality or Post Office) _____

(Postal Code) _____

6. The corporation requests that the order dated _____ be rescinded.

Dated this _____ day of _____ 19____.

Name of Corporation _____

signature _____

description of office _____

signature _____

description of office _____

Corporate Seal

