MACHINERY'S DATA SHEETS

REVISED AND RE-ARRANGED IN LIBRARY FORM

No. 1

Screw Threads

PRICE 25 CENTS

CONTENTS

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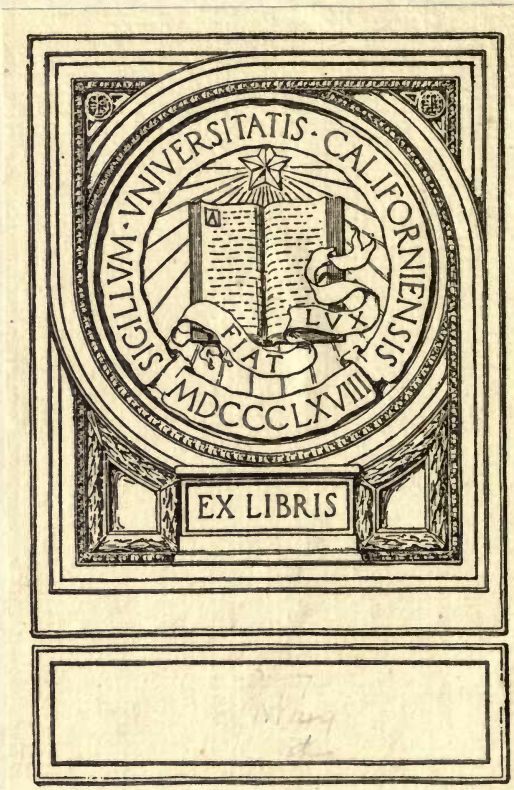
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MACHINERY'S DATA SHEET SERIES

COMPILED FROM MACHINERY'S MONTHLY DATA SHEETS AND ARRANGED WITH EXPLANATORY NOTES

No. 1

Screw Threads

CONTENTS

In the following pages are compiled a number of concise tables relating to standard screw thread systems and kindred subjects, carefully selected from MACHINERY'S monthly Data Sheets, issued as supplements to the Engineering and Railway editions of MACHINERY since September, 1898. A number of additional tables also are included which are published here for the first time.

In order to enhance the value of the tables, brief explanatory notes have been provided. In these notes a complete list of references is given to articles which have appeared in MACHINERY, and to matter published in MACHINERY'S Reference Series and Jig Sheets, giving additional information on the subject. These references will be of considerable value to readers who wish to make a more thorough study of the subject. In a note at the foot of each table, reference is made to the page on which the explanatory note relating to the table appears.

SCREW THREADS

United States Standard Thread

The formulas for the shape of the U. S. standard screw thread are given on page 4; on the same page and on page 5 are also given the dimensions for bolts and nuts with this form of thread. It will be seen that one column in the table is given for the tensile strength and one for what is called the working strength of the threaded part, at a stress of 6000 pounds per square inch. The tensile strength is the strength of the threaded bolt when no additional stress is thrown upon it by the tightening of the nut by the wrench. The working strength is the safe strength when allowance has been made for the stress caused in the bolt by the wrench action. It will be seen that bolts under ⅝ inch diameter are indicated as having no working strength, because the threads on bolts of this size are easily stripped off by careless tightening with a wrench. When it is required that the bolt should have a given safe working strength after having been tightened down, it is not advisable to use bolts of less than ⅝ inch diameter. [MACHINERY, November, 1906, Working Strength of Bolts; February, 1908, Screw Thread Systems; MACHINERY'S Reference Series No. 22, Calculations of Elements of Machine Design, Chapter II; No. 31, Screw Thread Tools and Gages, Chapter I.]

Whitworth Standard Thread

The tables on pages 6 and 7 give the diameters and corresponding numbers of threads for the Whitworth standard thread system. The columns for distance across flats and distance across corners refer to hexagon nuts and bolt heads. [MACHINERY, February, 1908, Screw Thread Systems; MACHINERY'S Reference Series No. 31, Screw Thread Tools and Gages, Chapter I.]

Sharp V-thread

Formulas for the sharp V-thread are given on page 8, together with the diameters and corresponding numbers of threads per inch for screws made according to this system. There is a movement on foot to entirely eliminate the sharp V-thread in machine construction, replacing it with the U. S. standard thread. [MACHINERY, October, 1906, The Flat on the Top of Sharp V-threads; February, 1908, Screw Thread Systems; March, 1909, The Passing of the Sharp V-thread; MACHINERY'S Reference Series No. 31, Screw Thread Tools and Gages, Chapter I.]

British Standard Fine Screw Thread

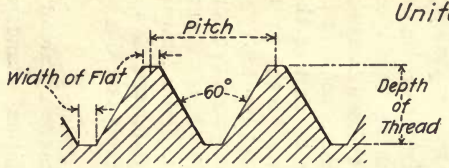
The British standard fine screw thread, details of which are given on page 8, is a system of threads recently adopted in Great Britain. The form of the thread is the same as that of the Whitworth standard, but there is a greater number of threads per inch for given diameters. [MACHINERY, October, 1906, British Standard Fine Screw Thread; February, 1908, Screw Thread Systems; MACHINERY'S Reference Series No. 31, Screw Thread Tools and Gages, Chapter I.]

British Association Standard Thread

The British Association standard thread is the standard system in Great Britain for screws of small diameters. Formulas for this screw thread and dimensions for screws made according to

(Continued on page 11.)

United States Standard Screw Thread.



$$\text{Pitch} = \frac{1}{\text{No. of Threads per Inch}}$$

$$\text{Depth of Thread} = 0.6495 \times \text{Pitch}$$

$$\text{Width of Flat} = \frac{\text{Pitch}}{8}$$

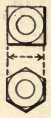
U. S. Standard Bolts and Nuts.

Diam.	No. of Th'ds per Inch	Diam. at Root of Thread	Diam. of Tap Drill*	Area in square Inches		Tensile strength at Stress of 6000 pounds per sq. inch	Working strength at Stress of 6000 pounds per sq. inch	Shearing strength at 6000 pounds Stress per sq. inch		Dimensions of Nuts and Bolt Heads				
				of Bolt	at Root of Thread			Full Diam. of Bolt	at Root of Thread					
1/4	20	0.185	13/64	0.049	0.026	160	—	295	160	1/2	0.578	0.707	1/4	1/4
5/16	18	0.240	1/4	0.076	0.045	270	—	460	270	19/32	0.686	0.840	5/16	19/64
3/8	16	0.294	5/16	0.110	0.068	410	—	660	410	11/16	0.794	0.972	3/8	11/32
7/16	14	0.345	23/64	0.150	0.093	560	—	900	560	25/32	0.902	1.105	7/16	25/64
1/2	13	0.400	27/64	0.196	0.126	760	—	1180	750	7/8	1.011	1.237	1/2	7/16
9/16	12	0.454	15/32	0.248	0.162	1000	—	1490	975	31/32	1.119	1.370	9/16	31/64
5/8	11	0.507	17/32	0.307	0.202	1210	260	1840	1210	1 1/16	1.227	1.502	5/8	17/32
3/4	10	0.620	41/64	0.442	0.302	1810	680	2650	1810	1 1/4	1.444	1.768	3/4	5/8
7/8	9	0.731	3/4	0.601	0.419	2520	1210	3610	2500	1 7/16	1.660	2.033	7/8	23/32
1	8	0.838	55/64	0.785	0.551	3300	1790	4700	3300	1 5/8	1.877	2.298	1	13/16
1 1/8	7	0.939	31/32	0.994	0.694	4160	2470	6000	4160	1 13/16	2.093	2.563	1 1/8	29/32
1 1/4	7	1.064	1 3/32	1.227	0.893	5350	3470	7400	5350	2	2.310	2.828	1 1/4	1
1 3/8	6	1.158	1 7/32	1.485	1.057	6340	4260	8900	6300	2 3/16	2.527	3.093	1 3/8	1 3/32
1 1/2	6	1.283	1 11/32	1.767	1.295	7770	5500	10600	7800	2 3/8	2.743	3.358	1 1/2	1 3/16

* The tap drill sizes given do not give a full thread, but provide for sufficient clearance to facilitate tapping.

Explanatory note: Page 3.

U.S. Standard Bolts and Nuts (continued).

Diam.	No. of Thds per Inch	Diam. at Root of Thread	Diam. of Tap Drill*	Area in square Inches		Tensile strength at Stress of 6000 pounds per sq. inch	Working strength at Stress of 6000 pounds per sq. inch	Shearing strength at 6000 pounds Stress per sq. inch		Dimensions of Nuts and Bolt Heads				
				of Bolt	at Root of Thread			Full Diam. of Bolt	at Root of Thread					
$1\frac{5}{8}$	$5\frac{1}{2}$	1.389	$1\frac{27}{64}$	2.074	1.515	9090	6630	12400	9100	$2\frac{9}{16}$	2.960	3.623	$1\frac{5}{8}$	$1\frac{9}{32}$
$1\frac{3}{4}$	5	1.490	$1\frac{17}{32}$	2.405	1.746	10470	7830	14400	10500	$2\frac{3}{4}$	3.176	3.889	$1\frac{3}{4}$	$1\frac{3}{8}$
$1\frac{7}{8}$	5	1.615	$1\frac{21}{32}$	2.761	2.051	12300	9470	16600	12300	$2\frac{15}{16}$	3.393	4.154	$1\frac{7}{8}$	$1\frac{15}{32}$
2	$4\frac{1}{2}$	1.711	$1\frac{49}{64}$	3.142	2.302	13800	10800	18800	13800	$3\frac{1}{8}$	3.609	4.419	2	$1\frac{9}{16}$
$2\frac{1}{4}$	$4\frac{1}{2}$	1.961	$2\frac{1}{64}$	3.976	3.023	18100	14700	23800	18200	$3\frac{1}{2}$	4.043	4.949	$2\frac{1}{4}$	$1\frac{3}{4}$
$2\frac{1}{2}$	4	2.175	$2\frac{15}{64}$	4.909	3.719	22300	18500	29500	22400	$3\frac{7}{8}$	4.476	5.479	$2\frac{1}{2}$	$1\frac{15}{16}$
$2\frac{3}{4}$	4	2.425	$2\frac{31}{64}$	5.940	4.620	27700	23600	35600	27700	$4\frac{1}{4}$	4.909	6.010	$2\frac{3}{4}$	$2\frac{1}{8}$
3	$3\frac{1}{2}$	2.629	$2\frac{11}{16}$	7.069	5.428	32500	28000	42500	32600	$4\frac{5}{8}$	5.342	6.540	3	$2\frac{5}{16}$
$3\frac{1}{4}$	$3\frac{1}{2}$	2.879	$2\frac{15}{16}$	8.296	6.510	39000	34100	50000	39000	5	5.775	7.070	$3\frac{1}{4}$	$2\frac{1}{2}$
$3\frac{1}{2}$	$3\frac{1}{4}$	3.100	$3\frac{11}{64}$	9.621	7.548	45300	40000	58000	45200	$5\frac{3}{8}$	6.208	7.600	$3\frac{1}{2}$	$2\frac{11}{16}$
$3\frac{3}{4}$	3	3.317	$3\frac{3}{8}$	11.045	8.641	51800	45000	66000	52000	$5\frac{3}{4}$	6.641	8.131	$3\frac{3}{4}$	$2\frac{7}{8}$
4	3	3.567	$3\frac{5}{8}$	12.566	9.963	59700	50100	75000	60000	$6\frac{1}{8}$	7.074	8.661	4	$3\frac{1}{16}$
$4\frac{1}{4}$	$2\frac{7}{8}$	3.798	$3\frac{27}{32}$	14.186	11.340	68000	58000	85000	68000	$6\frac{1}{2}$	7.508	9.191	$4\frac{1}{4}$	$3\frac{1}{4}$
$4\frac{1}{2}$	$2\frac{3}{4}$	4.028	$4\frac{3}{32}$	15.904	12.750	76500	66000	95000	76000	$6\frac{7}{8}$	7.941	9.721	$4\frac{1}{2}$	$3\frac{7}{16}$
$4\frac{3}{4}$	$2\frac{5}{8}$	4.255	$4\frac{5}{16}$	17.721	14.215	85500	74000	106000	85000	$7\frac{1}{4}$	8.374	10.252	$4\frac{3}{4}$	$3\frac{5}{8}$
5	$2\frac{1}{2}$	4.480	$4\frac{9}{16}$	19.635	15.760	94000	82500	118000	94000	$7\frac{5}{8}$	8.807	10.782	5	$3\frac{13}{16}$
$5\frac{1}{4}$	$2\frac{1}{2}$	4.730	$4\frac{13}{16}$	21.648	17.570	105500	93000	130000	105000	8	9.240	11.312	$5\frac{1}{4}$	4
$5\frac{1}{2}$	$2\frac{3}{8}$	4.953	$5\frac{1}{32}$	23.758	19.260	116000	103000	142000	116000	$8\frac{3}{8}$	9.673	11.842	$5\frac{1}{2}$	$4\frac{3}{16}$
$5\frac{3}{4}$	$2\frac{3}{8}$	5.203	$5\frac{9}{32}$	25.967	21.250	127000	114000	155000	127000	$8\frac{3}{4}$	10.106	12.373	$5\frac{3}{4}$	$4\frac{3}{8}$
6	$2\frac{1}{4}$	5.423	$5\frac{1}{2}$	28.274	23.090	138000	124000	169000	138000	$9\frac{1}{8}$	10.539	12.903	6	$4\frac{9}{16}$

* The tap drill sizes given do not give a full thread, but provide for sufficient clearance to facilitate tapping.

Explanatory note: Page 2

WHITWORTH'S STANDARD SCREW THREADS FOR BOLTS,

with Sizes of Hexagonal Nuts and Bolt Heads.

ESTABLISHED IN 1841

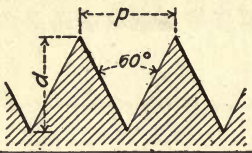
DIAMETER OF BOLT.		Number of Threads per Inch.	Diameter at Bottom of Thread.	Distance Across Flats.	Distance Across Corners.	Thickness of Bolt Head.	Thickness of Nut.
Fractional Sizes.	Decimal Sizes.						
1/16	.0625	60	.0411	.212	.2447	.0547	1/16
3/32	.09375	48	.0670	.280	.3233	.0820	3/32
1/8	.125	40	.0929	.338	.3902	.1093	1/8
5/32	.15625	32	.1162	.3875	.4474	.1367	5/32
3/16	.1875	24	.1341	.448	.5173	.1640	3/16
1/4	.25	20	.1859	.525	.6062	.2187	1/4
5/16	.3125	18	.2413	.6014	.6944	.2734	5/16
3/8	.375	16	.2949	.7094	.8191	.3281	3/8
7/16	.4375	14	.3460	.8204	.9473	.3828	7/16
1/2	.5	12	.3932	.9191	1.0612	.4375	1/2
9/16	.5625	12	.4557	1.011	1.1674	.4921	9/16
5/8	.625	11	.5085	1.101	1.2713	.5468	5/8
11/16	.6875	11	.5710	1.2011	1.3869	.6015	11/16
3/4	.75	10	.6219	1.3012	1.5024	.6562	3/4
13/16	.8125	10	.6844	1.39	1.6050	.7109	13/16
7/8	.875	9	.7327	1.4788	1.7075	.7656	7/8
15/16	.9375	9	.7952	1.5745	1.8180	.8203	15/16
1	1.0	8	.8399	1.6701	1.9284	.875	1
1 1/8	1.125	7	.9420	1.8605	2.1483	.9843	1 1/8
1 1/4	1.25	7	1.0670	2.0483	2.3651	1.0937	1 1/4
1 3/8	1.375	6	1.1615	2.2146	2.5571	1.2031	1 3/8
1 1/2	1.5	6	1.2865	2.4134	2.7867	1.3125	1 1/2
1 5/8	1.625	5	1.3688	2.5763	2.9748	1.4218	1 5/8
1 3/4	1.75	5	1.4938	2.7578	3.1844	1.5312	1 3/4
1 7/8	1.875	4.5	1.5904	3.0183	3.4852	1.6406	1 7/8
2	2.0	4.5	1.7154	3.1491	3.6362	1.75	2
2 1/8	2.125	4.5	1.8404	3.337	3.8532	1.8593	2 1/8
2 1/4	2.25	4	1.9298	3.546	4.0945	1.9687	2 1/4
2 3/8	2.375	4	2.0548	3.75	4.3301	2.0781	2 3/8

WHITWORTH'S STANDARD SCREW THREADS, &c.

(Continued.)

DIAMETER OF BOLT.		Number of Threads per inch.	Diameter at Bottom of Thread.	Distance Across Flats.	Distance Across Corners.	Thickness of Bolt Head.	Thickness of Nut.
Fractional Sizes.	Decimal Sizes,						
2½	2.5	4	2.1798	3.894	4.4964	2.1875	2½
2⅝	2.625	4	2.3048	4.049	4.6753	2.2968	2⅝
2¾	2.75	3.5	2.3840	4.181	4.8278	2.4062	2¾
2⅞	2.875	3.5	2.5090	4.3456	5.0178	2.5156	2⅞
3	3.0	3.5	2.6340	4.531	5.2319	2.625	3
3⅛	3.125	3.5	2.7590	4.69	5.4155	2.734	3⅛
3¼	3.25	3.25	2.8559	4.85	5.6002	2.843	3¼
3⅜	3.375	3.25	2.9809	5.01	5.7850	2.953	3⅜
3½	3.5	3.25	3.1059	5.175	5.9755	3.062	3½
3⅝	3.625	3.25	3.2309	5.362	6.1915	3.171	3⅝
3¾	3.75	3	3.3231	5.55	6.4085	3.281	3¾
3⅞	3.875	3	3.4481	5.75	6.6395	3.39	3⅞
4	4.0	3	3.5731	5.95	6.8704	3.5	4
4⅛	4.125	3	3.6981	6.162	7.1152	3.609	4⅛
4¼	4.25	2.875	3.8045	6.375	7.3612	3.718	4¼
4⅜	4.375	2.875	3.9295	6.6	7.6210	3.828	4⅜
4½	4.5	2.875	4.0545	6.825	7.8819	3.937	4½
4⅝	4.625	2.875	4.1795	7.0625	8.1550	4.046	4⅝
4¾	4.75	2.75	4.2843	7.3	8.4293	4.156	4¾
4⅞	4.875	2.75	4.4093	7.55	8.7179	4.265	4⅞
5	5.0	2.75	4.5343	7.8	9.0066	4.375	5
5⅛	5.125	2.75	4.6593	8.065	9.3126	4.484	5⅛
5¼	5.25	2.625	4.7621	8.35	9.6417	4.593	5¼
5⅜	5.375	2.625	4.8871	8.6	9.9304	4.703	5⅜
5½	5.5	2.625	5.0121	8.85	10.2190	4.812	5½
5⅝	5.625	2.625	5.1371	9.15	10.5655	4.921	5⅝
5¾	5.75	2.5	5.2377	9.45	10.9119	5.031	5¾
5⅞	5.875	2.5	5.3627	9.75	11.2583	5.140	5⅞
6	6.0	2.5	5.4877	10	11.5470	5.25	6

SHARP V-THREAD AND BRITISH FINE SCREW THREAD

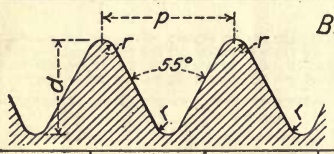


Standard Sharp "V" Thread.

p = pitch = $\frac{1}{\text{number of threads per inch}}$

d = depth = $p \times 0.866$

Diameter	Threads per Inch	Diameter	Threads per Inch	Diameter	Threads per Inch	Diameter	Threads per Inch
1/16	72	13/16	10	1 3/4	5	3 3/8	3 1/4
3/32	56	7/8	9	1 13/16	5	3 1/2	3 1/4
1/8	40	15/16	9	1 7/8	4 1/2	3 5/8	3 1/4
5/32	32	1	8	1 15/16	4 1/2	3 3/4	3
3/16	24	1 1/16	8	2	4 1/2	3 7/8	3
7/32	24	1 1/8	7	2 1/8	4 1/2	4	3
1/4	20	1 3/16	7	2 1/4	4 1/2	4 1/4	2 7/8
5/16	18	1 1/4	7	2 3/8	4 1/2	4 1/2	2 3/4
3/8	16	1 5/16	7	2 1/2	4	4 3/4	2 5/8
7/16	14	1 3/8	6	2 5/8	4	5	2 1/2
1/2	12	1 7/16	6	2 3/4	4	5 1/4	2 1/2
9/16	12	1 1/2	6	2 7/8	4	5 1/2	2 3/8
5/8	11	1 9/16	6	3	3 1/2	5 3/4	2 3/8
11/16	11	1 5/8	5	3 1/8	3 1/2	6	2 1/4
3/4	10	1 11/16	5	3 1/4	3 1/2		



British Standard Fine Screw Thread.

p = pitch = $\frac{1}{\text{number of threads per inch}}$

d = depth = $p \times 0.6403$

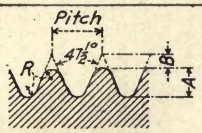
r = radius = $p \times 0.1373$

Diameter	Threads per Inch	Diameter	Threads per Inch	Diameter	Threads per Inch	Diameter	Threads per Inch
1/4	25	1 1/8	9	2	7	3 3/4	4 1/2
5/16	22	1 3/16	9	2 1/8	7	3 7/8	4 1/2
3/8	20	1 1/4	9	2 1/4	6	4	4 1/2
7/16	18	1 5/16	9	2 3/8	6	4 1/4	4
1/2	16	1 3/8	8	2 1/2	6	4 1/2	4
9/16	16	1 7/16	8	2 5/8	6	4 3/4	4
5/8	14	1 1/2	8	2 3/4	6	5	4
11/16	14	1 9/16	8	2 7/8	6	5 1/4	3 1/2
3/4	12	1 5/8	8	3	5	5 1/2	3 1/2
13/16	12	1 11/16	8	3 1/8	5	5 3/4	3 1/2
7/8	11	1 3/4	7	3 1/4	5	6	3 1/2
15/16	11	1 13/16	7	3 3/8	5		
1	10	1 7/8	7	3 1/2	4 1/2		
1 1/16	10	1 15/16	7	3 5/8	4 1/2		

Explanatory note: Page 3.

BRITISH ASSOCIATION STANDARD THREAD

British Association Standard Thread.



Depth of Thread (A) = 0.6 x Pitch

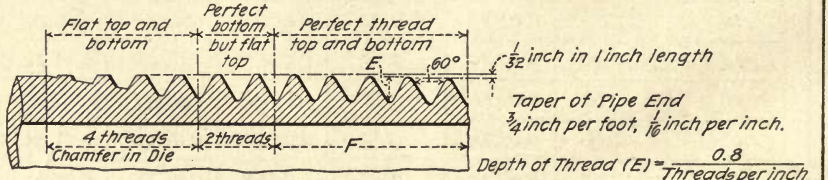
Radius (R) = $\frac{2 \times \text{Pitch}}{11}$

British Association Number	Diameter		Pitch		A	B	R
	Millimeters	Inches	Millimeters	Inches	Inches	Inches	Inches
0	6.0	0.2362	1.0	0.0394	0.0236	0.0106	0.0072
1	5.3	0.2087	0.90	0.0354	0.0212	0.0095	0.0064
2	4.7	0.1850	0.81	0.0319	0.0191	0.0085	0.0058
3	4.1	0.1614	0.73	0.0287	0.0172	0.0077	0.0052
4	3.6	0.1417	0.66	0.0260	0.0156	0.0070	0.0047
5	3.2	0.1260	0.59	0.0232	0.0139	0.0062	0.0042
6	2.8	0.1102	0.53	0.0209	0.0125	0.0056	0.0038
7	2.5	0.0984	0.48	0.0189	0.0113	0.0051	0.0034
8	2.2	0.0866	0.43	0.0169	0.0101	0.0045	0.0031
9	1.9	0.0748	0.39	0.0154	0.0092	0.0041	0.0028
10	1.7	0.0669	0.35	0.0138	0.0083	0.0037	0.0025
11	1.5	0.0591	0.31	0.0122	0.0073	0.0033	0.0022
12	1.3	0.0511	0.28	0.0110	0.0066	0.0030	0.0020
13	1.2	0.0472	0.25	0.0098	0.0059	0.0026	0.0018
14	1.0	0.0394	0.23	0.0091	0.0055	0.0024	0.0016
15	0.90	0.0354	0.21	0.0083	0.0050	0.0022	0.0015
16	0.79	0.0311	0.19	0.0075	0.0045	0.0020	0.0014
17	0.70	0.0276	0.17	0.0067	0.0040	0.0018	0.0012
18	0.62	0.0244	0.15	0.0059	0.0035	0.0016	0.0011
19	0.54	0.0213	0.14	0.0055	0.0033	0.0015	0.0010
20	0.48	0.0189	0.12	0.0047	0.0028	0.0013	0.0009
21	0.42	0.0165	0.11	0.0043	0.0026	0.0012	0.0008
22	0.37	0.0146	0.098	0.0039	0.0023	0.0010	0.0007
23	0.33	0.0130	0.089	0.0035	0.0021	0.0009	0.0006
24	0.29	0.0114	0.080	0.0031	0.0019	0.0008	0.0006
25	0.25	0.0098	0.072	0.0028	0.0017	0.0008	0.0005

Explanatory note: Page 3.

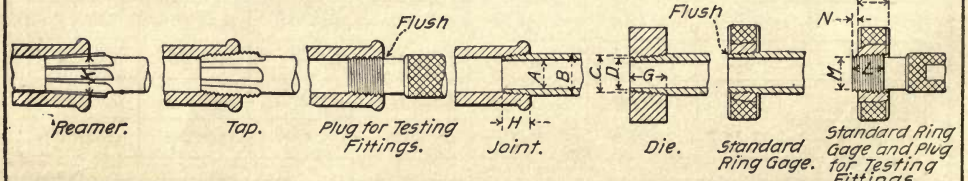
BRIGGS PIPE THREAD AND GAGE DIMENSIONS

Diam. of Pipe																					
Nominal Inside	Actual Inside	Actual Outside	Number of threads per inch	Diameter at end of pipe	Diameter at bottom of thread	Depth of thread	Length of perfect thread	Number of perfect threads	Total length of thread	No. turns pipe screws into fitting by hand	Distance pipe screws into fitting by hand	Number of turns made with wrench	Distance pipe is screwed in with wrench	Total No. of turns pipe screws into fitting	Total distance pipe screws into fitting	Diameter drill to be used with pipe reamer	Diameter of reamer at large end of reamed hole	Length of thread on plug and ring gage	Number of threads on plug and ring gage	Diameter of end of plug for testing fittings	Distance inspection plug projects through ring
	A	B		C	D	E	F		G						H		K	L		M	N
1/8	0.270	0.405	27	0.398	0.334	0.029	0.19	5.13	0.412	4	0.148	1.13	0.042	5.13	0.19	21/64	0.347	0.264	7.13	0.386	0.116
1/4	0.364	0.540	18	0.522	0.433	0.044	0.29	5.22	0.624	4	0.222	1.22	0.066	5.22	0.29	29/64	0.448	0.401	7.22	0.511	0.179
3/8	0.494	0.675	18	0.656	0.568	0.044	0.30	5.40	0.634	4	0.222	1.40	0.078	5.40	0.30	19/32	0.583	0.411	7.40	0.644	0.189
1/2	0.623	0.840	14	0.815	0.701	0.057	0.39	5.46	0.818	4	0.285	1.46	0.105	5.46	0.39	23/32	0.719	0.533	7.46	0.800	0.247
3/4	0.824	1.050	14	1.025	0.911	0.057	0.40	5.60	0.828	4	0.285	1.60	0.115	5.60	0.40	15/16	0.929	0.543	7.60	1.009	0.257
1	1.048	1.315	11 1/2	1.283	1.144	0.069	0.51	5.87	1.03	4 1/2	0.391	1.37	0.119	5.87	0.51	1 3/16	1.170	0.684	7.87	1.265	0.293
1 1/4	1.380	1.660	11 1/2	1.626	1.488	0.069	0.54	6.21	1.06	5	0.435	1.21	0.105	6.21	0.54	1 15/32	1.515	0.714	8.21	1.608	0.279
1 1/2	1.610	1.900	11 1/2	1.866	1.728	0.069	0.55	6.33	1.07	5	0.435	1.33	0.115	6.33	0.55	1 23/32	1.757	0.724	8.33	1.848	0.289
2	2.067	2.375	11 1/2	2.339	2.201	0.069	0.58	6.67	1.10	5	0.435	1.67	0.145	6.67	0.58	2 3/16	2.228	0.754	8.67	2.319	0.319
2 1/2	2.468	2.875	8	2.819	2.619	0.100	0.89	7.12	1.64	5	0.625	2.12	0.265	7.12	0.89	2 11/16	2.655	1.14	9.12	2.787	0.515
3	3.067	3.500	8	3.441	3.241	0.100	0.95	7.60	1.70	5	0.625	2.60	0.325	7.60	0.95	3 5/16	3.279	1.20	9.60	3.405	0.575
3 1/2	3.548	4.000	8	3.938	3.738	0.100	1.00	8.00	1.75	5	0.625	3.00	0.375	8.00	1.00	3 13/16	3.776	1.25	10.00	3.899	0.625
4	4.026	4.500	8	4.434	4.234	0.100	1.05	8.40	1.80	5 1/2	0.688	2.70	0.362	8.40	1.05		4.277	1.30	10.40	4.396	0.612
4 1/2	4.508	5.000	8	4.931	4.731	0.100	1.10	8.80	1.85	5 1/2	0.688	3.30	0.412	8.80	1.10		4.774	1.35	10.80	4.890	0.662
5	5.045	5.563	8	5.490	5.290	0.100	1.16	9.28	1.91	5 1/2	0.688	3.78	0.472	9.28	1.16		5.333	1.41	11.28	5.445	0.722
6	6.065	6.625	8	6.546	6.346	0.100	1.26	10.08	2.01	6	0.750	4.08	0.510	10.08	1.26		6.393	1.51	12.08	6.499	0.760
7	7.023	7.625	8	7.540	7.340	0.100	1.36	10.88	2.11	7	0.875	3.88	0.485	10.88	1.36		7.395	1.61	12.88	7.494	0.735
8	7.982	8.625	8	8.534	8.334	0.100	1.46	11.68	2.21	8	1.000	3.68	0.460	11.68	1.46		8.391	1.71	13.68	8.490	0.710
9	8.937	9.625	8	9.527	9.327	0.100	1.57	12.56	2.32	9	1.125	3.56	0.445	12.56	1.57		9.398	1.82	14.56	9.494	0.695
10	10.019	10.750	8	10.645	10.445	0.100	1.68	13.44	2.43	10	1.250	3.44	0.430	13.44	1.68		10.524	1.93	15.44	10.603	0.680



Pipe Thread (Enlarged)

Note:- The pipe should always be cut to fit Briggs standard pipe gage. In theory the joint should be tight when pipe has entered fitting a distance equal to H, but to allow for errors, the thread on pipe is cut two threads farther than H. The fitting should be tapped two threads deeper than H for the same reason.



this system are given on page 9. The form of the thread is similar to that of the Whitworth thread, but the radius at top and bottom is greater in proportion, and the angle between the sides of the thread is only 47 degrees 30 minutes. [MACHINERY, February, 1908, Screw Thread Systems; MACHINERY'S Reference Series No. 31, Screw Thread Tools and Gages, Chapter I.]

Briggs Standard Pipe Thread

The Briggs standard pipe thread is made with an angle of 60 degrees and is slightly rounded off at top and bottom. On page 10, standard pipe dimensions are given, together with dimensions of pipe threads and gages. Taps for cutting Briggs standard pipe thread are provided with a taper of ¾ inch per foot on the diameter. [MACHINERY, February, 1908, Screw Thread Systems; MACHINERY'S Reference Series No. 31, Screw Thread Tools and Gages, Chapter I.]

Whitworth Thread for Gas and Water Piping

Dimensions and number of threads per inch for gas, water and hydraulic piping, according to the Whitworth screw thread system for this class of work, are given on page 12. The form of the thread is the regular Whitworth standard form, and the only difference from the regular Whitworth standard is the number of threads per inch. The table also gives the permissible pressure in pounds per square inch of pipe used for hydraulic piping. [MACHINERY, February, 1908, Screw Thread Systems; MACHINERY'S Reference Series No. 31, Screw Thread Tools and Gages, Chapter I.]

Oil Well Casing Gages

Dimensions of oil well casing gages are given on page 13. The total taper, or taper on the diameter, is ⅜ inch per foot. The ring gage tapers for its whole length, and the plug gage on the outside for a distance *H* from the small end, as shown in the illustration on page 13, and as tabulated in the table.

Fire-hose Connections

On page 14 is given a table of the standard of fire-hose connections adopted by the National Board of Fire Underwriters and a number of leading water works associations. It should be noted that in these connections there is considerable play or clearance in the threads in order to insure easy working, and that the thread itself is not intended to in any way be tight against hydraulic pressure. This table is adapted from an official publication of the National Fire Protection Association.

Acme Screw Thread

Dimensions for the Acme standard thread are given on pages 15 and 16. In the table on the latter page the various diameters for screws, taps, nuts and dies are given by simple formulas. The Acme thread has clearance at top and bottom, and in order to avoid the confusion often caused by the difference in diameter of taps and screws, due to this clearance, this table has been prepared. The example given in the last column of the table will aid considerably in making the use of the table clear. On page 17 are given dimensions for a modified form of Acme thread having fillets or round portions in the bottom of the thread. The illustration shows the dimensions for bolts with 6 threads per inch. The table also refers to this number of threads, but, of course, different numbers of threads can be used and proportioned accordingly. [MACHINERY, January, 1905, Acme Taps in Sets; February, 1908, Screw Thread Systems; MACHINERY'S Reference Series No. 31, Screw Thread Tools and Gages, Chapter I.]

(Continued on page 20.)

WHITWORTH'S SCREW THREADS FOR GAS, WATER AND HYDRAULIC IRON PIPING.

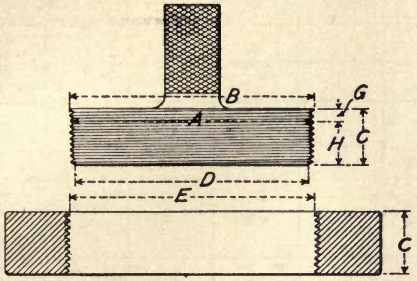
GAS AND WATER PIPING.

Diameter of Piping. Internal.	Diameter of Piping. External.	Diameter at Bottom of Thread.	No. of Threads per Inch.
$\frac{1}{8}$	.3825	.3367	28
$\frac{1}{4}$	.518	.4506	19
$\frac{3}{8}$	.6563	.5889	19
$\frac{1}{2}$	.8257	.7342	14
$\frac{5}{8}$	.9022	.8107	14
$\frac{3}{4}$	1·041	.9495	14
$\frac{7}{8}$	1.189	1.0975	14
1	1.309	1.1925	
$1\frac{1}{8}$	1.492	1.3755	
$1\frac{1}{4}$	1.650	1.5335	
$1\frac{3}{8}$	1.745	1.6285	
$1\frac{1}{2}$	1.8825	1.7660	
$1\frac{5}{8}$	2 021	1.9045	
$1\frac{3}{4}$	2.047	1.9305	
$1\frac{7}{8}$	2.245	2.1285	
2	2.347	2.2305	
$2\frac{1}{8}$	2.467	2.3505	
$2\frac{1}{4}$	2.5875	2.4710	11
$2\frac{3}{8}$	2.794	2.6775	
$2\frac{1}{2}$	3.0013	2.8848	
$2\frac{5}{8}$	3.124	3.0075	
$2\frac{3}{4}$	3.247	3.1305	
$2\frac{7}{8}$	3.367	3.2505	
3	3.485	3.3685	
$3\frac{1}{4}$	3.6985	3.5820	
$3\frac{1}{2}$	3.912	3.7955	
$3\frac{3}{4}$	4.1255	4.0090	
4	4.339	4.2225	

HYDRAULIC PIPING.

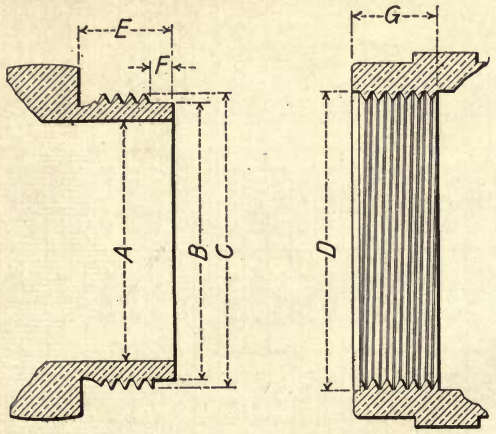
Diameter of Piping. Internal.	Diameter of Piping. External.	Diameter at Bottom of Thread.	Pressure in lbs. per square Inch.	No. of Threads per Inch.
$\frac{1}{4}$	$\frac{5}{8}$	.5335	4000	14
	$\frac{3}{4}$	.6585	6000	
	$\frac{7}{8}$	.7835	8000	
	1	.9085	10000	
$\frac{3}{8}$	$\frac{3}{4}$	.6585	4000	14
	$\frac{7}{8}$	.7835	6000	
	1	.9085	8000	
	$1\frac{1}{8}$	1.0335	10000	
$\frac{1}{2}$	1	.9085	4000	14
	$1\frac{1}{8}$	1.0335	6000	
	$1\frac{1}{4}$	1.1335	8000	11
	$1\frac{3}{8}$	1.2585	10000	
$\frac{5}{8}$	$1\frac{1}{8}$	1.0335	4000	14
	$1\frac{1}{4}$	1.1335	6000	
	$1\frac{3}{8}$	1.2585	8000	11
	$1\frac{1}{2}$	1.3835	10000	
$\frac{3}{4}$	$1\frac{1}{4}$	1.1335	4000	
	$1\frac{3}{8}$	1.2585	6000	11
	$1\frac{1}{2}$	1.3835	8000	
	$1\frac{5}{8}$	1.5085	10000	
$\frac{7}{8}$	$1\frac{3}{8}$	1.2585	4000	
	$1\frac{1}{2}$	1.3835	6000	11
	$1\frac{5}{8}$	1.5085	8000	
	$1\frac{3}{4}$	1.6335	10000	
1	$1\frac{1}{2}$	1.3835	4000	
	$1\frac{5}{8}$	1.5085	6000	11
	$1\frac{3}{4}$	1.6335	8000	
	$1\frac{7}{8}$	1.7585	10000	
$1\frac{1}{8}$	$1\frac{5}{8}$	1.5085	4000	11
	$1\frac{3}{4}$	1.6335	6000	
$1\frac{1}{8}$	$1\frac{7}{8}$	1.7585	8000	11
	2	1.8835	10000	
$1\frac{1}{4}$	$1\frac{3}{4}$	1.6335	4000	
	$1\frac{7}{8}$	1.7585	6000	11
	2	1.8835	8000	
	$2\frac{1}{8}$	2.0085	10000	
$1\frac{3}{8}$	$1\frac{7}{8}$	1.7585	4000	
	2	1.8835	6000	11
	$2\frac{1}{8}$	2.0085	6000	
	$2\frac{1}{4}$	2.1335	10000	
$1\frac{1}{2}$	2	1.8835	4000	
	$2\frac{1}{8}$	2.0085	6000	
	$2\frac{1}{4}$	2.1335	8000	11
	$2\frac{3}{8}$	2.2585	10000	
$1\frac{5}{8}$	$2\frac{1}{8}$	2.0085	4000	
	$2\frac{1}{4}$	2.1335	6000	11
	$2\frac{3}{8}$	2.2585	8000	
	$2\frac{1}{2}$	2.3835	10000	
$1\frac{3}{4}$	$2\frac{1}{4}$	2.1335	3000	
	$2\frac{3}{8}$	2.2585	4000	11
	$2\frac{1}{2}$	2.3835	6000	
	$2\frac{3}{4}$	2.6335	10000	
$1\frac{7}{8}$	$2\frac{3}{8}$	2.2585	3000	
	$2\frac{1}{2}$	2.3835	4000	11
	$2\frac{3}{4}$	2.6335	8000	
2	$2\frac{1}{2}$	2.3835	3000	
	$2\frac{3}{4}$	2.6335	6000	11
	3	2.8835	10000	

DIMENSIONS OF STANDARD OIL WELL CASING GAGES



The total taper is $\frac{3}{8}$ inch per foot. The ring gage tapers for its whole length, and the plug gage on the outside for a distance H from the small end, the distance G being straight. The root of the thread tapers whole length of plug gage. The bottom of the thread in both plug and ring gage is sharp.

Nominal size	No. of threads per inch	Diameter of gage at size line	Diam. of gage at large end, if turned taper for whole length of thd.	Length of threaded portion of gage	Diameter of root of thread at small end	Diam. over flats of threads, large end of ring gage	Flat on top of threads	Length of straight portion of thread	Length of taper thread
		A	B	C	D	E	F	G	H
2	14	2.250	2.254	0.968	2.105	2.140	0.0027	0.143	0.825
2 1/4	14	2.500	2.504	0.993	2.355	2.390	0.0027	0.143	0.850
2 1/2	14	2.750	2.754	1.018	2.604	2.640	0.0027	0.143	0.875
2 3/4	14	3.000	3.004	1.043	2.853	2.890	0.0027	0.143	0.900
3	14	3.250	3.254	1.068	3.102	3.140	0.0027	0.143	0.925
3 1/4	14	3.500	3.504	1.093	3.351	3.390	0.0027	0.143	0.950
3 1/2	14	3.750	3.754	1.118	3.601	3.640	0.0027	0.143	0.975
3 3/4	14	4.000	4.004	1.143	3.850	3.890	0.0027	0.143	1.000
4	14	4.250	4.254	1.168	4.099	4.140	0.0027	0.143	1.025
4 1/4	14	4.500	4.504	1.193	4.348	4.390	0.0027	0.143	1.050
4 1/2	14	4.750	4.754	1.218	4.597	4.640	0.0027	0.143	1.075
4 3/4	14	5.000	5.004	1.243	4.847	4.890	0.0027	0.143	1.100
5	14	5.250	5.254	1.268	5.096	5.140	0.0027	0.143	1.125
5	11 1/2	5.250	5.255	1.299	5.070	5.116	0.0033	0.174	1.125
5 3/16	14	5.500	5.504	1.293	5.345	5.390	0.0027	0.143	1.150
5 3/16	11 1/2	5.500	5.505	1.324	5.319	5.366	0.0033	0.174	1.150
5 3/8	14	6.000	6.004	1.343	5.844	5.890	0.0027	0.143	1.200
5 3/8	11 1/2	6.000	6.005	1.374	5.818	5.866	0.0033	0.174	1.200
6 1/4	14	6.625	6.629	1.405	6.467	6.515	0.0027	0.143	1.262
6 1/4	11 1/2	6.625	6.630	1.436	6.441	6.491	0.0033	0.174	1.262
6 5/8	14	7.000	7.004	1.443	6.840	6.890	0.0027	0.143	1.300
6 5/8	11 1/2	7.000	7.005	1.474	6.815	6.866	0.0033	0.174	1.300
7 1/4	14	7.625	7.629	1.505	7.464	7.515	0.0027	0.143	1.362
7 1/4	11 1/2	7.625	7.630	1.536	7.438	7.491	0.0033	0.174	1.362
7 5/8	11 1/2	8.000	8.005	1.574	7.811	7.866	0.0033	0.174	1.400
8 1/4	11 1/2	8.625	8.630	1.636	8.434	8.491	0.0033	0.174	1.462
8 5/8	11 1/2	9.000	9.005	1.674	8.808	8.866	0.0033	0.174	1.500
9 5/8	11 1/2	10.000	10.005	1.774	9.805	9.866	0.0033	0.174	1.600
10 5/8	11 1/2	11.000	11.005	1.874	10.802	10.866	0.0033	0.174	1.700
11 5/8	11 1/2	12.000	12.005	1.974	11.799	11.866	0.0033	0.174	1.800
12 1/2	11 1/2	13.000	13.005	2.074	12.796	12.866	0.0033	0.174	1.900
13 1/2	11 1/2	14.000	14.005	2.174	13.793	13.866	0.0033	0.174	2.000
14 1/2	11 1/2	15.000	15.005	2.274	14.790	14.866	0.0033	0.174	2.100
15 1/2	11 1/2	16.000	16.005	2.374	15.786	15.866	0.0033	0.174	2.200



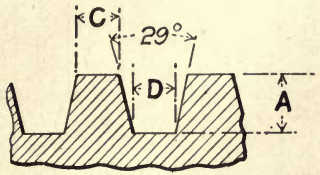
Form of Thread: 60° V with 0.010 inch cut off the top of thread and 0.010 inch left at the bottom of the groove on the $2\frac{1}{2}$, 3 and $3\frac{1}{2}$ inch couplings, and 0.020 inch cut off the top and 0.020 inch left at the bottom on the $4\frac{1}{2}$ inch coupling.

Adopted by the National Board of Fire Underwriters, American Waterworks Association, New England Water Works Association, National Firemen's Association, National Fire Protection Association, etc., and up to January 1, 1910, by more than 200 towns and cities.

Dimensions	$2\frac{1}{2}$" Size		3" Size		$3\frac{1}{2}$" Size		$4\frac{1}{2}$" Size	
	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters
A	$2\frac{1}{2}$	63.50	3	76.20	$3\frac{1}{2}$	88.90	$4\frac{1}{2}$	114.30
B	2.8715	72.94	3.3763	85.76	4.0013	101.63	5.397	137.08
C	$3\frac{1}{16}$	77.79	$3\frac{5}{8}$	92.07	$4\frac{1}{4}$	107.95	$5\frac{3}{4}$	146.05
D	3.0925	78.55	3.6550	92.84	4.280	108.71	5.80	147.32
E	1	25.40	$1\frac{1}{8}$	28.57	$1\frac{1}{8}$	28.57	$1\frac{3}{8}$	34.92
F	$\frac{1}{4}$	6.35	$\frac{1}{4}$	6.35	$\frac{1}{4}$	6.35	$\frac{1}{4}$	6.35
G	$\frac{7}{8}$	22.22	1	25.40	1	25.40	$1\frac{1}{4}$	31.75
No. of Threads per Inch	$7\frac{1}{2}$	—	6	—	6	—	4	—
Clearance between Male and Female Threads	0.030	0.76	0.030	0.76	0.030	0.76	0.050	1.27

Explanatory note: Page 11.

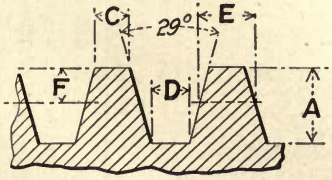
Acme Thread



Pitch	A	C	D
1	.5100	.3707	.3655
1¼	.4100	.2966	.2914
1½	.3433	.2471	.2419
2	.2600	.1853	.1801
2½	.2100	.1483	.1431
3	.1767	.1235	.1183
4	.1350	.0927	.0875
5	.1100	.0741	.0689
6	.0933	.0618	.0566
7	.0814	.0529	.0478
8	.0725	.0463	.0411
9	.0655	.0413	.0361
10	.0600	.0371	.0319

Note: Above Dimensions apply to Screws only. For Taps, A is 0.010 larger than above. C and D equal D as given above. Outside Diameter is 0.020 greater than for Screws

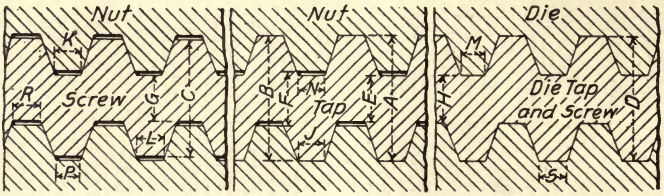
Worm Thread



Pitch Threads per Inch. (Single)	A	C	D	E	F
1	.6866	.3350	.3100	.5000	.3183
1¼	.5492	.2680	.2480	.4000	.2546
1½	.4577	.2233	.2066	.3333	.2122
2	.3433	.1675	.1550	.2500	.1592
2½	.2746	.1340	.1240	.2000	.1273
3	.2289	.1117	.1033	.1666	.1061
3½	.1962	.0957	.0886	.1429	.0909
4	.1716	.0838	.0775	.1250	.0796
4½	.1526	.0744	.0689	.1111	.0707
5	.1373	.0670	.0620	.1000	.0637
6	.1144	.0558	.0517	.0833	.0531
7	.0981	.0479	.0443	.0714	.0455
8	.0858	.0419	.0388	.0625	.0398
9	.0763	.0372	.0344	.0555	.0354
10	.0687	.0335	.0310	.0500	.0318
12	.0572	.0279	.0258	.0416	.0265
16	.0429	.0209	.0194	.0312	.0199
20	.0343	.0167	.0155	.0250	.0159

ACME STANDARD THREAD

Table of Acme Thread Parts.



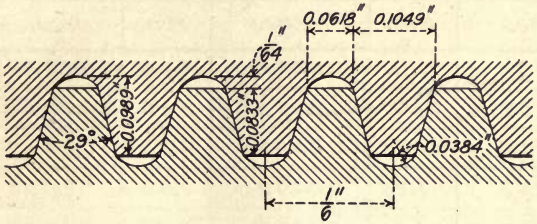
Dimension Required	Class of Thread	Symbol on Drawing	Formula	Example: Nominal Diam., 2 inches; 4 Threads per inch
Outside Diameter	Tap	A	Nominal size* + 0.020 inch	2.000 + 0.020 = 2.020
	Nut	B	Nominal size + 0.020 inch	2.000 + 0.020 = 2.020
	Screw and Die Tap	C	Nominal size	2.000
	Die	D	Nominal size	2.000
Root Diameter	Tap	E	$\text{Nominal size} - \left(\frac{1}{\text{No. of th'ds per inch}} + 0.020\right)$	$2.000 - (\frac{1}{4} + 0.020) = 1.730$
	Nut	F	$\text{Nominal size} - \left(\frac{1}{\text{No. of threads per inch}}\right)$	$2.000 - 0.250 = 1.750$
	Screw and Die Tap	G	$\text{Nominal size} - \left(\frac{1}{\text{No. of th'ds per inch}} + 0.020\right)$	$2.000 - (\frac{1}{4} + 0.020) = 1.730$
	Die	H	$\text{Nominal size} - \left(\frac{1}{\text{No. of th'ds per inch}} + 0.020\right)$	$2.000 - (\frac{1}{4} + 0.020) = 1.730$
Width of Flat on Top of Thread	Tap	J	$\frac{0.3707}{\text{No. of threads per inch}} - 0.0052$	$\frac{0.3707}{4} - 0.0052 = 0.0875$
	Nut	K	$\frac{0.3707}{\text{No. of threads per inch}}$	$\frac{0.3707}{4} = 0.0927$
	Screw and Die Tap	L	$\frac{0.3707}{\text{No. of threads per inch}}$	$\frac{0.3707}{4} = 0.0927$
	Die	M	$\frac{0.3707}{\text{No. of threads per inch}} - 0.0052$	$\frac{0.3707}{4} - 0.0052 = 0.0875$
Width of Flat at Bottom of Thread	Tap	N	$\frac{0.3707}{\text{No. of threads per inch}} - 0.0052$	$\frac{0.3707}{4} - 0.0052 = 0.0875$
	Nut	P	$\frac{0.3707}{\text{No. of threads per inch}} - 0.0052$	$\frac{0.3707}{4} - 0.0052 = 0.0875$
	Screw and Die Tap	R	$\frac{0.3707}{\text{No. of threads per inch}} - 0.0052$	$\frac{0.3707}{4} - 0.0052 = 0.0875$
	Die	S	$\frac{0.3707}{\text{No. of threads per inch}}$	$\frac{0.3707}{4} = 0.0927$

* Nominal size is the actual outside diameter of the Acme thread screw

Explanatory note: Page 11.

MODIFIED ACME THREAD

Acme Standard 6 Thread Bolts With Fillets.
For Bolts 6 Inch Diameter and Under.



Diam.	Diam. at Root of Thread	Area of Bolt Body	Area at Root of Thread	Diam.	Diam. at Root of Thread	Area of Bolt Body	Area at Root of Thread
Inches	Inches	Square Inches	Square Inches	Inches	Inches	Square Inches	Square Inches
1 1/2	1.302	1.767	1.331	3 3/8	3.177	8.946	7.927
1 5/8	1.427	2.074	1.599	3 1/2	3.302	9.621	8.563
1 3/4	1.552	2.405	1.892	3 5/8	3.427	10.321	9.224
1 7/8	1.677	2.761	2.209	3 3/4	3.552	11.045	9.909
2	1.802	3.142	2.550	3 7/8	3.677	11.793	10.619
2 1/8	1.927	3.547	2.916	4	3.802	12.566	11.353
2 1/4	2.052	3.976	3.307	4 1/4	4.052	14.186	12.896
2 3/8	2.177	4.430	3.722	4 1/2	4.302	15.904	14.535
2 1/2	2.302	4.909	4.162	4 3/4	4.552	17.721	16.274
2 5/8	2.427	5.412	4.626	5	4.802	19.635	18.111
2 3/4	2.552	5.940	5.115	5 1/4	5.052	21.648	20.046
2 7/8	2.677	6.492	5.586	5 1/2	5.302	23.758	22.078
3	2.802	7.069	6.166	5 3/4	5.552	25.967	24.210
3 1/8	2.927	7.670	6.729	6	5.802	28.274	26.439
3 1/4	3.052	8.296	7.316				

INTERNATIONAL STANDARD THREAD

Diameter		Pitch		Diam. at Bottom of Thread		Diam of Tap Drill, Inches
Mm.	Inches	Mm.	Inches	Mm.	Inches	
6	0.2362	1.0	0.0394	4.70	0.1850	0.189
7	0.2756	1.0	0.0394	5.70	0.2244	0.228
8	0.3150	1.25	0.0492	6.38	0.2512	0.257
9	0.3543	1.25	0.0492	7.38	0.2906	0.295
10	0.3937	1.5	0.0590	8.05	0.3169	0.323
11	0.4331	1.5	0.0590	9.05	0.3563	23/64
12	0.4724	1.75	0.0689	9.73	0.3831	25/64
14	0.5512	2.0	0.0787	11.40	0.4488	29/64
16	0.6299	2.0	0.0787	13.40	0.5276	17/32
18	0.7087	2.5	0.0984	14.75	0.5807	19/32
20	0.7874	2.5	0.0984	16.75	0.6594	43/64
22	0.8661	2.5	0.0984	18.75	0.7382	3/4
24	0.9449	3.0	0.1181	20.10	0.7913	51/64
27	1.0630	3.0	0.1181	23.10	0.9095	59/64
30	1.1811	3.5	0.1378	25.45	1.0020	1 1/64
33	1.2992	3.5	0.1378	28.45	1.1201	1 1/8
36	1.4173	4.0	0.1575	30.80	1.2126	1 7/32
39	1.5354	4.0	0.1575	33.80	1.3307	1 11/32
42	1.6535	4.5	0.1772	36.15	1.4232	1 7/16
45	1.7716	4.5	0.1772	39.15	1.5413	1 35/64
48	1.8898	5.0	0.1969	41.51	1.6343	1 41/64
52	2.0472	5.0	0.1969	45.51	1.7918	1 51/64
56	2.2047	5.5	0.2165	48.86	1.9237	1 15/16
60	2.3622	5.5	0.2165	52.86	2.0811	2 3/32
64	2.5197	6.0	0.2362	56.21	2.2130	2 7/32
68	2.6772	6.0	0.2362	60.21	2.3705	2 3/8
72	2.8346	6.5	0.2559	63.56	2.5023	2 33/64
76	2.9921	6.5	0.2559	67.56	2.6598	2 43/64
80	3.1497	7.0	0.2756	70.91	2.7918	2 13/16

Explanatory note: Page 20.

FRENCH STANDARD THREAD

Diam. Tap.		Pitch.		Diam. Bottom of Thread M.M.	Allowance M.M.	Diam. Tap Drill.		Length M.M.	Taper Shank
M.M.	Inches.	M.M.	Inches.			M.M.	Inches.		
6	.236	1.0	.039	4.70	.10	4.80	.1890	187	#1
7	.276	"	"	5.70	"	5.80	.2283	197	
8	.315	"	"	6.70	"	6.80	.2677	207	
9	.354	"	"	7.70	"	7.80	.3071	217	
10	.394	1.5	.059	8.05	"	8.15	.3209	222	
12	.472	"	"	10.05	"	10.15	.3996	227	
14	.551	2.0	.079	11.40	"	11.50	.4528	232	
16	.630	"	"	13.40	.12	13.52	.5323	242	
18	.709	2.5	.098	14.75	"	14.87	.5854	252	
20	.787	"	"	16.75	"	16.87	.6642	275	#2
22	.866	"	"	18.75	"	18.87	.7429	285	
24	.945	3.0	.118	20.10	.15	20.25	.7972	295	
26	1.024	"	"	22.10	"	22.25	.8760	305	
28	1.102	"	"	24.10	"	24.25	.9547	315	#3
30	1.181	3.5	.138	25.45	"	25.60	1.0079	325	
32	1.260	"	"	27.45	.18	27.63	1.0878	335	
34	1.339	"	"	29.45	"	29.63	1.1665	300	
36	1.417	4.0	.157	30.80	"	30.98	1.2197	310	
38	1.496	"	"	32.80	"	32.98	1.2980	320	
40	1.575	"	"	34.80	.20	35.00	1.3779	370	#4
42	1.654	4.5	.177	36.15	"	36.35	1.4311	375	
44	1.732	"	"	38.15	"	38.35	1.5098	385	
46	1.811	"	"	40.15	"	40.35	1.5886	395	
48	1.890	5.0	.197	41.51	.22	41.73	1.6929	400	
50	1.969	"	.197	43.51	"	43.73	1.7216	410	

Contributed by M. J. Oches, MACHINERY's Data Sheet No. 74. Explanatory note: Page 20.

Standard Worm Thread

On page 15 are given dimensions for the standard worm thread, often referred to as the Brown & Sharpe worm thread. The angle of this thread is the same as that of the Acme thread, but the depth of the thread is greater, and hence the width of the flat at top and bottom is smaller. [MACHINERY, August, 1907, Calculating Dimensions of Worm Gearing; MACHINERY'S Reference Series No. 1, Worm Gearing, Chapter I.]

International and French Standard Threads

The International standard screw thread, based on the metric system, was adopted at the International Congress for the Standardization of Screw Threads, held at Zürich in 1898. The form of the thread is the same as that of the United States standard thread. The standard diameters and corresponding pitches are as given in the table on page 18. The French standard thread, page 19, which is also based on the metric system, differs somewhat as regards diameters and pitches from the International system, but the form of the thread is the same as that of the International system. These thread systems are used extensively on the European continent, and to a very limited extent in some special manufacturing industries in the United States. [MACHINERY, February, 1908, Screw Thread Systems; MACHINERY'S Reference Series No. 31, Screw Thread Tools and Gages, Chapter I.]

Threading Tools for Square Threads

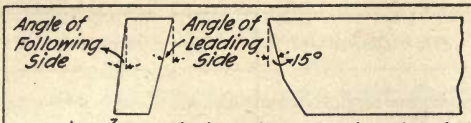
When cutting square threads, it is customary to make the screws exactly according to the theoretical standard of the square thread. The width of the point of the tool for cutting screws is, therefore, exactly one-half of the pitch, but the width of the point of the tool for cutting taps which are to be used for tapping nuts is slightly less than half the pitch, so that the groove in the tap becomes narrower and the land or cutting point wider than half the pitch of the thread, so as to cut a groove in the nut with the proper clearance for the thread in the screw. An inside threading tool for threading nuts must evidently be of the same width as the land of the tap, or slightly wider than half the pitch. The accompanying table gives the width of the point of tools for the various purposes for all ordinary pitches from 1 to 24 threads per inch.

TOOLS FOR SQUARE THREADS

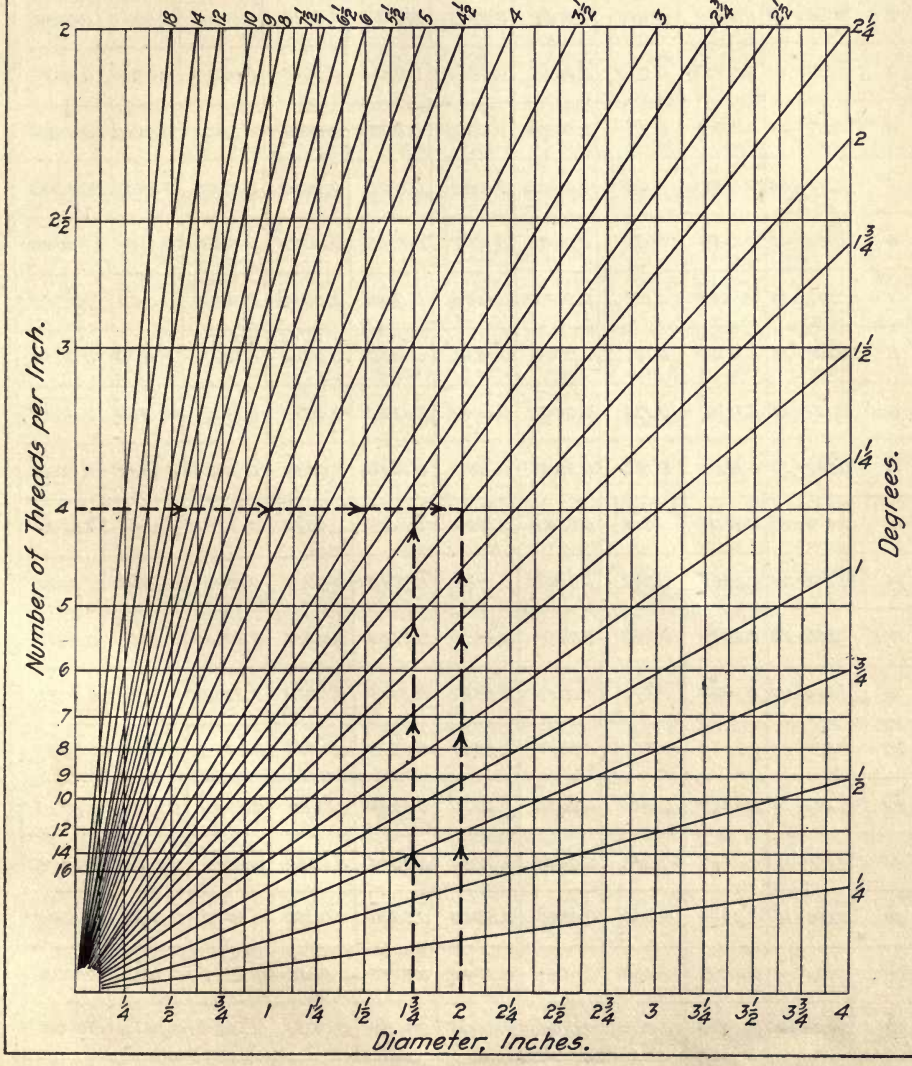
No. of Threads per Inch	Width of Point of Tool			No. of Threads per Inch	Width of Point of Tool		
	For Taps	For Screws	For Inside Thread Tools for Nuts		For Taps	For Screws	For Inside Thread Tools for Nuts
1	0.4965	0.5000	0.5035	8	0.0615	0.0625	0.0635
1¼	0.3715	0.3750	0.3785	9	0.0545	0.0555	0.0565
1½	0.3333	0.3333	0.3363	10	0.0490	0.0500	0.0510
1¾	0.2827	0.2857	0.2887	11	0.0444	0.0454	0.0464
2	0.2475	0.2500	0.2525	12	0.0407	0.0417	0.0427
2¼	0.1975	0.2000	0.2025	13	0.0375	0.0385	0.0395
3	0.1641	0.1666	0.1691	14	0.0352	0.0357	0.0362
3½	0.1408	0.1428	0.1448	15	0.0328	0.0333	0.0338
4	0.1235	0.1250	0.1265	16	0.0307	0.0312	0.0317
4½	0.1096	0.1111	0.1126	18	0.0272	0.0277	0.0282
5	0.0985	0.1000	0.1015	20	0.0245	0.0250	0.0255
5½	0.0894	0.0909	0.0924	22	0.0222	0.0227	0.0232
6	0.0818	0.0833	0.0848	24	0.0203	0.0208	0.0213
7	0.0699	0.0714	0.0729				

(Continued on page 27.)

CLEARANCE ANGLES FOR SQUARE THREADING TOOLS



Angle on leading side is figured to correspond to root diameter, angle on following side to outside diameter of thread. Example: Find required angles for tool for screw, 2 inches diameter, 4 threads per inch. Root diameter = $2-\frac{1}{4}=1\frac{3}{4}$. To find angle for leading side, follow vertical line from $1\frac{3}{4}$ inch diameter to intersecting horizontal line, from 4 threads per inch, from intersection follow nearest diagonal line finding thus $2\frac{1}{2}$ degrees. To find angle for following side, follow vertical line from 2 inches diameter to intersecting horizontal line, from 4 threads per inch. From intersection follow nearest diagonal line, finding thus $2\frac{1}{4}$ degrees. These angles are the theoretical clearance angles. For practical purposes, slightly greater clearances should be given.



STANDARD MACHINE SCREWS

Old	New	Outside Diameters			Pitch Diameters			Root Diameters		
No.	Out. Diam. and Thds. per Inch	Minimum	Maximum	Difference	Minimum	Maximum	Difference	Minimum	Maximum	Difference
0	0.060–80	0.0572	0.060	0.0028	0.0505	0.0519	0.0014	0.0410	0.0438	0.0028
1	0.073–72	0.0700	0.073	0.0030	0.0625	0.0640	0.0015	0.0520	0.0550	0.0030
2	0.086–64	0.0828	0.086	0.0032	0.0743	0.0759	0.0016	0.0624	0.0657	0.0033
3	0.099–56	0.0955	0.099	0.0035	0.0857	0.0874	0.0017	0.0721	0.0758	0.0037
4	0.112–48	0.1082	0.112	0.0038	0.0966	0.0985	0.0019	0.0807	0.0849	0.0042
5	0.125–44	0.1210	0.125	0.0040	0.1082	0.1102	0.0020	0.0910	0.0955	0.0045
6	0.138–40	0.1338	0.138	0.0042	0.1197	0.1218	0.0021	0.1007	0.1055	0.0048
7	0.151–36	0.1466	0.151	0.0044	0.1308	0.1330	0.0022	0.1097	0.1149	0.0052
8	0.164–36	0.1596	0.164	0.0044	0.1438	0.1460	0.0022	0.1227	0.1279	0.0052
9	0.177–32	0.1723	0.177	0.0047	0.1544	0.1567	0.0023	0.1307	0.1364	0.0057
10	0.190–30	0.1852	0.190	0.0048	0.1660	0.1684	0.0024	0.1407	0.1467	0.0060
12	0.216–28	0.2111	0.216	0.0049	0.1904	0.1928	0.0024	0.1633	0.1696	0.0063
14	0.242–24	0.2368	0.242	0.0052	0.2123	0.2149	0.0026	0.1808	0.1879	0.0071
16	0.268–22	0.2620	0.268	0.0054	0.2358	0.2385	0.0027	0.2014	0.2090	0.0076
18	0.294–20	0.2884	0.294	0.0056	0.2587	0.2615	0.0028	0.2208	0.2290	0.0082
20	0.320–20	0.3144	0.320	0.0056	0.2847	0.2875	0.0028	0.2468	0.2550	0.0082
22	0.346–18	0.3402	0.346	0.0058	0.3070	0.3099	0.0029	0.2649	0.2738	0.0089
24	0.372–16	0.3660	0.372	0.0060	0.3284	0.3314	0.0030	0.2810	0.2908	0.0098
26	0.398–16	0.3920	0.398	0.0060	0.3544	0.3574	0.0030	0.3070	0.3168	0.0098
28	0.424–14	0.4178	0.424	0.0062	0.3745	0.3776	0.0031	0.3204	0.3312	0.0108
30	0.450–14	0.4438	0.450	0.0062	0.4005	0.4036	0.0031	0.3464	0.3572	0.0108

Standard approved by the A. S. M. E., May, 1907, MACHINERY's Data Sheet No. 82.
Explanatory note: Page 27.

SPECIAL MACHINE SCREWS

Old	New	Outside Diameters			Pitch Diameters			Root Diameters		
No.	Out. Diam. and Thds. per Inch	Minimum	Maximum	Difference	Minimum	Maximum	Difference	Minimum	Maximum	Difference
1	0.073 - 64	0.0698	0.073	0.0032	0.0613	0.0629	0.0016	0.0494	0.0527	0.0033
2	0.086 - 56	0.0825	0.086	0.0035	0.0727	0.0744	0.0017	0.0591	0.0628	0.0037
3	0.099 - 48	0.0952	0.099	0.0038	0.0836	0.0855	0.0019	0.0677	0.0719	0.0042
4	0.112 - 40	0.1078	0.112	0.0042	0.0937	0.0958	0.0021	0.0747	0.0795	0.0048
	36	0.1076	0.112	0.0044	0.0918	0.0940	0.0022	0.0707	0.0759	0.0052
5	0.125 - 40	0.1208	0.125	0.0042	0.1067	0.1088	0.0021	0.0877	0.0925	0.0048
	36	0.1206	0.125	0.0044	0.1048	0.1070	0.0022	0.0837	0.0889	0.0052
6	0.138 - 36	0.1336	0.138	0.0044	0.1178	0.1200	0.0022	0.0967	0.1019	0.0052
	32	0.1333	0.138	0.0047	0.1154	0.1177	0.0023	0.0917	0.0974	0.0057
7	0.151 - 32	0.1463	0.151	0.0047	0.1284	0.1307	0.0023	0.1047	0.1104	0.0057
	30	0.1462	0.151	0.0048	0.1270	0.1294	0.0024	0.1017	0.1077	0.0060
8	0.164 - 32	0.1593	0.164	0.0047	0.1414	0.1437	0.0023	0.1177	0.1234	0.0057
	30	0.1592	0.164	0.0048	0.1400	0.1424	0.0024	0.1147	0.1207	0.0060
9	0.177 - 30	0.1722	0.177	0.0048	0.1529	0.1553	0.0024	0.1277	0.1337	0.0060
	24	0.1718	0.177	0.0052	0.1473	0.1499	0.0026	0.1158	0.1229	0.0071
10	0.190 - 32	0.1853	0.190	0.0047	0.1674	0.1697	0.0023	0.1437	0.1494	0.0057
	24	0.1848	0.190	0.0052	0.1603	0.1629	0.0026	0.1288	0.1359	0.0071
12	0.216 - 24	0.2108	0.216	0.0052	0.1863	0.1889	0.0026	0.1548	0.1619	0.0071
14	0.242 - 20	0.2364	0.242	0.0056	0.2067	0.2095	0.0028	0.1688	0.1770	0.0082
16	0.268 - 20	0.2624	0.268	0.0056	0.2327	0.2355	0.0028	0.1948	0.2030	0.0082
18	0.294 - 18	0.2882	0.294	0.0058	0.2550	0.2579	0.0029	0.2129	0.2218	0.0089
20	0.320 - 18	0.3142	0.320	0.0058	0.2810	0.2839	0.0029	0.2389	0.2478	0.0089
22	0.346 - 16	0.3400	0.346	0.0060	0.3024	0.3054	0.0030	0.2550	0.2648	0.0098
24	0.372 - 18	0.3662	0.372	0.0058	0.3330	0.3359	0.0029	0.2909	0.2998	0.0089
26	0.398 - 14	0.3918	0.398	0.0062	0.3485	0.3516	0.0031	0.2944	0.3052	0.0108
28	0.424 - 16	0.4180	0.424	0.0060	0.3804	0.3834	0.0030	0.3330	0.3428	0.0098
30	0.450 - 16	0.4440	0.450	0.0060	0.4064	0.4094	0.0030	0.3590	0.3688	0.0098

Standard approved by the A. S. M. E., May, 1907, MACHINERY's Data Sheet No. 82.
Explanatory note: Page 27.

MACHINE, WOOD AND LAG SCREW THREADS

Machine Screw Thread, Old Standard.

Number	Diam.	Threads per Inch	Number	Diam.	Threads per Inch	Number	Diam.	Threads per Inch
1	0.071	64	8	0.166	32	16	0.272	18
1½	0.081	56	9	0.180	30	18	0.298	18
2	0.089	56	10	0.194	24	20	0.325	16
3	0.101	48	11	0.206	24	22	0.350	16
4	0.113	36	12	0.221	24	24	0.378	16
5	0.125	36	13	0.234	22	26	0.404	16
6	0.141	32	14	0.246	20	28	0.430	14
7	0.154	32	15	0.261	20	30	0.456	14

Wood Screw Thread.

No. of Screw	Diam.	Threads per Inch	No. of Screw	Diam.	Threads per Inch	No. of Screw	Diam.	Threads per Inch
0	0.058	32	11	0.203	12	22	0.347	7
1	0.071	28	12	0.216	11	23	0.361	7
2	0.084	26	13	0.229	11	24	0.374	7
3	0.097	24	14	0.242	10	25	0.387	7
4	0.110	22	15	0.255	10	26	0.400	6
5	0.124	20	16	0.268	9	27	0.413	6
6	0.137	18	17	0.282	9	28	0.426	6
7	0.150	16	18	0.295	8	29	0.439	6
8	0.163	15	19	0.308	8	30	0.453	6
9	0.176	14	20	0.321	8			
10	0.189	13	21	0.334	8			

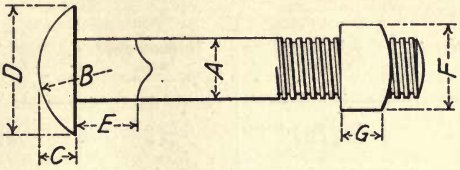
Lag Screw Thread Systems in Common Use.

Diam.	Alternate Systems		Diam.	Alternate Systems		Diam.	Alternate Systems	
	Threads per Inch	Threads per Inch		Threads per Inch	Threads per Inch		Threads per Inch	Threads per Inch
¼	10	10	½	6	6	¾	4½	5
5/16	9½	9	9/16	5	6	⅞	4½	4
⅜	7	8	5/8	5	5	1	3	4
7/16	7	7	11/16	4½	5			

Explanatory note: Page 27.

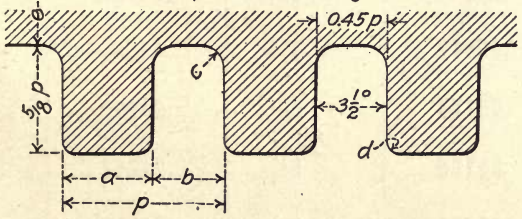
CARRIAGE BOLTS AND THREADS

Carriage-bolt Heads, Shanks and Screw Threads.



A	B	C	D	E	Number of Threads	F	G
3/16	3/16	3/32	7/16	3/16	24	3/8	3/16
1/4	1/4	1/8	9/16	1/4	20	7/16	7/32
5/16	7/16	3/16	11/16	5/16	18	1/2	1/4
3/8	9/16	7/32	7/8	3/8	16	5/8	11/32
7/16	21/32	1/4	1	7/16	14	11/16	3/8
1/2	3/4	5/16	1 3/16	1/2	13	13/16	7/16
5/8	29/32	11/32	1 7/16	9/16	11	1	9/16
3/4	1	13/32	1 5/8	5/8	10	1 3/16	5/8

Philadelphia Carriage-bolt Screw Threads.



p = pitch
a = 0.53 p
b = 0.47 p
c = 0.18 p
d = 0.10 p

Threads per Inch	e	p	a	b	c	d
26	0.024	0.03846	0.0204	0.0181	0.0069	0.0038
24	0.026	0.04167	0.0221	0.0196	0.0075	0.0042
20	0.031	0.0500	0.0265	0.0235	0.0090	0.0050
18	0.0347	0.05556	0.0294	0.0262	0.0100	0.0056
16	0.039	0.06250	0.0331	0.0294	0.0113	0.0062
14	0.0445	0.07142	0.0379	0.0335	0.0129	0.0071
12	0.052	0.08333	0.0442	0.0391	0.0150	0.0083
11	0.0568	0.09091	0.0482	0.0427	0.0164	0.0091
10	0.0625	0.1000	0.0530	0.0470	0.0180	0.0100
9	0.0695	0.11111	0.0589	0.0522	0.0200	0.0111
8	0.0780	0.1250	0.0663	0.0587	0.0225	0.0125

Explanatory note: Page 27.

CONSTANTS FOR FINDING DIAMETER OF BOTTOM OF THREAD.

Threads per inch.	U. S. Standard Constant	V Thread Constant.	Threads per inch.	U. S. Standard Constant.	V Thread Constant.
64	.02029	.02707	16	.08118	.10825
60	.02165	.02887	14	.09278	.12357
56	.02319	.03093	13	.09992	.13323
50	.02598	.03464	12	.10825	.14433
48	.02706	.03608	11	.11809	.15745
44	.02952	.03936	10	.12990	.17320
40	.03247	.04330	9	.14433	.19244
36	.03608	.04811	8	.16237	.21650
32	.04059	.05412	7	.18555	.24742
30	.04330	.05773	6	.21650	.28866
28	.04639	.06185	5½	.23618	.31490
26	.04996	.06661	5	.25980	.34650
24	.05412	.07216	4½	.28866	.38488
22	.05904	.07872	4	.32475	.43300
20	.06495	.08660	3½	.37114	.49485
18	.07216	.09622	3	.43333	.57733

C = constant for number of threads per inch.

D = outside diameter.

B = diameter at bottom of thread.

$$B = D - C$$

While the table has been carried to as fine a pitch as 24 threads per inch, square threaded screws having so fine a pitch are seldom used. Some manufacturers of square threading tools, however, make tools for pitches as fine as these, and for this reason they have been included. A diagram for obtaining the clearance angles on the sides of square thread tools is given on page 21. An example showing the use of the diagram is given at the top of it. [MACHINERY, April, 1908, Widths of Tools for Cutting Square Threads.]

Standard Machine Screws

The American Society of Mechanical Engineers adopted in 1907 a standard system of machine screw threads, details of which are given in the tables on pages 22 and 23, the sizes specified on page 22 being the standard sizes, and those on page 23 the special sizes. The number of threads per inch and corresponding diameters in the old system of machine screw threads are given on page 24. [MACHINERY, December, 1907, Standard Proportions of Machine Screws.]

Wood and Lag Screw Threads

There is no generally accepted standard system for the number of threads corresponding to given diameters in wood and lag screws. The number of threads in these screws, of course, is not very important, inasmuch as they do not fit into nuts. On page 24, however, are given the number of threads of wood screws adopted as a standard by the American Screw Co. The two most common systems in use for lag screw threads also are tabulated on page 24.

Carriage Bolts

The upper table on page 25 gives dimensions for heads and shanks and the number of threads per inch of carriage bolts as used by the Michigan Bolt and Nut Works, Detroit, Mich. There is, however, no generally adopted standard of carriage bolt threads. The tendency is for users to demand the U. S. standard thread and pitches, but most carriage bolt thread taps are still made to a sample submitted by the manufacturer of carriage bolt nuts to the tap maker. The lower table gives dimensions and shape of the Philadelphia carriage bolt screw thread, which is typical of the old style carriage bolt thread. [MACHINERY, August, 1909, Carriage Bolt Heads, Shanks and Screw Threads.]

Constants for Finding Diameter at Bottom of Thread

On page 26 is given a table of constants for finding the diameter at the bottom of the U. S. standard and V-threads, for numbers of threads per inch varying from 3 to 64. The number given in the column under the respective kind of thread, when subtracted from the outside diameter of the screw thread, will give the diameter at the root. For example, find the diameter at the root of a ¾-inch screw with 10 U. S. threads per inch. The constant to be subtracted from the outside diameter of the screw is found from the table to be 0.1299; hence $0.7500 - 0.1299 = 0.6201$, which is the required root diameter. [MACHINERY'S Jig Sheet No. 1B, Screw Threads and Tap Drills, MACHINERY'S Reference Series No. 18, Shop Arithmetic for the Machinist, third edition, Chapter IV.]

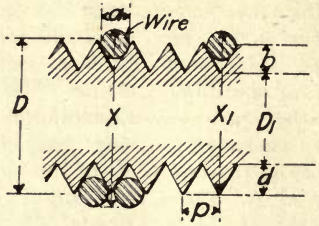
Measuring Screw Threads

On pages 28 to 31 inclusive, tables are given facilitating the measuring of the various standard screw threads by means of the three-wire system. The formulas and tables given make it possible to determine very accurately the diameter of the thread by means of a micrometer measurement over the wires and a simple calculation. For example, referring to the table on page 28, assume that it is required to ascertain

(Continued on page 40.)

MEASURING SCREW THREADS—I

60° V THREAD



n = number of threads per inch

p = pitch = $\frac{1}{\text{no. of threads per inch}}$

d = depth of thread = $0.866p = \frac{0.866}{n}$

D = diameter of top of threads

D_1 = root diameter = $D - 2d$

a = diameter of wire { maximum diam. = $1.155p$; minimum diam. = $0.577p$

$b = a$

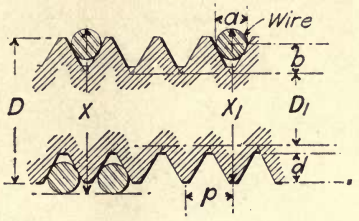
$x = D_1 + 2b + a = D_1 + 3a$

$x_1 = \frac{D}{2} + \frac{D_1}{2} + b + \frac{a}{2} = \frac{D + D_1 + 3a}{2}$

D	n	d	D_1	a and b	x	x_1
1/4"	20"	.0433"	.1634"	0.040"	.2834"	.2667"
5/16	18	.0481	.2163	"	.3363	.3244
3/8	16	.0541	.2667	"	.3867	.3808
7/16	14	.0617	.3138	0.060	.4938	.4656
1/2	12	.0722	.3557	"	.5357	.5178
9/16	12	.0722	.4182	"	.5982	.5803
5/8	11	.0787	.4676	"	.6476	.6363
11/16	11	.0787	.5300	"	.7100	.6987
3/4	10	.0866	.5768	0.100	.8768	.8134
13/16	10	.0866	.6393	"	.9393	.8759
7/8	9	.0962	.6826	"	.9826	.9288
15/16	9	.0962	.7450	"	1.0450	.9912
1	8	.1082	.7835	"	1.0835	1.0417
1 1/8	7	.1237	.8776	"	1.1776	1.1513
1 1/4	7	.1237	1.0026	"	1.3026	1.2763
1 3/8	6	.1443	1.0863	0.150	1.5363	1.4556
1 1/2	6	.1443	1.2113	"	1.6613	1.5806
1 5/8	5	.1732	1.2786	"	1.7286	1.6768
1 3/4	5	.1732	1.4036	"	1.8536	1.8018
1 7/8	4 1/2	.1924	1.4900	"	1.9400	1.9075
2	4 1/2	.1924	1.6150	"	2.0650	2.0325
2 1/8	4 1/2	.1924	1.7400	"	2.1900	2.1575
2 1/4	4 1/2	.1924	1.8650	"	2.3150	2.2825
2 3/8	4 1/2	.1924	1.9900	"	2.4400	2.4075
2 1/2	4	.2165	2.0670	0.200	2.6670	2.5835
2 3/4	4	.2165	2.3170	"	2.9170	2.8335
3	3 1/2	.2474	2.5050	"	3.1050	3.0525
3 1/4	3 1/2	.2474	2.7550	"	3.3550	3.3025
3 1/2	3 1/4	.2664	2.9670	"	3.5670	3.5335
3 3/4	3	.2886	3.1727	"	3.7727	3.7613
4	3	.2886	3.4227	"	4.0227	4.0113

MEASURING SCREW THREADS—II

U.S STANDARD



n = number of threads per inch

p = pitch = $\frac{1}{\text{no. of threads per inch}}$

d = depth of thread = $0.6495p = \frac{0.6495}{n}$

D = diameter on top of threads

$D_1 = D - \frac{1.5155}{n}$

a = diameter of wire { maximum diam. = $1.010p$; mininum diam. = $0.505p$

$b = a$

$x = D_1 + 2b + a = D_1 + 3a$

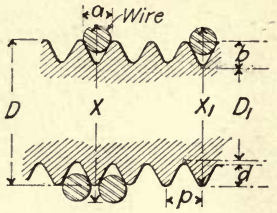
$x_1 = \frac{D}{2} + \frac{D_1}{2} + b + \frac{a}{2} = \frac{D + D_1 + 3a}{2}$

D	n	d	D_1	a and b	x	x_1
1/4"	20"	.0325"	.1742"	0.040"	.2942"	.2721"
5/16	18	.0361	.2283	"	.3483	.3304
3/8	16	.0406	.2803	"	.4003	.3876
7/16	14	.0464	.3292	"	.4492	.4433
1/2	13	.0500	.3834	0.060	.5634	.5317
9/16	12	.0541	.4362	"	.6162	.5893
5/8	11	.0590	.4872	"	.6672	.6460
11/16	11	.0590	.5497	"	.7297	.7086
3/4	10	.0649	.5984	"	.7784	.7643
13/16	10	.0649	.6610	"	.8410	.8267
7/8	9	.0722	.7066	0.100	1.0066	.9408
15/16	9	.0722	.7691	"	1.0690	1.0033
1	8	.0812	.8105	"	1.1105	1.0553
1 1/8	7	.0928	.9085	"	1.2085	1.1667
1 1/4	7	.0928	1.0335	"	1.3335	1.2917
1 3/8	6	.1082	1.1224	"	1.4224	1.3987
1 1/2	6	.1082	1.2474	"	1.5474	1.5237
1 5/8	5 1/2	.1180	1.3494	0.150	1.7994	1.7122
1 3/4	5	.1299	1.4470	"	1.8970	1.8234
1 7/8	5	.1299	1.5720	"	2.0220	1.9484
2	4 1/2	.1443	1.6632	"	2.1132	2.0566
2 1/8	4 1/2	.1443	1.7882	"	2.2382	2.1816
2 1/4	4 1/2	.1443	1.9132	"	2.3632	2.3066
2 3/8	4	.1624	1.9960	"	2.4460	2.4105
2 1/2	4	.1624	2.1210	"	2.5710	2.5355
2 3/4	4	.1624	2.3710	"	2.8210	2.7855
3	3 1/2	.1856	2.5670	0.200	3.1670	3.0835
3 1/4	3 1/2	.1856	2.8170	"	3.4170	3.3335
3 1/2	3 1/4	.2000	3.0337	"	3.6337	3.5668
3 3/4	3	.2165	3.2448	"	3.8448	3.7974
4	3	.2165	3.4948	"	4.0948	4.0474

Contributed by Walter Cantelo, MACHINERY'S Data Sheet No. 73. Explanatory note: Page 27.

MEASURING SCREW THREADS—III

WHITWORTH THREAD



n = number of threads per inch

p = pitch = $\frac{1}{\text{no. of threads per inch}}$

d = depth of thread = $0.6403p = \frac{0.6403}{n}$

D = diameter on top of threads

$D_1 = D - \frac{1.6008}{n}$

a = diameter of wire { maximum diam. = $0.840p$; mininum diam. = $0.506p$

$b = 1.08205a$

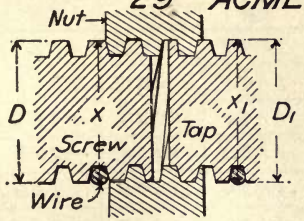
$x = D_1 + 2b + a = D_1 + 3.1657a$

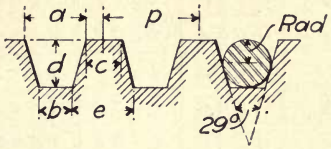
$x_1 = \frac{D}{2} + \frac{D_1}{2} + b + \frac{a}{2} = \frac{D + D_1 + 3.1657a}{2}$

D	n	d	D_1	a	b	x	x_1
1/4	20	.0320	.1699	0.040	.0433	.2965	.2733
5/16	18	.0356	.2235	"	"	.3501	.3313
3/8	16	.0400	.2749	"	"	.4015	.3883
7/16	14	.0457	.3231	"	"	.4497	.4436
1/2	12	.0534	.3666	"	"	.4932	.4966
9/16	12	.0534	.4291	0.060	.0649	.6190	.5907
5/8	11	.0582	.4794	"	"	.6693	.6372
11/16	11	.0582	.5420	"	"	.7319	.7097
3/4	10	.0640	.5899	"	"	.7798	.7649
13/16	10	.0640	.6524	"	"	.8423	.8274
7/8	9	.0711	.6971	"	"	.8870	.8810
15/16	9	.0711	.7596	"	"	.9495	.9435
1	8	.0800	.7999	0.100	.1084	1.1167	1.0583
1 1/8	7	.0915	.8963	"	"	1.2131	1.1690
1 1/4	7	.0915	1.0213	"	"	1.3381	1.2940
1 3/8	6	.1067	1.1082	"	"	1.4250	1.3999
1 1/2	6	.1067	1.2332	"	"	1.5500	1.5250
1 5/8	5	.1281	1.3048	0.150	.1624	1.7796	1.7023
1 3/4	5	.1281	1.4298	"	"	1.9046	1.8273
1 7/8	4 1/2	.1430	1.5193	"	"	1.9941	1.9345
2	4 1/2	.1430	1.6443	"	"	2.1191	2.0595
2 1/8	4 1/2	.1430	1.7693	"	"	2.2441	2.1845
2 1/4	4	.1601	1.8498	"	"	2.3246	2.2873
2 3/8	4	.1601	1.9750	"	"	2.4498	2.4123
2 1/2	4	.1601	2.1000	"	"	2.5748	2.5373
2 3/4	3 1/2	.1830	2.2926	0.200	.2157	2.9240	2.8370
3	3 1/2	.1830	2.5426	"	"	3.1740	3.0870
3 1/4	3 1/4	.1970	2.7574	"	"	3.3887	3.3194
3 1/2	3 1/4	.1970	3.0074	"	"	3.6387	3.5694
3 3/4	3	.2134	3.2164	"	"	3.8477	3.7990
4	3	.2134	3.4664	"	"	4.0977	4.0490

MEASURING SCREW THREADS—IV

29° ACME SCREW THREAD





SCREW THREAD

p = pitch = $\frac{1}{\text{no. of threads per inch}}$
d = depth of thread = $\frac{p}{2}$ + 0.010"
a = space at top = 0.6293 p
b = space at bottom = 0.3707 p − 0.0052"
c = thickness at top = 0.3707 p
e = thickness at bottom = 0.6293 p + 0.0052"
D = diameter at top of thread
x = D + 0.010"

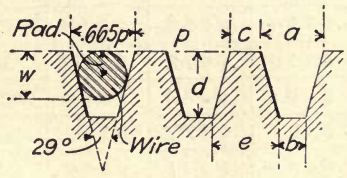
TAP THREAD

p = pitch = $\frac{1}{\text{no. of threads per inch}}$
d = depth of thread = $\frac{p}{2}$ + 0.020"
a = space at top = 0.6293 p + 0.0052"
b = space at bottom = 0.3707 p − 0.0052"
c = thickness at top = 0.3707 p − 0.0052"
e = thickness at bottom = 0.6293 p + 0.005
D_1 = diameter at top of thread = D + 0.02
x_1 = D_1 − D + 0.020"

Threads per inch	p	d	Diameter of wire	Threads per inch	p	d	Diameter of wire
½	2.000"	1.0100"	0.9785"	3	0.3333"	0.1767"	0.1664"
¾	1.500	0.7600	0.7349	4	0.2500	0.1350	0.1278
1	1.000	0.5100	0.4913	5	0.2000	0.1100	0.1014
1⅓	0.750	0.3850	0.3694	6	0.1667	0.0933	0.0852
1½	0.667	0.3433	0.3288	7	0.1429	0.0814	0.0736
1¾	0.571	0.2957	0.2824	8	0.1250	0.0725	0.0649
2	0.500	0.2600	0.2476	9	0.1111	0.0655	0.0581
2½	0.400	0.2100	0.1989	10	0.1000	0.0600	0.0527

The wire used is of such diameter that when laid in the thread groove of the tap, it will be flush with the top of the threads, and when laid in the thread groove of the screw, it will extend beyond the top of the threads 0.010."

THE BROWN AND SHARPE 29° WORM THREAD



p = pitch = $\frac{1}{\text{no. of threads per inch}}$
d = depth of thread = 0.6866 p
a = space at top = 0.665 p
b = space at bottom = 0.310 p
c = thickness at top = 0.335 p
e = thickness at bottom = 0.690 p
w = diam. of wire = 0.5149 p

Pitch	d	Wire Diam.	Pitch	d	Wire Diam
2.000	1.3732	1.0298	.3333	.2288	.1716
1.750	1.2015	.9010	.2500	.1716	.1287
1.500	1.0299	.7723	.2000	.1373	.1030
1.250	.8582	.6436	.1667	.1144	.0858
1.000	.6866	.5149	.1250	.0858	.0643
.750	.5150	.3862	.1111	.0763	.0582
.500	.3433	.2574	.1000	.0687	.0515

The wire used is of such diameter that it will be flush with the top of the thread when laid in the thread groove.

PITCH DIAMETERS, U. S. THREAD—I

Threads per Inch	1/64	1/32	1/16	3/32	1/8	5/32	3/16	7/32
64	.0055	.0211	.0524	.0836	.1149	.1461	.1774	.2087
62	.0051	.0207	.0520	.0832	.1145	.1457	.1770	.2083
60	.0048	.0204	.0517	.0829	.1142	.1454	.1767	.2080
58	.0044	.0200	.0513	.0825	.1138	.1450	.1763	.2076
56	.0040	.0196	.0509	.0821	.1134	.1446	.1759	.2072
54	.0036	.0192	.0505	.0817	.1130	.1442	.1755	.2068
52	.0031	.0187	.0500	.0812	.1125	.1437	.1750	.2063
50	.0026	.0182	.0495	.0807	.1120	.1432	.1745	.2058
48	.0021	.0177	.0490	.0802	.1115	.1427	.1740	.2053
46	.0015	.0171	.0484	.0796	.1109	.1421	.1734	.2047
44	.0008	.0164	.0477	.0789	.1102	.1414	.1727	.2040
42	.0001	.0157	.0470	.0782	.1095	.1407	.1720	.2033
40	.9994	.0150	.0463	.0775	.1088	.1400	.1713	.2026
38	.9985	.0141	.0454	.0766	.1079	.1391	.1704	.2017
36	.9976	.0132	.0445	.0757	.1070	.1383	.1695	.2008
34	.9965	.0121	.0434	.0746	.1059	.1371	.1684	.1997
32	.9953	.0109	.0422	.0734	.1047	.1359	.1672	.1985
30	.9939	.0095	.0408	.0720	.1033	.1345	.1658	.1971
28	.9924	.0080	.0393	.0705	.1018	.1330	.1643	.1956
27	.9915	.0071	.0384	.0696	.1009	.1321	.1634	.1947
26	.9906	.0062	.0375	.0687	.1000	.1312	.1625	.1938
24	.9885	.0041	.0354	.0666	.0979	.1291	.1604	.1917
22	.9861	.0017	.0330	.0642	.0955	.1267	.1580	.1893
20	.9832	.9988	.0301	.0613	.0926	.1238	.1551	.1864
18	.9796	.9952	.0265	.0577	.0890	.1202	.1515	.1828
16	.9750	.9906	.0219	.0531	.0844	.1156	.1469	.1782
14	.9692	.9848	.0161	.0473	.0786	.1098	.1411	.1724
13	.9657	.9813	.0126	.0438	.0751	.1063	.1376	.1689
12	.9615	.9771	.0084	.0396	.0709	.1021	.1334	.1647
11	.9566	.9722	.0035	.0347	.0660	.0972	.1285	.1598
10	.9507	.9663	.9976	.0288	.0601	.0913	.1226	.1539
9	.9435	.9591	.9904	.0216	.0529	.0841	.1154	.1467
8	.9344	.9500	.9813	.0125	.0438	.0750	.1063	.1376
7	.9228	.9384	.9697	.0009	.0322	.0634	.0947	.1260
6	.9074	.9230	.9543	.9855	.0168	.0480	.0793	.1106

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PITCH DIAMETERS, U. S. THREAD—II

Threads per Inch	1/4	9/32	5/16	11/32	3/8	13/32	7/16	15/32
64	.2399	.2711	.3024	.3336	.3649	.3961	.4274	.4586
62	.2395	.2707	.3020	.3332	.3645	.3957	.4270	.4582
60	.2392	.2704	.3017	.3329	.3642	.3954	.4267	.4579
58	.2388	.2700	.3013	.3325	.3638	.3950	.4263	.4575
56	.2384	.2696	.3009	.3321	.3634	.3946	.4259	.4571
54	.2380	.2692	.3005	.3317	.3630	.3942	.4255	.4567
52	.2375	.2687	.3000	.3312	.3625	.3937	.4250	.4562
50	.2370	.2682	.2995	.3307	.3620	.3932	.4245	.4557
48	.2365	.2677	.2990	.3302	.3615	.3927	.4240	.4552
46	.2359	.2671	.2984	.3296	.3609	.3921	.4234	.4546
44	.2352	.2664	.2977	.3289	.3602	.3914	.4227	.4539
42	.2345	.2657	.2970	.3282	.3595	.3907	.4220	.4532
40	.2338	.2650	.2963	.3275	.3588	.3900	.4213	.4525
38	.2329	.2641	.2954	.3266	.3579	.3891	.4204	.4516
36	.2320	.2632	.2945	.3257	.3570	.3882	.4195	.4507
34	.2309	.2621	.2934	.3246	.3559	.3871	.4184	.4496
32	.2297	.2609	.2922	.3234	.3547	.3859	.4172	.4484
30	.2283	.2595	.2908	.3220	.3533	.3845	.4158	.4470
28	.2268	.2580	.2893	.3205	.3518	.3830	.4143	.4455
27	.2259	.2571	.2884	.3196	.3509	.3821	.4134	.4446
26	.2250	.2562	.2875	.3187	.3500	.3812	.4125	.4437
24	.2229	.2541	.2854	.3166	.3479	.3791	.4104	.4416
22	.2205	.2517	.2830	.3142	.3455	.3767	.4080	.4392
20	.2176	.2488	.2801	.3113	.3426	.3738	.4051	.4363
18	.2140	.2452	.2765	.3077	.3390	.3702	.4015	.4327
16	.2094	.2406	.2719	.3031	.3344	.3656	.3969	.4281
14	.2036	.2348	.2661	.2973	.3286	.3598	.3911	.4223
13	.2001	.2313	.2626	.2938	.3251	.3563	.3876	.4188
12	.1959	.2271	.2584	.2896	.3209	.3521	.3834	.4146
11	.1910	.2222	.2535	.2847	.3160	.3472	.3785	.4097
10	.1851	.2163	.2476	.2788	.3101	.3413	.3726	.4038
9	.1779	.2091	.2404	.2716	.3029	.3341	.3654	.3966
8	.1688	.2000	.2313	.2625	.2938	.3250	.3563	.3875
7	.1572	.1884	.2197	.2509	.2822	.3134	.3447	.3759
6	.1418	.1730	.2043	.2355	.2668	.2980	.3293	.3605

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PITCH DIAMETERS, U. S. THREAD—III

Threads per Inch	1/2	17/32	9/16	19/32	5/8	21/32	11/16	23/32
64	.4899	.5211	.5524	.5836	.6149	.6461	.6774	.7086
62	.4895	.5207	.5520	.5832	.6145	.6457	.6770	.7082
60	.4892	.5204	.5517	.5829	.6142	.6454	.6767	.7079
58	.4888	.5200	.5513	.5825	.6138	.6450	.6763	.7075
56	.4884	.5196	.5509	.5821	.6134	.6446	.6759	.7071
54	.4880	.5192	.5505	.5817	.6130	.6442	.6755	.7067
52	.4875	.5187	.5500	.5812	.6125	.6437	.6750	.7062
50	.4870	.5182	.5495	.5807	.6120	.6432	.6745	.7057
48	.4865	.5177	.5490	.5802	.6115	.6427	.6740	.7052
46	.4859	.5171	.5484	.5796	.6109	.6421	.6734	.7046
44	.4852	.5164	.5477	.5789	.6102	.6414	.6727	.7039
42	.4845	.5157	.5470	.5782	.6095	.6407	.6720	.7032
40	.4838	.5150	.5463	.5775	.6088	.6400	.6713	.7025
38	.4829	.5141	.5454	.5766	.6079	.6391	.6704	.7016
36	.4820	.5132	.5445	.5757	.6070	.6382	.6695	.7007
34	.4809	.5121	.5434	.5746	.6059	.6371	.6684	.6996
32	.4797	.5109	.5422	.5734	.6047	.6359	.6672	.6984
30	.4783	.5095	.5408	.5720	.6033	.6345	.6658	.6970
28	.4768	.5080	.5393	.5705	.6018	.6330	.6643	.6955
27	.4759	.5071	.5384	.5696	.6009	.6321	.6634	.6946
26	.4750	.5062	.5375	.5687	.6000	.6312	.6625	.6937
24	.4729	.5041	.5354	.5666	.5979	.6291	.6604	.6916
22	.4705	.5017	.5330	.5642	.5955	.6267	.6580	.6892
20	.4676	.4988	.5301	.5613	.5926	.6238	.6551	.6863
18	.4640	.4952	.5265	.5577	.5890	.6202	.6515	.6827
16	.4594	.4906	.5219	.5531	.5844	.6156	.6469	.6781
14	.4536	.4848	.5161	.5473	.5786	.6098	.6411	.6723
13	.4501	.4813	.5126	.5438	.5751	.6063	.6376	.6688
12	.4459	.4771	.5084	.5396	.5709	.6021	.6334	.6646
11	.4410	.4722	.5035	.5347	.5660	.5972	.6285	.6597
10	.4351	.4663	.4976	.5288	.5601	.5913	.6226	.6538
9	.4279	.4591	.4904	.5216	.5529	.5841	.6154	.6466
8	.4188	.4500	.4813	.5125	.5438	.5750	.6063	.6375
7	.4072	.4384	.4697	.5009	.5322	.5634	.5947	.6259
6	.3918	.4230	.4543	.4855	.5168	.5480	.5793	.6105

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PITCH DIAMETERS, U. S. THREAD—IV

Threads per Inch	3/4	25/32	13/16	27/32	7/8	29/32	15/16	31/32	1
64	.7399	.7711	.8024	.8336	.8649	.8961	.9274	.9586	.9899
62	.7395	.7707	.8020	.8332	.8645	.8957	.9270	.9582	.9895
60	.7392	.7704	.8017	.8329	.8642	.8954	.9267	.9579	.9892
58	.7388	.7700	.8013	.8325	.8638	.8950	.9263	.9575	.9888
56	.7384	.7696	.8009	.8321	.8634	.8946	.9259	.9571	.9884
54	.7380	.7692	.8005	.8317	.8630	.8942	.9255	.9567	.9880
52	.7375	.7687	.8000	.8312	.8625	.8937	.9250	.9562	.9875
50	.7370	.7682	.7995	.8307	.8620	.8932	.9245	.9557	.9870
48	.7365	.7677	.7990	.8302	.8615	.8927	.9240	.9552	.9865
46	.7359	.7671	.7984	.8296	.8609	.8921	.9234	.9546	.9859
44	.7352	.7664	.7977	.8289	.8602	.8914	.9227	.9539	.9852
42	.7345	.7657	.7970	.8282	.8595	.8907	.9220	.9532	.9845
40	.7338	.7650	.7963	.8275	.8588	.8900	.9213	.9525	.9838
38	.7329	.7641	.7954	.8266	.8579	.8891	.9204	.9516	.9829
36	.7320	.7632	.7945	.8257	.8570	.8882	.9195	.9507	.9820
34	.7309	.7621	.7934	.8246	.8559	.8871	.9184	.9496	.9809
32	.7297	.7609	.7922	.8234	.8547	.8859	.9172	.9484	.9797
30	.7283	.7595	.7908	.8220	.8533	.8845	.9158	.9470	.9783
28	.7268	.7580	.7893	.8205	.8518	.8830	.9143	.9455	.9768
27	.7259	.7571	.7884	.8196	.8509	.8821	.9134	.9446	.9759
26	.7250	.7562	.7875	.8187	.8500	.8812	.9125	.9437	.9750
24	.7229	.7541	.7854	.8166	.8479	.8791	.9104	.9416	.9729
22	.7205	.7517	.7830	.8142	.8455	.8767	.9080	.9392	.9705
20	.7176	.7488	.7801	.8113	.8426	.8738	.9051	.9363	.9676
18	.7140	.7452	.7765	.8077	.8390	.8702	.9015	.9327	.9640
16	.7094	.7406	.7719	.8031	.8344	.8656	.8969	.9281	.9594
14	.7036	.7348	.7661	.7973	.8286	.8598	.8911	.9223	.9536
13	.7001	.7313	.7626	.7938	.8251	.8563	.8876	.9188	.9501
12	.6959	.7271	.7584	.7896	.8209	.8521	.8834	.9146	.9459
11	.6910	.7222	.7535	.7847	.8160	.8472	.8785	.9097	.9410
10	.6851	.7163	.7476	.7788	.8101	.8413	.8726	.9038	.9351
9	.6779	.7091	.7404	.7716	.8029	.8341	.8654	.8966	.9279
8	.6688	.7000	.7313	.7625	.7938	.8250	.8563	.8875	.9188
7	.6572	.6884	.7197	.7509	.7822	.8134	.8447	.8759	.9072
6	.6418	.6730	.7043	.7355	.7668	.7980	.8293	.8605	.8918

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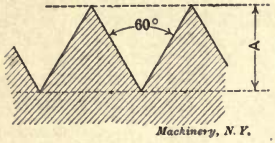
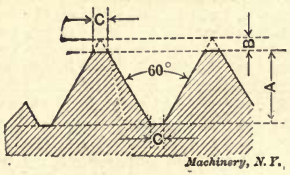
DIMENSIONS OF STANDARD THREADS.—I.

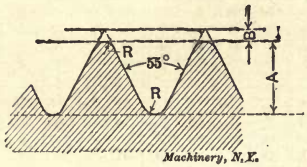
Sharp V Thread.



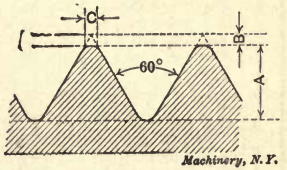
U. S. Standard Form.



Whitworth Standard Form.



Briggs Standard Pipe Thread Form.



Threads per inch.	Sharp V.	U. S. Standard Form.			Whitworth Standard Form.			Briggs Standard Pipe Thread Form.		
	A	A	B	C	A	B	R	A	B	C
3	.2887	.2165	.0361	.0417	.2134	.0534	.0458	.2667	.0110	.0127
3¼	.2665	.1999	.0333	.0385	.1970	.0493	.0423	.2462	.0101	.0117
3½	.2474	.1856	.0309	.0357	.1830	.0457	.0392	.2286	.0094	.0109
4	.2165	.1624	.0271	.0313	.1601	.0400	.0343	.2000	.0082	.0095
4½	.1925	.1443	.0241	.0278	.1423	.0356	.0305	.1777	.0073	.0085
5	.1732	.1299	.0217	.0250	.1281	.0320	.0275	.1600	.0066	.0076
5½	.1575	.1181	.0197	.0227	.1164	.0291	.0250	.1454	.0060	.0069
6	.1443	.1083	.0180	.0208	.1067	.0267	.0229	.1333	.0055	.0064
7	.1237	.0928	.0155	.0179	.0915	.0229	.0196	.1143	.0047	.0054
8	.1083	.0812	.0135	.0156	.0800	.0200	.0172	.1000	.0041	.0048
9	.0962	.0722	.0120	.0139	.0712	.0178	.0153	.0888	.0037	.0042
10	.0866	.0650	.0108	.0125	.0640	.0160	.0137	.0800	.0033	.0038
11	.0787	.0591	.0098	.0114	.0582	.0146	.0125	.0727	.0030	.0035
11½	.0753	.0565	.0094	.0109	.0557	.0139	.0119	.0696	.0029	.0033
12	.0722	.0541	.0090	.0104	.0534	.0133	.0114	.0667	.0028	.0032
13	.0666	.0500	.0083	.0096	.0493	.0123	.0106	.0615	.0025	.0029
14	.0619	.0464	.0077	.0089	.0457	.0114	.0098	.0571	.0024	.0027
15	.0577	.0433	.0072	.0083	.0427	.0107	.0092	.0533	.0022	.0025

DIMENSIONS OF STANDARD THREADS.—II.

Threads per inch.	Sharp V.	U. S. Standard Form.			Whitworth Standard Form.			Briggs Standard Pipe Thread Form.		
	A	A	B	C	A	B	R	A	B	C
16	.0541	.0406	.0068	.0078	.0400	.0160	.0086	.0500	.0021	.0024
17	.0509	.0382	.0064	.0073	.0377	.0094	.0081	.0471	.0019	.0022
18	.0481	.0361	.0060	.0069	.0356	.0089	.0076	.0444	.0018	.0021
20	.0433	.0325	.0054	.0063	.0320	.0080	.0069	.0400	.0016	.0019
22	.0394	.0295	.0049	.0057	.0291	.0073	.0062	.0364	.0015	.0017
24	.0361	.0271	.0045	.0052	.0267	.0067	.0057	.0333	.0014	.0016
25	.0346	.0260	.0043	.0050	.0256	.0064	.0055	.0320	.0013	.0015
26	.0333	.0250	.0042	.0048	.0246	.0062	.0053	.0308	.0013	.0015
27	.0321	.0241	.0040	.0046	.0237	.0059	.0051	.0296	.0012	.0014
28	.0309	.0232	.0039	.0045	.0229	.0057	.0049	.0286	.0012	.0014
30	.0289	.0217	.0036	.0042	.0213	.0053	.0046	.0267	.0011	.0013
32	.0271	.0203	.0034	.0039	.0200	.0050	.0043	.0250	.0010	.0012
34	.0255	.0191	.0032	.0037	.0188	.0047	.0040	.0235	.0010	.0011
36	.0241	.0180	.0030	.0035	.0178	.0045	.0038	.0222	.0009	.0011
38	.0228	.0171	.0028	.0033	.0169	.0042	.0036	.0211	.0009	.0010
40	.0216	.0162	.0027	.0031	.0160	.0040	.0034	.0200	.0008	.0010
42	.0206	.0155	.0026	.0030						
44	.0197	.0148	.0025	.0028						
46	.0188	.0141	.0024	.0027						
48	.0180	.0135	.0023	.0026						
50	.0173	.0130	.0022	.0025						
52	.0166	.0125	.0021	.0024						
54	.0160	.0120	.0020	.0023						

The Whitworth and the Briggs forms of thread are seldom used for pitches finer than 40 per inch.

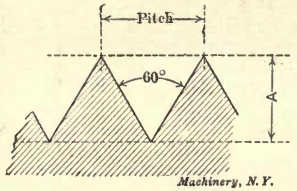
The dimensions underlined appertain to standard pitches for the Briggs pipe thread form.

DIMENSIONS OF STANDARD THREADS.—III.

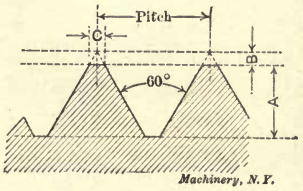
Threads per Inch.	Sharp V.	U. S. Standard Form.		
	A	A	B	C
56	.0155	.0116	.0019	.0022
58	.0149	.0112	.0019−	.0022−
60	.0144	.0108	.0018+	.0021
62	.0140	.0105	.0018	.0020
64	.0135	.0102	.0017	.0019
66	.0131	.0098	.0016+	.0019−
68	.0127	.0095	.0016	.0018
70	.0124	.0093	.0015+	.0018−
72	.0120	.0090	.0015	.0017
74	.0117	.0088	.0015−	.0017−
76	.0114	.0086	.0014+	.0016
78	.0111	.0083	.0014	.0016−
80	.0108	.0081	.0014−	.0016−
82	0106	.0079	.0013+	.0015
84	.0103	.0077	.0013	.0015−
86	.0101	.0075	.0013−	.0015−
88	.0098	.0074	.0012+	.0014
90	.0096	.0072	.0012	.0014−
92	.0094	.0071	.0012−	.0014−
94	.0092	.0069	.0011+	.0013
96	.0090	.0068	.0011	.0013−
98	.0088	.0066	.0011	.0013−
100	.0087	.0065	.0011−	.0013−

METRIC THREAD DIMENSIONS REDUCED TO INCHES.

Sharp V Thread.



International and French Standard Form.



Pitch.	Sharp V.	International and French Standard Form.		
	A	A	B	C
m/m	Inch.	Inch.	Inch.	Inch.
5.	.1705	.1279	.0213	.0246
4.9	.1671	.1253	.0209	.0241
4.8	.1637	.1227	.0205	.0236
4.75	.1619	.1215	.0202	.0234
4.7	.1602	.1202	.0200	.0231
4.6	.1568	.1176	.0196	.0226
4.5	.1534	.1151	.0192	.0221
4.4	.1500	.1125	.0188	.0217
4.3	.1466	.1100	.0183	.0212
4.25	.1449	.1087	.0181	.0209
4.2	.1432	.1074	.0179	.0207
4.1	.1398	.1048	.0175	.0202
4.	.1364	.1023	.0171	.0197
3.9	.1330	.0997	.0166	.0192
3.8	.1296	.0972	.0162	.0187

DIMENSIONS OF STANDARD THREADS.—IV.

Pitch.	Sharp V.	International and French Standard Form.			Pitch.	Sharp V.	International and French Standard Form.		
	A	A	B	C		A	A	B	C
m/m	Inch	Inch.	Inch.	Inch.	m/m.	Inch.	Inch.	Inch.	Inch.
3.75	.1279	.0959	.0160	.0184	1.9	.0648	.0486	.0081	.0094
3.7	.1262	.0946	.0158	.0182	1.8	.0614	.0460	.0077	.0089
3.6	.1227	.0921	.0153	.0177	1.75	.0597	.0447	.0075	.0086
3.5	.1193	.0895	.0149	.0172	1.7	.0580	.0435	.0072	.0084
3.4	.1159	.0969	.0145	.0167	1.6	.0546	.0409	.0068	.0079
3.3	.1125	.0844	.0141	.0162	1.5	.0511	.0384	.0064	.0074
3.25	.1108	.0831	.0139	.0160	1.4	.0477	.0358	.0060	.0069
3.2	.1091	.0818	.0136	.0158	1.3	.0443	.0332	.0055	.0064
3.1	.1057	.0793	.0132	.0153	1.25	.0426	.0320	.0053	.0062
3.	.1023	.0767	.0128	.0148	1.2	.0409	.0307	.0051	.0059
2.9	.0989	.0742	.0124	.0143	1.1	.0375	.0281	.0047	.0054
2.8	.0955	.0716	.0119	.0138	1.	.0341	.0256	.0043	.0049
2.75	.0938	.0703	.0117	.0135	.9	.0307	.0230	.0038	.0044
2.7	.0921	.0690	.0115	.0133	.8	.0273	.0205	.0034	.0039
2.6	.0887	.0665	.0111	.0128	.75	.0256	.0192	.0032	.0037
2.5	.0852	.0639	.0107	.0123	.7	.0239	.0179	.0030	.0034
2.4	.0818	.0614	.0102	.0118	.6	.0205	.0153	.0026	.0030
2.3	.0784	.0588	.0098	.0113	.5	.0171	.0128	.0021	.0025
2.25	.0767	.0575	.0096	.0111	.4	.0136	.0102	.0017	.0020
2.2	.0750	.0563	.0094	.0108	.3	.0102	.0077	.0013	.0015
2.1	.0716	.0537	.0090	.0103	.25	.0085	.0064	.0011	.0012
2.	.0682	.0511	.0085	.0098	.2	.0068	.0051	.0009	.0010

whether the pitch diameter of a one-inch screw having eight standard V-threads per inch is correct. Assume that wires 0.100 inch in diameter are used. Then, if the pitch diameter is correct the dimension x measured over the wires, as shown in the engraving above the table, should equal the value of D_1 (given in the table opposite one inch diameter and eight threads per inch) plus three times the diameter of the wire a, or $0.7835 + 0.300 = 1.0835$. This calculation is based on the formula $x = D_1 + 3a$, given above the table. If the dimension measured over the wires is a certain amount larger or smaller than the dimension found by this calculation, it indicates that the pitch diameter is that amount larger or smaller than the standard. The dimensions in the tables are for the standard threads of the system referred to only. For special diameters and pitches the values required are, however, easily computed from the formulas given in the tables. It is necessary that the wires used be as nearly round in section as possible and of uniform diameter, preferably ground to size. [MACHINERY, January, 1904, Measuring External Thread Diameters; March, 1907, Helpful Hints for the Toolmaker; September, 1907, Measuring Screw Thread Diameters; MACHINERY'S Reference Series No. 31, Screw Thread Tools and Gages, Chapter V.]

Pitch Diameters of U. S. Standard Threads

On pages 32 to 35, inclusive, are given four tables for obtaining pitch diameters for taps or screws with the U. S. standard form of thread. The outside diameter of the thread and the number of threads per inch are assumed to be given. It will be noticed that decimals only are given in the body of the table, so that no matter what the whole number is that precedes the fraction giving the outside diameter of the thread at the top of the column, if the same number is placed before the decimal, the correct pitch diameter is obtained, except in that portion of the table on page 32 below the heavy line, where the whole number preceding the decimal should be *one less than the whole number preceding the fraction at the top of the column.* For example, if it be required to find the pitch diameter of a screw 2⅛ inches in diameter with 10 threads per inch, follow the column marked ⅛ at the top, downwards, until opposite 10 threads per inch; the decimal here given is .0601, and the pitch diameter therefore is 2.0601. Had the outside diameter of the thread been 1⅛, then the pitch diameter would have been 1.0601. Had the diameter been 2 1/32, then the pitch diameter would have been 1.9663, because in this case the decimal is below the heavy line, and the whole number preceding it is one less than the whole number giving the diameter of the thread. By arranging the table in this way it is applicable to all diameters increasing by 32nds.

Dimensions of Standard Threads

On pages 36 to 39, inclusive, are given dimensions of standard threads. In the case of the U. S., the Whitworth, the Briggs and the International and French standard threads a dimension B is given from the top of the thread to the sharp point where the sides of the thread may be imagined as meeting if they be continued. This dimension is of value when making thread tools, as then the tool can first be made with a sharp point, and then the required amount removed.

No. 16. Machine Tool Drives.—Speeds and Feeds of Machine Tools; Geared or Single Pulley Drives; Drives for High Speed Cutting Tools.

No. 17. Strength of Cylinders—Formulas, Charts, and Diagrams.

No. 18. Shop Arithmetic for the Machinist.—Tapers; Change Gears; Cutting Speeds; Feeds; Indexing; Gearing for Cutting Spirals; Angles.

No. 19. Use of Formulas in Mechanics.—With numerous applications.

No. 20. Spiral Gearing.—Rules, Formulas, and Diagrams, etc.

No. 21. Measuring Tools.—History and Development of Standard Measurements; Special Calipers; Compasses; Micrometer Tools; Protractors, etc.

No. 22. Calculation of Elements of Machine Design.—Factor of Safety; Strength of Bolts; Riveted Joints; Keys and Keyways; Toggle-joints.

No. 23. Theory of Crane Design.—Jib Cranes; Calculation of Shaft, Gears, and Bearings; Force Required to Move Crane Trolleys; Pillar Cranes.

No. 24. Examples of Calculating Designs.—Charts in Designing; Punch and Riveter Frames; Shear Frames; Billet and Bar Passes; etc.

No. 25. Deep Hole Drilling.—Methods of Drilling; Construction of Drills.

No. 26. Modern Punch and Die Construction.—Construction and Use of Subpress Dies; Modern Blanking Die Construction; Drawing and Forming Dies.

No. 27. Locomotive Design, Part I.—Boilers, Cylinders, Pipes and Pistons.

No. 28. Locomotive Design, Part II.—Stephenson Valve Motion; Theory, Calculation and Design of Valve Motion; The Walschaerts Valve Motion.

No. 29. Locomotive Design, Part III.—Smokebox; Exhaust Pipe; Frames; Cross-heads; Guide Bars; Connecting-rods; Crank-pins; Axles; Driving-wheels.

No. 30. Locomotive Design, Part IV.—Springs, Trucks, Cab and Tender.

No. 31. Screw Thread Tools and Gages.

No. 32. Screw Thread Cutting.—Lathe Change Gears; Thread Tools; Kinks.

No. 33. Systems and Practice of the Drafting-Room.

No. 34. Care and Repair of Dynamos and Motors.

No. 35. Tables and Formulas for Shop and Drafting-Room.—The Use of Formulas; Solution of Triangles; Strength of Materials; Gearing, Screw Threads; Tap Drills; Drill Sizes; Tapers; Keys; Jig Bushings, etc.

No. 36. Iron and Steel.—Principles of Manufacture and Treatment.

No. 37. Bevel Gearing.—Rules and Formulas; Examples of Calculation; Tooth Outlines; Strength and Durability; Design; Methods of Cutting Teeth.

No. 38. Grinding and Grinding Machines.

No. 39. Fans, Ventilation and Heating.—Fans; Heaters; Shop Heating.

No. 40. Fly Wheels.—Their Purpose, Calculation and Design.

No. 41. Jigs and Fixtures, Part I.—Principles of Jig and Fixture Design; Drill and Boring Jig Bushings; Locating Points; Clamping Devices.

No. 42. Jigs and Fixtures, Part II.—Open and Closed Drill Jigs.

No. 43. Jigs and Fixtures, Part III.—Boring and Milling Fixtures.

No. 44. Machine Blacksmithing.—Systems, Tools and Machines used.

No. 45. Drop Forging.—Lay-out of Plant; Methods of Drop Forging; Dies.

No. 46. Hardening and Tempering.—Hardening Plants; Treating High-Speed Steel; Hardening Gages; Hardening Kinks.

No. 47. Electric Overhead Cranes.—Design and Calculation.

No. 48. Files and Filing.—Types of Files; Using and Making Files.

No. 49. Girders for Electric Overhead Cranes.

No. 50. Principles and Practice of Assembling Machine Tools. Part I.

No. 51. Principles and Practice of Assembling Machine Tools, Part II.

No. 52. Advanced Shop Arithmetic for the Machinist.

No. 53. Use of Logarithms and Logarithmic Tables.

No. 54. Solution of Triangles, Part I.—Methods, Rules and Examples.

No. 55. Solution of Triangles, Part II.—Tables of Natural Functions.

No. 56. Ball Bearings.—Principles of Design and Construction.

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No. 58. Helical and Elliptic Springs.—Calculation and Design.

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No. 63. Heat Treatment of Steel.—Hardening, Tempering and Case-Hardening.

No. 64. Gage Making and Lapping.

No. 65. Formulas and Constants for Gas Engine Design.