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# SYNTHETIC ORGANIC CHEMICALS

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**United States Production  
and Sales, 1989**

(Investigation No. 332-135)

USITC PUBLICATION 2338

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United States International Trade Commission  
Washington, DC 20436

UNITED STATES INTERNATIONAL TRADE COMMISSION

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This report was prepared principally by Cynthia B. Foreso, Jesse Lawrence Johnson, Dr. Aimison Jonnard, Eric Land, Edward Matusik, David Michels, Elizabeth R. Nesbitt, James Raftery, Edward J. Taylor, Cynthia Trainor, and Steve Wanser.

Assistance in the preparation of the report was provided by Kenneth R. Kozel, Gwen L. Bennett, Brenda Carroll, Sharon Greenfield, Lemuel Shields, and Darlene Smith. Data Processing was provided by Barbara Bobbitt, James Gill, and Marie Jagannathan. Electronic publishing and design was provided by Pamela Chase, Joyce Bookman, and Paulette Henderson.

Address all communications to  
**Kenneth R. Mason, Secretary to the Commission**  
**United States International Trade Commission**  
**Washington, DC 20436**

UNITED STATES INTERNATIONAL TRADE COMMISSION

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## Introduction

This is the 73rd annual report of the U.S. International Trade Commission on domestic production and sales of synthetic organic chemicals and the raw materials from which they are made. The report, along with the quarterly report titled *Preliminary Report on U.S. Production of Selected Synthetic Organic Chemicals (Including Synthetic Plastics and Resin Materials)*, is prepared under investigation No. 332-135, Synthetic Organic Chemicals Reports. This investigation is conducted under the authority of section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1322(g)), for the purpose of collecting data and preparing public reports on synthetic organic chemicals, plastics materials, medicinal chemicals, pesticides, and other organic chemical products. The annual report consists of 15 sections, each covering a specified group (based principally on use) of organic chemicals as follows: Coal tar, tar crudes and pitches; primary products from petroleum and natural gas for chemical conversion; cyclic intermediates; dyes; organic pigments; medicinal chemicals; flavor and perfume materials; plastics and resin materials; rubber-processing chemicals; elastomers; plasticizers; surface-active agents; pesticides and related products; miscellaneous end-use chemicals and chemical products; and miscellaneous cyclic and acyclic chemicals. Data have been supplied by approximately 698 producers.

Each of the 15 sections is headed by a summary of the statistical data. The first table in each section gives statistics on products and groups of products in as great detail as is possible without revealing the operations of individual producers. Statistics for an individual chemical or group of chemicals are given only when there are three or more producers, no one or two of which may be predominant. Moreover, even when there are three or more producers, statistics are not given if there is any possibility that their publication would violate the statutory provisions relating to unlawful disclosure of information accepted in confidence by the Commission.<sup>1</sup>

Data are reported by producers for only those items where the volume of production or sales or value of sales exceeds certain minimums. Those minimums are 450 kilograms of production or sales or \$1,000 of value of sales for organic pigments, medicinal chemicals, flavor and perfume materials, rubber-processing chemicals, elastomers, and those chemicals whose end-use is not readily determinable; 2,250 kilograms or \$5,000 for coal tar, tar crudes and pitches, primary products from petroleum and natural gas for chemical conversion, dyes, plasticizers, surface-active agents, and pesticides; 4,500 kilograms or \$10,000 for cyclic intermediates and miscellaneous cyclic and acyclic chemicals; 9,000 kilograms or \$20,000 for miscellaneous end-use chemicals and products; and 22,500 kilograms for \$50,000 for plastics materials. Data are usually supplied in terms of undiluted materials; however, for reporting purposes, products of 95 percent or

greater purity are considered to be 100 percent pure. Commercial concentrations are applicable for dyes, certain plastics and resins, and a few solvents; such concentrations are specifically noted.

The statistics given in this report include data from all known domestic producers of the items covered and include the total output of each company's plants, i.e., the quantities produced for consumption within the producing plant, as well as the quantities produced for domestic and foreign sale. The quantities reported as produced, therefore, generally exceed the quantities reported as sold. Some of these differences, however, are attributable to changes in inventory.

The second table in each section lists all items for which data on production or sales have been reported, by primary manufacturers, identified by manufacturers' codes. Each code consists of not more than three capital letters and is assigned on a permanent basis.

The third table in each section is a directory, alphabetized by the codes of the manufacturers reporting in that section.

Appendix A is a directory, alphabetized by the names of the manufacturers reporting in all sections and which includes their general corporate phone numbers and office addresses.

Appendix B lists synonymous names for cyclic intermediates. Information on synonymous names of the organic chemicals included in this report may be found in the *SOCMA Handbook: Commercial Organic Chemical Names*, published by the Chemical Abstracts Service of the American Chemical Society, or the *Colour Index (Revised Third Edition)*, published jointly by the Society of Dyes and Colourists and the American Association of Textile Chemists and Colorists.

Appendix C presents the data in this report aggregated in the format of the Harmonized System (HS) nomenclature on a 6-digit HS basis.

Appendix D is an alphabetical index of all the products in this edition of the report.

Data contained in this report are compiled primarily from Commissions questionnaires sent to domestic producers and represent the best data available to the Commission. While the data supplied in the questionnaires are checked against data previously supplied by the submitting firm and with data supplied by other domestic producers, data are not independently verified by direct Commission examination of the books of companies furnishing information. Data contained in this report should not be used for investment and other purposes without independent verification.

As specified in the reporting instructions sent to manufacturers, production and sales (unless otherwise specified) are defined as follows:

**Production** is the total quantity of a commodity made available by Original Manufacturers Only within the customs territory of the United States (includes the 50 states, the District of Columbia, and Puerto Rico). It covers synthetic organic chemicals, specified crudes

<sup>1</sup> 18 U.S.C. § 1905 and 44 U.S.C. § 3508.

from petroleum and coal tar, and certain chemically described natural products, such as, alkaloids, enzymes, and perfume isolates. It is the sum—expressed in terms of 100 percent active ingredient unless otherwise specified in the reporting instructions—of the quantities:

Produced, separated, and consumed in the same plant or establishment. A Commodity is considered separated either when it is isolated from the reactive system or when it is not isolated, but weighed, analyzed, or otherwise measured. This includes by-products and co-products that are not classifiable as waste materials;

Produced and not isolated, but directly converted to a finished or semifinished item not included in this report (e.g., polyester film, polyurethane tires, nylon fiber, bar soap, etc.). (See specific instructions in individual sections);

Produced and transferred to other plants or establishments of the same firm or 100 percent owned subsidiaries or affiliates;

Produced and sold to, or bartered with, other firms (including less than 100 percent owned subsidiaries);

Produced for others under toll agreements (see general instructions);

Produced and held in stock.

#### PRODUCTION EXCLUDES:

Purification of a commodity, which is purchased by, or transferred from within, the company, unless inclusion of such processing is specifically requested in the reporting instructions for individual sections;

Intermediate products which are formed in the manufacturing process, but are not

isolated from the reaction system—that is, not weighed, analyzed, or otherwise measured; except such products as described above as being produced and not isolated, but directly converted to a finished or semifinished item.

Materials that are used in the process but which are recovered for re-use or sale;

Waste products having no economic significance.

**SALES** are actual quantities of commodities sold by **Original Manufacturers Only**. Sales include the quantity and value of:

Shipments of a commodity for domestic use or for export, or segregation in a warehouse when title has passed to the purchaser in a bona fide sale;

Shipments of a commodity produced for you by others under toll agreement;

Shipments to subsidiary or affiliated companies, provided the ownership is less than 100 percent.

#### SALES EXCLUDE:

All intra-company transfers within a corporate entity;

All shipments to 100 percent owned subsidiary or affiliated companies;

All resales of imported or purchased material, including materials obtained by barter;

All shipments of commodity produced for others under toll agreements.

**VALUE OF SALES** is the net dollar receipts of sales f.o.b. plant or warehouse, or delivered. F.o.b. values are preferred, but if they are not readily available from your records, delivered values are acceptable.

## Summary

Combined production of all synthetic organic chemicals, coal tar, and primary products from petroleum and natural gas in 1989 was 172,977 million kilograms—a decrease of 1.6 percent from the output in 1988 (which also included data on tars) (table 1). Sales of these materials in 1989, which totaled 98,382 million kilograms, valued at \$96,071 million, were 0.2 percent larger than in 1988 in terms of quantity and 2.9 percent more in terms of value. These figures include data on production and sales of chemicals measured at several successive steps in the manufacturing process, and, therefore, they necessarily reflect some duplication. During 1985–89, the total output of these products rose each year except for 1989 (figure 1). During that period the output of these products generally followed the trend of the Federal Reserve Board Index of U.S. Production, except for 1989.

In 1989, production of all synthetic organic chemicals, including cyclic intermediates and finished products totaled 121,378 million kilograms, or 2.1 percent less than the output in

1988. Six sections showed an increase in production in 1989 over 1988. Dyes (174 million kilograms) increased by 37.1 percent; medicinal chemicals (130 million kilograms) increased by 11.3 percent; rubber-processing chemicals (176 million kilograms) increased by 9.9 percent; pesticides and related products (572 million kilograms) increased by 8.4 percent; miscellaneous end-use chemicals and chemical products (13,503 million kilograms) increased by 4.3 percent; miscellaneous cyclic and acyclic chemicals (48,804 million kilograms) increased by 1.6 percent; of the remaining sections, flavor and perfume materials (64 million kilograms) showed a decreased of 12.5 percent; surface-active agents (3,085 million kilograms) decreased 7.0 percent; cyclic intermediates (24,756 million kilograms) decreased 6.6 percent; plasticizers (976 million kilograms) decreased 6.4 percent; plastics and resin materials (26,995 million kilograms) decreased 6.3 percent; elastomers (synthetic rubber) (2,091 million kilograms) decreased 6.0 percent; and organic pigments (50 million kilograms) decreased 4.2 percent in 1989 from that in 1988.

Table 1  
Synthetic organic chemicals and their raw materials: U.S. production and sales, 1988 and 1989

Chemical	Production			Sales					
				Quantity			Value		
	1988	1989	Increase or decrease (-), 1989 over 1988 <sup>1</sup>	1988	1989	Increase or decrease (-), 1989 over 1988 <sup>1</sup>	1988	1989	Increase or decrease (-), 1989 over 1988 <sup>1</sup>
	Million kilograms	Million kilograms	Percent	Million kilograms	Million kilograms	Percent	Million dollars	Million dollars	Percent
Grand total	175,841	172,977	-1.6	98,197	98,382	0.2	93,406	96,071	2.9
Coal tar	894	857	-4.1	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Primary products from petroleum and natural gas	51,003	50,742	-0.5	26,669	27,834	4.4	10,517	11,369	8.1
Synthetic organic chemicals, total <sup>3</sup>	123,944	121,378	-2.1	71,528	70,548	-1.4	82,889	84,702	2.2
Cyclic intermediates	26,492	24,756	-6.6	12,016	12,371	3.0	9,369	10,284	9.8
Dyes	127	174	37.1	114	146	28.1	766	858	11.9
Organic pigments	53	50	-4.2	39	43	9.7	595	702	18.0
Medicinal chemicals	117	130	11.3	103	204	97.0	1,831	1,988	8.5
Flavor and perfume materials	74	64	-12.5	43	38	-10.8	866	1,005	16.1
Plastics and resin materials	28,820	26,995	-6.3	25,057	23,819	-4.9	33,831	32,180	-4.9
Rubber-processing chemicals	160	176	9.9	121	129	6.9	424	473	11.6
Elastomer (synthetic rubber)	2,226	2,091	-6.0	1,467	1,395	-4.9	2,982	2,872	-3.7
Plasticizers	1,043	976	-6.4	850	837	-1.6	1,001	1,046	4.4
Surface-active agents	3,319	3,085	-7.0	1,933	1,724	-10.8	2,303	2,086	-9.4
Pesticides and related products	528	572	8.4	424	461	8.7	4,354	5,203	19.5
Miscellaneous end-use chemicals and chemical products	12,940	13,503	4.3	10,214	9,278	-9.2	9,449	9,759	3.3
Miscellaneous cyclic and acyclic chemicals	48,046	48,804	1.6	19,147	20,103	5.0	15,118	16,247	7.5

<sup>1</sup> Percentage calculated from figures rounded to thousands.

<sup>2</sup> Not available

<sup>3</sup> Because of rounding, figures may not add to the totals shown.

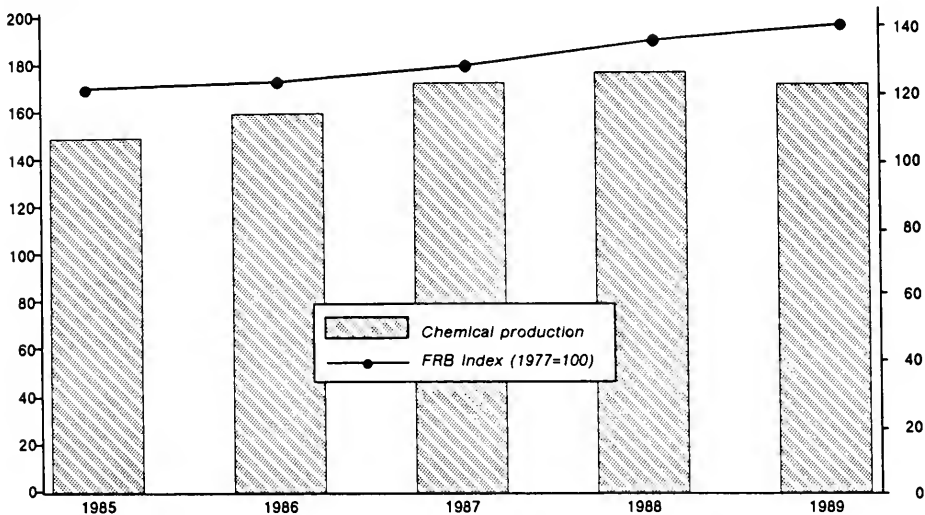
Note.—Data for 1988 and 1989 do not include ethane, propane, and butane production.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Summary

Figure 1-1  
Synthetic organic chemicals and their raw materials, total production, vs FRB Industrial production Index

Billions  
of kilograms



Source: Production, U.S. International Trade Commission, *Synthetic Organic Chemicals: United States Production and Sales*; FRB Industrial Production Index, The Board of Governors of the Federal Reserve System.

## General

In this report, synthetic organic chemicals are classified on the basis of their principal use as follows: Cyclic intermediates, dyes, organic pigments, medicinal chemicals, flavor and perfume materials, plastics and resin materials, rubber-processing chemicals, elastomers (synthetic rubber), plasticizers, surface-active agents, pesticides and related products, miscellaneous end-use chemicals and chemical products, and miscellaneous cyclic and acyclic chemicals. Most of these groups are further subdivided either by use or by chemical composition. As intermediates, chemicals are used in the manufacture of finished products, aggregate figures that cover both intermediates and finished products necessarily include considerable duplication.

Total production of synthetic organic chemicals (intermediates and finished products combined) in 1989 was 121,378 million kilograms, or 2.1 percent less than the output of 123,944 million kilograms reported for 1988, and 53.4 percent more than the output of 79,144 million kilograms reported in 1977 (see table 2).

Sales of synthetic organic chemicals in 1989 amounted to 70,548 million kilograms, valued at \$84,702 million, compared with 71,528 million kilograms, valued at \$82,889 million, in 1988, and 44,378 million kilograms, valued at \$32,434 million, in 1977. Production of all cyclic (ring chemical structure) products (intermediates and finished products combined) in 1989 totaled 38,895 million kilograms, or 5.2 percent less than the 41,031 million kilograms reported for 1988, and 122.9 percent more than the 17,451 million kilograms reported for 1977; however, the transfer of eight items, in 1979, from the primary products from petroleum and natural gas section to the section on cyclic intermediates has caused the output of cyclic products to appear much higher in relation to 1977 than would otherwise have resulted. Production of all acyclic (linear or branch chemical structure) products in 1989 totaled 80,392 million kilograms, or 0.4 percent less than the 80,688 million kilograms reported for 1988, and 36.1 percent more than the 59,057 million kilograms reported for 1977. Differences in trends between cyclic and acyclic products reflect the aggregation of changes in usage of individual chemicals rather than preferences for cyclic versus acyclic chemicals.

**Table 2**

**Synthetic organic chemicals: Summary of U.S. production and sales of intermediates and finished products, 1977, 1988, and 1989**

(Production and sales in thousands of kilograms; sales value in thousands of dollars)

Chemicals	1977 <sup>1</sup>	1988	1989	Increase or decrease (-)	
				1989 over 1977	1989 over 1988
<b>Organic chemicals, cyclic and acyclic, total:</b>					
Production .....	79,144,480	123,944,362	121,378,075	53.4	-2.1
Sales .....	44,378,105	71,528,398	70,548,189	59.0	-1.4
Sales value .....	32,434,301	82,888,676	84,702,188	161.2	2.2
<b>Cyclic, total:2</b>					
Production .....	17,451,083	41,030,608	38,895,104	122.9	-5.2
Sales .....	10,833,542	23,550,694	23,577,601	117.6	0.1
Sales value .....	13,410,029	35,676,925	38,189,601	184.8	7.0
<b>Acyclic, total:2</b>					
Production .....	59,056,510	80,888,148	80,391,891	36.1	-0.4
Sales .....	31,849,694	46,510,559	45,575,686	44.0	-2.0
Sales value .....	17,084,012	44,229,621	43,640,346	155.4	-1.3
<b>1. Cyclic Intermediates</b>					
Production .....	8,493,888	28,492,181	24,755,837	191.5	-6.6
Sales .....	3,622,331	12,016,015	12,370,861	241.5	3.0
Sales value .....	2,596,627	9,369,068	10,283,993	296.1	9.8
<b>2. Dyes</b>					
Production .....	119,917	127,183	174,358	45.4	37.1
Sales .....	115,448	113,779	145,757	26.3	28.1
Sales value .....	689,992	766,148	857,554	24.3	11.9
<b>3. Organic Pigments</b>					
Production .....	31,165	52,570	50,360	61.6	-4.2
Sales .....	26,052	39,406	43,236	66.0	9.7
Sales value .....	267,747	594,657	701,552	162.0	18.0

See footnotes at end of table.

Table 2—Continued

Synthetic organic chemicals: Summary of U.S. production and sales of intermediates and finished products, 1977, 1988, and 1989

(Production and sales in thousands of kilograms; sales value in thousands of dollars)

Chemicals	1977 <sup>1</sup>	1988	Increase or decrease (-)		
			1989	1989 over 1977	1989 over 1988
<b>4. Medicinal Chemicals</b>					
Cyclic:					
Production	69,819	72,140	95,672	37.0	32.6
Sales	37,914	50,295	153,166	304.0	204.5
Sales value	718,392	1,622,980	1,782,033	148.1	9.8
Acyclic:					
Production	39,377	44,979	34,654	-12.0	-23.0
Sales	35,743	53,079	50,447	41.1	-5.0
Sales value	75,626	208,031	205,486	171.7	-1.2
<b>5. Flavors and Perfume Materials</b>					
Cyclic:					
Production	26,514	35,552	38,097	43.7	7.2
Sales	21,232	25,882	27,502	29.5	6.3
Sales value	134,628	704,353	908,457	574.8	29.0
Acyclic:					
Production	41,715	37,970	26,227	-37.1	-30.9
Sales	27,559	17,200	10,918	-60.4	-36.5
Sales value	72,473	161,742	96,786	33.5	-40.2
<b>6. Plastics and Resin Materials</b>					
Cyclic:					
Production	4,899,932	8,559,482	8,017,658	63.6	-6.3
Sales	4,284,062	7,316,588	6,955,265	62.4	-4.9
Sales value	4,275,111	13,795,504	13,065,234	205.6	-4.9
Acyclic:					
Production	10,804,977	20,260,322	18,977,823	75.6	-6.3
Sales	9,232,677	17,740,220	16,864,135	82.7	-4.9
Sales value	6,606,712	20,095,787	19,115,146	189.3	-4.9
<b>7. Rubber-Processing Chemicals</b>					
Cyclic:					
Production	152,204	144,462	155,035	1.9	7.3
Sales	91,740	107,185	108,721	18.5	1.4
Sales value	248,756	397,388	429,565	72.7	8.1
Acyclic:					
Production	21,076	15,535	20,830	-1.2	34.1
Sales	16,254	13,322	20,125	23.8	51.1
Sales value	29,009	26,525	43,327	49.4	63.3
<b>8. Elastomers (Synthetic Rubber)</b>					
Production	2,636,867	2,225,606	2,091,080	-20.7	-6.0
Sales	1,894,869	1,467,145	1,394,902	-26.4	-4.9
Sales value	1,940,260	2,982,130	2,872,241	48.0	-3.7
<b>9. Plasticizers</b>					
Cyclic:					
Production	638,249	804,954	734,653	15.1	-8.7
Sales	630,645	653,102	634,202	0.6	-2.9
Sales value	474,781	700,084	703,942	48.3	0.6
Acyclic:					
Production	174,615	238,508	241,738	38.1	1.4
Sales	125,784	196,753	202,387	60.9	2.9
Sales value	157,549	301,219	341,585	116.8	13.4
<b>10. Surface-Active Agents</b>					
Cyclic:3					
Production	448,863	1,375,479	1,347,168	(4)	-2.1
Sales	212,933	1,035,108	911,195	(4)	-12.0
Sales value	200,244	1,000,033	743,088	(4)	-25.7
Acyclic:					
Production	1,691,285	1,943,071	1,738,206	(4)	-10.5
Sales	927,674	897,769	812,840	(4)	-9.5
Sales value	674,778	1,303,218	1,342,759	(4)	3.0
<b>11. Pesticides and Related Products</b>					
Cyclic:					
Production	376,276	344,599	365,900	-2.8	6.2
Sales	313,520	259,530	286,745	-8.5	10.5
Sales value	1,664,008	3,054,331	3,639,436	118.7	19.2
Acyclic:					
Production	253,099	183,312	206,486	-18.4	12.6
Sales	259,376	164,662	174,427	-32.8	5.9
Sales value	1,144,265	1,299,407	1,563,346	36.6	20.3

See footnotes at end of table.



Table 2—Continued

Synthetic organic chemicals: Summary of U.S. production and sales of intermediates and finished products, 1977, 1988, and 1989

(Production and sales in thousands of kilograms; sales value in thousands of dollars)

Chemicals	1977 <sup>1</sup>	1988	1989	Increase or decrease (-)	
				1989 over 1977	1989 over 1988
<b>12. Miscellaneous End-Use Chemicals and Chemical Product</b>					
Cyclic:					
Production .....	1,252,527	1,537,478	1,592,471	27.1	3.6
Sales .....	1,004,105	1,243,629	1,205,851	20.1	-3.0
Sales value .....	1,479,800	1,984,420	3,606,757	143.7	81.8
Acyclic:					
Production .....	7,523,638	11,402,681	11,910,252	58.3	4.5
Sales .....	3,919,801	8,970,501	8,072,193	105.9	-10.0
Sales value .....	1,067,681	7,464,116	6,152,720	476.3	-17.6
<b>13. Miscellaneous Cyclic and Acyclic Chemicals</b>					
Cyclic:					
Production .....	941,729	1,484,528	1,567,895	66.5	5.6
Sales .....	473,560	690,175	735,100	55.2	6.5
Sales value .....	659,943	1,747,959	1,467,990	122.4	-16.0
Acyclic:					
Production .....	38,506,728	46,561,770	47,235,675	22.7	1.4
Sales .....	17,104,826	18,457,053	19,368,214	13.2	4.9
Sales value .....	7,255,919	13,369,576	14,779,191	103.7	10.5

<sup>1</sup> Standard reference base period for Federal Government general-purpose index numbers.<sup>2</sup> Does not include data for elastomers.<sup>3</sup> Includes ligninsulfonates.<sup>4</sup> The data for 1977 are not comparable with current data as a result of a change in accounting procedures.<sup>5</sup> Items in these two sections were previously included in the section named miscellaneous chemicals.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

The following tabulation shows, by chemical groups, the number of companies that reported production in 1989 of one or more of the chemicals included in each group.

Chemical group	Number of companies	Chemical group	Number of companies
Cyclic intermediates .....	168	Elastomers (synthetic rubber) .....	31
Dyes .....	34	Plasticizers .....	43
Organic pigments .....	34	Surface-active agents .....	156
Medicinal chemicals .....	87	Pesticides and related products .....	67
Flavor and perfume materials .....	30	Miscellaneous end-use chemicals and	
Plastics and resins materials .....	254	chemicals products .....	161
Rubber-processing chemicals .....	23	Miscellaneous cyclic and acyclic	
		chemicals .....	249



## Section 1 Coal Tar, Tar Crudes and Pitches

Coal tar is produced chiefly by the steel industry as a by-product of the manufacture of coke. Production of coal tar, therefore, depends on the demand for steel. Petroleum asphalts are not usually considered to be raw materials for chemicals.

The U.S. International Trade Commission began collecting data on crude coal tar for the 1986 reporting year. In 1989, U.S. production of crude coal tar was 590 million liters. Production of crude light oil was 268 million liters in 1989.

Tar crudes are obtained from coke-oven gas and by distilling coal tar, water-gas tar, and oil-gas tar. The most important tar crudes are benzene, toluene, xylene, creosote oil, and pitch of tar. Some of these products are identical with those obtained from petroleum. Data for materials obtained from petroleum are included, for the most part, with the statistics for like materials

obtained from coke-oven gas and tars, and are shown in table 1-1.

The domestic production by coke-oven operators of industrial and specification grades of benzene, toluene, and xylene cannot be published since to do so would disclose the operations of individual companies. Some of the products obtained from tar and included in the statistics in table 1-1 are obtained from other products for which data are also included in the table. The statistics, therefore, involve considerable duplication, and for this reason no group totals or grand totals are given.

Table 1-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 1-3.

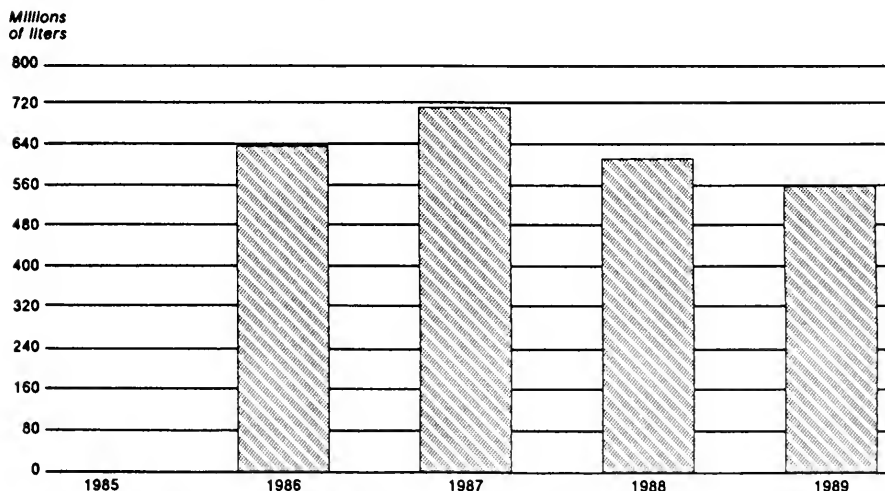
Data for 1989 tar crudes were supplied by 26 companies and company divisions.

*Cynthia B. Foreso*

202-252-1348

(Effective 1/14/91 202-205-3348)

Figure 1-1  
Crude Coal tar: U.S. production, 1985-89



Note.—Data for 1985 are not available.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 1-1

Coal tar, tar crudes, and pitches: U.S. production and sales, 1989

Coal tar, tar crudes and pitches	Unit of Quantity	Production	Sales		Average Unit value <sup>1</sup>
			Quantity	Value	
				1,000 dollars	
Crude coal tar (coke-oven operators) .....	1,000 liters	589,669	657,391	47,965	\$0.07
Crude light oil: (coke-oven operators) .....	1,000 liters	267,908	264,259	43,282	.16
Light-oil distillates:					
Benzene, all grades, total <sup>2</sup> .....	1,000 liters	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Coke-oven operators .....	1,000 liters	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Petroleum refiners .....	1,000 liters	6,159,354	3,987,436	1,360,245	.34
Toluene, all grades, total <sup>2</sup> .....	1,000 liters	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Coke-oven operator .....	1,000 liters	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Petroleum refiners .....	1,000 liters	3,039,346	2,034,914	548,599	.27
Xylene, all grades, total <sup>2</sup> .....	1,000 liters	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Coke-oven operators .....	1,000 liters	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Petroleum refiners .....	1,000 liters	3,227,742	1,556,757	506,042	.33
Other tar distillates .....	1,000 liters	278,713	255,312	35,650	.14
Creosote oil (Dead oil) (100 percent creosote basis):					
Distillate as such (100 percent creosote basis) .....	1,000 liters	206,672	138,231	21,787	.16
Creosote in coal tar solution (100 percent solution basis) .....	1,000 liters	72,041	117,081	13,863	.12
Tar and tar pitches:					
Refined tar for uses other than road tar .....	1,000 liters	35,271	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Pitch of tar: Hard .....	1,000 metric ton	645	487	121,246	248.90

<sup>1</sup> Unit value per liter or metric ton as specified.

<sup>2</sup> Includes data for material produced for use in blending motor fuels. The annual production statistics for petroleum refiners on benzene, toluene, and xylene are not comparable with the combined monthly production figures because of fiscal year revisions.

<sup>3</sup> Statistics cannot be published; to do so would disclose the operations of individual companies.

Note.—Statistics for materials produced in tar and petroleum refineries are compiled by the U.S. International Trade Commission. Data for all other tars and tar crudes are not included in the 1989 report because publication would disclose the operations of individual companies.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 1-2

Coal tar, tar crudes and pitches for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Coal tar, tar crudes and pitches	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 1-3)
<b>Light oil, light oil distillates, and tar bases:</b>		
Crude coal tar .....	Yes	ABP, ALS, ART, CGU, DTR, EKO, GSS, ILI, INL, LTV, NBC, NTS, SGO, TWD, WPS.
Crude light oil .....	Yes	ABP, ALS, ART, BTS, CGU, EKO, GSS, ILI, INL, KPT, LTV, NBC, NTS, SGO, TWD, USX, WPS.
Pyridine, tar bases:		
Benzene (benzol):		
Tar bases: crude bases (dry basis) .....	No	CPY, KPT, USX.
Toluene (toluol):		
Toluene (Toluol) other grades .....	No	KPT.
All other:		
All other light-oil distillates .....	No	LYP, NTS.
Other tar distillates:		
Naphthalene, crude:		
Methylnaphthalene .....	No	KPT.
Naphthalene, crude, solidifying at less than 74° C ..	No	BTS, COP, CPY, GSS.
Naphthalene, crude, solidifying at 76° C to less than 79° C .....	No	ACS, KPT.
Crude tar acid oils:		
Crude tar acid oils having a tar acid content of 5 percent to less than 24 percent .....	No	ACS, ASY, INL, KPT, NTS.
Cresylic acid, crude:		
Sodium cresylate .....	No	KPT.
Creosote oil (Dead oil):		
Creosote oil (Dead oil): creosote content in solution (100 percent basis) .....	No	RIL.
Creosote oil (Dead oil): creosote in coal tar solution (100 percent solution basis) .....	Yes	ACS, ART, KPT, RIL.
Creosote oil (Dead oil): distillate as such (100 percent creosote basis) .....	Yes	ACS, ART, COP, KPT, RIL.
All other distillate products:		
Carbon Black oil .....	No	ACS.
Crude coal tar solvent .....	No	KPT.
Priming and refractory oil .....	No	BTS, KPT.
All other tar distillates .....	No	GIV.
Tar and tar pitches:		
Tar, road:		
Tar, road .....	No	ACS, RIL.
Tar for other uses:		
Tar for other uses: crude .....	No	ALS, BTS.
Tar for other uses: refined .....	Yes	ACS, COP, KPT, RIL.
Pitch of tar:		
Pitch of tar: hard (M.P. 161° F and over) .....	Yes	ACS, COP, KPT, RIL.
Pitch of tar: medium (M.P. 110° To 160° F) .....	No	ART, KPT, RIL.
Pitch of tar: soft (M.P. 80° To 109° F) .....	No	ART, COP.
All other:		
All other pitch of tar .....	No	WPS.

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 1-3

Coal tar, tar crudes and pitches: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
ABP .....	Drummond Co. Inc.	ILI .....	Acme Steel Corp.
ACS .....	Allied Signal, Inc., Engineered Materials Sector	INL .....	Inland Steel Co.
ALS .....	Armco, Inc.	KPT .....	Kopper Industries
ART .....	Arlotech Chemical Corp.	LTV .....	LTV Steel Co.
ASY .....	American Synthetic Rubber Corp.	LYP .....	Lyondell Petrochemical Co.
BTS .....	Bethlehem Steel Corp.	NBC .....	New Boston Coke Corp.
CGU .....	Citizen Gas And Coke Utility	NTS .....	National Steel Corp., Great Lakes Div.
COP .....	Coopers Creek Chemical Corp.	RIL .....	Relly Industries, Inc.
CPY .....	Copolymer Rubber and Chemical Corp.	SGO .....	Shenango, Inc.
DTR .....	Detroit Coke Corp.	TWD .....	Tonawanda Coke Corp.
EKO .....	Empire Coke Co.	USX .....	U.S. Steel, Div. of USX Chemical Div. Gary Works
GIV .....	Givaudan Corp.	WPS .....	Wheeling-Pittsburg Steel Corp.
GSS .....	Gulf States Steel		

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A.  
Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 2 Primary Products from Petroleum and Natural Gas for Chemical Conversion

Primary products that are derived from petroleum and natural gas are related to the intermediates and finished products made from such primary materials in much the same way that crude products derived from the distillation of coal tar<sup>1</sup> are related to their intermediates and finished products. Many of the primary products derived from petroleum are identical to those derived from coal tar (e.g., benzene, toluene, and mixed xylenes). Considerable duplication exists in the statistics on the production and sales of primary petroleum products because some of these primary chemicals are converted to other primary products derived from petroleum and because data on some production and sales are reported at successive stages in the conversion process. The statistics are sufficiently accurate, however, to indicate trends in the industry. Many of the primary products for which data are included in the statistics may be used either as fuel or as basic materials from which other chemicals are derived. In this report every effort has been made to exclude data on materials that are used as fuel; however, data are included on toluene and mixed xylenes, which are used in blending aviation and motor fuel.

The total production of primary products derived from petroleum and natural gas during

1985-89 is shown in figure 2-1. Beginning in 1988, production and sales data no longer are collected for ethane, propane, and butane. Total production for primary products during 1989 amounted to 50,742 million kilograms.

The output of aromatic and naphthenic products from petroleum amounted to 12,628 million kilograms in 1989, compared with 13,254 million kilograms in 1988. Sales amounted to \$2,635 million in 1989 and \$2,254 million in 1988. In 1989, production of benzene was 5,414 million kilograms; production of toluene was 2,635 million kilograms; and production of mixed xylenes was 2,948 million kilograms (table 2-1).

Production of all aliphatic hydrocarbons and derivatives from petroleum and natural gas was 38,113 million kilograms in 1989. Sales of these products were valued at \$8,734 million. Production of ethylene was 15,871 million kilograms in 1989. The output of 1,3-butadiene was 1,416 million kilograms and propylene production was 9,331 million kilograms during 1989 (table 2-1).

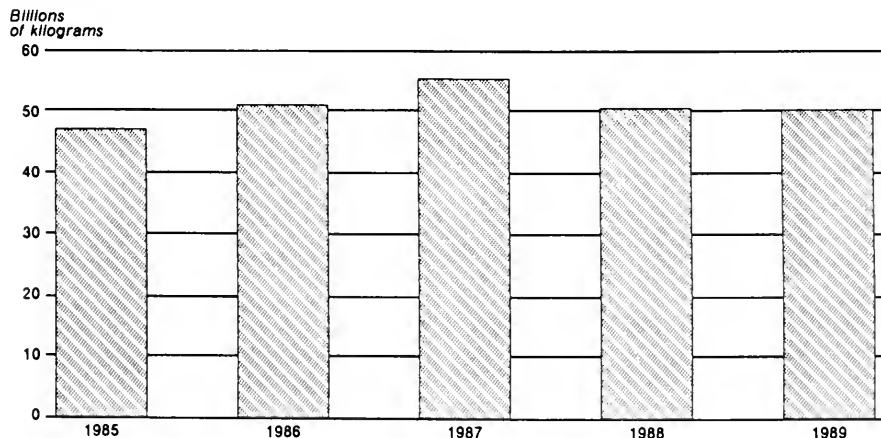
Table 2-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. The codes are identified by company name in table 2-3.

Data for 1989 primary products from petroleum and natural gas for chemical conversion were supplied by 61 companies or company divisions.

James Raftery  
202-252-1365  
(Effective 1/14/91 202-205-3365)

<sup>1</sup> Statistics on chemicals from coal tar are given in Section 1 (Coal tar, tar crudes, and pitches) of this report.

Figure 2-1  
Primary products from petroleum and natural gas for chemical conversion U.S. production, 1985-89



Note.—Data for 1988 and 1989 does not include ethane, propane, and butane production.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 2

Table 2-1

Primary products from petroleum and natural gas for chemical conversion:  
U.S. production and sales, 1989

Primary products from petroleum and natural gas for chemical conversion	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
Grand total .....	50,741,619	27,834,154	11,369,191	\$0.41
<b>Aromatics and naphthenes<sup>2</sup></b>				
Total .....	12,628,256	7,658,278	2,635,111	.34
Benzene, all grades .....	5,414,072	3,504,956	1,360,245	.39
Toluene, all grades <sup>3,4</sup> .....	2,634,809	1,764,067	548,599	.31
Xylenes, mixed .....	2,947,574	1,421,631	506,042	.36
All other aromatics and naphthenes <sup>5</sup> .....	1,631,801	967,624	220,225	.23
<b>Aliphatic hydrocarbons</b>				
Total .....	38,113,363	20,175,876	8,734,080	.43
<b>C<sub>2</sub> Hydrocarbons, total<sup>6</sup></b> .....	15,926,316	(?)	(?)	(?)
Acetylene <sup>6</sup> (For chemical use only) .....	55,814	(?)	(?)	(?)
Ethylene .....	15,870,502	7,622,374	3,991,876	.52
<b>C<sub>3</sub> Hydrocarbons, total<sup>6</sup></b> .....	9,331,186	5,269,185	2,109,565	.40
Propylene <sup>10</sup> .....	9,331,186	5,269,185	2,109,565	.40
<b>C<sub>4</sub> Hydrocarbons, total<sup>11</sup></b> .....	5,316,981	3,162,813	1,046,936	.33
Butadiene and butylene fractions				
1,3-Butadiene, grade for rubber (elastomers) .....	853,516	594,631	132,168	.22
1-Butene .....	1,415,751	1,370,278	592,991	.43
Isobutane .....	255,479	134,614	71,761	.53
Isobutylene .....	383,307	319,572	55,766	.17
Isobutylene .....	541,173	121,938	64,046	.53
All other C <sub>4</sub> hydrocarbons <sup>12</sup> .....	1,867,755	621,780	130,204	.21
<b>C<sub>5</sub> Hydrocarbons, total</b> .....	1,483,464	870,792	230,307	.26
Isoprene (2-Methyl-1,3-butadiene) .....	158,027	97,439	40,090	.41
n-Pentane .....	430,008	(?)	(?)	(?)
Piperylene (1,3-Pentadiene) .....	50,928	55,301	18,382	.33
All other C <sub>5</sub> hydrocarbons <sup>13,14</sup> .....	844,501	718,052	171,835	.24
<b>All other aliphatic hydrocarbons, derivatives, and mixtures, total</b> .....	6,055,416	3,250,712	1,355,396	.42
Alpha olefins, C <sub>6</sub> -C <sub>10</sub> .....	345,073	(?)	(?)	(?)
Alpha olefins, C <sub>11</sub> and higher .....	346,764	184,406	183,334	.99
Dodecene (Tetrapropylene) .....	156,641	144,154	66,417	.46
n-Heptane .....	62,419	64,039	28,346	.44
Nonene (Tripropylene) .....	291,600	161,384	76,928	.48
n-Paraffins <sup>15</sup> .....	927,142	588,039	219,974	.37
All other <sup>16</sup> .....	3,925,777	2,108,690	780,397	.37

See footnotes at end of table.



Table 2-1—Continued

Primary products from petroleum and natural gas for chemical conversion:  
U.S. production and sales, 1989

- 
- <sup>1</sup> Calculated from rounded figures.
- <sup>2</sup> The chemical raw materials designated as aromatics are in some cases identical with those obtained from the distillation of coal tar; however, the statistics given in the table above relate only to such materials as are derived from petroleum and natural gas. Statistics on production and/or sales of benzene, toluene, and xylene from all sources are given in table 1-1 of the report on "Coal tar, tar crudes and pitches."
- <sup>3</sup> Includes toluene, solvent grade, 90 percent.
- <sup>4</sup> Includes toluene and xylene used as solvents; may include that which is blended in aviation and motor gasolines.
- <sup>5</sup> Includes data for alkyl aromatics, crude cresylic acid, cyclopentane, naphthalene, naphthenic acid, carbon black feedstock, distillates, solvents and miscellaneous cyclic hydrocarbons.
- <sup>6</sup> Ethane production and sales data are no longer collected.
- <sup>7</sup> Reported data are accepted in confidence and may not be published, or no data were reported.
- <sup>8</sup> Production figures on acetylene from calcium carbide for chemical synthesis are collected by the U.S. Bureau of the Census.
- <sup>9</sup> Propane production and sales data are no longer collected.
- <sup>10</sup> Includes data for refinery propylene.
- <sup>11</sup> Butane production and sales data are no longer collected.
- <sup>12</sup> Includes production and/or sales data for 2-butene, mixtures of 1-butene and 2-butene, and mixed C<sub>4</sub> streams.
- <sup>13</sup> Includes data for mixtures of C<sub>6</sub> hydrocarbons, isopentane, 2-pentene, and mixed pentenes.
- <sup>14</sup> Includes sales data only for n-pentane.
- <sup>15</sup> Includes data for the following chain lengths: C<sub>8</sub>-C<sub>9</sub>, C<sub>9</sub>-C<sub>10</sub>, C<sub>10</sub>-C<sub>11</sub>, C<sub>11</sub>-C<sub>12</sub>, C<sub>12</sub>-C<sub>13</sub> and others.
- <sup>16</sup> Includes production and/or sales data for acetylene, alpha olefins (C<sub>2</sub>-C<sub>10</sub>), methane, hexane, isoheptanes, isohexane, iso-octane, neohexane, methylcyclopentadiene, mixed hexenes, mixed heptenes, mixed octenes, n-octane, di-isobutylene, eicosane, mixtures of C<sub>2</sub> and C<sub>3</sub>, C<sub>6</sub>-C<sub>8</sub>, C<sub>6</sub>-C<sub>7</sub>, C<sub>6</sub>-C<sub>7</sub> hydrocarbons, hydrocarbon derivatives, and other hydrocarbons.
- Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 2-2

Primary products from petroleum and natural gas for chemical conversion for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Primary products from petroleum and natural gas for chemical conversion	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 2-3)
<b>Aromatics and naphthenes:</b>		
Alkyl aromatics:		
Cyclosols .....	No	CXI.
All other alkyl aromatics: .....	No	SHC.
Benzene:		
Benzene High purity (98-100%) .....	No	AMO, ASH, CNE, CSD, DOW, ENJ, GRS, HES, KHI, LYP, MOC, PLC, PPR, SHC, SIO, SM, SOC, SOG, SUN, SWR, TX, UOC, USI.
All other benzenes .....	No	AMO, ATR, HCL, KLM, UTP, VST.
Cresylic acid (Less than 75 percent distilling over 215° C) .....	No	KHI, PSG.
Cyclopentane .....	No	PLC.
Naphthalene .....	No	CXI, TX.
Naphthenic acid:		
Naphthenic acid, acid number 150-199 .....	No	CPS, HEC, MER.
Naphthenic acid, acid number 200-224 .....	No	MER, PSG.
Naphthenic acid, acid number less than 150 .....	No	HEC, SHC.
Toluene:		
Toluene High purity (98-100%) .....	No	ASH, CNE, CSD, ENJ, GRS, HES, KHI, LYP, MOC, PLC, PPR, PXP, SC, SHC, SIO, SM, SOG, SUN, SWR, TX, UOC, LYP, SOC.
All other toluenes .....	No	
Xylenes, mixed:		
Xylene High purity (98-100%) .....	No	AMO, ASH, CSD, CSP, ENJ, HES, LYP, PLC, PPR, SHC, SOG, SUN, SWR, UOC.
All other xylenes .....	No	AMO, MOC.
All other aromatics and naphthenes:		
Aromatics, C <sub>9</sub> .....	No	ENJ, MOC.
Benzene, toluene, xylene, mixtures .....	No	ELP.
Carbon black feedstock .....	No	ENJ.
All other products from petroleum and natural gas, cyclic .....	No	AMO, ATR, BAS, BFG, EKX, ELP, ENJ, LYP, OMC, SHC, TX, UCC, UPM, VST.
<b>Aliphatic hydrocarbons:</b>		
C <sub>1</sub> Hydrocarbons:		
Methane .....	No	SHO.
C <sub>2</sub> Hydrocarbons:		
Acetylene (For chemical use only) .....	Yes	KHI, RH, UCC.
Ethylene .....	Yes	AMO, BAS, BFG, CNE, DOW, DUP, EKX, ELP, ENJ, GE, LYP, OMC, PLC, SHC, SM, SOC, SUN, TX, UCC, USI, UTP, VST.
C <sub>3</sub> Hydrocarbons:		
Hydrocarbons, C <sub>2</sub> -C <sub>3</sub> mixtures .....	No	CGO, SIO.
Propylene .....	Yes	AMO, ASH, BAS, BFG, CCP, CGO, CNE, CSD, DA, DOW, DUP, EKX, ELP, ENJ, GE, KHI, LYP, MOC, PLC, PPS, SHC, SM, SOC, SOG, SUN, TX, UCC, USI, UTP, VLR, VST.
C <sub>4</sub> Hydrocarbons:		
Butadiene and butylene fractions .....	Yes	BAS, CNE, DA, DOW, EKX, ELP, GE, PLC, SOC, TX, UCC, USI, UTP, VST.
1,3-Butadiene, grade for rubber (Elastomers) .....	Yes	AMO, CNE, ENJ, LYP, SHC, SM, TPC, TX.
1-Butene .....	Yes	ENJ, SHC, SM, SOC, TNA, TPC.
2-Butene .....	No	TPC.
1-Butene and 2-butene, mixed .....	No	ATR, DOW, LYP, SHC, TNA.
Hydrocarbons, C <sub>4</sub> fraction .....	No	KHI, TX.
Hydrocarbons, C <sub>4</sub> mixtures .....	No	LYP, PPR, SOG.
Isobutane (2-Methylpropane) .....	Yes	AMO, ATR, CSP, DA, MOC, PLC, SHO, SUN, TX.
Isobutylene (2-Methylpropene) .....	Yes	AMO, ATR, ENJ, SHC, TPC, TX.
All other C <sub>4</sub> hydrocarbons .....	No	ENJ, SM, TX.

See footnotes at end of table.

Table 2-2—Continued

Primary products from petroleum and natural gas for chemical conversion for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Primary products from petroleum and natural gas for chemical conversion	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 2-3)
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## Aliphatic hydrocarbons—Continued

C<sub>8</sub> Hydrocarbons:

Hydrocarbons, C <sub>8</sub> mixtures	No	CNE, GYR, LYP.
Isoamylene	No	ENJ.
Isopentane (2-Methylbutane)	No	PLC, SHO.
Isoprene (2-Methyl-1,3-butadiene)	Yes	DOW, ENJ, GYR, LYP, SOC.
n-Pentane	Yes	CSP, KHI, PLC, SHO.
2-Pentene	No	BFG, DOW.
Pentenes, mixed	No	CSP, CXI, PLC, SHO, TX.
Piperylene (1,3-Pentadiene)	Yes	CXI, DOW, LYP.
All other C <sub>8</sub> hydrocarbons	No	ENJ, SHC, TX.

## All other aliphatic hydrocarbons, derivatives, and mixtures:

C<sub>6</sub> Hydrocarbons:

Hexane	No	ENJ, PLC, SOG, TX, UOC.
1-Hexene	No	PLC.
Hexenes, mixed	No	ENJ.
Hydrocarbons, C <sub>6</sub> -C <sub>8</sub> mixtures	No	PLC.
Isohexane	No	PLC.
Methylcyclopentadiene	No	ENJ.
Neohexane (2,2-Dimethylbutane)	No	PLC.
All other C <sub>6</sub> hydrocarbons	No	DA, PLC, SHC, SM, TX.

C<sub>7</sub> Hydrocarbons:

n-Heptane	Yes	ENJ, PLC, SOG, TX, UOC.
Heptenes, mixed	No	ENJ, TX.
Isoheptanes	No	PLC.
All other C <sub>7</sub> hydrocarbons	No	EKX, PPR, SHC.

C<sub>8</sub> Hydrocarbons:

Di-isobutylene (DI-isobutene)	No	EKT, TPC.
n-Octane	No	SOG.
Octenes, mixed	No	ENJ, TX.
2,2,4-Trimethylpentane (iso-octane)	No	LYP, PLC.

C<sub>9</sub> and above Hydrocarbons (except alpha olefins):

Dodecene	Yes	CSP, ENJ, SOC, SUN.
Nonene (Tripropylene)	Yes	ATR, CSP, ENJ, SOC, TX.

## Alpha olefins:

Alpha olefins, C <sub>8</sub> -C <sub>10</sub>	Yes	SHC, SOC, TNA.
Alpha olefins, C <sub>11</sub> and higher	Yes	SHC, SOC, TNA.

## N-Paraffins - carbon chain length:

n-Paraffins, C <sub>10</sub> -C <sub>14</sub>	No	SHC, UOC.
n-Paraffins, C <sub>10</sub> -C <sub>18</sub>	No	ENJ, VST.
n-Paraffins, C <sub>12</sub> -C <sub>18</sub>	No	VST.
n-Paraffins, C <sub>8</sub> -C <sub>9</sub>	No	SOG, UOC.
n-Paraffins, C <sub>8</sub> -C <sub>18</sub>	No	SOG, TX, UOC.
All other n-paraffins	No	ENJ, SOG, UOC.
Polybutene	No	AMO.

## Hydrocarbon derivatives:

n-Butyl mercaptan (1-Butanethiol)	No	PAS, PLC.
sec-Butyl mercaptan (2-Butanethiol)	No	HAP, PLC.
tert-Butyl mercaptan (2-Methyl-2-propanethiol)	No	HAP, PAS, PLC.
Decyl mercaptans	No	PAS.
Di-tert-butyl disulfide	No	PLC.
Diethyl sulfide (Ethyl sulfide)	No	HAP, PAS.
Dimethyl sulfide	No	GAY, PAS.
Ethyl mercaptan (Ethanethiol)	No	HAP, PAS, PLC.
Ethylthioethanol	No	HAP.
Isopropyl mercaptan (2-Propanethiol)	No	HAP, PAS, PLC.
Methyl ethyl sulfide	No	CED, HAP.
Methyl mercaptan (Methanethiol)	No	PAS.
Octyl mercaptans	No	PAS.
n-Propyl mercaptan (1-Propanethiol)	No	PAS, PLC.

See footnotes at end of table.

Table 2-2—Continued

Primary products from petroleum and natural gas for chemical conversion for which U.S. production and/or sales were reported, identified by manufacturer, 1989

<i>Primary products from petroleum and natural gas for chemical conversion</i>	<i>Separate statistics<sup>1</sup></i>	<i>Manufacturers' identification codes (according to list in table 2-3)</i>
<b>Allphatic hydrocarbons—Continued</b>		
<b>Hydrocarbon derivatives—Continued</b>		
Thlophane (Tetrahydrothlophene) .....	No	HAP.
All other hydrocarbon derivatives .....	No	PAS, PLC, SHC.
All other hydrocarbons C <sub>6</sub> and above, including mixtures .....	No	ENJ, PLC, SOC, TNA.

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 2-3

Primary products from petroleum and natural gas for chemical conversion: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
AMO . . . . .	Amoco Corp.	HKO . . . . .	Occidental Chemical Corp., Olefins Div.
ASH . . . . .	Ashland Oil, Inc., Ashland Petroleum Co.	KHI . . . . .	Koch Refining Co.
ATR . . . . .	Atlantic Richfield Co., Arco Chemical Co.	KLM . . . . .	Kalama Chemical, Inc.
BAS . . . . .	BASF Corp.	LYP . . . . .	Lyondell Petrochemical Co.
BFG . . . . .	B. F. Goodrich Co., B. F. Goodrich Chemical Group	MER . . . . .	Merichem Co.
CCP . . . . .	Crown Central Petroleum Corp.	MOC . . . . .	Marathon Petroleum Co., Texas Refining Div.
CED . . . . .	Cedar Chemical Co.	OMC . . . . .	Olin Corp.
CGO . . . . .	Citgo Petroleum Corp.	PAS . . . . .	Atochem North America, Inc.
CNE . . . . .	Oxy Petrochemicals, Inc.	PLC . . . . .	Phillips 66 Co.
CPS . . . . .	CPS Chemical Co., Inc.	PPR . . . . .	Phillips Puerto Rico Corp., Inc.
CSD . . . . .	Fina Oil & Chemical Co., Cosden Chemical Div.	PPS . . . . .	EPC Partners, LTD
CSP . . . . .	Coastal Refining & Marketing, Inc.	PPX . . . . .	Phillips Paraxylene, Inc.
CXI . . . . .	Chemical Exchange Industries, Inc.	PSG . . . . .	PMC, Inc., Specialties Group, Inc.
DA . . . . .	Diamond Shamrock Refining & Marketing	RH . . . . .	Rohm & Haas Co.
DOW . . . . .	Dow Chemical Co.	SC . . . . .	Sterling Chemicals, Inc.
DUP . . . . .	E. I. duPont de Nemours & Co., Inc. Eastman Kodak Co.:	SHC . . . . .	Shell Chemical Co.
EKT . . . . .	Tennessee Eastman Co. Div.	SHO . . . . .	Shell Oil Co.
EKX . . . . .	Texas Eastman Co. Div.	SIO . . . . .	BP Oil Company
ELP . . . . .	Rexene Products Company	SM . . . . .	Mobil Oil Corp.:
ENJ . . . . .	Exxon Chemical Americas		Gas Liquids Dept.
EPC . . . . .	EPC Partners, Ltd.		Petrochemicals Div.
GAY . . . . .	Gaylord Chemical Corp.	SOC . . . . .	Chevron Corp., Chevron Chemical Co.
GE . . . . .	General Electric, Specialty Chemical Group	SOG . . . . .	Hill Petroleum Co.
GRS . . . . .	Champlin Refining Co.	SUN . . . . .	Sun Company, Inc.
GYR . . . . .	Goodyear Tire & Rubber Co.	SWR . . . . .	Southwestern Refining Co., Inc.
HAP . . . . .	Helmerich & Payne Inc., Natural Gas Odorizing, Inc.	TNA . . . . .	Ethyl Corp.
HCL . . . . .	Hoechst Celanese Corp., Bayport Works, SP & W Div.	TPC . . . . .	Texas Petrochemicals Corp.
HEC . . . . .	Hewchem	TX . . . . .	Texaco Chemical Co.
HES . . . . .	Amerada Hess Corp. (Hess Oil Virgin Islands Corp)	UCC . . . . .	Union Carbide Corp., Industrial Chemical Div.
		UOC . . . . .	Union Oil Co. of California
		UPM . . . . .	UOP, Inc.
		USI . . . . .	Quatum Chemical Corp., USI Div.
		UTP . . . . .	Union Texas Product Corp.
		VLR . . . . .	Valero Refining Co. & Marketing Co.
		VST . . . . .	Vista Chemical Co.

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A. Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.



## Section 3 Cyclic Intermediates

Cyclic intermediates are synthetic organic chemicals derived principally from petroleum and natural gas and from coal-tar crudes produced by destructive distillation (pyrolysis) of coal. Most cyclic intermediates are used in the manufacture of more advanced synthetic organic chemicals and finished products, such as dyes, medicinal chemicals, elastomers (synthetic rubber), pesticides, and plastics and resin materials. Some intermediates, however, are sold as end products without further processing. For example, ethylbenzene is used as a raw material in the manufacture of styrene. In 1989, about 50 percent of the total output of cyclic intermediates was sold; the rest was consumed chiefly in the producing plants in the manufacture of more advanced intermediates and finished products.

The total annual production of cyclic intermediates during 1985-89 is shown in figure 3-1. Total production of cyclic intermediates in 1989 amounted to 24,756 million kilograms, a decrease of 7 percent compared with production reported to the Commission in 1988. Reported

sales of cyclic intermediate chemicals in 1989 were 12,371 million kilograms, valued at \$10,284 million, compared with 12,016 million kilograms, valued at \$9,369 million, in 1988.

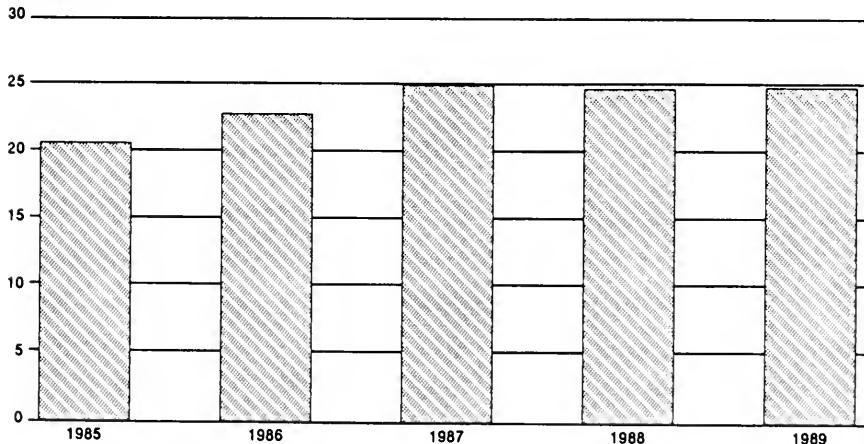
Intermediates that were produced in excess of 500 million kilograms in 1989 were ethylbenzene (4,189 million kilograms), terephthalic acid and terephthalic acid dimethyl ester (3,822 million kilograms), styrene (3,782 million kilograms), p-xylene (2,424 million kilograms), cumene (2,008 million kilograms), phenol (1,726 million kilograms), cyclohexane (1,031 million kilograms), and bisphenol A (563 million kilograms). These intermediate chemicals produced in excess of 1 billion kilograms accounted for about 79 percent of the total output of cyclic intermediate chemicals produced in 1989.

Table 3-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 3-3.

*Ed Matusik*  
202-252-1356  
(Effective 1/14/91 202-205-3356)

**Figure 3-1**  
Cyclic Intermediates: U.S. production, 1985-89

Billions  
of kilograms



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 3-1

Cyclic Intermediates: U.S. production and sales, 1989

Cyclic intermediates	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
Grand total .....	24,755,837	12,370,861	10,283,993	\$0.83
o-Acetoacetanilide .....	718	677	5,833	8.62
4-Amino-5-methoxy-2-methylbenzenesulfonic acid (5-methyl-1-o-anisidine sulfonic acid) .....	1,068	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Aniline (Aniline oil) .....	460,998	316,383	215,867	.68
Anilinoethanesulfonic acid and salt .....	92	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Benzic acid, tech .....	47,332	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Biphenyl .....	19,775	10,196	6,697	.66
Chlorobenzene, mono- .....	133,741	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Cresols and cresylic acid <sup>3</sup> .....	34,412	29,904	49,332	1.65
Cumene .....	2,007,702	1,271,899	601,429	.47
Cyclohexane .....	1,031,211	1,048,405	489,448	.47
Cyclohexanone .....	483,277	56,673	64,323	1.13
Dicyclopentadiene (Including cyclopentadiene) .....	54,867	62,146	21,720	.35
Ethylbenzene .....	4,189,377	145,353	80,533	.55
Isocyanic acid derivatives, total .....	774,332	571,117	962,373	1.69
Diphenylmethane-4,4'-diisocyanate (MDI) .....	158,428	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Polymethylene polyphenylisocyanate .....	277,523	205,806	393,154	1.91
Toluene-2,4- and 2,6-diisocyanate (80/20 mixture) .....	332,443	281,615	459,347	1.63
All other isocyanic acid derivatives .....	5,938	83,696	109,872	1.31
4,4'-Isopropylidenediphenol (Bisphenol A) .....	563,074	180,965	221,658	1.22
Nonylphenol .....	74,702	38,841	46,218	1.19
Octylphenol .....	14,248	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Phenol, total .....	1,726,417	654,045	619,665	.95
From cumene .....	1,406,030	528,584	494,091	.93
All other phenol .....	320,387	125,461	125,574	1.00
Phthalic anhydride .....	416,125	195,880	130,786	.67
Salicylic acid, tech .....	11,691	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Styrene .....	3,781,561	1,965,840	1,411,501	.72
Terephthalic acid, dimethyl ester <sup>4</sup> .....	3,821,973	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Tetrahydrofuran .....	78,275	33,751	64,064	1.90
o-Xylene .....	445,915	238,607	102,563	.43
p-Xylene .....	2,424,231	1,401,609	870,823	.62
All other cyclic intermediates .....	2,158,723	4,148,570	4,319,160	1.04

<sup>1</sup> Calculated from unrounded figures.<sup>2</sup> Reported data were accepted in confidence and may not be published, or no data were reported.<sup>3</sup> Does not include data for coke oven and gas-retort ovens.<sup>4</sup> The figure for terephthalic acid, dimethyl ester (DMT) includes both the acid itself and the dimethyl ester without double counting. The acid production figure was multiplied by the factor 1.16 to convert it to equivalent DMT.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.



Table 3-2

Cyclic Intermediates for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Cyclic Intermediates	Separate statistics <sup>1</sup>	Manufacturers' Identification codes (according to list in table 3-3)
<b>Cyclic</b>		
Acetoacetanilide	No	BRD, EKT.
o-Acetoacetanilide	Yes	BRD, EKT, LC.
o-Acetoacetotoluidide	No	BRD, EKT.
2',4'-Acetoacetoxylidide	No	EKT.
Acetoacet-m-xylidide	No	BRD.
Acetoguanamine	No	DIX.
Acetophenone, tech	No	S, TLI.
p-Acetotoluidide	No	EK.
2-Acetylpyridine	No	RIL.
Aldadlene	No	SRL.
<b>Alkylbenzenes:</b>		
Alkylbenzene straight-chain (except dodecyl and tridecyl)	No	MON, PLC.
<b>Dodecylbenzene (including tridecylbenzene):</b>		
Dodecylbenzene, straight-chain	No	MON, VST.
All other dodecylbenzene (including tridecylbenzene)	No	MON.
Alkylphenols, mixed	No	PSG, SCN.
Alkylpyridines, mixed	No	RIL, (?).
Aluminum chlorohydroxyphthalocyanine blue	No	PHC.
4'-Aminoacetanilide (Acetyl-p-phenylenediamine)	No	HCL.
3'-Amino-p-acetanilide	No	BUC, SDC.
1-Aminoanthraquinone and salt	No	SDC.
p-Aminobenzamide	No	NSC.
o-Aminobenzenethiol	No	FMT.
p-Aminobenzoic acid, tech	No	NSC, WYK.
2-Amino-6-benzothiazolesulfonic acid	No	VPC.
2-Amino-1-bromo-3-chloroanthraquinone	No	PLC.
1-Amino-4-bromo-9,10-dihydro-9,10-dioxo-2-anthracenesulfonic acid and sodium salt	No	VPC.
7-Aminocephalosporanic acid	No	BRS, TRD.
2-Amino-5-chloro-p-toluenesulfonic acid [SO <sub>2</sub> H=1]	No	LMC.
8-Amino-5-chloro-m-toluenesulfonic acid [SO <sub>2</sub> H=1] (2B Acid)	No	DUP, PHC.
4-Amino-N,N-di(β-hydroxyethyl)aniline sulfate	No	WAY.
4-Amino-5-methoxy-2-methylbenzenesulfonic acid (5-methyl-o-anisidinesulfonic acid)	Yes	PSG, VPC, (?).
m-[(4-Amino-3-methoxyphenyl)azo]benzenesulfonic acid	No	VPC.
2-Amino-2-methylpropyl-8-bromothephylillnate	No	CHT.
2-Amino-5-methylpyridine	No	RIL.
2-Amino-6-methylpyridine	No	RIL.
3-Amino-2,7-naphthalenedisulfonic acid	No	NES.
2-Amino-5-nitrothiazole	No	PCW, SAL.
2-Amino-4-nitrotoluene hydrochloride	No	PCW.
5-Amino-2-[(2-oxo-5-benzimidazolyl)amino]-benzenesulfonic acid	No	BRS, PFZ.
6-Aminopenicillanic acid	No	BEE.
p-Aminophenol	No	MAL.
p-[(p-Aminophenyl)azo]benzenesulfonic acid	No	ATL, VPC.
7-[(4-Aminophenyl)azo]-1,3-naphthalenedisulfonic acid	No	ACY.
3-Aminophenylphosphonic acid	No	ICI.
2-Aminopyridine	No	RIL.
4-Aminopyridine	No	RIL.
5-Aminoalicyclic acid	No	SAL.
2-Aminothiazole nitrate	No	PCW.
4-Amino-m-toluenesulfonic acid [SO <sub>2</sub> H=1]	No	DUP.
6-Amino-m-toluenesulfonic acid [SO <sub>2</sub> H=1]	No	DUP, PHC.
Aniline (Aniline oil)	Yes	ART, DUP, FST, ICI, MAL, MOB, RUC, USR.
2-Anilinoethanol	No	SCP.
Anilinoethanesulfonic acid and salt	Yes	ACY, ATL, VPC.
o-Anisidinomethanesulfonic acid	No	VPC.
Anisole, tech	No	CHF.

See footnotes at end of table.

Table 3-2—Continued

Cyclic Intermediates for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Cyclic intermediates	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 3-3)
<b>Cyclic—Continued</b>		
Anisoyl chloride	No	SD.
Anthranilic acid (o-Aminobenzoic acid)	No	PSG.
N,N'-(1,5-Anthraquinonylene)dianthranilic acid	No	SDC.
Benzaldehyde, tech	No	KLM.
Benzanilide	No	EK.
Benzene phosphorus chloride	No	ICI.
Benzenesulfonic acid	No	UPF.
Benzenesulfonic acid, 2-formyl-, sodium salt	No	(?).
Benzenesulfonyl chloride	No	ICI, UPF.
1,2,4,5-Benzenetetracarboxylic acid	No	AMO.
1,2,4-Benzenetricarboxylic acid, 1,2-dianhydride (Trimellitic anhydride)	No	AMO.
Benzhydrol (Diphenylmethanol)	No	PD.
Benzimidazole	No	EK.
Benzoic acid, 2-[4-(dimethylamino)-benzoyl]-	No	(?).
Benzoic acid, methyl ester	No	HCF.
Benzoic acid, tech	Yes	KLM, PFZ, VEL.
Benzonitrile	No	PSG.
Benzophenone	No	CWN.
2-Benzothiazolethiol, sodium salt	No	BFG, USR.
1H-Benzotriazole	No	PSG.
2-Benzoxazolethiol	No	EK.
Benzoyl chloride	No	HK, VEL.
Benzylamine	No	HXL, KLM.
2-(Benzylamino)ethanol	No	HXL.
2-Benzyl-2'-hydroxy-5,9-dimethyl-6,7-benzomorphanhydrobromide	No	SD.
1-Benzyl-4-phenylisonipecotonitrile	No	SDW.
Benzyltrimethylammonium hydroxide	No	RSA.
4,4'-Biphenol	No	SCN.
Biphenyl	Yes	CKI, KHI, MON, SOC.
2,6-Bis(p-azidobenzylidene)-4-methylcyclohexanone	No	(?).
N,N-Bis(2-hydroxyethyl)-p-toluidine	No	RSA.
N,N-Bis[(4-methylphenyl)sulfonyl]amine, potassium salt	No	EK.
1,2-Bis(tribromophenoxy)ethane	No	GTL.
3-Bromoacetophenone	No	(?).
Bromobenzene, mono	No	DAZ, GTL.
p-Bromobenzenesulfonyl chloride	No	EK.
o-Bromobenzoic acid	No	PD.
2-Bromodibenzofuran	No	ARS.
2-Bromo-4,6-dinitroaniline	No	HCL.
1-Bromo-4-ethoxy-2-methylbenzene	No	(?).
Bromoethylbenzene	No	GTL.
p-Bromofluorobenzene	No	(?).
2-Bromopyridine	No	DAZ.
Butyl p-aminobenzoate	No	WYK.
p-Butylaniline	No	TNA.
p-tert-Butylbenzaldehyde	No	GIV.
n-Butylbenzene	No	PLC.
2-tert-Butyl-p-cresol	No	PSG.
6-tert-Butyl-o-cresol	No	PSG.
2-[(1-Butyl-2-methylindol-3-yl)carbonyl]benzoic acid	No	(?).
o-sec-Butylphenol	No	SCN, TNA.
o-tert-Butylphenol	No	TNA.
p-sec-Butylphenol	No	SCN.
p-tert-Butylphenol	No	PSG, SCN.
Butylphenols, mixed	No	PSG, TNA, (?.)
p-tert-Butyltoluene	No	GIV.
6-tert-Butyl-2,4-xyleneol	No	GAF, PSG.
4,4'-Carbonylbis[phthalic anhydride]	No	ACH.
N-Carboxy-N-methylanthranilic anhydride	No	(?).

See footnotes at end of table.

Table 3-2—Continued

Cyclic Intermediates for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Cyclic Intermediates	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 3-3)
<b>Cyclic—Continued</b>		
2-Chloroacetophenone	No	EK.
1-(3-Chloro-allyl)-D-3,5,7-triaza-1-azoniaadamante chloride	No	DOW.
2-Chloro-4-aminotoluene	No	LMC.
o-Chloroaniline	No	CWN, DUP, LMC.
p-Chloroaniline	No	DUP.
p-Chlorobenzaldehyde	No	PD.
Chlorobenzene, mono	Yes	MON, PPG, SCC.
p-Chlorobenzenesulfonic acid	No	UPF.
2-Chloro-1,4-dibutoxybenzene	No	ALL.
1-Chloro-2,5-dibutoxy-4-nitrobenzene	No	ALL.
2-Chloro-1,4-diethoxybenzene	No	ALL.
1-Chloro-2,5-diethoxy-4-nitrobenzene	No	ALL.
4'-Chloro-2',5'-dimethoxyacetacetanilide	No	HCL.
2-Chloro-1,4-dimethoxybenzene	No	CHF.
1-Chloro-2,4-dinitrobenzene (Dinitrochlorobenzene)	No	SDC.
4-Chloro-3,5-dinitrobenzenesulfonic acid	No	LMC.
3-Chlorodiphenylamine	No	SK.
p-[(2-Chloroethyl)methylamino]benzaldehyde	No	VPC.
1-Chloro-2-nitrobenzene (Chloro-o-nitrobenzene)	No	DUP, MON.
1-Chloro-4-nitrobenzene (Chloro-p-nitrobenzene)	No	DUP, MON.
2-Chloro-4-nitrobenzoic acid	No	SAL.
2-Chloro-4-nitrobenzoic acid, potassium salt	No	SAL.
4-Chloro-3-nitrobenzotrifluoride	No	DAZ.
2-Chloro-4-nitrotoluene	No	DUP, PCW.
2-Chlorophenothiazine	No	SK.
N-(4-Chlorophenyl)-N'-(3,4-dichlorophenyl)urea	No	VPC.
4-Chloro-o-phenylenediamine	No	FMT.
4-Chlorophthalic acid	No	PSG.
3-Chloropropyl-2,5-xylyl ether	No	PD.
2-Chloropyridine	No	OMC.
4-Chlororesorcinol	No	PCW.
2-(4-Chlorosulfonylphenyl)ethyltrichlorosilane	No	NOD.
o-Chlorotoluene	No	S.
$\alpha$ -Chlorotoluene (Benzyl chloride)	No	MON.
3-Chloro-p-toluidine [NH <sub>2</sub> =1]	No	DUP.
3-(2-Chloro-4-trifluoromethylphenoxy)toluene	No	(?).
4-Chloro-3,5-xyleneol	No	FER.
Cis-1-(3-Chloro-allyl)-3,5,7-triaza-1-azoniaadamante chloride	No	DOW.
Copper, [2,2',2'',2'''-[9H,31H-phthalocyanine]penty]pentakis(methylene)]pentakis[1H-isoleudole-1,3(2H)-dionato]]	No	(?).
<b>Cresols:</b>		
m-Cresol	No	MER.
o-cresol:		
o-Cresol, from petroleum	No	GE, MER, PSG.
p-Cresol	No	MER, PSG.
<b>Cresols, mixed:</b>		
(m,p)-cresol:		
(m,p)-Cresol, from petroleum	No	MER, PSG.
<b>Cresylic acid, refined:</b>		
Cresylic acid, refined; from petroleum	No	MER, PSG.
<b>Cumene (Isopropyl benzene)</b>	Yes	ASH, BTL, GGC, GRS, KHI, SHC, SOC, TX.
Cumene hydrogen peroxide	No	ART.
Cumenesulfonic acid	No	NES.
4-(Cyanoacetyl)morpholine	No	DUP.
N-Cyano-s-methyl-N-2(4-methyl-5-imidazolyl)-methylthioethylisothiourea	No	SK.
Cyclohexane	Yes	GRS, PLC, PPR, SOC, SUN, TX, UOC.
1,4-Cyclohexanedicarboxylic acid	No	EKT.

See footnotes at end of table.

Table 3-2—Continued

Cyclic intermediates for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Cyclic Intermediates	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 3-3)
<b>Cyclic—Continued</b>		
1,2-Cyclohexanedicarboxylic acid anhydride	No	BCC, HK.
Cyclohexanol	No	ACS, BAS, DUP, MON.
Cyclohexanone	Yes	ACS, BAS, CNP, DUP, MON.
Cyclohexanone oxime	No	CNP.
Cyclohexene	No	USR.
4-Cyclohexene-1,2-dicarboxylic anhydride	No	DKA.
Cyclohexene oxide	No	USR.
$\beta$ -(1-Cyclohexenyl)ethylamine	No	HXL.
Cyclohexylamine	No	AIP, HCL.
Cyclohexylmethyldimethoxysilane	No	NOD.
Cyclooctadene	No	DUP.
Cyclopropene carboxylic acid, 3-(2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethyl-(2-methyl[1,1'-biphenyl]-3-yl) methyl ester	No	NES.
2-Cyclopropylmethylamino-5-chlorobenzophenone	No	PD.
2-(N-Cyclopropylmethyl-N-phthalimidoacetyl)-amino-5-chlorobenzophenone	No	PD.
p-Cymene	No	HPC.
Decyldiphenyl oxide	No	TCC.
3-Diacetoxyethylaminobenzanilide	No	HCL.
DI-N- $\beta$ -acetoxyethyl-m-toluidine	No	SDC.
Dialkylbenzene	No	VST.
1,3-Diaminocyclohexane	No	DUP.
4,4'-Diaminodiphenyl sulfone	No	TLI.
2,6-Diaminopyridine	No	RIL.
2,5-Dianilino-terephthalic acid	No	VPC.
Dibenzylaminosuccinic acid	No	( <sup>2</sup> ).
m-Dibromobenzene	No	DAZ.
p-Dibromobenzene	No	DAZ.
(1,2-Dibromoethyl)benzene	No	DAZ.
2,6-Dibromo-4-nitroaniline	No	HCL.
p-Dibutoxybenzene (DBB)	No	ALL.
2,5-Dibutoxy-4-morpholinobenzene-diazonium sulfate salt (DBB sulfate)	No	ALL.
2,5-Dibutoxy-4-morpholinonitrobenzene	No	ALL.
Dibutyl-p-cresol	No	PSG.
2,4-Di-tert-butylphenol	No	PSG, SCN.
2,6-Di-tert-butylphenol	No	SCN.
2,6-Di-tert-butylphenol	No	TNA.
2,6-Di-tert-4-sec-butylphenol	No	SCN.
3,4-Dichloroaniline	No	DUP.
o-(and p)-Dichlorobenzene	No	SCC.
o-Dichlorobenzene	No	MON, PPG, SCC, SOI.
m-Dichlorobenzene	No	MON.
p-Dichlorobenzene	No	MON, PPG, SCC, SOI.
3,3'-Dichlorobenzidine base and salts	No	CWN, LMC.
3,4-Dichlorobenzotrifluoride	No	HK, ( <sup>2</sup> ).
Dichlorodiphenylsilane	No	DCC.
2,6-Dichloro-3-methylaniline	No	SDC.
Dichloromethylphenylsilane	No	DCC.
2,6-Dichloro-4-nitroaniline	No	CWN.
1,2-Dichloro-4-nitrobenzene	No	DUP.
2,4-Dichloro-4-(2-nitro-4-trifluoromethylphenyl)-cinnamic acid	No	SK.
2,6-Dichloropyridine	No	OMC.
p, $\alpha$ -Dichlorotoluene	No	HK.
2,4-Dicumylphenol	No	SCN.
Dicyclohexylamine	No	AIP.
Dicyclopentadiene (includes Cyclopentadiene)	Yes	CXI, DOW, ENJ, LYP, SHC, VEL.
$\alpha,\alpha$ -Diethoxyacetophenone	No	CWN.
p-Diethoxybenzene	No	ALL.

See footnotes at end of table.

Table 3-2—Continued

Cyclic intermediates for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Cyclic intermediates	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 3-3)
<b>Cyclic—Continued</b>		
2,5-Diethoxy-4-morpholinonitrobenzene	No	ALL.
p-(Diethylamino)benzaldehyde	No	MCK, VPC.
4-(Diethylamino)benzaldehyde, 1,1-diphenylhydrazone	No	EKT.
2-[4-(Diethylamino)-2-hydroxybenzyl]benzoic acid	No	( <sup>2</sup> ).
4-(Diethylamino)-2-methylbenzaldehyde	No	( <sup>2</sup> ).
m-(Diethylamino)phenol (N,N-Diethyl-3-aminophenol)	No	HIL.
3-(Diethylamino)propophenone	No	SCP.
N,N-Diethylaniline	No	BCC, DUP.
2,6-Diethylaniline	No	TNA.
Diethylbenzene	No	UPM.
N,N-Diethylcyclohexylamine	No	AIP.
3,5-Diethyl-1,2-dihydro-1-phenyl-2-propylpyridine	No	RIL.
3,5-Diethyltoluene	No	TNA.
N,N-Diethyl-m-toluidine	No	DUP.
N,N-Diethyl-p-toluidine	No	RSA.
6,11-Dihydrodibenz(b,e)oxepin-11-one	No	PFZ.
2,3-Dihydro-2,2-dimethyl-7-benzofuranol	No	FMN.
2-(2,3-Dihydro-1,3-dioxo-1H-inden-2yl)-(quinollinyl)-6-methylbenzothiazole-7-sulfonic acid	No	VPC.
Dihydrophenylglycine sodium methyl dane salt	No	KAN.
2,4-Dihydroxybenzaldehyde	No	EK.
3,4-Dihydroxybenzoic acid, methyl ester	No	PCW.
2,4-Dihydroxybenzophenone	No	ACY.
N,N-Di(β-hydroxyethyl)-m-chloroaniline	No	MIL.
6,7-Dihydroxy-2-naphthalenesulfonic acid	No	CCC.
Diisobutyl-o-cresol	No	PSG.
m-Diisopropenylbenzene	No	EKT.
Diisopropylaniline	No	TNA.
Diisopropylbenzene	No	EKT, GGC.
2,6-Diisopropyl-4-phenoxyaniline	No	TNA.
2,5-Dimethoxybenzaldehyde	No	CWN.
m-Dimethoxybenzene	No	ACY.
p-Dimethoxybenzene	No	CHF.
p-(Dimethylamino)benzaldehyde	No	( <sup>2</sup> ).
m-(Dimethylamino)benzoic acid	No	HIL.
2-[4-(Dimethylamino)benzoyl]benzoic acid	No	EK.
m-Dimethylaminophenol	No	ACY, BCC.
11-[3(Dimethylamino)propyl]-6H-hydroxydibenz(b,e)-oxepin	No	PFZ.
N,N-Dimethylaniline	No	DUP.
2,6-Dimethylaniline	No	TNA.
N,N-Dimethylbenzylamine	No	HXL.
Dimethyl-1,4-cyclohexanedicarboxylate	No	EKT.
N,N-Dimethylcyclohexylamine	No	AIP, BAS.
4,4'-Dimethyldiphenyl ether	No	TNA.
5,5-Dimethylhydantoin	No	BRD.
2,6-Dimethylnaphthalene	No	UPM.
Dimethyl-2,6-naphthalenedicarboxylate	No	AMC, UPF.
N,N'-Dimethyl-3,4,9,10-perylenetetracarboxylic acid 3,4:9,10-dilimide	No	VPC.
3,5-Dimethylpiperidine	No	RIL.
N,N-Dimethyl-o-toluidine	No	RSA.
N,N-Dimethyl-p-toluidine	No	FST, RSA.
m-Dinitrobenzene	No	DUP, FST.
2,4-Dinitrobenzenesulfonic acid, sodium salt	No	EK.
3,5-Dinitrobenzoic acid	No	SAL.
3,5-Dinitrochlorobenzenesulfonic acid, potassium salt	No	LMC.
2,4-Dinitrophenol, tech	No	SDC.
2,4-Dinitrophenoxyethanol	No	OMC.
3,5-Dinitrosalicylic acid, methyl ester	No	SAL.
p-Dinitrosobenzene	No	LC.
2,4-Dinitrotoluene	No	DUP.

See footnotes at end of table.

Table 3-2—Continued

Cyclic Intermediates for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Cyclic Intermediates	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 3-3)
<b>Cyclic—Continued</b>		
2,4 (and 2,6)-Dinitrotoluene	No	ICI, RUC, (?).
3,5-Dinitro-p-toluenesulfonic acid	No	(?).
Dinonylphenol	No	TX.
2,4-Dioxo-3-azaspiro[5.5]undecane-1,5-dicarbonitrile mono sodium salt	No	PD.
DI-para-benzoquinone dioxime	No	LC.
2,4-DI-tert-pentylphenol	No	PAS, PSG, SCN.
Diphenylamine	No	ART, RUC, USR.
Diphenyldimethoxysilane	No	NOD.
Diphenyldisulfide	No	PAH.
Diphenyl phosphorous chloride	No	ICI.
Diphenyl phthalate	No	EK, UPF.
DI-2-picolyamine	No	RIL.
1,3-DI-4-piperidylpropane	No	RIL.
2,5-DI-p-toluidinoterephthalic acid	No	VPC.
1,5-Dlureidonaphthalene	No	SOI.
Divinylbenzene	No	DOW, TCC.
Dodecylphenyl oxide	No	TCC.
Dodecylnitrobenzene	No	LMC.
p-Dodecylphenol	No	MON, SCN.
4-Ethanolpiperidine	No	RIL.
2-Ethanolpyridine	No	RIL.
5-Ethoxy-3-trichloromethyl-1,2,4-thiadiazole	No	OMC.
Ethlsterone	No	SRL, UPJ.
1-Ethoxy-3-methylbenzene	No	(?).
4-Ethoxy-2-methyl-N-phenylaniline	No	(?).
o-Ethylaniline	No	TNA.
N-Ethylaniline, refined	No	BCC, FST.
2-(N-Ethylanilino)ethanol	No	MIL, SCP.
3-(N-Ethylanilino)propionitrile	No	SCP.
α-(N-Ethylanilino)-m-toluenesulfonic acid	No	HIL.
Ethylbenzene	Yes	AMO, ATR, CSD, DOW, ELP, GE, HCL, KHI.
2-(N-Ethyl-N, -cyanoethyl)-4-acetaminoanilole	No	SCP.
N-Ethylmaleimide	No	REG.
6-Ethyl-2-methylaniline	No	TNA.
2-[Ethyl(3-methylphenyl)amino]ethanol	No	FST.
Ethyl 2(2-nitro-4-trifluoromethylphenyl)-3-oxobutanoate	No	SK.
N-Ethyl-N-phenylbenzylamine	No	HIL.
5-Ethyl-2,3-pyridinedicarboxylic acid	No	NES.
N-Ethyl-m-toluidine	No	DUP, FST.
3-(N-Ethyl-m-toluidino)propionitrile	No	SCP.
p-Fluoroaniline	No	DAZ.
o-Fluorobenzoyl chloride	No	OMC.
5-Fluoro-2-methyl-1-[4-(methylsulfinyl)phenyl]-methylene-1h-Indene	No	MRK.
p-Fluoronitrobenzene	No	(?).
1-Formylpiperidine	No	RIL.
Furan	No	KQO.
Furfuryl alcohol	No	KQO.
1-(2-Furoyl)piperazine	No	PFZ.
Hexachlorocyclopentadiene	No	VEL.
1,4,5,6,7,7-Hexachloro-5-norbornene-2,3-dicarboxylic anhydride (Chlorendic anhydride)	No	VEL.
Hexamethylenimine	No	CXI, DUP.
Hydroquinone, tech	No	EKT, GYR.
p-Hydroxybenzenesulfonic acid	No	UPF.
p-Hydroxybenzoic acid	No	LEM.
4-Hydroxybenzylbenzene	No	TNA.
2'-Hydroxy-5,9-dimethyl-6,7-benzomorphan	No	SD.
3-[N-(2-Hydroxyethyl)anilino]propionitrile	No	SCP.

See footnotes at end of table.

Table 3-2—Continued

Cyclic intermediates for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Cyclic Intermediates	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 3-3)
<b>Cyclic—Continued</b>		
N- $\beta$ -Hydroxyethyl-2,4-dihydroxybenzamide	No	PCW.
5-Hydroxylsophthalic acid	No	MRF.
2-Hydroxymethylene-17 $\alpha$ -ethinylandroster-17 $\beta$ -ol-4-en-3-one	No	SD.
3-Hydroxy-N-(3-N-morpholino- $\gamma$ -propyl)-2-naphthimide	No	PCW.
6-Hydroxy-2-naphthalenesulfonic acid	No	HIL.
1-Hydroxy-2-naphthol acid	No	PCW.
3-Hydroxy-2-naphthol acid (B.O.N.)	No	PCW.
3-Hydroxy-2-naphthol acid, ethanalamide	No	PCW.
1-Hydroxynaphthol acid, methyl ester	No	PCW.
3-Hydroxy-2-naphthol acid, methyl ester	No	PCW.
3-Hydroxy-2-naphthol acid, sodium salt	No	PCW.
2-Imidazolidinone modification	No	(?).
5-Indanol	No	(?).
Isatoic anhydride	No	PSG.
Isobutylbenzene	No	PLC, TNA.
Isobutylbiphenyl	No	TCC.
Isobutyrophenone	No	ARS.
Isocyanic acid derivatives:		
Bitoluene diisocyanate (TODI)	No	CWN.
Diphenylmethane-4,4'-diisocyanate (MDI)	Yes	BAS, DOW, ICI, MOB, RUC.
Polymethylene polyphenylisocyanate	No	BAS, ICI, RUC.
Toluene 2,4-and 2,6-diisocyanate (80/20 Mixture)	Yes	BAS, DOW, ICI, MOB, OMC, RUC.
p-Toluenesulfonyl isocyanate	No	CWN.
Isonicotinamide	No	RIL.
Isonicotinic acid	No	RIL.
Isonicotinonitrile	No	RIL.
Isophthalic acid (Benzene-1,3-dicarboxylic acid)	No	AMO.
Isophthalic acid, dimethyl ester	No	UTC.
Isophthalonitrile	No	DUP, PSG.
Isophthaloyl chloride	No	DUP, TLC.
Isopropylbiphenyl	No	TCC.
5,5'-Isopropylidenebis(2-hydroxy-m-xylene- $\alpha$ , $\alpha'$ -diol)	No	ARK.
4,4'-Isopropylidenediphenol (Bisphenol A)	Yes	ART, DOW, GE, SHC.
4,4'-Isopropylidenediphenol, ethoxylated	No	ICI, SCP.
4,4'-Isopropylidenediphenol, propoxylated	No	ICI, SCP.
o-Isopropylphenol	No	FMC.
Isopropylphenol, mixed	No	PSG.
Isothiocyanic acid, phenyl ester	No	EK.
2,6-Lutidine	No	RIL.
3,4-Lutidine	No	RIL.
Magnesium bis(4-nitrobenzylmalonate) dihydrate	No	(?).
Malonanilide	No	PCW.
Melamine	No	ACY, MLC.
dl-p-Mentha-1,8-diene (Limonene)	No	ARZ, NCI.
4-Methoxybenzyl alcohol	No	BUC.
2-Methoxyethylpiperidine	No	RIL.
N-(4-Methoxy-3-nitrophenyl)acetamide	No	SDC.
2-(N-Methylanilino)ethanol	No	SCP.
3-(N-Methylanilino)propionitrile	No	SCP.
2-Methylantraquinone	No	ACY.
Methyl-2-benzimidazole carbamate	No	CED.
2-Methylbenzothiazole	No	FMT.
o-Methylbenzoyl chloride	No	TLC.
4-Methylbenzoyl chloride	No	TLC.
Methylbenzyl alcohol	No	TNA.
N-Methylbenzylamine	No	HXL.
Methyl-bis-diisopropylaniline	No	TNA.
Methylcyclohexane	No	PLC.
Methyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboate	No	FMN.
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-o-cresol)	No	CPS.

See footnotes at end of table.

Table 3-2—Continued

Cyclic intermediates for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Cyclic intermediates	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 3-3)
<b>Cyclic—Continued</b>		
4-Methyl-2,6-dinitrophenol	No	PSG.
4,4-Methylenebis(2,6-di-tert-butylphenol)	No	TNA.
4,4'-Methylenebis[N,N-dimethylaniline]	No	ACY.
4,4'-Methylenebis[N,N-dimethylaniline] (Methane base)	No	ACY.
2,2'-Methylenebis(4-methyl-6-nonyl-p-cresol)	No	PSG.
4,4'-Methylenedianiline	No	RUC, USR.
5,5'-Methylenedisalicylic acid	No	KLM.
N-Methyl-2-ethanolpiperidine	No	RIL.
Methyl p-formylbenzoate	No	EKT.
(2,4-Methyl-5-imidazolyl)methylthioethylamine dihydrochloride-	No	SK.
2-Methylindole	No	(?).
4-Methyl-N-(4-methylphenyl)sulfonylbenzenesulfonamide	No	EK.
N-Methyl-p-nitroaniline	No	ACY, USR.
4-Methyl-2-nitroanisole	No	PSG.
2-Methyl-5-norbornene-2,3-dicarboxylic anhydride	No	BCC.
N-(3-Methylphenyl)acetamide	No	SDC.
4-(1-Methyl-1-phenyl)ethylphenol	No	SCN.
4-Methylphthalic acid	No	EK.
1-Methylpiperidine	No	RIL.
2-Methylpiperidine	No	RIL.
$\alpha$ -Methylstyrene	No	ART, GGC, TX.
ar-Methylstyrene (Vinyltoluene)	No	BTL.
Methylthiobenzoic acid	No	(?).
Myristylbenzyltrimethylammonium chloride • 2H <sub>2</sub> O	No	PCW.
1-Naphthaldehyde	No	GNW.
2,6-Naphthalenedicarboxylic acid	No	AMO.
2-Naphthalenesulfonic acid	No	ACY.
2-Naphthalenesulfonic acid, sodium salt	No	GNW.
Naphthallimide	No	VPC.
1-Naphthylamine ( $\alpha$ -Naphthylamine)	No	DUP.
p-(2-Naphthylamino)phenol (N-(p-Hydroxyphenyl)-2-naphthylamine)	No	SDC.
Nicotinonitrile (3-Cyanopyridine)	No	NEP, RIL.
3-Nitro-6-pyrrolodinytoluene	No	ALL.
o-Nitroaniline	No	BUC, MON.
p-Nitroaniline	No	DUP, MON.
5-Nitroanthranilic acid	No	SAL.
1-Nitroanthraquinone	No	SDC.
Nitrobenzamide	No	PD.
Nitrobenzene	No	FST, ICI, RUC.
m-Nitrobenzenesulfonic acid, sodium salt	No	USM.
o-Nitrobenzoic acid	No	SAL.
m-Nitrobenzoic acid	No	HIL, SAL.
p-Nitrobenzoic acid	No	DUP.
m-Nitrobenzoic acid, sodium salt	No	SAL.
2-Nitro-p-cresol	No	PSG.
5-Nitrodimethylsophthalate	No	SAL.
Nitrodiphenylamine	No	ACY, MON.
5-Nitrosophthalic acid	No	SAL.
3-Nitro-4-methylacetophenone	No	TLI.
p-Nitrophenethyl alcohol	No	PCW.
p-Nitrophenol	No	DUP, MON.
p-Nitrophenol, sodium salt	No	DUP.
3(and 5)-Nitrosalicylic acid	No	SAL.
p-Nitrosophenol	No	SDC.
4-Nitrosophenol, sodium salt	No	SDC.
o-Nitrotoluene	No	DUP, FST.
m-Nitrotoluene	No	DUP, FST.
p-Nitrotoluene	No	DUP, FST.
Nitrotoluene mixtures	No	FST.

See footnotes at end of table.



Table 3-2—Continued

Cyclic Intermediates for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Cyclic intermediates	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 3-3)
<b>Cyclic—Continued</b>		
(2-Nitro-4-trifluoromethylphenyl)acetic acid	No	SK.
Nonylphenol	Yes	GAF, GE, KLM, MON, RH, SCN, TX.
Octylphenol	Yes	PSG, RH, SCN.
Octylphenoxydiethoxy chloride	No	RH.
5-Oxo-1-phenyl-2-pyrazoline-3-carboxylic acid, ethyl ester	No	HCL.
4,4'-Oxydianiline	No	CHT, DUP.
Parahydroxyphenylglycine potassium methyl diane salt	No	KAN.
o-Pentylphenol (o-Amylphenol)	No	PAS, SCN, (?).
p-tert-Pentylphenol	No	PAS.
3,4,9,10-Perylenetetracarboxylic-3,4:9,10-dianhydride	No	VPC.
3,4,9,10-Perylenetetracarboxylic-3,4:9,10-dilimide	No	VPC.
1,10-Phenanthroline	No	VNC.
2-Phenethylamine	No	HXL.
p-Phenatidine	No	HCL, MNA.
Phenol:		
Natural:		
From petroleum:		
Phenol, natural, from petroleum, U.S.P.	No	MER.
All other, phenol, natural, from petroleum	No	PSG.
Synthetic:		
By caustic fusion:		
All other phenol, synthetic, by caustic fusion	No	ISP.
Phenol, benzylated	No	MIL.
Phenol, styrenated	No	MIL, PSG.
Phenol, synthetic, from cumene by oxidation, U.S.P.	Yes	ACS, ART, BTL, DOW, GE, GGC.
All other phenol, synthetic	No	KLM, SHC, TX.
Phenolsulfonaphthalein	No	EK.
Phenolsulfonaphthalein, sodium salt	No	EK.
Phenolsulfonic acid	No	PSG.
Phenolsulfonic acid, sodium salt	No	SAL.
Phenoxyacetic acid, sodium salt	No	NCC.
3-Phenoxybenzaldehyde	No	TNA.
3-Phenoxybenzaldehyde cyanohydrin	No	TNA.
3-Phenoxybenzenemethanol	No	TNA.
m-Phenoxytoluene	No	MER.
4'-Phenylacetophenone	No	ANG.
4-(Phenylazo)diphenylamine	No	EK.
4-(Phenylazo)-1-naphthylamine	No	OMC.
m-Phenylenbismaleimide	No	NES.
o-Phenylenediamine	No	DUP, PSG.
m-Phenylenediamine	No	DUP, FST.
p-Phenylenediamine	No	DUP.
Phenyl ether (Diphenyl oxide)	No	DOW, MON.
d(+)- $\alpha$ -Phenylethylamine	No	HXL.
N-Phenylglycine	No	EK.
Phenylglycine, potassium salt	No	KAN.
Phenylglycine, sodium salt	No	LIL.
Phenylglycol esters	No	BCC.
2,2'-[(Phenyl)imino]diethanol (N-Phenyldiethanolamine)	No	MIL, SCP.
2,2'-[(Phenyl)imino]diethanol, diacetate ester	No	SCP.
o-Phenylphenol	No	DOW.
p-Phenylphenol	No	DOW.
o-Phenylphenol, sodium salt	No	DOW.
N-Phenyl-p-phenylenediamine	No	USR.
Phenylphosphinic acid	No	FER.
Phenylphosphinic acid, potassium salt	No	FER.
Phenylphosphinic acid, sodium salt	No	FER.
1-Phenyl-1,2-propanedione, 2-oxime	No	ORT.
4-Phenylpropylpyridine	No	RIL.

See footnotes at end of table.

## Section 3

Table 3-2—Continued

Cyclic Intermediates for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Cyclic Intermediates	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 3-3)
<b>Cyclic—Continued</b>		
di-Phenylsuccinic acid	No	PD.
Phenyltrimethyl ammonium chloride	No	LLI.
Phthalic acid	No	EK.
Phthalic anhydride	Yes	ART, BAS, ENJ, KPT, SC, STP, USR.
Phthallimide	No	PSG.
[Phthalocyaninato(2-)]copper	No	PHC.
[Phthalocyaninato(2-)]iron	No	PHC.
[Phthalocyaninetetramethanaminato]copper	No	( <sup>2</sup> ).
Phthalocyaninetetrasulfonyl chloride, copper derivative	No	VPC.
Phthaloyl chloride (Phthalyl chloride)	No	TLC.
<b>Picolines:</b>		
2-Picoline ( $\alpha$ -Picoline)	No	RIL.
3-Picoline ( $\beta$ -Picoline)	No	NEP, RIL.
4-Picoline ( $\gamma$ -Picoline)	No	RIL.
Picolinonitrile (2-Cyanopyridine)	No	NEP.
3-Picolylamine	No	RIL.
Picric acid (Trinitrophenol)	No	SDC.
Piperidine	No	AIP, RIL.
Polyethylbenzene (80 percent diethylbenzene)	No	ELP.
Propiophenone	No	ORT.
8,16-Pyranthredione	No	PCW.
1,3,6,8-Pyranetetrasulfonic acid	No	( <sup>2</sup> ).
Pyridine hydrochloride	No	RSA.
<b>Pyridine, refined:</b>		
2 <sup>o</sup> Pyridine, refined	No	NEP.
All other pyridine, refined grades	No	RIL.
3-Pyridinemethanol	No	RIL.
2-Pyridinethiol-1-oxide, sodium salt	No	OMC.
2-Pyridinethiol-1-oxide, zinc salt	No	OMC.
3-Pyridinol	No	RIL.
Pyromellitic dianhydride	No	ACH.
2-Pyrrolidone (2-Pyrrolidone)	No	GAF.
Pyrvinium pamoate	No	( <sup>2</sup> ).
Quinaldine	No	ACY.
<b>Quinoline:</b>		
Quinoline-2,3-dicarboxylic acid	No	NES.
2-Quinolindol	No	EK.
Quinone dioxime	No	LC.
Resorcinol, dimethyl ether	No	BAS.
Resorcinol, tech.	No	CIC, ISP.
$\beta$ -Resorcylic acid	No	ISP.
Salicylaldehyde	No	RDA.
Salicylaldehyde oxime	No	EK.
Salicylanilide	No	PCW.
Salicylic acid, tech.	Yes	DOW, HIL, KLM, MON, RDA.
Sodium p-sulfophenylmethyl ether	No	SAL.
Sodium trichlorobenzenesulfate	No	UPF.
Spiro[3H-1,2-benzoxathiole-3,9'-[9H]-xanthene]-3',6'-diol-1,1-dioxide	No	( <sup>2</sup> ).
Styrene (Vinylbenzene)	Yes	AMO, ATR, CSD, DOW, ELP, GE, HCL, PLC, SC, SOC.
Sulfanilic acid (p-Aminobenzenesulfonic acid) and salt	No	HIL.
5-Sulfisophthalic acid, 1,3-dimethyl ester	No	PCW.
5-Sulfisophthalic acid, 1,3-dimethyl ester, sodium salt	No	DUP.
5-Sulfisophthalic acid, lithium salt	No	EKT.
5-Sulfisophthalic acid, sodium salt	No	EKT, PCW.
4-Sulfophthalic acid	No	CWN.
Terephthalic acid	No	AMO, DUP, HCF.
Terephthalic acid, dimethyl ester	Yes	DUP, EKT, HCF.
Terephthaloyl chloride	No	DUP, TLC.

See footnotes at end of table.

Table 3-2—Continued

Cyclic Intermediates for which U.S. production and/or sales were reported, Identified by manufacturer, 1989

Cyclic intermediates	Separate statistics <sup>1</sup>	Manufacturers' Identification codes (according to list in table 3-3)
<b>Cyclic—Continued</b>		
Terphenyl (Phenylbiphenyl) (m-, o-, and p-isomers)	No	MON.
1-Tert-butyl-2,5-dimethoxybenzene	No	EKT.
Tetrabromophthalic anhydride	No	TNA.
Tetrachlorophthalic anhydride	No	MON.
Tetrahydrofuran	Yes	BAS, DUP, GAF, QKO.
1,2,3,4-Tetrahydronaphthalene	No	RDA.
2,2',3,3'-Tetrahydro-3,3',3'-tetramethyl-1,1'-spiro[11H-Indene]-5,5',6,6'-tetrol	No	SCN.
1,2,4,5-Tetramethylbenzene (Durene)	No	KHI.
p-(1,1,3,3-Tetramethylbutyl)phenol	No	GAF.
3,3,4,4-Tetramethylphenol ether	No	TNA.
Thiodiphenol	No	CRZ.
Thiophenol	No	ICI.
Toluene-2,3-(and 3,4)-diamine (35/65 mixture)	No	OMC.
Toluene-2,4-diamine (4-m-Tolylenediamine)	No	RUC, (2).
Toluene-2,4-(and 2,6)-diamine (80/20 mixture)	No	OMC.
Toluene-3,4-diamine	No	(2).
p-Toluenesulfonamide	No	UTC.
p-Toluenesulfonic acid	No	TEN, UPF.
p-Toluenesulfonic acid, aniline salt	No	NES.
o-Toluenesulfonyl chloride	No	UPF.
m-Toluic acid	No	WTC.
p-Toluic acid, methyl ester	No	HCF.
o-Toluidine	No	DUP, FST.
m-Toluidine	No	DUP, FST.
p-Toluidine	No	DUP, FST.
m-Toluidinormethanesulfonic acid	No	ATL.
2,2'-(m-Tolylimino)diethanol	No	MIL, SCP.
Tolyltriazole	No	PSG.
N,N,N-Tribenzylamine	No	HXL.
ar-Tribromoethyl benzene	No	(2).
2,4,6-Tribromophenol	No	GTL.
3,4',5-Tribromosalicylanilide	No	PCW.
2,4,6-Tri-tert-butylphenol	No	SCN.
1,2,3(and 1,2,4)-Trichlorobenzene	No	PPG, SCC.
1,2,4-Trichlorobenzene	No	SCC.
3-Trichloromethyl-1,2,4-thiadiazole	No	OMC.
1,2,4-Trichloro-5-nitrobenzene	No	PCW.
Trichlorophenylsilane	No	DCC.
$\alpha, \alpha, \alpha$ -Trichlorotoluene (Benzotrchloride)	No	HK, VEL.
2,4,6-Trichloro-s-triazine (Cyanuric chloride)	No	DGC.
Tri(dimethylaminomethyl)phenol	No	PEL.
Trimellitic trichloride	No	TLC.
1,2,4-Trimethylbenzene (Pseudocumene)	No	KHI.
1,3,5-Trimethylbenzene (Mesitylene)	No	ABB.
1,3,3-Trimethyl- $\delta^2$ , $\alpha$ -indolineacetaldehyde	No	VPC.
2,3,6-Trimethylphenol	No	GE.
Triphenylmethane	No	EK.
Triphenylphosphine	No	(2).
$\alpha, \alpha', \alpha''$ -Tris(dimethylamino)mesitol	No	RH.
Tris(2-methyl-1-aziridinyl)phosphine oxide	No	ARS.
7,7'-Ureylenebis[4-hydroxy-2-naphthalenesulfonic acid] (J-Acid urea)	No	S.
Veratraldehyde (3,4-Dimethoxybenzaldehyde)	No	GIV.
2-Vinylpyridine	No	RIL.
4-Vinylpyridine	No	RIL.
o-Xylene (90-100% of o-xylene isomer)	Yes	ENJ, KHI, LYP, PLC, PPR, SM.
m-Xylene (90-100% of m-xylene isomer)	No	AMO, PLC.
p-Xylene (90-100% of p-xylene isomer)	Yes	AMO, ENJ, KHI, LYP, PLC, PPX, SOC, STX.
2,4-Xylenesulfonic acid	No	UPF.
Xylenesulfonic acid, mixed isomers	No	NES.

See footnotes at end of table.

Table 3-2—Continued

Cyclic Intermediates for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Cyclic intermediates	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 3-3)
<b>Cyclic—Continued</b>		
2,5-Xylenol .....	No	PSG.
2,6-Xylenol .....	No	GE.
3,5-Xylenol .....	No	PSG.
Xylenol crystals .....	No	HXL.
Xylenols:		
Xylenol, low boiling point .....	No	MER.
Xylenols, not classified as to boiling point .....	No	GE.
Xylidines:		
Xylidine, original mixture .....	No	DUP.
4-(2,4-Xylylazo)-2,5-xylidine .....	No	ACH.
All other cyclic intermediates .....	Yes	ACY, AMB, ATL, BRD, BRS, BUC, CHD, CRZ, DUP, 2EK, EKT, GIV, HCF, HCL, HIL, HK, HXL, LC, NOD, OMC, PAH, PCW, PFZ, PSG, RAY, RIL, S, SAL, SCH, SCP, SDC, SDW, SK, TLI, TNA, TRD, UPF, UPJ, UPJ, UPJ, VPC, (2), (2), (2), (2), (2), (2), (2), (2), (2).

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 3-3

Cyclic Intermediates: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
ABB	Abbott Laboratories		Bedford Chemical Div.
ACH	Alico Chemical Corp.		Grant Div.
ACS	Allied Signal Inc., Engineered Material Sector	FMC	FMC Corp., Nitro Div.
ACY	American Cyanamid Co.	FMN	Agricultural Chemical Group
AIP	Air Products & Chemicals, Inc.	FMT	Fairmount Chemical Co., Inc.
ALL	Alliance Chemical, Inc.	FST	First Chemical Corp.
AMB	American Bio-Synthetics Corp.	GAF	GAF Chemical Corp.
AMO	Amoco Corp.	GE	General Electric Co., Speciality Chemical Group
ANG	Angus Chemical Co.	GGC	Georgia-Gulf Corp.: Houston Div. Plaquemine Div.
ARK	Armstrong World Industries, Inc.	GIV	Givaudan Corp
ARS	Arsynco, Inc., Sub. Div. of Aceto Corp.	GNW	Greenwood Chemical Co.
ART	Aristech Chemical Corp., Chemical Div.	GRS	Champlin Refining Co.
ARZ	Arizona Chemical Co.	GTL	Great Lakes Chemical Corp.
ASH	Ashland Oil, Inc., Ashland Petroleum Co.	GYR	Goodyear Tire & Rubber Co.
ATL	Atlantic Industries, Inc.	HCF	Cape Industries
ATR	Atlantic Richfield Co., Arco Chemical Co.	HCL	Hoechst Celanese Corp.: Bayport Works Fine Chemicals Div. Sou-Tex Works Speciality Chem Group
BAS	BASF Corp.	HIL	Hilton Davis Co.
BCC	Buffalo Color Corp.	HK	Occidental Chemical Corp., ED & S Div.
BEE	Beecham Inc., Beecham Laboratories Div.	HPC	Hercules, Inc.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Group	HXL	Hexcel Corp., Hexcel Chemical Products
BRD	Lonza, Inc.	ICI	ICI Americas, Inc., Agricultural Chemicals Div. Polyurethanes Group Speciality Chem Div.
BRS	Bristol-Myers Co.	ISP	Indspec Chemical Corp.
BTL	BTL Speciality Resin Corp.	KAN	Kanasco, Ltd
BUC	Synalloy Corp., Blackman Uhler Chemical Div.	KHI	Koch Refining Co.
CCC	C.N.C. International, Inc.	KLM	Kalama Chemical, Inc.
CED	Cedar Chemical Co.	LC	Lord Corp., Chemical Products Group
CHD	Chemdesign Corp.	LEM	Napp Chemicals, Inc.
CHF	Kincaid Enterprises, Inc.	LIL	Eli Lilly & Co.
CHT	Chattem, Inc.	LLI	Lee Laboratories, Inc.
CIC	Color Chem International Corp.	LMC	Lomac, Inc.
CNP	DSM Chemicals North America	LYP	Lyondell Petrochemical Co.
CPS	CPS Chemical Co., Inc.	MAL	Mallinckrodt, Inc.
CRZ	James River II Corp.	MCK	MacKenzie Chemical Works, Inc.
CSD	Fina Oil & Chemicals Co., Cosden Chemical Div.	MER	Merichem Co.
CWN	Upjohn Co., Fine Chemicals	MIL	Milliken & Co., Milliken Chemical Div.
CXI	Chemical Exchange Industries, Inc.	MLC	Melamine Chemicals, Inc.
DAZ	Diaz Chemical Corp.	MNA	Monsanto Agriculture Co.
DCC	Dow Corning Corp.	MON	Monsanto Co.
DGC	Degussa Corp.	MRF	Morflex, Inc.
DIX	Dixie Chemical Co., Inc.	MRK	Merck & Co., Inc.
DKA	Mobay Synthetics Corp.	NCC	Niacet, Corp.
DOW	Dow Chemical Co.	NCI	Union Camp Corp., B B A Div.
DUP	E. I. duPont de Nemours & Co., Inc. Chemicals and Pigments Dept. Petrochemicals Dept.	NEP	Nepera, Inc.
EK	Eastman Kodak Co.:	NES	Ruetgers-Nease Chemical Co.
EKT	Tennessee Eastman Co. Div.	NOD	Huls America, Inc.
ELP	Rexene Products Company		
ENJ	Exxon Chemical Americas		
FER	Ferro Corp.:		

See note at end of table.

Table 3-3—Continued

Cyclic Intermediates: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
NSC .....	National Starch & Chemical Corp.	SDC .....	Sandoz Chemicals Corp.
OMC .....	Olin Corp.	SDW .....	Sterling Drug, Inc., Organic Div.
ORT .....	Rohr Chemicals, Inc., Div. of Aceto Corp.	SHC .....	Shell Chemical Co.
PAH .....	Parish Chemical Co.	SK .....	Smithkline Beecham Chemicals
PAS .....	Atochem North America, Inc.	SOC .....	Chevron Corp., Chevron Chemical Co.
PCW .....	Pfister Chemical, Inc.	SOG .....	Hill Petroleum Company
PD .....	Parke-Davis Div. of Warner-Lambert Co.	SOI .....	Specialty Organics, Inc.
PEL .....	Pelron Corp.	SRL .....	G. D. Searle & Co.
PFZ .....	Pfizer, Inc., & Pfizer Pharmaceuticals, Inc.	STP .....	Stepan Co.
PHC .....	Phthalchem, Inc.	STX .....	St. Croix Petrochemical Corp.
PLC .....	Phillips 66 Co.	SUN .....	Sun Company, Inc.
PPG .....	PPG Industries, Inc.	TCC .....	Sybron Chemicals, Inc.
PPR .....	Phillips Puerto Rico Core, Inc.	TEN .....	Tennessee Chemical Co.
PPX .....	Phillips Paraxylene, Inc.	TLC .....	Twin Lake Chemical, Inc.
PSG .....	PMC, Inc., PMC Specialty Group, Inc.	TLI .....	Teledyne Industries Inc., Teledyne McCormick Selph
QKO .....	QO Chemicals, Inc.	TNA .....	Ethyl Corp.
RAY .....	Rayonier Chemical Products, Inc.	TRD .....	Bristol Myers Squibb Co.
RDA .....	Rhone-Poulenc, Inc.	TX .....	Texaco Chemical Co.
REG .....	Regie Chemical Co.	UOC .....	Union Oil Co., of California
RH .....	Rohm & Haas Co.	UPF .....	Sloss Industries
RIL .....	Reilly Industries, Inc.	UPJ .....	Upjohn Co.
RSA .....	R. S. A. Corp.	UPM .....	UOP, Inc.
RUC .....	Rubicon, Inc.	USM .....	Crown Metro, Inc.
S .....	Sandoz Chemicals Corp.	USR .....	Uniroyal Chemical Co., Inc.
SAL .....	Solvay Animal Health Inc.	UTC .....	Unitex Chemical Corp.
SC .....	Sterling Chemicals, Inc.	VEL .....	Velsicol Chemical Corp.
SCC .....	Standard Chlorine of Delaware, Inc.	VNC .....	Vanderbilt Chemical Corp.
SCH .....	The Schering Corp.	VPC .....	Mobay Chemical Corp., Dyes & Pigments Div.
SCN .....	Schenectady Chemical, Inc.	VST .....	Vista Chemical Co.
SCP .....	Henkel Corp.	WAY .....	Olin Hunt Specialty Products, Inc.
SD .....	Sterling Drug, Inc., Sterling Pharmaceuticals, Inc.	WTC .....	Witco Corp.
		WYK .....	Wyckoff Chemical Co., Inc.

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission

## Section 4 Dyes

Synthetic dyes are derived in whole or in part from cyclic intermediates. Approximately two-thirds of the dyes consumed in the United States are used by the textile industry to dye natural and synthetic fibers or fabrics; about one-sixth is used for coloring paper; and the rest is used chiefly in the production of organic pigments and in dyeing leather and plastics. Of the several thousand different synthetic dyes that are known, more than one thousand are manufactured by domestic producers, collectively. The large number of dyes results from the many different types of materials to which dyes are applied, the different conditions of service for which dyes are required, and the cost that a particular use can bear. Commercial dyes are formulated products which are sold in a variety of physical forms (e.g. granular, powders, liquids, and pastes) containing concentrations of colorant ranging from 6 percent (approximately) to 100 percent. In the statistical tables, production and sales quantities are expressed in terms of a standard strength of product (based on dyeing performance) and not in terms of the amount of actual colorant.

Total domestic production of dyes in 1989 amounted to 174 million kilograms, or 37 percent more than the 127 million kilograms produced in 1988 (table 4-1). Sales of dyes in 1989 amounted to 146 million kilograms, valued at \$858 million, compared with 114 million kilograms, valued at \$766 million, in 1988. In terms of quantity, sales of dyes in 1989 was 28 percent higher, and in terms of value 12 percent higher. The average unit value of sales of all dyes in 1989 was \$5.88 per kilogram, compared with \$6.73 per kilogram in 1988.

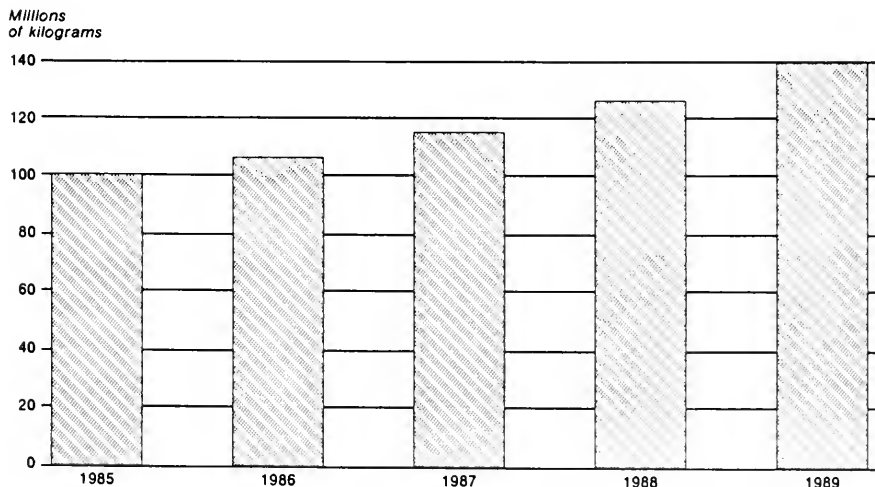
Production of four classes of dyes decreased in 1989, while the remaining six major classes increased their production. Fiber-reactive dyes and fluorescent brightening agents registered significant increases in 1989 while acid and basic dyes registered a noticeable declines. Changes in U.S. production of synthetic dyes followed overall changes in U.S. economic activity during 1985-89 (see figure 4-1).

Table 4-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 4-3.

*Stephen Wanser*  
202-252-1363

(Effective 1/14/91 202-205-3363)

Figure 4-1  
Dyes: U.S. production, 1985-89



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 4

Table 4-1

Dyes: U. S. production and sales, 1989

Dyes	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
		1,000 kilograms	1,000 dollars	
Grand total	174,358	145,757	857,554	\$5.88
<b>Acid dyes</b>				
Total	5,764	6,339	73,370	11.57
Acid yellow dyes	730	1,072	10,075	9.40
Acid orange dyes	640	1,106	7,515	6.79
Acid red dyes, total	1,005	989	12,871	13.01
Acid Red 1	( <sup>2</sup> )	103	761	7.41
Acid Red 137	( <sup>2</sup> )	12	248	20.49
Acid Red 182	( <sup>2</sup> )	250	2,485	9.92
All other acid red dyes	( <sup>2</sup> )	624	9,377	15.03
Acid violet dyes	25	46	959	20.85
Acid blue dyes, total	1,787	1,836	27,874	15.18
Acid Blue 324	637	648	9,193	14.19
All other acid blue dyes	1,150	1,188	18,681	15.72
Acid green dyes	101	75	1,457	19.43
Acid brown dyes	578	368	3,970	10.79
Acid black dyes	898	847	8,649	10.21
<b>Basic dyes (classical and modified)</b>				
Total	5,476	5,235	70,523	13.47
Basic yellow dyes	1,479	1,461	14,723	10.08
Basic orange dyes	255	247	2,698	10.92
Basic red dyes, total	762	741	10,854	14.65
Basic Red 15	225	201	1,504	7.49
All other basic red dyes	537	540	9,350	17.31
Basic violet dyes, total	1,546	1,422	15,012	10.56
Basic Violet 3	600	570	5,133	9.00
All other basic violet dyes	946	852	9,879	11.59
Basic blue dyes	856	837	14,685	17.54
All other basic dyes	578	527	12,551	23.82
<b>Direct dyes</b>				
Total	28,823	20,949	118,619	5.66
Direct yellow dyes	7,374	7,002	35,602	5.08
Direct orange dyes	395	506	3,620	7.15
Direct red dyes, total	3,196	3,353	23,119	6.90
Direct Red 254	1,164	1,238	6,325	5.11
All other direct red dyes	2,032	2,115	16,794	7.94
Direct violet and green dyes	170	141	2,103	14.91

See footnotes at end of table.



Table 4-1—Continued

Dyes: U.S. production and sales, 1989

Dyes	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
		1,000 kilograms	1,000 kilograms	
<b>Direct dyes—Continued</b>				
Direct blue dyes, total	2,639	2,784	25,134	\$9.03
Direct Blue 80	166	174	1,858	10.69
Direct Blue 86	281	318	2,453	7.71
Direct Blue 98	145	125	1,153	9.21
All other direct blue dyes	2,047	2,167	19,670	9.08
Direct brown dyes	116	139	1,333	9.59
Direct black dyes	14,933	7,024	27,708	3.94
<b>Disperse dyes</b>				
Total	12,184	10,595	117,706	11.11
Disperse yellow dyes	843	966	10,074	10.43
Disperse orange dyes, total	1,741	1,377	9,891	7.18
Disperse Orange 37	162	135	884	6.55
Disperse Orange 44 and 44:1	53	94	708	7.53
All other disperse orange dyes	1,526	1,148	8,299	7.23
Disperse red dyes, total	2,266	1,900	28,491	15.00
Disperse Red 73	245	188	1,652	8.78
Disperse Red 167 and 167:1	271	224	1,957	8.72
Disperse Red 177	169	142	1,754	12.34
All other disperse red dyes	1,581	1,346	23,128	17.20
Disperse violet dyes	705	343	4,353	12.69
Disperse blue dyes	4,919	4,556	51,650	11.32
Disperse black, brown and green dyes, total	1,710	1,453	13,247	9.12
Disperse Brown 1	434	374	2,790	7.46
All other disperse black, brown, and green dyes	1,276	1,079	10,457	9.70
<b>Fiber-reactive dyes</b>				
Total	13,832	9,820	118,972	12.12
<b>Fluorescent brightening agents</b>				
Total	60,711	57,181	119,787	2.09
<b>Food, drug, and cosmetic colors</b>				
Total	3,187	3,174	53,950	17.00
Food, drug and cosmetic dyes, total	3,043	3,033	48,400	15.96
Drug and cosmetic dyes, total <sup>2</sup>	144	141	5,550	39.36
<b>Mordant dyes</b>				
Total	29	29	355	12.24

See footnotes at end of table.

## Section 4

Table 4-1—Continued

Dyes: U.S. production and sales, 1989

Dyes	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Solvent dyes</b>				
Total .....	5,539	3,985	44,805	\$11.24
Solvent yellow dyes .....	765	562	9,993	17.78
Solvent orange dyes .....	166	175	3,125	17.86
Solvent red dyes .....	1,415	1,447	15,082	10.42
Solvent blue dyes .....	1,860	516	7,593	14.72
All other solvent dyes .....	1,333	1,285	9,012	7.01
<b>Vat dyes</b>				
Total .....	16,714	16,699	78,861	4.72
Vat Yellow dyes .....	2	14	628	44.86
Vat orange dyes .....	65	89	1,692	19.01
Vat red dyes .....	185	298	7,944	26.66
Vat violet dyes .....	107	114	1,790	15.70
Vat blue dyes .....	15,839	15,285	54,646	3.58
Vat green dyes .....	197	219	2,448	11.18
Vat brown dyes .....	120	359	4,868	13.56
Vat black dye .....	199	321	4,845	15.09
<b>All other dyes</b>				
Total <sup>4</sup> .....	22,099	11,751	60,606	5.16

<sup>1</sup> Calculated from unrounded figures.<sup>2</sup> Reported data were accepted in confidence and may not be published, or no data were reported.<sup>3</sup> The data include external drug and cosmetic dyes.<sup>4</sup> The data include azolic compositions, azolic coupling components, azolic diazo components (bases and salts), sulfur dyes, and miscellaneous dyes. Statistics for those groups of dyes may not be published separately because publication would disclose information received in confidence.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 4-2

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Acid dyes</b>	<b>Yes</b>	
<b>Acid yellow dyes:</b>	<b>Yes</b>	
Acid Yellow 3	No	BAS.
Acid Yellow 17	No	ATL, CK, HIL.
Acid Yellow 19	No	CK.
Acid Yellow 23	No	BAS, CK, HIL, LVR.
Acid Yellow 34	No	ATL.
Acid Yellow 36	No	ATL.
Acid Yellow 49	No	ATL, CK.
Acid Yellow 59	No	BAS, CK.
Acid Yellow 65	No	ATL.
Acid Yellow 73	No	HIL.
Acid Yellow 99	No	CK.
Acid Yellow 129	No	CGY.
Acid Yellow 135	No	ICI.
Acid Yellow 137	No	CK.
Acid Yellow 151	No	CGY, CK.
Acid Yellow 159	No	CK.
Acid Yellow 174	No	FAB.
Acid Yellow 198	No	CK.
Acid Yellow 200	No	CK.
Acid Yellow 219	No	CGY, CK.
Acid Yellow 226	No	BAS.
Acid Yellow 239	No	DGO.
All other acid yellow dyes	No	CK.
<b>Acid orange dyes:</b>	<b>Yes</b>	
Acid Orange 7	No	BAS, CK.
Acid Orange 8	No	ATL, BAS, CGY, CK.
Acid Orange 10	No	ATL, CK.
Acid Orange 24	No	CK, FAB.
Acid Orange 60	No	CGY, CK.
Acid Orange 64	No	ATL.
Acid Orange 89	No	BAS.
Acid Orange 118	No	CK.
Acid Orange 128	No	CK.
Acid Orange 152	No	CK.
Acid Orange 158	No	CGY, CK.
Acid Orange 161	No	ATL.
<b>Acid red dyes:</b>	<b>Yes</b>	
Acid Red 1	Yes	ATL, BAS, CGY, CK, FAB.
Acid Red 4	No	ATL.
Acid Red 14	No	ATL, BAS.
Acid Red 33	No	FAB.
Acid Red 57	No	CK.
Acid Red 73	No	ATL, PSC, S.
Acid Red 87	No	HIL.
Acid Red 97	No	ATL.
Acid Red 119	No	CK.
Acid Red 137	Yes	ATL, BAS, CK, LVR.
Acid Red 151	No	CK.
Acid Red 174	No	CGY.
Acid Red 182	Yes	CGY, CK, VPC.
Acid Red 186	No	CGY.
Acid Red 226	No	BAS.
Acid Red 266	No	CK.
Acid Red 278	No	CK.
Acid Red 296	No	BAS.
Acid Red 299	No	CK.
Acid Red 337	No	ATL, CK.
Acid Red 364	No	CK.
Acid Red 384	No	CK.
Acid Red 388	No	CK.
Acid Red 398	No	ICI.
Acid Red 410	No	ATL.

See footnotes at end of table.

Table 4-2—Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Acid dyes—Continued</b>	<b>Yes</b>	
<b>Acid red dyes—Continued</b>	<b>Yes</b>	
Acid Red 418 .....	No	CK.
Acid Red 419 .....	No	CK.
All other acid red dyes .....	Yes	ATL, BAS, CK.
<b>Acid violet dyes:</b>	<b>Yes</b>	
Acid Violet 3 .....	No	FAB.
Acid Violet 7 .....	No	ATL, FAB.
Acid Violet 12 .....	No	CGY.
Acid Violet 17 .....	No	HIL.
Acid Violet 49 .....	No	HIL.
<b>Acid blue dyes:</b>	<b>Yes</b>	
Acid Blue 9 .....	No	BAS, CK, HIL, LVR.
Acid Blue 15 .....	No	BAS.
Acid Blue 25 .....	No	VPC.
Acid Blue 40 .....	No	CK.
Acid Blue 41 .....	No	CK.
Acid Blue 62 .....	No	CK.
Acid Blue 67 .....	No	CK.
Acid Blue 92 .....	No	FAB.
Acid Blue 113 .....	No	CK.
Acid Blue 118 .....	No	ATL.
Acid Blue 145 .....	No	ATL, CK.
Acid Blue 231 .....	No	CK.
Acid Blue 281 .....	No	CK.
Acid Blue 283 .....	No	S.
Acid Blue 298 .....	No	CK.
Acid Blue 321 .....	No	ATL.
Acid Blue 324 .....	Yes	CK, S, VPC.
Acid Blue 330 .....	No	ATL.
All other acid blue dyes .....	No	CK.
<b>Acid green dyes:</b>	<b>Yes</b>	
Acid Green 1 .....	No	LVR.
Acid Green 5 .....	No	WJ.
Acid Green 16 .....	No	FAB, LVR.
Acid Green 20 .....	No	ATL.
Acid Green 25 .....	No	ATL, CK.
Acid Green 70 .....	No	CGY.
All other acid green dyes .....	No	CK, FAB.
<b>Acid brown dyes:</b>	<b>Yes</b>	
Acid Brown 14 .....	No	CK, LVR.
Acid Brown 19 .....	No	CK.
Acid Brown 50 .....	No	BAS.
Acid Brown 97 .....	No	BAS, FAB.
Acid Brown 147 .....	No	CK.
Acid Brown 159 .....	No	BAS.
Acid Brown 160 .....	No	BAS.
Acid Brown 161 .....	No	BAS.
Acid Brown 165 .....	No	BAS.
Acid Brown 188 .....	No	CK.
Acid Brown 189 .....	No	CK.
Acid Brown 227 .....	No	BAS.
Acid Brown 239 .....	No	CK.
Acid Brown 264 .....	No	BAS.
Acid Brown 439 .....	No	CK.
All other acid brown dyes .....	No	CK.
<b>Acid black dyes:</b>	<b>Yes</b>	
Acid Black 1 .....	No	CK, LVR.
Acid Black 2 .....	No	ATL, LVR.
Acid Black 52 .....	No	CK, S.
Acid Black 60 .....	No	CK.
Acid Black 63 .....	No	BAS.

See footnotes at end of table.

Table 4-2—Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Acid dyes—Continued</b>	<b>Yes</b>	
Acid black dyes—Continued	Yes	
Acid Black 92	No	FAB.
Acid Black 107	No	CK.
Acid Black 172	No	CK, ICI.
Acid Black 194	No	BAS.
Acid Black 210	No	BAS.
All other acid black dyes	No	BAS.
Azolic dyes and components:	No	
Azolic compositions:	No	
Azolic yellow compositions:	No	
Azolic Yellow 1	No	BUC.
Azolic orange compositions:	No	
Azolic Orange 3	No	BUC.
Azolic red compositions:	No	
Azolic Red 1	No	BUC.
Azolic Red 2	No	BUC.
Azolic Red 6	No	BUC.
All other azolic red compositions	No	ALL. BUC.
Azolic violet compositions:	No	
Azolic Violet 1	No	BUC.
All other azolic violet compositions	No	BUC.
Azolic blue compositions:	No	
Azolic Blue 3	No	BUC.
Azolic brown compositions:	No	
Azolic Brown 9	No	BUC.
Azolic black compositions:	No	
Azolic Black 4	No	BUC.
All other azolic black compositions	No	BUC.
Azolic diazo components, bases:	No	
Azolic Diazo Component 5, base	No	ALL.
Azolic Diazo Component 13, base	No	ALL.
Azolic Diazo Component 14, base	No	ALL.
Azolic Diazo Component 32, base	No	ALL.
All other azolic diazo components, base	No	ALL.
Azolic diazo components, salts:	No	
Azolic Diazo Component 1, salt	No	ALL. BUC.
Azolic Diazo Component 3, salt	No	ALL. BUC.
Azolic Diazo Component 5, salt	No	ALL. BUC.
Azolic Diazo Component 8, salt	No	ALL. BUC.
Azolic Diazo Component 9, salt	No	ALL. BUC.
Azolic Diazo Component 10, salt	No	ALL. BUC.
Azolic Diazo Component 12, salt	No	ALL. BUC.
Azolic Diazo Component 13, salt	No	ALL. BUC.
Azolic Diazo Component 14, salt	No	ALL.
Azolic Diazo Component 20, salt	No	ATL.
Azolic Diazo Component 32, salt	No	ATL.
Azolic Diazo Component 34, salt	No	ALL.
Azolic Diazo Component 41, salt	No	ALL.
Azolic Diazo Component 42, salt	No	ALL.
Azolic Diazo Component 44, salt	No	ALL.
Azolic Diazo Component 48, salt	No	ATL.
All other azolic diazo components, salt	No	ALL.
Azolic coupling components:	No	
Azolic Coupling Component 2	No	ALL.
Azolic Coupling Component 3	No	PCW.
Azolic Coupling Component 4	No	ALL.
Azolic Coupling Component 7	No	PCW.
Azolic Coupling Component 12	No	ALL.
Azolic Coupling Component 14	No	ALL.
Azolic Coupling Component 17	No	ALL.

See footnotes at end of table.

Table 4-2—Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Azolic dyes and components—Continued</b>	<b>No</b>	
<b>Azolic coupling components—Continued</b>	<b>No</b>	
Azolic Coupling Component 18	No	ALL.
Azolic Coupling Component 20	No	PCW.
Azolic Coupling Component 21	No	PCW.
Azolic Coupling Component 29	No	PCW.
Azolic Coupling Component 34	No	ALL.
Azolic Coupling Component 35	No	PCW.
Azolic Coupling Component 43	No	ALL.
All other azolic coupling components	No	PCW.
<b>Basic dyes (classical and modified):</b>	<b>Yes</b>	
<b>Basic yellow dyes:</b>	<b>Yes</b>	
Basic Yellow 11	No	ATL, CK.
Basic Yellow 13	No	ATL.
Basic Yellow 15	No	CK.
Basic Yellow 28	No	BAS, VPC.
Basic Yellow 29	No	BAS.
Basic Yellow 53	No	CK.
Basic Yellow 58	No	VPC.
Basic Yellow 65	No	BAS.
Basic Yellow 78	No	BAS.
Basic Yellow 79	No	CK.
Basic Yellow 83	No	CK.
Basic Yellow 94	No	S.
Basic Yellow 96	No	BAS.
Basic Yellow 98	No	BAS.
All other basic yellow dyes	No	ALL. (2)
<b>Basic orange dyes:</b>	<b>Yes</b>	
Basic Orange 1	No	ATL, BAS, CK.
Basic Orange 2	No	BAS, CK, PSC.
Basic Orange 21	No	ATL, VPC.
Basic Orange 26	No	CK.
All other basic orange dyes	No	ATL. (2)
<b>Basic red dyes:</b>	<b>Yes</b>	
Basic Red 1	No	BAS.
Basic Red 12	No	ATL, VPC.
Basic Red 14	No	BAS, CK.
Basic Red 15	Yes	ATL, BAS, CK.
Basic Red 17	No	CK.
Basic Red 22	No	CK.
Basic Red 29	No	BAS.
Basic Red 46	No	CK.
Basic Red 49	No	BAS.
Basic Red 54	No	BAS.
Basic Red 73	No	CK.
Basic Red 104	No	CK.
Basic Red 111	No	S.
All other basic red dyes	No	BAS. (2)
<b>Basic violet dyes:</b>	<b>Yes</b>	
Basic Violet 1	No	BAS, DSC.
Basic Violet 3	Yes	BAS, CK, DSC.
Basic Violet 4	No	BAS, DSC.
Basic Violet 10	No	BAS.
Basic Violet 11	No	BAS.
Basic Violet 16	No	BAS.
Basic Violet 35	No	ATL, CK, VPC.
All other basic violet dye	No	BAS.
<b>Basic blue dyes:</b>	<b>Yes</b>	
Basic Blue 1	No	BAS.
Basic Blue 3	No	BAS, CK.
Basic Blue 4	No	BAS.

See footnotes at end of table.

Table 4-2—Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Basic dyes (classical and modified)—Continued</b>	<b>Yes</b>	
<b>Basic blue dyes—Continued</b>	<b>Yes</b>	
Basic Blue 7	No	DSC.
Basic Blue 21	No	CK.
Basic Blue 41	No	BAS.
Basic Blue 54	No	BAS.
Basic Blue 60	No	BAS.
Basic Blue 77	No	CK.
Basic Blue 94 and 94:1	No	CK.
Basic Blue 140	No	VPC.
Basic Blue 152	No	BAS.
All other basic blue dyes	No	BAS. (2)
All other basic blue dyes, modified	No	CK.
<b>Basic green dyes:</b>	<b>No</b>	
Basic Green 4	No	BAS.
All other basic green dyes	No	BAS. (2)
<b>Basic brown dyes:</b>	<b>No</b>	
Basic Brown 2	No	PSC.
Basic Brown 4	No	BAS, PSC.
All other basic brown dyes	No	BAS.
All other basic brown dyes, modified	No	CGY.
<b>Basic black dyes:</b>	<b>No</b>	
All other basic black dyes	No	BAS. (2)
All other basic black dyes, modified	No	BAS.
<b>Direct dyes:</b>	<b>Yes</b>	
<b>Direct yellow dyes:</b>	<b>Yes</b>	
Direct Yellow 4	No	BAS, CGY, CK, LVR, VPC.
Direct Yellow 5	No	BAS.
Direct Yellow 6	No	VPC.
Direct Yellow 11	No	BAS, VPC.
Direct Yellow 34	No	CK.
Direct Yellow 44	No	CK.
Direct Yellow 50	No	CGY.
Direct Yellow 51	No	S.
Direct Yellow 105	No	CGY, CK.
Direct Yellow 108	No	CK.
Direct Yellow 107	No	CK.
Direct Yellow 118	No	CK.
Direct Yellow 119	No	VPC.
Direct Yellow 127	No	BAS, CGY, CK, VPC.
Direct Yellow 131	No	VPC.
Direct Yellow 132	No	S.
Direct Yellow 133	No	S.
Direct Yellow 137	No	VPC.
Direct Yellow 147	No	BAS, VPC.
Direct Yellow 148	No	S.
Direct Yellow 154	No	VPC.
Direct Yellow 166	No	CGY.
All other direct yellow dyes	No	ATL, BAS, CK.
<b>Direct orange dyes:</b>	<b>Yes</b>	
Direct Orange 15	No	BAS, CGY, VPC.
Direct Orange 26	No	CK.
Direct Orange 39	No	CK, FAB.
Direct Orange 72	No	CK.
Direct Orange 80	No	ATL.
Direct Orange 102	No	ATL, BAS, CGY, VPC.
Direct Orange 118	No	S.
All other direct orange dyes	No	ATL, BAS.
<b>Direct red dyes:</b>	<b>Yes</b>	
Direct Red 9	No	CK.
Direct Red 16	No	ATL, CGY.

See footnotes at end of table.

Table 4-2—Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Direct dyes—Continued</b>	<b>Yes</b>	
<b>Direct red dyes—Continued</b>	<b>Yes</b>	
Direct Red 24	No	ATL, FAB.
Direct Red 26	No	ATL.
Direct Red 72	No	CGY, CK.
Direct Red 73	No	ATL.
Direct Red 80	No	ATL, CK.
Direct Red 81	No	ATL, CGY, CK, FAB, LVR, VPC.
Direct Red 83	No	ATL, CK, FAB.
Direct Red 224	No	CGY, CK.
Direct Red 236	No	BAS, VPC.
Direct Red 238	No	VPC.
Direct Red 239	No	BAS, CGY, CK, S.
Direct Red 243	No	CK.
Direct Red 254	Yes	BAS, CGY, CK, VPC.
All other direct red dyes	Yes	ATL, BAS, CK, VPC.
<b>Direct violet dyes:</b>	<b>No</b>	
Direct Violet 9	No	ATL, CGY.
Direct Violet 66	No	ATL.
Direct Violet 99	No	VPC.
Direct Violet 195	No	CK.
All other direct violet dyes	No	BAS.
<b>Direct blue dyes:</b>	<b>Yes</b>	
Direct Blue 15	No	VPC.
Direct Blue 25	No	ATL.
Direct Blue 75	No	CK, S.
Direct Blue 76	No	CK.
Direct Blue 80	Yes	ATL, CGY, CK, FAB.
Direct Blue 86	Yes	CGY, CK, S, VPC.
Direct Blue 98	Yes	ATL, CK, FAB.
Direct Blue 100	No	FAB.
Direct Blue 108	No	ATL.
Direct Blue 120, 120:1, 120:2, and 120:3	No	FAB.
Direct Blue 160	No	CK.
Direct Blue 189	No	CK.
Direct Blue 191	No	CK.
Direct Blue 199	No	BAS, CGY, VPC.
Direct Blue 218	No	CGY, CK, FAB, VPC.
Direct Blue 261	No	S.
Direct Blue 269	No	VPC.
Direct Blue 279	No	VPC.
Direct Blue 281	No	CGY.
Direct Blue 283	No	ATL, CK.
Direct Blue 285	No	ATL.
Direct Blue 286	No	ATL.
Direct Blue 290	No	CGY.
All other direct blue dyes	Yes	ATL, BAS, FAB, VPC.
<b>Direct green dyes:</b>	<b>No</b>	
Direct Green 92	No	ATL.
All other direct green dyes	No	FAB.
<b>Direct brown dyes:</b>	<b>Yes</b>	
Direct Brown 44	No	FAB.
Direct Brown 154	No	CGY.
Direct Brown 230	No	ATL.
Direct Brown 231	No	ATL.
Direct Brown 232	No	ATL.
Direct Brown 238	No	ATL.
All other direct brown dyes	No	BAS, FAB, VPC.
<b>Direct black dyes:</b>	<b>Yes</b>	
Direct Black 22	No	ATL, CGY, CK, FAB.
Direct Black 80	No	ATL, CK, FAB.
Direct Black 163	No	S.

See footnotes at end of table.



Table 4-2—Continued

Dyes for which U.S. production end/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Direct dyes—Continued</b>	<b>Yes</b>	
<b>Direct black dyes—Continued</b>	<b>Yes</b>	
Direct Black 165	No	ATL.
Direct Black 170	No	ATL.
Direct Black 179	No	CK.
All other direct black dyes	No	ATL, BAS, CK, FAB, VPC.
<b>Disperse dyes:</b>	<b>Yes</b>	
<b>Disperse yellow dyes:</b>	<b>Yes</b>	
Disperse Yellow 3	No	CGY, CK.
Disperse Yellow 23	No	ATL, CK.
Disperse Yellow 42	No	CGY, CK, S.
Disperse Yellow 54	No	BAS.
Disperse Yellow 64	No	BAS, HCL.
Disperse Yellow 77	No	VPC.
Disperse Yellow 86	No	CGY, EKT.
Disperse Yellow 88	No	EKT.
Disperse Yellow 108	No	CGY, EKT.
Disperse Yellow 114	No	HCL.
Disperse Yellow 126	No	ICI.
Disperse Yellow 198	No	BAS.
Disperse Yellow 219	No	S.
Disperse Yellow 238	No	CK.
Disperse Yellow 239	No	CK.
All other disperse yellow dyes	No	BAS, ICI, VPC.
<b>Disperse orange dyes:</b>	<b>Yes</b>	
Disperse Orange 3	No	ATL, CK.
Disperse Orange 5	No	ATL.
Disperse Orange 25 and 25:1	No	ATL, CK, ICI.
Disperse Orange 29	No	CK.
Disperse Orange 30	No	ATL, BUC, CGY, CK, S, SDC.
Disperse Orange 37	Yes	ATL, CK, EKT.
Disperse Orange 41	No	CGY, CK, S.
Disperse Orange 44 and 44:1	Yes	ATL, CGY, CK, SDC.
Disperse Orange 73	No	BAS.
Disperse Orange 89	No	CK.
Disperse Orange 94	No	S.
Disperse Orange 138	No	EKT.
Disperse Orange 153	No	CK.
All other disperse orange dyes	No	CK.
<b>Disperse red dyes:</b>	<b>Yes</b>	
Disperse Red 1	No	ATL, CK.
Disperse Red 5	No	ATL, CK.
Disperse Red 13	No	ATL.
Disperse Red 17	No	ATL, CK.
Disperse Red 30	No	EKT.
Disperse Red 50	No	CK.
Disperse Red 55	No	BAS.
Disperse Red 60	No	BAS.
Disperse Red 65	No	CK.
Disperse Red 73	Yes	ATL, CK, S.
Disperse Red 74	No	S.
Disperse Red 88	No	EKT.
Disperse Red 91	No	BAS.
Disperse Red 117	No	EKT.
Disperse Red 135	No	CK.
Disperse Red 136	No	EKT.
Disperse Red 137	No	EKT.
Disperse Red 145	No	CK.
Disperse Red 153	No	CK, FAB, S.
Disperse Red 159	No	VPC.

See footnotes at end of table.

## Section 4

Table 4-2—Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Disperse dyes—Continued</b>	<b>Yes</b>	
<b>Disperse red dyes—Continued</b>	<b>Yes</b>	
Disperse Red 167 and 167:1	Yes	ATL, CGY, CK, S.
Disperse Red 177	Yes	CK, ICI, S.
Disperse Red 179	No	BAS, CK, S.
Disperse Red 263	No	BAS.
Disperse Red 273	No	S.
Disperse Red 274	No	CK, S.
Disperse Red 278	No	ICI.
Disperse Red 311	No	ICI.
Disperse Red 313	No	S.
Disperse Red 316	No	S.
Disperse Red 325	No	CK.
Disperse Red 333	No	S.
Disperse Red 338	No	EKT.
Disperse Red 339	No	CGY, EKT.
Disperse Red 340	No	EKT.
Disperse Red 345	No	CK.
Disperse Red 358	No	HCL.
All other disperse red dyes	Yes	BAS, CK, SDC.
<b>Disperse violet dyes:</b>	<b>Yes</b>	
Disperse Violet 1	No	CK.
Disperse Violet 17	No	CK.
Disperse Violet 28	No	CK.
Disperse Violet 33	No	ICI, S.
Disperse Violet 36	No	S.
Disperse Violet 48	No	HCL.
Disperse Violet 60	No	S.
Disperse Violet 91	No	CGY.
All other disperse violet dyes	No	CK, SDC.
<b>Disperse blue dyes:</b>	<b>Yes</b>	
Disperse Blue 3	No	CGY, CK, EKT, FAB.
Disperse Blue 7	No	CGY.
Disperse Blue 14	No	CK.
Disperse Blue 27	No	CGY, EKT.
Disperse Blue 60	No	BAS, CGY.
Disperse Blue 62	No	EKT.
Disperse Blue 64	No	EKT.
Disperse Blue 73	No	S.
Disperse Blue 77	No	CGY.
Disperse Blue 79	No	BAS, BUC, CGY, HCL, ICI.
Disperse Blue 81	No	S.
Disperse Blue 95	No	HCL.
Disperse Blue 102	No	CK, EKT.
Disperse Blue 106	No	CK.
Disperse Blue 118	No	EKT.
Disperse Blue 122	No	ICI.
Disperse Blue 148	No	BAS.
Disperse Blue 165	No	CGY, HCL.
Disperse Blue 183	No	ATL, S.
Disperse Blue 200	No	ICI.
Disperse Blue 281	No	S.
Disperse Blue 284	No	ICI.
Disperse Blue 291	No	CK, S.
Disperse Blue 317	No	CK.
Disperse Blue 333	No	HCL.
Disperse Blue 337	No	EKT.
Disperse Blue 359	No	CK.
All other disperse blue dyes	No	ATL, BAS, BUC, HCL, ICI.
<b>Disperse green dyes:</b>		
Disperse Green 9	No	ICI.
<b>Disperse brown dyes:</b>		
Disperse Brown 1	Yes	ATL, BUC, CK, S.

See footnotes at end of table.

Table 4-2—Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Disperse dyes—Continued</b>		
<b>Disperse brown dyes—Continued</b>		
Disperse Brown 18 .....	No	S.
Disperse Brown 22 .....	No	EKT.
Disperse Brown 26 .....	No	CK.
Disperse Brown 27 .....	No	CK.
<b>Disperse black dyes:</b>		
Disperse Black 1 .....	No	CGY.
Disperse Black 9 .....	No	ATL, CGY, CK, EKT, FAB.
Disperse Black 33 .....	No	CGY.
All other disperse black dyes .....	No	BAS, SDC.
<b>Fiber-reactive dyes:</b>		
<b>Reactive yellow dyes:</b>		
Reactive Yellow 7 .....	No	ICI.
Reactive Yellow 15 .....	No	HCL.
Reactive Yellow 17 .....	No	HCL.
Reactive Yellow 18 .....	No	ICI.
Reactive Yellow 37 .....	No	HCL.
Reactive Yellow 42 .....	No	HCL.
Reactive Yellow 86 .....	No	ICI.
Reactive Yellow 125 .....	No	S.
Reactive Yellow 135 .....	No	ICI.
Reactive Yellow 160 .....	No	HCL.
All other reactive yellow dyes .....	No	HCL.
<b>Reactive orange dyes:</b>		
Reactive Orange 1 .....	No	ICI.
Reactive Orange 4 .....	No	ICI.
Reactive Orange 12 .....	No	ICI.
Reactive Orange 13 .....	No	ICI.
Reactive Orange 16 .....	No	ATL, CK, HCL.
Reactive Orange 20 .....	No	CK.
Reactive Orange 72 .....	No	CK.
Reactive Orange 78 .....	No	HCL.
Reactive Orange 84 .....	No	ICI.
Reactive Orange 88 .....	No	CK, ICI.
All other reactive orange dyes .....	No	HCL.
<b>Reactive red dyes:</b>		
Reactive Red 2 .....	No	CK, ICI.
Reactive Red 8 .....	No	ICI.
Reactive Red 11 .....	No	ICI.
Reactive Red 21 .....	No	HCL.
Reactive Red 31 .....	No	ICI.
Reactive Red 33 .....	No	ICI.
Reactive Red 35 .....	No	HCL.
Reactive Red 43 .....	No	CK, ICI.
Reactive Red 49 .....	No	HCL.
Reactive Red 94 .....	No	HCL.
Reactive Red 120 .....	No	CK, ICI.
Reactive Red 141 .....	No	ICI.
Reactive Red 147 .....	No	S.
Reactive Red 180 .....	No	ATL, HCL.
Reactive Red 198 .....	No	ATL.
All other reactive red dyes .....	No	ATL, HCL.
<b>Reactive violet dyes:</b>		
Reactive Violet 1 .....	No	ICI.
Reactive Violet 5 .....	No	HCL.
Reactive violet 33 .....	No	S.
All other reactive violet dyes .....	No	CGY, HCL, ICI.
<b>Reactive blue dyes:</b>		
Reactive Blue 3 .....	No	ICI.
Reactive Blue 4 .....	No	CK, ICI.

See footnotes at end of table.

Table 4-2—Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Fiber-reactive dyes—Continued</b>		
Reactive blue dyes—Continued	No	
Reactive Blue 5 .....	No	ICI.
Reactive Blue 7 .....	No	CGY, CK.
Reactive Blue 13 .....	No	ICI.
Reactive Blue 19 .....	No	HCL.
Reactive Blue 21 .....	No	HCL.
Reactive Blue 38 .....	No	HCL.
Reactive Blue 41 .....	No	S.
Reactive Blue 50 .....	No	CGY.
Reactive Blue 71 .....	No	ICI.
Reactive Blue 89 .....	No	HCL, ICI.
Reactive Blue 174 .....	No	ICI.
Reactive Blue 199 .....	No	ICI.
Reactive Blue 203 .....	No	HCL.
All other reactive blue dyes .....	No	HCL, ICI.
Reactive green dyes:		
Reactive Green 19 .....	No	ICI.
Reactive brown dyes:		
Reactive Brown 1 .....	No	ICI.
Reactive Brown 17 .....	No	ICI.
Reactive Brown 18 .....	No	HCL.
All other reactive brown dyes .....	No	HCL.
Reactive black dyes:		
Reactive Black 5 .....	Yes	ATL, CK, HCL.
Reactive Black 9 .....	No	ICI.
All other reactive black dyes .....	No	HCL.
Fluorescent brighteners:	Yes	
Fluorescent Brightener 6 .....	No	VPC.
Fluorescent Brightener 22 .....	No	CGY.
Fluorescent Brightener 28 .....	No	CGY, VPC.
Fluorescent Brightener 46 .....	No	CGY.
Fluorescent Brightener 49 .....	No	S.
Fluorescent Brightener 52 .....	No	S.
Fluorescent Brightener 61 .....	No	BAS.
Fluorescent Brightener 71 .....	No	CGY, VPC.
Fluorescent Brightener 102 .....	No	CGY.
Fluorescent Brightener 128 .....	No	HIL.
Fluorescent Brightener 130 .....	No	BAS.
Fluorescent Brightener 134 .....	No	CGY.
Fluorescent Brightener 205 .....	No	VPC.
Fluorescent Brightener 220 .....	No	S.
Fluorescent Brightener 235 .....	No	S.
All other fluorescent brighteners .....	No	CGY, S, VPC.( <sup>2</sup> )
Food, drug, and cosmetic colors:	Yes	
Food, drug, and cosmetic dyes:	Yes	
Food, Drug, and Cosmetic Blue 1 .....	No	HIL, WJ.
Food, Drug, and Cosmetic Blue 2 .....	No	HIL, WJ.
Food, Drug, and Cosmetic Green 3 .....	No	WJ.
Food, Drug, and Cosmetic Red 3 .....	No	HIL, STG, WJ.
Food, Drug, and Cosmetic Red 4 .....	No	CK.
Food, Drug, and Cosmetic Red 40 .....	No	HIL, STG, WJ.
Food, Drug, and Cosmetic Yellow 5 .....	No	HIL, STG, WJ.
Food, Drug, and Cosmetic Yellow 6 .....	No	CK, HIL, STG, WJ.
Drug and cosmetic dyes:	Yes	
Drug and Cosmetic Green 5 .....	No	CK.
Drug and Cosmetic Green 8 .....	No	HIL.
Drug and Cosmetic Orange 5 .....	No	SNA.
Drug and Cosmetic Red 6 .....	No	HIL, SNA.

See footnotes at end of table.

Table 4-2—Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Food, drug and cosmetic colors—Continued</b>	<b>Yes</b>	
<b>Drug and cosmetic dyes—Continued</b>	<b>Yes</b>	
Drug and Cosmetic Red 7	No	HIL, SNA.
Drug and Cosmetic Red 17	No	WJ.
Drug and Cosmetic Red 21	No	SNA.
Drug and Cosmetic Red 27	No	HIL.
Drug and Cosmetic Red 30	No	SNA.
Drug and Cosmetic Red 33	No	CK, SNA.
Drug and Cosmetic Red 34	No	SNA.
Drug and Cosmetic Yellow 5	No	WJ.
Drug and Cosmetic Yellow 10	No	CK, HIL, WJ.
Drug and cosmetic dyes, external:	No	
External Drug and Cosmetic Orange 3	No	CK.
Mordant dyes:	<b>Yes</b>	
Mordant yellow dyes:	No	
Mordant Yellow 20	No	FAB.
Mordant orange dyes:	No	
Mordant Orange 1	No	FAB.
Mordant Orange 6	No	ATL, FAB.
All other mordant orange dyes	No	FAB.
Mordant brown dyes:	No	
Mordant Brown 1	No	FAB.
Mordant Brown 18	No	FAB.
Mordant Brown 33	No	FAB.
Mordant Brown 70	No	FAB.
Solvent dyes:	<b>Yes</b>	
Solvent yellow dyes:	<b>Yes</b>	
Solvent Yellow 3	No	PSC.
Solvent Yellow 13	No	BAS, FAB.
Solvent Yellow 14	No	ATL, PSC.
Solvent Yellow 16	No	PSC.
Solvent Yellow 18	No	ATL.
Solvent Yellow 33	No	BAS, MRT.
Solvent Yellow 40	No	CK.
Solvent Yellow 42	No	ATL, CK.
Solvent Yellow 43	No	DGO, HCL, MRT.
Solvent Yellow 47	No	( <sup>2</sup> ).
Solvent Yellow 56	No	PSC.
Solvent Yellow 72	No	CIC, FAB, PSC.
Solvent Yellow 94	No	HIL.
Solvent Yellow 107	No	MRT.
Solvent Yellow 131	No	DGO.
Solvent Yellow 135	No	( <sup>2</sup> ).
Solvent Yellow 143	No	MRT.
Solvent Yellow 160	No	( <sup>2</sup> ).
Solvent Yellow 161	No	MRT.
Solvent Yellow 167	No	CIC.
All other solvent yellow dyes	No	ATL, MIL, MRT, ( <sup>2</sup> )
Solvent orange dyes:	<b>Yes</b>	
Solvent Orange 2	No	PSC.
Solvent Orange 3	No	BAS, PSC.
Solvent Orange 7	No	ATL, PSC.
Solvent Orange 20	No	BAS, FAB.
Solvent Orange 23	No	CK.
Solvent Orange 25	No	ATL.
Solvent Orange 31	No	PSC.
Solvent Orange 60	No	CIC.
Solvent Orange 77	No	MRT.

See footnotes at end of table.

Table 4-2—Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
<b>Solvent dyes—Continued</b>	<b>Yes</b>	
<b>Solvent orange dyes—Continued</b>	<b>Yes</b>	
Solvent Orange 97	No	MRT.
All other solvent orange dyes	No	MRT.
<b>Solvent red dyes:</b>	<b>Yes</b>	
Solvent Red 1	No	PSC.
Solvent Red 23	No	PSC.
Solvent Red 24	No	ATL, PSC.
Solvent Red 26	No	PSC.
Solvent Red 27	No	PSC.
Solvent Red 49	No	BAS.
Solvent Red 68	No	ATL, CK, MRT.
Solvent Red 74	No	ATL.
Solvent Red 111	No	MRT.
Solvent Red 164	No	MRT.
Solvent Red 166	No	MRT.
Solvent Red 168	No	MRT.
Solvent Red 169	No	MRT.
Solvent Red 175	No	MRT.
Solvent Red 207	No	MRT.
Solvent Red 208	No	MRT.
Solvent Red 222	No	CIC.
All other solvent red dyes	No	CIC, MIL, PSC.
<b>Solvent violet dyes:</b>	<b>No</b>	
Solvent Violet 8	No	BAS, DSC.
Solvent violet 11	No	CK.
Solvent Violet 13	No	CK, DSC, MRT.
Solvent Violet 14	No	MRT.
Solvent Violet 38	No	MRT.
All other solvent violet dyes	No	MIL.
<b>Solvent blue dyes:</b>	<b>Yes</b>	
Solvent Blue 3	No	PSG.
Solvent Blue 5	No	DSC.
Solvent Blue 23	No	BAS.
Solvent Blue 35	No	MRT.
Solvent Blue 36	No	MRT.
Solvent Blue 38	No	ATL, TNI.
Solvent Blue 43	No	ATL.
Solvent Blue 58	No	VPC.
Solvent Blue 59	No	MRT, VPC.
Solvent Blue 98	No	MRT.
Solvent Blue 99	No	MRT.
Solvent Blue 100	No	MRT.
Solvent Blue 101	No	MRT.
Solvent Blue 102	No	MRT.
Solvent Blue 129	No	MRT.
All other solvent blue dyes	No	MIL.
<b>Solvent green dyes:</b>	<b>No</b>	
Solvent Green 3	No	CK, MRT.
<b>Solvent brown dyes:</b>		
Solvent Brown 12	No	PSC.
Solvent Brown 20	No	ATL.
Solvent Brown 22	No	PSC.
Solvent Brown 52	No	MRT.
<b>Solvent black dyes:</b>	<b>No</b>	
Solvent Black 5	No	LVR.
Solvent Black 7	No	BAS, OCC, PSC.
Solvent Black 13	No	ATL, CK.
Solvent Black 26	No	ATL, FAB.
Solvent Black 46	No	MRT.
Solvent Black 47	No	MRT.
Solvent Black 49	No	MRT.

See footnotes at end of table.

Table 4-2--Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
Sulfur dyes:	No	
Sulfur yellow dyes:	No	
Leuco Sulfur Yellow 22	No	SDC.
All other sulfur yellow dyes	No	SDC.
Sulfur orange dyes:	No	
All other sulfur orange dyes	No	SDC.
Sulfur red dyes:	No	
Leuco Sulfur Red 14	No	SDC.
Sulfur Red 10	No	SDC.
Sulfur blue dyes:	No	
Leuco Sulfur Blue 7	No	S. SDC.
Leuco Sulfur Blue 11	No	SDC.
Sulfur green dyes:	No	
Leuco Sulfur Green 2	No	SDC.
Leuco Sulfur Green 16	No	SDC.
Leuco Sulfur Green 34	No	SDC.
Leuco Sulfur Green 35	No	SDC.
Leuco Sulfur Green 36	No	SDC.
Sulfur brown dyes:	No	
Leuco Sulfur Brown 1, 1:1	No	SDC.
Leuco Sulfur Brown 3	No	SDC.
Leuco Sulfur Brown 37	No	SDC.
Leuco Sulfur Brown 52	No	SDC.
Sulfur brown dyes:	No	
Leuco Sulfur Brown 96	No	S.
All other sulfur brown dyes	No	SDC.
Sulfur black dyes:	No	
Leuco Sulfur Black 1	No	SDC.
Leuco Sulfur Black 2	No	SDC.
Leuco Sulfur Black 11, 11:1	No	SDC.
Leuco Sulfur Black 18	No	SDC.
Solubilized Sulfur Black 2	No	S. SDC.
Sulfur Black 1	No	BRR.
Sulfur Black 11, 11:1	No	SDC.
Vat dyes:	Yes	
Vat yellow dyes:	Yes	
Vat Yellow 2, 8-1/2%	No	BRR.
Vat Yellow 33, 15%	No	CGY.
Vat orange dyes:	Yes	
Vat Orange 1, 20%	No	CGY. SDC.
Vat Orange 2, 12%	No	BAS.
Vat Orange 7, 11%	No	HCL.
Vat Orange 9, 12%	No	BAS.
Vat red dyes:	Yes	
Vat Red 1, 13%	No	BAS.
Vat Red 10, 18%	No	BAS. CGY.
Vat Red 13, 11%	No	CGY.
Vat Red 15, 10%	No	HCL.
All other vat red dyes	No	HCL.
Vat violet dyes:	Yes	
Vat Violet 1, 11%	No	BRR. CGY.
Vat Violet 13, 6-1/4%	No	BAS. SDC.
Vat blue dyes:	Yes	
Vat Blue 1, 20%	No	BCC. PSC.
Vat Blue 6, 8-1/3%	No	BAS. CGY.
Vat Blue 16, 16%	No	BAS. BUC. CGY.
Vat Blue 18, 13%	No	CGY.
Vat Blue 19	No	BAS.
Vat Blue 20, 14%	No	BRR. CGY. SDC.
Vat Blue 29	No	BAS.

See footnotes at end of table.

Table 4-2—Continued

Dyes for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Dyes	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 4-3)
Vat dyes—Continued	Yes	
Vat blue dyes—Continued	Yes	
Vat Blue 43 .....	No	S, SDC.
Vat Blue 66 .....	No	BAS.
Vat green dyes:	Yes	
Vat Green 1, 6% .....	No	BAS, CGY, SDC.
Vat Green 3, 10% .....	Yes	BAS, BRR, SDC.
Vat Green 7 .....	No	SDC.
All other vat green dyes .....	No	BRR.
Vat brown dyes:	Yes	
Vat Brown 1, 11% .....	No	BRR, CGY.
Vat Brown 11, 12% .....	No	CGY.
Vat Brown 13, 17% .....	No	CGY.
Vat Brown 57, 12.8% .....	No	CGY, HCL.
All other vat brown dyes .....	No	BRR.
Vat black dyes:	Yes	
Vat Black 16 .....	No	BRR, CGY.
Vat Black 22, 19% .....	No	CGY.
Vat Black 25, 12-1/2% .....	No	BAS, CGY, SDC.
All other vat black dyes .....	No	BRR, SDC.
Miscellaneous dyes:		
All other dyes .....	Yes	BRR, DAN, MIL, MRT, SDC.

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.



Table 4-3

Dyes: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
ALL	Alliance Chemical, Inc.	ICI	ICI Americas, Inc., Specialty Chem Div.
ATL	Atlantic Industries, Inc.	LVR	C. Lever Co., Inc.
BAS	BASF Corp.	MIL	Milliken & Co., Milliken Chemical Div.
BCC	Buffalo Color Corp.	MRT	Morton International, Inc., Specialty Chemicals
BRR	Burris Chemical Inc., Colors Div.	OCC	Orient Chemical Corp.
BUC	Synalloy Corp., Blackman Uhler Chemical Div.	PCW	Pfister Chemical, Inc.
CGY	Ciba-Geigy Corp.	PSC	Passaic Color & Chemical Co.
CIC	Color Chem International Corp.	PSG	PMC, Inc., PMC Specialties Group, Inc.
CK	Crompton & Knowles Corp.	S	Sandoz Chemical Corp., Colors & Chemicals Div.
DAN	Dan River, Inc., Chemical Products Div.	SDC	Sun Chemical Corp., Pigments Div.
DGO	Day-Glo Color Corp.	SNA	McCormick & Co., Inc., McCormick/Strange Flavor Div.
DSC	Dye Specialties, Inc.	STG	
EKT	Eastman Kodak Co., Tennessee Eastman Co. Div.	TNI	Gillette Co., Chemical Div.
FAB	Fabricolor Manufacturing Corp.	VPC	Mobay Chemical Corp., Dyes & Pigments Div.
HCL	Hoechst Celanese Corp.: Sou-Tex Works Specialty Chem Group	WJ	Warner-Jenkinson Co.
HIL	Hilton Davis Company		

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A.  
 Source: Compiled from data received in response to questionnaire of the U.S. International Trade Commission.



## Section 5 Organic Pigments

Organic pigments are toners and lakes<sup>1</sup> derived in whole or in part from benzenoid chemicals and colors.

Statistics on production and sales of all organic pigments in 1989 are given in table 5-1. Individual toners and lakes are identified in this report by the names used in the third edition of the *Colour Index*.

Total production of organic pigments in 1989 was 50 million kilograms, 4 percent less than the 53 million kilograms produced in 1988. Total sales of organic pigments in 1989 amounted to 43 million kilograms, valued at \$702 million, compared with 39 million kilograms, valued at \$595 million, in 1988. In terms of quantity, sales of organic pigments in 1989 were 10 percent higher than in 1988; in terms of value, sales in 1989 were 18 percent higher than in 1988. Changes in U.S. production of pigments have followed overall changes in U.S. economic activity during 1985-89 (see figure 5-1).

<sup>1</sup> Toners and lakes are essentially the same in their final form; they differ in the method of preparation. A lake is an organic pigment produced by the interaction of a soluble dye, a precipitant, and an absorptive inorganic substrate. A toner is an insoluble dye produced as a powder; some toners are extended by the inclusion of a solid diluent.

Production of toners in 1989 amounted to 50 million kilograms, 4 percent less than the 52 million pounds reported in 1988. Sales in 1989 were 43 million kilograms, valued at \$702 million, compared with 39 million kilograms valued at \$591 million, in 1988. In terms of quantity, sales of toners in 1989 were 10 percent higher than in 1988; in terms of value, sales were 18 percent higher in 1989 than in 1988. The individual toners listed in the report which were produced in the largest quantities in 1989 were Pigment Yellow 12, Pigment Yellow 14, Pigment Red 48:1 barium toner, Pigment Red 49:1 barium toner, Pigment Red 53:1 barium toner, Pigment Red 57:1, calcium toner, Pigment Violet 19, Pigment Blue 15:3, beta form, and Pigment Green 7.

Production of lakes totaled 307,000 kilograms in 1989, 9 percent lower than the 336,000 pounds reported for 1988. Sales of lakes in 1989 amounted to 256,000 kilograms, valued at \$4.4 million. In terms of quantity, sales of lakes in 1989 were 7 percent lower than in 1988; in terms of value, sales in 1989 were 7 percent higher lower than in 1988.

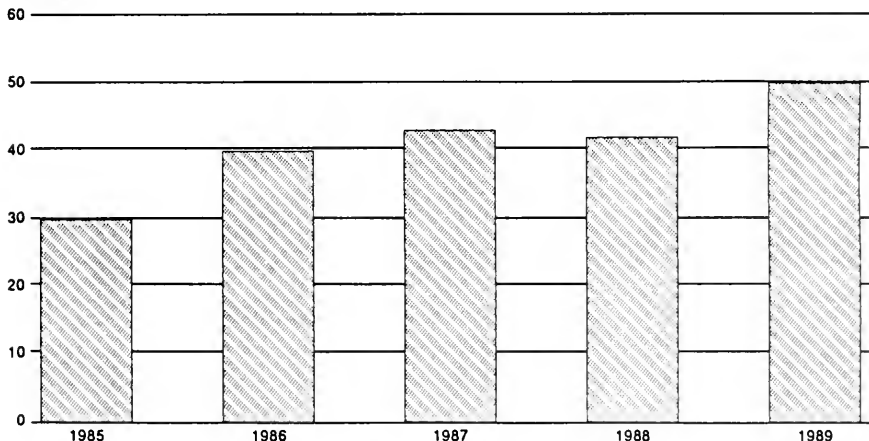
Table 5-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 5-3.

Stephen Wansner  
202-252-1363

(Effective 1/14/91 202-205-3363)

Figure 5-1  
Organic pigments: U.S. production, 1985-89

Millions  
of kilograms



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 5

Table 5-1

Organic pigments: U.S. production and sales, 1989

Organic pigments	Production	Sales		Average Unit value <sup>2</sup>
		Quantity	Value <sup>1</sup>	
	1,000 Kilograms dry basis <sup>3</sup>	1,000 Kilograms dry basis <sup>3</sup>	1,000 dollars	Per kilogram
Grand Total .....	50,360	43,236	701,552	\$16.23
<b>Toners</b>				
Total .....	50,053	42,980	697,145	16.20
Yellow toners, total .....	13,122	10,750	133,756	12.44
Acetoacetarylide yellows:				
Pigment Yellow 3, C.I. 11 710 .....	30	36	476	13.34
Pigment Yellow 65, C.I. 11 740 .....	99	94	1,739	18.58
Pigment Yellow 73, C.I. 11 738 .....	128	126	1,632	13.01
Pigment Yellow 74, C.I. 11 741 .....	326	316	5,979	18.92
All other acetoacetarylide yellows .....	774	267	3,386	12.67
Diarylide yellows:				
Pigment Yellow 12, C.I. 21 090 .....	8,192	6,468	74,695	11.55
Pigment Yellow 13, C.I. 21 100 .....	307	307	4,296	13.98
Pigment Yellow 14, C.I. 21 095 .....	2,372	2,283	23,968	10.50
Pigment Yellow 17, C.I. 21 105 .....	321	308	4,632	15.05
Pigment Yellow 83, C.I. 21 108 .....	507	485	10,668	22.01
All other yellow toners .....	66	60	2,285	38.08
Orange toners, total .....	1,303	1,174	17,312	14.75
Pigment Orange 5, C.I. 21 075 .....	437	347	4,015	11.58
Pigment Orange 16, C.I. 21 160 .....	410	374	4,165	11.13
Pigment Orange 46, C.I. 15 602 .....	370	346	4,319	12.50
All other orange toners .....	86	107	4,813	44.98
Red toners, total .....	17,158	14,927	264,131	17.69
Naphthol reds, total .....				
Pigment Red 2, C.I. 12 310 .....	20	16	419	26.09
Pigment Red 17, C.I. 12 390 .....	20	5	116	21.54
Pigment Red 22, C.I. 12 315 .....	118	112	1,863	16.69
Pigment Red 23, C.I. 12 355 .....	153	104	2,710	26.07
All other naphthol reds .....	669	655	18,601	28.42
Pigment Red 3, C.I. 12 120 .....	300	327	4,649	14.23
Pigment Red 4, C.I. 12 085 .....	41	37	568	15.33
Pigment Red 38, C.I. 12 120 .....	67	72	1,761	24.61
Pigment Red 48:1, barium toner, C.I. 15 865 .....	1,108	1,123	15,625	13.92
Pigment Red 48:2, calcium toner, C.I. 15 865 .....	704	629	8,493	13.50
Pigment Red 49:1, barium toner, C.I. 15 630 .....	1,932	1,669	16,668	10.00
Pigment Red 49:2, calcium toner, C.I. 15 630 .....	421	389	5,066	13.03
Pigment Red 52:1, calcium toner, C.I. 15 860 .....	376	386	6,284	16.29
Pigment Red 53:1, barium toner, C.I. 15 585 .....	1,160	1,141	11,663	10.22
Pigment Red 57:1, calcium toner, C.I. 15 850 .....	7,224	5,614	67,329	11.99
Pigment Red 81, PMA, C.I. 45 160 .....	180	170	6,532	38.38
All other red toners .....	2,665	2,478	95,784	38.63
Violet toners, total .....	2,547	2,459	85,175	34.65
Pigment Violet 1, C.I. 45 170 .....	12	13	474	37.11
Pigment Violet 19, C.I. 46 500 .....	1,856	1,797	55,666	30.97
Pigment Violet 23, C.I. 51 319 .....	226	218	17,044	78.32
All other violet toners .....	453	431	11,991	27.87

See footnotes at end of table.

Table 5-1—Continued

Organic pigments: U.S. production and sales, 1989

Organic pigments	Production	Sales		Average Unit value <sup>2</sup>
		Quantity	Value <sup>1</sup>	
	1,000 Kilograms dry basis <sup>3</sup>	1,000 Kilograms dry basis <sup>3</sup>	1,000 dollars	Per kilogram
<b>Toners—Continued</b>				
Blue toners, total .....	14,542	12,318	169,235	\$13.74
Pigment Blue 1, (PMA), C.I. 42 595 .....	31	27	911	33.81
Pigment Blue 15, alpha form, C.I. 74 160 .....	195	278	5,306	19.10
Pigment Blue 15:1, alpha form, C.I. 74 160 .....	380	413	10,965	26.55
Pigment Blue 15:2, alpha form, C.I. 74 160 .....	198	250	5,558	22.26
Pigment Blue 15:3, beta form, C.I. 74 160 .....	8,017	6,753	85,366	12.64
Pigment Blue 15:4, beta form, C.I. 74 160 .....	644	459	6,736	14.68
All other blue toners .....	5,077	4,138	54,393	13.14
Green toners, total .....	1,279	1,238	25,882	20.91
Pigment Green 7, C.I. 74 260 .....	1,211	1,166	23,173	19.87
All other green toners .....	68	72	2,709	37.76
Brown and black toners, .....	102	114	1,654	14.51
<b>Lakes</b>				
Total .....	307	256	4,407	17.21
Pigment Red 83, C.I. 58 000 .....	14	13	422	31.66
Pigment Violet 5:1, C.I. 58 055 .....	31	31	732	23.61
All other lakes .....	262	212	3,253	15.34

<sup>1</sup> The value of sales for toners is reported on a dry-full strength basis and the value of sales for lakes is reported on a dry form basis. All sales value data exclude the additional cost of processing or packaging in commercial forms other than the dry full-strength or dry form.

<sup>2</sup> Calculated from unrounded figures.

<sup>3</sup> Quantities for toners are reported as dry full-strength toner content, excluding the weight of any dispersing agent, vehicle, or extender. Quantities for lakes are reported as dry lake content, excluding the weight of any dispersing agent or vehicle.

Note.—The C.I. (Colour Index) number shown in this report are the identifying number given in the third edition of the Colour Index. The abbreviations PMA and PTA stand for phosphomolybdic and phosphotungstic (including phosphotungstomolybdic) acids, respectively.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 5-2

Organic pigments for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Organic pigments	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 5-3)
<b>Toners</b>		
<b>Yellow toners:</b>		
<b>Acetoacetarylide yellows:</b>		
Pigment Yellow 1	No	BAS, DUP, GLX, HSH, SNA, VPC.
Pigment Yellow 2	No	KCW.
Pigment Yellow 3	Yes	HEU, HSH, KCW, SNA, VPC.
Pigment Yellow 60	No	HSH.
Pigment Yellow 65	Yes	HEU, HSH, SNA, VPC.
Pigment Yellow 73	No	HCL, HSH, SNA, VPC.
Pigment Yellow 74	Yes	BAS, HCL, HEU, HIL, HSH, IND, ROM, SNA, VPC.
Pigment Yellow 97	No	HCL.
Pigment Yellow 98	No	HCL.
Pigment Yellow 116	No	VPC.
All other acetoacetarylide yellows	No	KCW.
<b>Diarylide yellows:</b>		
Pigment Yellow 12	Yes	AMS, APO, BAS, HCL, HIL, HSH, IDC, IND, POP, ROM, SNA.
Pigment Yellow 13	Yes	AMS, APO, BAS, FAB, GLX, HCL, IDC, IND, SNA.
Pigment Yellow 14	Yes	AMS, BAS, BNS, FAB, GLX, HCL, HSH, IDC, IND, ROM, SNA.
Pigment Yellow 17	Yes	AP0, BAS, FAB, GLX, HCL, HSH, IDC, IND, ROM, SNA, VPC.
Pigment Yellow 63	Yes	BAS, FAB, GLX, HCL, IDC, IND, ROM, SNA.
Pigment Yellow 124	No	GLX.
Pigment Yellow 152	No	HCL.
<b>Yellow pigments, other:</b>		
Pigment Yellow 139	No	VPC.
All other pigment yellow toners	No	HCL, HSH.
<b>Orange toners:</b>		
Pigment Orange 1	No	KCW.
Pigment Orange 2	No	UHL.
Pigment Orange 5	Yes	BAS, HCL, HIL, HSH, PCW, SNA.
Pigment Orange 13	No	GLX, HSH, IND, SNA, VPC.
Pigment Orange 15	No	BNS.
Pigment Orange 16	Yes	BNS, CGY, FAB, GLX, HSH, IND, ROM, SNA.
Pigment Orange 34	No	HCL, IND, ROM, VPC.
Pigment Orange 43	No	HCL.
Pigment Orange 46	Yes	AMS, BAS, CMC, MGR, SNA, UHL.
Pigment Orange 48	No	CGY.
Pigment Orange 49	No	CGY.
All other pigment orange toners	No	GLX.
<b>Red toners:</b>		
<b>Naphthol reds:</b>		
Pigment Red 2	Yes	GLX, HCL, HSH.
Pigment Red 5	No	GLX, HSH.
Pigment Red 13	No	KCW.
Pigment Red 14	No	HCL.
Pigment Red 17	Yes	BNS, ROM, SNA, UHL.
Pigment Red 21	No	BNS.
Pigment Red 22	Yes	GLX, HEU, IND, ROM, SNA.
Pigment Red 23	Yes	DUP, FAB, GLX, HEU, HSH, IND, KCW, ROM, SNA, UHL.
Pigment Red 31	No	GLX, HIL, ROM.
Pigment Red 112	No	HCL, VPC.
Pigment Red 146	No	HCL.
Pigment Red 147	No	HSH.
Pigment Red 170	No	GLX, HCL.
Pigment Red 210	No	SNA.
All other naphthol reds	No	BUC, FAB, GLX, IND, KCW, ROM, (2), (2).

See footnotes at end of table.

Table 5-2—Continued

Organic pigments for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Organic pigments	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 5-3)
<b>Toners—Continued</b>		
<b>Red toners—Continued</b>		
Red pigments, other:	Yes	
Pigment Red 1, (light)	No	HSH.
Pigment Red 3	Yes	BAS, CGY, HIL, HSH, KCW, SNA, UHL.
Pigment Red 4	Yes	ALE, HIL, HSH, MAX, UHL.
Pigment Red 38	Yes	HCL, HSH, SNA, VPC.
Pigment Red 41	No	VPC.
Pigment Red 48:1, (barium)	Yes	AMS, APO, BAS, CGY, CMC, FAB, HEU, HIL, HSH, MGR, MAX, SNA, UHL.
Pigment Red 48:2, (calcium)	Yes	AMS, APO, BAS, CMC, FAB, HIL, HSH, MGR, MAX, SNA, UHL, VPC.
Pigment Red 48:3, (strontium)	No	CGY, HEU, HSH.
Pigment Red 48:4, (manganese)	No	HEU, HSH, SNA, VPC.
Pigment Red 49:1, (barium)	Yes	AMS, BAS, BNS, CMC, HIL, IDC, MGR, SNA, UHL.
Pigment Red 49:2, (calcium)	Yes	AMS, BNS, CMC, HIL, IDC, MGR, SNA, UHL.
Pigment Red 52:1, (calcium)	Yes	BAS, HSH, MGR, SNA, UHL.
Pigment Red 52:2, (manganese)	No	BAS, HSH, UHL.
Pigment Red 53, (sodium)	No	MGR.
Pigment Red 53:1, (barium)	Yes	AMS, APO, BAS, CMC, FAB, HCL, HIL, HSH, IDC, MAX, SNA, UHL.
Pigment Red 57	No	BNS.
Pigment Red 57:1, (calcium)	Yes	AMS, APO, BAS, BNS, CGY, CMC, FAB, HEU, HIL, HSH, IDC, MGR, POP, PS, SNA, UHL.
Pigment Red 63	No	HSH.
Pigment Red 63:1, calcium	No	SNA.
Pigment Red 81, (PMA)	Yes	BAS, MGR, MAX, SNA, UHL.
Pigment Red 81, (PTA)	No	BAS, MGR, MAX, UHL.
Pigment Red 88	No	VPC.
Pigment Red 101	No	BAS.
Pigment Red 122	No	SNA, VPC.
Pigment Red 123	No	VPC.
Pigment Red 168	No	VPC.
Pigment Red 169	No	MAX.
Pigment Red 179	No	SNA, VPC.
Pigment Red 188	No	HCL.
Pigment Red 190	No	VPC.
Pigment Red 200	No	BAS.
Pigment Red 202	No	CGY, SNA, VPC.
Pigment Red 206	No	CGY.
Pigment Red 207	No	CGY.
Pigment Red 209	No	SNA.
Pigment Red 224	No	VPC.
Pigment Red 245	No	IND.
All other pigment red toners	No	HCL.
<b>Violet toners:</b>		
Pigment Violet 1, (fugitive)	No	KCW, UHL.
Pigment Violet 1, (PMA)	Yes	MGR, MAX, UHL.
Pigment Violet 1, (PTA)	No	MGR, SNA, UHL.
Pigment Violet 3, (fugitive)	No	KCW, MGR, UHL.
Pigment Violet 3, (PMA)	No	BAS, HIL, MGR, MAX, UHL.
Pigment Violet 3, (PTA)	No	MAX, UHL.
Pigment Violet 4, (fugitive)	No	KCW.
Pigment Violet 19	Yes	CGY, SNA, VPC.
Pigment Violet 23	Yes	HCL, IPP, SNA, VPC.
Pigment Violet 27	No	MAX.
Pigment Violet 29	No	SNA, VPC.
Pigment Violet 39, (PMA)	No	BAS.
Pigment Violet 42	No	CGY.
All other pigment violet toners	No	BUC. (?)

See footnotes at end of table.

Table 5-2 —Continued

Organic pigments for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Organic pigments	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 5-3)
<b>Toners—Continued</b>		
<b>Blue toners:</b>		
(Basic Blue 7) .....	No	KCW.
Pigment Blue 1, (PMA) .....	Yes	BNS, HIL, MGR, MAX, UHL.
Pigment Blue 1, (PTA) .....	No	MAX.
Pigment Blue 2, (PMA) .....	No	UHL.
Pigment Blue 14, (PMA) .....	No	BAS, UHL.
Pigment Blue 15, (alpha form) .....	Yes	BAS, CGY, FAB, HEU, HSH, SNA.
Pigment Blue 15:1, (alpha form) .....	Yes	CGY, HEU, HIL, SNA, VPC.
Pigment Blue 15:2, (alpha form) .....	Yes	CGY, DUP, HEU, HIL, SNA, VPC.
Pigment Blue 15:3, (beta form) .....	Yes	AMS, APO, BAS, CGY, CIK, CMC, HEU, HIL, IDC, IPP, MGR, POP, PS, ROM, SNA, VPC.
Pigment Blue 15:4, (beta form) .....	Yes	BAS, CGY, HEU, POP, SNA, VPC.
Pigment Blue 19 .....	No	PSG.
Pigment Blue 25 .....	No	GLX.
Pigment Blue 61 .....	No	BAS.
Pigment Blue 62 .....	No	MAX.
All other pigment blue toners .....	No	FAB.
<b>Green toners:</b>		
Pigment Green 1, (PMA) .....	No	MAX, UHL.
Pigment Green 2, (PTA) .....	No	MAX, UHL.
Pigment Green 4, (fugitive) .....	No	UHL.
Pigment Green 4, (PMA) .....	No	UHL.
Pigment Green 7 .....	Yes	ALG, BAS, CGY, HCL, HIL, MGR, POP, SNA, VPC.
Pigment Green 8 .....	No	KCW.
Pigment Green 10 .....	No	HEU.
Pigment Green 36 .....	No	BAS, SNA, VPC.
All other pigment green toners .....	No	( <sup>2</sup> ).
<b>Brown toners:</b>		
Pigment Brown 5 .....	No	GLX.
<b>Black toners:</b>		
Pigment Black 7 .....	No	HCL, VPC.
All other pigment black toners .....	No	HCL, UHL.
<b>Lakes:</b>		
<b>Yellow lakes:</b>		
(Acid Yellow 1) .....	No	KCW.
(Acid Yellow 23) .....	No	MAX.
<b>Orange lakes:</b>		
Pigment Orange 17 .....	No	KCW.
<b>Red lakes:</b>		
(Acid Red 26) .....	No	KCW.
(Basic Red 1) .....	No	BNS.
(Basic Red 81, PMA) .....	No	LVR.
Pigment Red 60:1 .....	No	HSH, MAX, SNA.
Pigment Red 83 .....	Yes	HSH, MAX, UHL.
<b>Violet lakes:</b>		
(Basic Violet 1) .....	No	BNS.
(Basic Violet 3, PMA) .....	No	LVR.
(Basic Violet 4) .....	No	BNS.
(Basic Violet 10) .....	No	BNS.
Pigment Violet 5:1 .....	Yes	HSH, MAX, UHL, VPC.
<b>Blue lakes:</b>		
(Basic Blue 14, PMA) .....	No	LVR.
(Basic Blue 1, PTA) .....	No	LVR.

See footnote at end of table.



Table 5-2 —Continued

Organic pigments for which U.S. production and/or sales were reported, identified by manufacturer, 1989

<i>Organic pigments</i>	<i>Separate statistics<sup>1</sup></i>	<i>Manufacturers' identification codes (according to list in table 5-3)</i>
<b>Lakes—Continued</b>		
<b>Green lakes:</b>		
(Acid Green 3) .....	No	KCW.
(Basic Green 1, PMA) .....	No	LVR.

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 5-3

Organic pigments: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
ALE .....	Alex Chemical Co.	HIL .....	Hilton Davis Company
ALG .....	Allegheny Chemical Corp.	HSH .....	Engelhard Corporation
AMS .....	Rldgway Color Co.	IDC .....	Industrial Color, Inc.
APO .....	Apollo Colors, Inc.	IND .....	Indol Color Co., Inc.
BAS .....	BASF Corp.	IPP .....	Spectrachim Corp.
BNS .....	Binney and Smith, Inc.	KCW .....	Keystone Color Works, Inc.
BUC .....	Synalloy Corp., Blackman Uhler Chemical Div.	LVR .....	C. Lever Co., Inc.
CGY .....	Ciba-Gelgy Corp.	MAX .....	Max Marx Color Corp.
CIK .....	Flint Ink Corp., Cal/Ink Div.	MGR .....	Magruder Color Co., Inc.
CMC .....	Chromatic Color Corp.	PCW .....	Pfister Chemical, Inc.
DUP .....	E.I. duPont de Nemours & Co., Inc., Chemicals and Pigments Dept.	POP .....	Dalcolor-Pope, Inc.
FAB .....	Fabricolor Manufacturing Corp.	PS .....	CPS Corp.
GLX .....	Galaxie Chemical Corp.	PSG .....	PMC, Inc. Specialties Group, Inc.
HCL .....	Hoechst Celanese Corp.: Sou-Tex Works	ROM .....	Roma Color, Inc.
	Specialty Chem Group	SNA .....	Sun Chemical Corp., Pigment Div.
HEU .....	Cookeon Pigment, Inc.	UHL .....	Paul Uhlich & Co., Inc.
		VPC .....	Mobay Chemical Corp., Dyes & Pigments Div.

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A.  
Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 6 Medicinal Chemicals

Medicinal chemicals include the medicinal and feed grades of all organic chemicals having therapeutic value, whether obtained by chemical synthesis, by fermentation, by extraction from naturally occurring plant or animal substances, or by refining a technical grade product. They include antibiotics and other anti-infective agents, antihistamines, autonomic drugs, cardiovascular agents, central nervous system depressants and stimulants, hormones and synthetic substitutes, vitamins, and other therapeutic agents for human or veterinary use, and for animal feed supplements. Data for the production of these products during 1985-89 are shown in figure 6-1.

Table 6-1 shows statistics for production and sales of medicinal chemicals grouped by pharmacological class. The statistics shown are for bulk chemicals only. Finished pharmaceutical preparations and products put up in pills, capsules, tablets, or other measured doses are excluded.<sup>1</sup> The difference between production and sales reflects inventory changes, processing losses, and captive consumption of medicinal chemicals processed into ethical and proprietary

<sup>1</sup> Complementary statistics on the dollar value of manufacturers' shipments of finished pharmaceutical preparations, except biologicals, are published annually by the U.S. Department of Commerce, Bureau of the Census, in Current Industrial Reports, Series MA-28G. Many pharmaceutical manufacturers that report to the Bureau of the Census are excluded from the U.S. International Trade Commission report because they are not primary producers of medicinal chemicals; that is, they do not themselves produce the bulk drugs which go into their pharmaceutical products, but purchase their drug requirements from domestic or foreign producers.

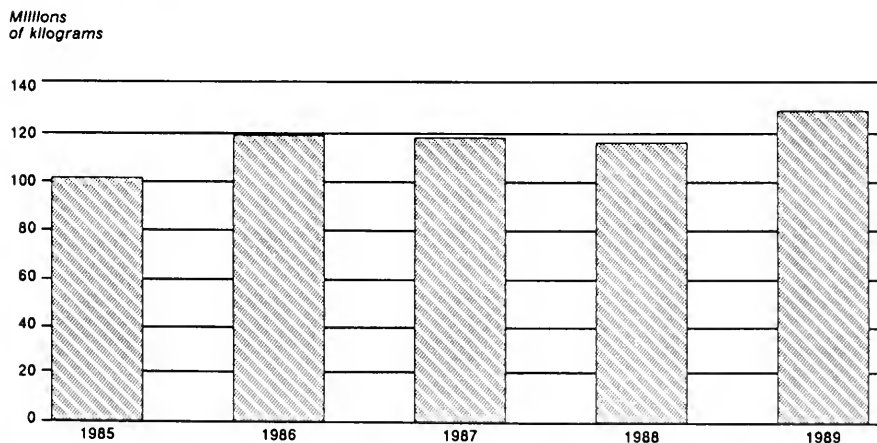
pharmaceutical products by the primary manufacturer. In some instances, the difference may also include quantities for medicinal grade products used as intermediates; for example, penicillin V used as an intermediate in the manufacture of other antibiotics. All quantities are given in terms of 100 percent content of the pure bulk drug. Table 6-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 6-3.

Total U.S. production of bulk medicinal chemicals in 1989 amounted to 130.3 million kilograms. Total sales of bulk medicinal chemicals in 1989 amounted to 203.6 million kilograms, valued at \$1,987.5 million. Beginning in 1980, methionine and most other amino acids and their salts are reported in the section on Miscellaneous End-Use Chemicals and Chemical Products. Section totals are not, therefore, comparable with years prior to 1980.

Production of the larger groups of medicinal chemicals in 1989 was as follows (see table 6-1): Antibiotics, 17.6 million kilograms, 34 percent higher than in 1988; anti-infective agents other than antibiotics, 8.9 million kilograms, 3 percent higher than in 1988; central nervous system depressants and stimulants, 34.3 million kilograms, 53 percent higher than in 1988; gastrointestinal agents and therapeutic nutrients, 34.4 million kilograms, 24 percent lower than in 1988; and vitamins, 19.9 kilograms, 14 percent higher than in 1988.

*Elizabeth R. Nesbitt*  
202-252-1355  
(Effective 1/14/91 202-205-3355)

**Figure 6-1**  
**Medicinal Chemicals: U.S. production, 1985-89**



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 6

Table 6-1

Medicinal chemicals: U.S. production and sales, 1989

Medicinal chemicals	Production <sup>1</sup>	Sales		Average Unit value <sup>2</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
Grand total .....	130,326	203,613	1,987,519	\$9.76
Acyclic .....	34,654	50,447	205,486	4.07
Benzenoid <sup>3</sup> .....	63,402	134,664	889,795	6.61
Cyclic nonbenzenoid <sup>4</sup> .....	32,270	18,502	892,238	48.22
Antibiotics .....	17,645	105,047	606,524	5.77
Antihistamines .....	190	152	7,276	47.87
Anti-infective agents (except antibiotics), total .....	8,902	6,301	42,042	6.67
Anthelmintics .....	4,152	2,634	4,800	1.82
All other anti-infective agents (except antibiotics) <sup>5</sup> .....	4,750	3,667	37,242	10.16
Central depressants and stimulants, total .....	34,331	24,542	381,026	15.53
Analgesics, antipyretics, and nonhormonal anti-inflammatory agents, total .....	31,452	23,325	164,829	7.07
Aspirin .....	10,201	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )
All other analgesics, antipyretics, and nonhormonal anti-inflammatory agents <sup>7</sup> .....	21,251	23,325	164,829	7.07
Antidepressants .....	40	7	1,795	256.43
Antitussives .....	214	184	45,527	247.43
All other central depressants and stimulants <sup>8</sup> .....	2,625	1,026	168,875	164.60
Dermatological agents .....	5,349	2,660	5,762	2.17
Expectorants and mucolytic agents .....	475	430	9,336	21.71
Gastrointestinal agents and therapeutic nutrients <sup>9</sup> .....	34,445	48,735	58,274	1.20
Vitamins <sup>10</sup> .....	19,872	13,459	160,052	11.89
Miscellaneous medicinal chemicals <sup>11</sup> .....	9,117	2,287	717,227	313.61

<sup>1</sup> The data on production and sales are for bulk medicinal chemicals only. Methionine and most other amino acids and their salts are now reported in the section on Miscellaneous End-Use Chemicals and Chemical Products. Section totals are not, therefore, comparable with years prior to 1980.

<sup>2</sup> Calculated from rounded figures.

<sup>3</sup> Benzenoid, as used in this report, describes any cyclic medicinal chemical whose molecule contains either a 6-membered carbocyclic ring with conjugated double bonds or a 6-membered heterocyclic ring with 1 or 2 hetero atoms and conjugated double bonds, except the pyrimidine ring.

<sup>4</sup> Includes antibiotics of unknown structure.

<sup>5</sup> Includes production and sales of antiprotozoan agents, sulfonamides, and urinary antiseptics; does not include production of sulfaguanidine used as an intermediate in the production of anti-infective sulfonamides.

<sup>6</sup> Reported data were accepted in confidence and may not be published, or no data were reported.

<sup>7</sup> Includes sales quantity and value of aspirin.

<sup>8</sup> Includes production and sales of amphetamines; general anesthetics; respiratory and cerebral stimulants; skeletal muscle relaxants; tranquilizers; and anticonvulsants, hypnotics, and sedatives.

<sup>9</sup> Methionine and its salts are reported in the section in Miscellaneous End-Use Chemicals and Chemical Products under amino acids.

<sup>10</sup> Includes production and sales of vitamin A, vitamin B, vitamin C, vitamin D, vitamin E, and vitamin K.

<sup>11</sup> Includes production and sales of antineoplastic agents, cardiovascular agents, diagnostic agents, hematological agents, renal-acting and edema-reducing agents, autonomic drugs, and unclassified medicinal chemicals. Also includes production and sales of local anesthetics, smooth muscle relaxants (including theophylline derivatives), and hormones and synthetic substitutes.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 6-2

Medicinal chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

<i>Medicinal chemicals</i>	<i>Separate statistics<sup>1</sup></i>	<i>Manufacturers' identification codes (according to list in table 6-3)</i>
Antibiotics:	Yes	
Cephalosporins:	No	
Cefaclor .....	No	LIL.
Cefamandole .....	No	LIL.
Cefazolin, sodium .....	No	LIL.
Cefoxitin .....	No	MRK.
Cephalexin .....	No	BOC, KAN, LIL, TRD.
Cephalothin, sodium .....	No	LIL.
Cephradine .....	No	KAN, SK, TRD.
Penicillins, semisynthetic:	No	
Amoxicillin:	No	
Amoxicillin (trihydrate) .....	No	BEE, BOC, KAN.
Amoxicillin (anhydrous) .....	No	BEE, BEW, BRS.
Ampicillin:	No	
Ampicillin (trihydrate) .....	No	BEW, BOC, BRS, KAN.
Other semisynthetic penicillins:	No	
Ampicillin, sodium .....	No	BEE, BEW, WYT.
Carbenicillin, disodium .....	No	BEW.
Cloxacillin, sodium .....	No	BEE, BEW.
Dicloxacillin, sodium .....	No	BEE, BEW, BOC, WYT.
Floxacin .....	No	BEW.
Hetacillin, potassium .....	No	BRS.
Nafcillin, sodium .....	No	WYT.
Oxacillin, sodium .....	No	BEE, BOC.
Piperacillin .....	No	BRS.
Ticarcillin, disodium .....	No	BEE, BEW.
All other semisynthetic penicillins .....	No	BEE.
Penicillins (except semisynthetic):	No	
For medicinal use:	No	
Penicillin V .....	No	BRS.
Penicillin G, benzathine .....	No	WYT.
Penicillin G, potassium .....	No	PFZ.
Penicillin V, potassium .....	No	BRS, LIL.
Penicillin G, procaine (medicinal grade) .....	No	PFZ, WYT.
For nonmedicinal uses:	No	
Penicillin G, procaine (animal feed grade) .....	No	PFZ.
Tetracyclines:	No	
For medicinal use:	No	
Chlortetracycline (medicinal grade) .....	No	ACY.
Demeclocycline .....	No	ACY.
Minocycline .....	No	ACY.
Oxytetracycline (medicinal grade) .....	No	PFZ.
Tetracycline .....	No	ACY.
For nonmedicinal uses:	No	
Chlortetracycline (animal feed grade) .....	No	ACY, PFZ.
Oxytetracycline (animal feed grade) .....	No	PFZ.
Other antibiotics:	No	
For medicinal use:	No	
Antifungal antibiotics:	No	
Amphotericin B .....	No	PEN, TRD.
Nystatin (medicinal grade) .....	No	ACY, TRD.
Tobramycin .....	No	LIL.
Antitubercular antibiotics:	No	
Cycloserine .....	No	LIL.
Dihydrostreptomycin .....	No	PFZ.
Other antibiotics for medicinal use:	No	
Aztreonam .....	No	TRD.
Cefonicid .....	No	SK.
Cefuroxime .....	No	LIL.
Clindamycin .....	No	ABB, UPJ.
Erythromycin .....	No	ABB, ANG, UPJ.
Erythromycin estolate .....	No	LIL, UPJ.

<sup>1</sup> footnotes at end of table.

Table 6-2—Continued

Medicinal chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Medicinal chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 6-3)
Antibiotic—Continued	Yes	
Other antibiotics—Continued	No	
For medicinal use—Continued	No	
Other antibiotics for medicinal use—Continued	No	
Erythromycin stearate	No	UPJ.
Erythromycin succinate	No	ANG.
Erythromycin thioyanate	No	ANG.
Gentamycin	No	SCH.
Imipenem	No	MRK.
Kanamycin	No	BRS.
Lincomycin (medicinal grade)	No	UPJ.
Moxalactam	No	LIL.
Neomycin (medicinal grade)	No	UPJ.
Netilmicin	No	SCH.
Novoblocin, sodium	No	UPJ.
Polymyxin B	No	PFZ.
Sisomicin	No	SCH.
Spectinomycin (medicinal grade)	No	ABB, UPJ.
Thiostrepton	No	TRD.
Vancomycin	No	ABB, ACY, LIL.
All other antibiotics, for medicinal use	No	ABB, RSA.
For nonmedicinal uses:	No	
Bacitracin (animal feed grade)	No	IMC.
Cycloheximide	No	UPJ.
Efrotomycin	No	MRK.
Hygromycin B	No	LIL.
Lasalocid, sodium	No	HOF.
Lincomycin (animal feed grade)	No	UPJ.
Monesin	No	LIL.
Neomycin (animal feed grade)	No	PFZ, UPJ.
Spectinomycin (animal feed grade)	No	UPJ.
Streptomycin	No	PFZ.
Tylosin	No	LIL.
Antihistamines:	Yes	
Antinauseants:	No	
Dimenhydrinate	No	GAN.
Meclizine hydrochloride	No	PFZ.
Metoclopramide hydrochloride	No	LLI.
Other antihistamines:	No	
Brompheniramine maleate	No	LLI.
Chlorpheniramine	No	SK, UPJ.
Chlorpheniramine maleate	No	SK.
Chlorpheniramine tannate	No	CHL.
Cyproheptadine hydrochloride	No	MRK.
Dexbrompheniramine maleate	No	(*)
Dimethindene maleate	No	CGY.
Diphenhydramine citrate	No	WYK.
Diphenhydramine hydrochloride	No	PD, WYK.
Doxylamine succinate	No	BKC, MAL.
Phenindamine tartrate	No	HOF.
Phenyltoloxamine citrate	No	GAN.
Tripeleannamine	No	CGY.
Tripeleannamine citrate	No	CGY.
Tripeleannamine hydrochloride	No	CGY.
Triprolidine hydrochloride	No	AMD, BUR.
Anti-infective agents (except antibiotics):	Yes	
Anthelmintics:	Yes	
Clorsulon	No	MRK.
Dichlorvos	No	CHL.
Diethylcarbamazine citrate	No	SK.
Ivermectin	No	MRK.
Piperazine	No	TX, UCC.

See footnotes at end of table.

Table 6-2—Continued

Medicinal chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Medicinal chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 6-3)
Anti-infective agents (except antibiotics)—Continued	Yes	
Anthelmintics—Continued	Yes	
Piperazine dihydrochloride	No	FLM.
Piperazine hexahydrate	No	BRS.
Piperazine hydrochloride	No	FLM.
Piperazine sulfate	No	FLM.
Thiabendazole	No	MRK.
Antiprotozoan agents:	No	
Arsenic and bismuth compounds:	No	
Arsanilic acid	No	FLM.
Bismuth subsalicylate	No	MAL.
Nitarsone	No	SAL.
Roxarsone	No	SAL.
Roxarsone, sodium	No	SAL.
Other antiprotozoan agents:	No	
Amprolium	No	MRK.
Dinitolmide	No	SAL.
Ethopabate	No	MRK.
Florfenicol	No	SCH.
Hydroxychloroquine sulfate	No	SD.
Iodochlorhydroxyquin	No	CGY.
Metronidazole	No	SRL.
Sulfonamides:	No	
Mafenide	No	SDW.
Mafenide acetate	No	SDW.
Sulfabenzamide	No	ACY.
Sulfacetamide, sodium	No	SCH.
Sulfadiazine	No	ACY.
Sulfadiazine, silver	No	BOT. LEM.
Sulfadimethoxine	No	HOF.
Sulfamethazine	No	SAL.
Sulfamethazine, sodium	No	SAL.
Sulfamethizole	No	ACY.
Sulfamethoxazole	No	HOF.
Sulfasalazine	No	SAL.
Sulfathiazole, sodium	No	SAL.
Sulfisoxazole	No	HOF.
Sulfisoxazole, acetyl	No	HOF.
Urinary antiseptics:	No	
Methanamine	No	ARN.
Methanamine mandelate	No	ARN. PD.
Other anti-infective agents:	Yes	
Antifungal agents:	No	
Benzolic acid	No	KLM.
Calcium undecylenate	No	RCN.
Fluconazole	No	PFZ.
Flucytosine	No	HOF.
Sodium caprylate	No	LEM.
Zinc undecylenate	No	RCN.
All other antifungal agents	No	ARN.
Antileprotic and antitubercular agents:	No	
Aminosalicilic acid	No	HXL.
Sulfoxone, sodium	No	ABB.
Antiviral agents:	No	
Acyclovir	No	BUR.
Azidothymidine	No	BUR.
General antiseptics and antibacterial agents:	No	
Bromchlorenone	No	MHI.
Capreomycin	No	LIL.
Ceftazidime	No	BRS. LIL.
Cetylpyridinium chloride	No	HXL.
Cinoxacin	No	LIL.

See footnotes at end of table.

Table 6-2—Continued

Medicinal chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Medicinal chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 6-3)
Anti-infective agents (except antibiotics)—Continued	Yes	
Other anti-infective agents—Continued	Yes	
General antiseptics and antibacterial agents—Cont	No	
m-Cresyl acetate	No	ADC.
8-Hydroxy-5-quinolinesulfonic acid	No	MRK.
Iodoform	No	MAL.
Magnesium salicylate	No	ARN.
Ormetoprim	No	HOF.
Oxyquinoline benzoate (Benoxiquine)	No	LEM.
Oxyquinoline citrate	No	LEM.
Pentamidine isethionate	No	MRX.
Povidone - Iodine	No	GAF.
Resorcinol	No	ISP.
Trimethoprim	No	BUR.
Autonomic drugs:	No	
Sympathomimetic agents:	No	
Albuterol sulfate	No	SCH.
Dobutamine	No	LIL.
Methoxyphenamine hydrochloride	No	HXL.
Naphazoline hydrochloride	No	CGY.
Phenylephrine bitartrate	No	GAN.
Phenylephrine hydrochloride	No	GAN, SDW.
Phenylpropanolamine bitartrate	No	ARS.
Phenylpropanolamine hydrochloride	No	HXL, ORT.
Propylhexedrine	No	SK.
Pseudoephedrine hydrochloride	No	BUR, GAN.
Pseudoephedrine sulfate	No	GAN.
Terbutaline sulfate	No	CGY.
Tetrahydrozoline hydrochloride	No	PFZ.
All other sympathomimetic (adrenergic) agents	No	ARN.
Other autonomic drugs:	No	
Parasympatholytic quaternary ammonium compounds (except tropane derivatives):	No	
Glycopyrrolate	No	LLI.
Propantheline bromide	No	SRL.
Parasympatholytic tertiary amines (except tropane derivatives):	No	
Oxybutyrin chloride	No	ABB.
Oxyphenycyclimine hydrochloride	No	PFZ.
Parasympathomimetic agents:	No	
Bethanechol chloride	No	GAN.
Neostigmine methylsulfate	No	HOF.
Pyridostigmine bromide	No	HOF.
Sympatholytic agents:	No	
Timolol maleate	No	MRK.
Central depressants and stimulants:	Yes	
Analgesics, antipyretics, and nonhormonal anti-inflammatory agents:	Yes	
Acetaminophen	No	MAL, MON, RDA, SDW.
Aspirin	Yes	DOW, MON, NOR, RDA, SD.
Aurothioglucose	No	SCH.
Butorphanol tartrate	No	BRS.
Choline magnesium salicylate	No	ARN, LEM.
Choline salicylate	No	ARN.
Diflunisal	No	MRK.
Fenopropfen	No	LIL, WYK.
Fentanyl citrate	No	MRX.
Flunixin	No	SCH.
Hydromorphone hydrochloride	No	PEN.
Ibuprofen	No	TNA.
Indomethacin	No	MRK.
Ketoprofen	No	WYK.

See footnotes at end of table.



Table 6-2—Continued

Medicinal chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Medicinal chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 6-3)
Central depressants and stimulants—Continued	Yes	
Analgesics, antipyretics, and nonhormonal anti-inflammatory agents—Continued	Yes	
Meclofenamate, sodium	No	PD, WYK.
Meclofenamic acid	No	PD.
Mefenamic acid	No	PD, WYK.
Meperidine hydrochloride	No	PEN, SDW.
Methadone hydrochloride	No	MAL.
Morphine sulfate	No	MAL, PEN.
Oxycodone hydrochloride	No	DUP, MAL, PEN.
Oxycodone terephthalate	No	PEN.
Pentazocine	No	SD.
Pentazocine hydrochloride	No	SD.
Phenylbutazone	No	CGY.
Piroxicam	No	PFZ.
Potassium salicylate	No	KLM.
Propoxyphene hydrochloride	No	ABB, GAN, LIL.
Propoxyphene napsylate	No	ABB, GAN, LIL.
Salsalate	No	WYK.
Sodium aminobenzoate	No	GAN.
Sodium salicylate	No	KLM.
Sulindac	No	MRK.
Anticonvulsants, hypnotics, and sedatives:	No	
Anticonvulsants (except barbiturates):	No	
Ethosuximide	No	PD.
Ethotoin	No	ABB.
Methsuximide	No	PD.
Phenytoin	No	PD.
Phenytoin, sodium	No	PD.
Valproic acid	No	ABB.
Barbiturates:	No	
Amobarbital	No	GAN.
Amobarbital, sodium	No	GAN.
Butabarbital	No	GAN.
Butabarbital, sodium	No	ABB.
Butalbital	No	GAN.
Phenobarbital	No	GAN.
Phenobarbital, sodium	No	GAN.
Poly(oxy-1,2-ethanediyloxy)- $\alpha$ -carboxymethyl, omega-(tridecyloxy), potassium salt	No	GAN.
Secobarbital	No	GAN.
Secobarbital, sodium	No	GAN.
Thiamylal, sodium	No	ABB, PD.
Thiopental, sodium	No	ABB.
Hypnotics and sedatives (except barbiturates):	No	
Alprazolam	No	UPJ.
Dichloralphenazone	No	ARN.
Ethchlorvynol	No	ABB.
Glutethimide	No	CGY, GAN.
Antidepressants:	Yes	
Amitriptyline hydrochloride	No	GAN, MRK.
Amoxapine	No	WYK.
Bupropion	No	BUR.
Doxepin hydrochloride	No	PFZ, SK.
Imipramine hydrochloride	No	CGY.
Maprotiline hydrochloride	No	ABB.
Nortriptyline hydrochloride	No	LIL.
Antitussives:	Yes	
Benzonatate	No	CGY, WYK.
Caramphen	No	SK.
Codeine	No	MAL, PEN.
Dextromethorphan hydrobromide	No	AMD, HOF.

See footnotes at end of table.

Table 6-2—Continued

Medicinal chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Medicinal chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 6-3)
Central depressants and stimulants—Continued	Yes	
Antitussives—Continued	Yes	
Doxepin	No	SK.
Hydrocodone bitartrate	No	MAL, PEN.
Noscapine	No	MAL, PEN.
Thebaine	No	MAL, PEN.
Tranquillizers:	No	
Phenothiazine derivatives:	No	
Chlorpromazine	No	SK.
Chlorpromazine hydrochloride	No	SK.
Fluphenazine hydrochloride	No	TRD.
Perphenazine	No	SCH.
Prochlorperazine	No	SK.
Prochlorperazine maleate	No	SK.
Other tranquilizers:	No	
Diazepam	No	PEN.
Halazepam	No	SCH.
Haloperidol	No	SRL.
Hydroxyzine pamoate	No	LEM, PFZ.
Loxapine succinate	No	WYK.
Prazepam	No	PD.
Thiothixene hydrochloride	No	PFZ.
Other central depressants and stimulants:	Yes	
Amphetamines:	No	
Amphetamine	No	ARN, SK.
Amphetamine sulfate	No	ARN.
Dextroamphetamine	No	ARN.
Dextroamphetamine sulfate	No	ARN.
Methamphetamine hydrochloride	No	ARN.
General anesthetics:	No	
Enflurane	No	OH.
Isoflurane	No	OH.
Ketamine hydrochloride	No	PD.
Respiratory and cerebral stimulants:	No	
Caffeine (natural and synthetic):	No	
Caffeine, natural	No	CPR.
Caffeine, synthetic	No	PFZ.
Other respiratory and cerebral stimulants:	No	
Benzphetamine hydrochloride	No	UPJ.
Diethylpropion hydrochloride	No	GAN.
Doxapram hydrochloride	No	LLI.
Methyphenidate hydrochloride	No	CGY.
Pemoline	No	ABB.
Phendimetrazine tartrate	No	GAN.
Phentermine	No	GAN, SDW.
Skeletal muscle relaxants:	No	
Cyclobenzaprine hydrochloride	No	MRK.
Metaxalone	No	LLI.
Methocarbamol	No	ABB, LLI.
Orphenadrine citrate	No	WYK.
Succinylcholine chloride	No	ABB, BUR.
Tubocurarine	No	ABB.
Dermatological agents:	Yes	
Ammonium phenolsulfonate	No	SAL.
Bismuth subgallate	No	MAL.
Salicylic acid	No	DOW, KLM, MON.
Zinc phenolsulfonate	No	MAL, SAL.
Zinc salicylate	No	RSA.
Expectorants and mucolytic agents:	Yes	
Ethylene diamine dihydrochloride	No	AJY, DPW.
Guaifenesin	No	LLI, NOR.
Iodinated glycerol	No	(?).

See footnotes at end of table.

Table 6-2—Continued

Medicinal chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Medicinal chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 6-3)
<b>Gastrointestinal agents and therapeutic nutrients:</b>	Yes	
<b>Gastrointestinal agents:</b>	No	
Choline chloride (all grades): . . . . .	No	
Choline chloride (animal feed grade) . . . . .	No	CHO, HFT, NUT.
Choline chloride (medicinal grade) . . . . .	No	CHO, HFT, TMH.
<b>Other gastrointestinal agents:</b> . . . . .	No	
Betaine hydrochloride . . . . .	No	CHO, HFT, UPJ.
Calcium polycarboxyl . . . . .	No	DAN, LLI.
Choleretics and hydrocholeretics . . . . .	No	UPJ.
Choline . . . . .	No	HFT, RSA.
Choline bicarbonate . . . . .	No	CHO, HFT.
Choline bitartrate . . . . .	No	CHO, HFT.
Choline citrate . . . . .	No	CHO.
Choline dihydrogen citrate . . . . .	No	CHO, HFT.
Cimetidine . . . . .	No	SK.
Cimetidine hydrochloride . . . . .	No	SK.
Colestipol hydrochloride . . . . .	No	UPJ.
Dihydroxyaluminum aminoacetate . . . . .	No	CHT.
Diphenoxylate . . . . .	No	MAL.
Docusate, calcium . . . . .	No	MAL.
Docusate, potassium . . . . .	No	ACY.
Docusate, sodium . . . . .	No	ACY, MAL.
Famotidine . . . . .	No	MRK.
Gemfibrozil . . . . .	No	PD.
Methacopolamine bromide . . . . .	No	UPJ.
Nizatidine . . . . .	No	LIL.
Sucralfate . . . . .	No	SK.
<b>Therapeutic nutrients:</b> . . . . .	No	
Calcium gluceptate . . . . .	No	PFN.
Copper gluconate . . . . .	No	PFZ.
Magnesium gluconate . . . . .	No	PFZ.
Manganese gluconate . . . . .	No	PFZ.
Potassium gluconate . . . . .	No	PFZ.
Zinc gluceptate . . . . .	No	PFN.
Zinc gluconate . . . . .	No	PFZ.
<b>Hormones and synthetic substitutes:</b> . . . . .	No	
<b>Anabolic agents and androgens:</b> . . . . .	No	
Fluoxymesterone . . . . .	No	UPJ.
Methyltestosterone . . . . .	No	( <sup>2</sup> ).
Stanozolol . . . . .	No	SD.
Testosterone . . . . .	No	( <sup>2</sup> ).
Testosterone cypionate . . . . .	No	( <sup>2</sup> ).
Testosterone propionate . . . . .	No	( <sup>2</sup> ).
Zeranol . . . . .	No	IMC.
All other anabolic agents and androgens . . . . .	No	( <sup>2</sup> ).
<b>Corticosteroids:</b> . . . . .	No	
Aclomethasone . . . . .	No	SCH.
Betamethasone . . . . .	No	SCH.
Betamethasone dipropionate . . . . .	No	SCH, ( <sup>2</sup> ).
Betamethasone sodium phosphate . . . . .	No	SCH.
Betamethasone valerate . . . . .	No	SCH, ( <sup>2</sup> ).
Cortisone acetate . . . . .	No	MRK, UPJ.
Dexamethasone . . . . .	No	MRK, ( <sup>2</sup> ).
Dexamethasone sodium phosphate . . . . .	No	( <sup>2</sup> ).
Diflorasone diacetate . . . . .	No	MRK, UPJ.
Fludrocortisone acetate . . . . .	No	UPJ.
Fluorometholone . . . . .	No	UPJ.
Halcinonide . . . . .	No	TRD.
Hydrocortisone . . . . .	No	UPJ.
Hydrocortisone acetate . . . . .	No	UPJ.
Medrysone . . . . .	No	UPJ.
Meprednisone . . . . .	No	UPJ.

See footnotes at end of table.

Table 6-2—Continued

Medicinal chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Medicinal chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 6-3)
Hormones and synthetic substitutes—Continued	No	
Corticosteroid—Continued	No	
Methylprednisolone	No	ABB, SCH, UPJ.
Prednisolone	No	MRK, UPJ.
Prednisolone acetate	No	UPJ.
Prednisone	No	UPJ.
Triamcinolone	No	TRD, (?).
Triamcinolone acetonide	No	TRD, (?).
Triamcinolone diacetate	No	TRD, (?).
All other corticosteroids	No	(?).
Estrogens and progestogens	No	
Estrogens:	No	
Estradiol cypionate	No	UPJ.
Estrogens, conjugated	No	ORG.
Estrogens, esterified	No	ORG.
All other estrogens	No	ORG.
Progestogens:	No	
Alprostadil	No	(?).
Dinoprostone	No	UPJ.
Hydroxyprogesterone	No	CWN, UPJ.
Medroxyprogesterone acetate	No	(?).
Megestrol acetate	No	UPJ.
Melengestrol acetate	No	UPJ.
Progesterone	No	UPJ.
Synthetic hypoglycemic agents:	No	
Chlorpropamide	No	PFZ.
Gilipizide	No	PFZ.
Tolazamide	No	(?).
Tolbutamide	No	UPJ.
Thyroid hormone and antithyroid agents:	No	
Methimazole	No	LIL.
Thyroglobulin	No	NEP.
Other hormones and synthetic substitutes:	No	
Calcitonin	No	ARP.
Corticotropin	No	ARP, ORG.
Danazol	No	SD.
Flutamide	No	SCH.
Glucagon	No	LIL.
Gonadorelin, acetate	No	ABB.
Humatrope	No	LIL.
Insulin	No	LIL.
Local anesthetics:	No	
Benzocaine	No	MAL, WYK.
Butamben	No	ABB, WYK.
Butamben picrate	No	ARN.
Cocaine	No	MAL.
Dibucaine	No	CGY.
Dibucaine hydrochloride	No	CGY.
Lidocaine	No	LEM, WYK.
Lidocaine hydrochloride	No	LEM, WYK.
Pramoxine hydrochloride	No	ABB.
Renal-acting and edema-reducing agents:	No	
Benzothiadiazine derivatives:	No	
Chlorothiazide	No	MRK.
Hydrochlorothiazide	No	CGY, MRK, SK.
Methyclothiazide	No	ABB.
Polythiazide	No	PFZ.
Trichlormethiazide	No	SCH.
Other renal-acting and edema-reducing agents:	No	
Acetazolamide	No	ACY.
Amloride hydrochloride	No	MRK.
Canrenoate, potassium	No	SRL.

See footnotes at end of table.

Table 6-2—Continued

Medicinal chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Medicinal chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 6-3)
Renal-acting and edema-reducing agents—Continued	No	
Other renal-acting and edema-reducing agents—Cont.	No	
Probenecid	No	MRK, SAL.
Sprinolactone	No	SRL.
Triamterene	No	GAN, SK.
Smooth muscle relaxants:	No	
Atracurium besylate	No	BUR.
Flavoxate hydrochloride	No	SK.
Oxtriphylline	No	PD.
Papaverine hydrochloride	No	CHT.
Vitamins:	Yes	
Vitamin A:	No	
Beta carotene (provitamin A)	No	HOF.
Tretinoin (vitamin A acid)	No	EK.
Vitamin A acetate (medicinal grade)	No	HOF.
Vitamin A alcohol	No	EK, HOF.
Vitamin A palmitate (medicinal grade)	No	HOF.
All other vitamin A	No	EK.
Vitamin B-complex:	No	
Niacin and derivatives:	No	
Niacin (medicinal grade)	No	RIL.
Niacinamide (medicinal grade)	No	NEP, RIL.
Pantothenic acid derivatives:	No	
Dexpanthenol	No	HOF.
Panthenol	No	HOF.
Other B-complex vitamins:	No	
Biotin	No	AMD, HOF.
Cyanocobalamin (medicinal grade)	No	MRK.
Riboflavin (animal feed grade)	No	MRK.
Riboflavin (medicinal grade)	No	HOF.
Riboflavin-5-phosphate, sodium	No	HOF.
Thiamine mononitrate	No	HOF, TKD.
Vitamin C:	No	
Ascorbic acid	No	HOF, TKD.
Calcium ascorbate	No	HOF.
Sodium ascorbate	No	HOF.
All other vitamin C	No	HOF.
Vitamin D:	No	
Ergocalciferol (vitamin D <sub>2</sub> )	No	VTM.
Vitamin E	No	
Di- $\alpha$ -tocopheryl acetate (all grades):	No	
di- $\alpha$ -Tocopheryl acetate (animal feed grade)	No	BAS, HOF.
di- $\alpha$ -Tocopheryl acetate (medicinal grade)	No	BAS, HOF.
Other vitamin E:	No	
d- $\alpha$ -Tocopherol	No	EKT, SCP.
di- $\alpha$ -Tocopherol	No	HOF.
d- $\alpha$ -Tocopheryl acetate	No	EKT, SCP.
d- $\alpha$ -Tocopheryl acid succinate	No	EKT, SCP.
Poly(oxy-1,2-ethanedyl)- $\alpha$ -tocopheryl acetate (all grades):	No	
Other vitamin E:	No	
Miscellaneous medicinal chemicals:	Yes	
Antineoplastic agents:	No	
Azathioprine	No	BUR.
Carboplatin	No	MRX.
Cisplatin	No	BRS, MRX.
Cytarabine	No	PFN, UPJ.
Gallium nitrate	No	MRX.
Leuprolide acetate	No	ABB.
Mitomycin	No	BRS.
Procarbazine hydrochloride	No	HOF.
Streptozocin	No	PFN.
Vinblastine sulfate	No	LIL.
Vincristine sulfate	No	LIL.

See footnotes at end of table.

Table 6-2—Continued

Medicinal chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Medicinal chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 6-3)
Miscellaneous medicinal chemicals—Continued	Yes	
Cardiovascular agents:	No	
Antihypertensive agents:	No	
Captopril	No	TRD.
Diazoxide	No	SCH.
Dilevalol hydrochloride	No	SCH.
Doxazosin mesylate	No	PFZ.
Hydralazine hydrochloride	No	CGY.
Lisinopril	No	MRK.
Methyldopa	No	MRK.
Metoprolol tartrate	No	CGY.
Minoxidil	No	UPJ.
Nadolol	No	TRD.
Phenoxybenzamine	No	SK.
Prazosin	No	ABB.
Sodium nitroprusside	No	ABB.
Terazosin	No	ABB.
Enalapril maleate	No	MRK.
Vasodilators:	No	
Amyl nitrite	No	BUR.
Nicotinic alcohol tartrate	No	ARN.
Nifedipine	No	PFZ.
Other cardiovascular agents:	No	
Dileopyramide phosphate	No	SRL.
Lovastatin	No	MRK.
Procalinamide hydrochloride	No	PD, WYK.
Propranolol hydrochloride	No	WYK.
Simvastatin	No	MRK.
Tocalinide	No	MRK, SDW.
Diagnostic agents:	No	
Roentgenographic contrast media:	No	
Diatrizoate, sodium	No	SDW.
Iohexol	No	SD.
Iothalamate, meglumine	No	MAL.
Other diagnostic agents:	No	
Albumin	No	SPR.
Aminohippuric acid	No	WYK.
Edrophonium chloride	No	MRX.
Glutamyl-p-nitroaniline (liver function test)	No	REG.
Metyrapone	No	CGY.
Xylose (intestinal malabsorption test)	No	PFN.
All other diagnostic agents, other than roentgenographic contrast media	No	PFZ.
Hematological agents:	No	
Anticoagulants:	No	
Ammonium heparin	No	SPR.
Benzalkonium heparin	No	RIK.
Dicumarol	No	ABB.
Lithium heparin	No	SPR.
Potassium warfarin	No	(?).
Sodium heparin	No	SPR.
Warfarin	No	SDW.
Other hematological agents:	No	
Cellulose, oxidized	No	EKT.
Dextran	No	PHR.
Unclassified medicinal chemicals:	No	
Allopurinol	No	BUR.
Carbidopa	No	MRK.
Disulfuram	No	ABB.
Etidronate, disodium	No	NQR.
Levodopa	No	SRL.
Nicotine polacrilex	No	WYK.

See footnotes at end of table.

Table 6-2—Continued

Medicinal chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

<i>Medicinal chemicals</i>	<i>Separate statistics<sup>1</sup></i>	<i>Manufacturers' identification codes (according to list in table 6-3)</i>
Miscellaneous medicinal chemicals—Continued	Yes	
Unclassified medicinal chemicals—Continued	No	
Sodium tetradecyl sulfate .....	No	MRX.
Tacrine .....	No	PD.
All other medicinal chemicals .....	No	ABB, BIB.

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 6-3

Medicinal chemicals: Directory of manufacturers, alphabetical by code, 1989

<i>Code</i>	<i>Name of company</i>	<i>Code</i>	<i>Name of company</i>
ABB .....	Abbott Laboratories	MAL .....	Mallinckrodt, Inc.
ACY .....	American Cyanamid Co.	MHI .....	Morton International, Inc., Ventron Div.
ADC .....	Anderson Development Co.	MON .....	Monsanto Co.
AJY .....	Ajay Chemicals, Inc.	MRK .....	Merck & Co., Inc.
AMD .....	Cyclo Products, Inc.	MRX .....	Johnson Matthey, Inc.
ANG .....	Angus Chemical Co.	NEP .....	Nepers Inc.
ARN .....	Arenol Chemical Corp.	NOR .....	Norwich Eaton Pharmaceutical, Inc.
ARP .....	Armour Pharmaceutical Co.	NUT .....	Bloproducts, Inc.
ARS .....	Arsynco, Inc., Sub. Div. of Aceto Corp.	OH .....	Anaquest
BAS .....	BASF Corp.	ORG .....	Organics/LaGrange, Inc.
	Beecham, Inc.:	ORT .....	Roehr Chemicals, Inc., Div. of Aceto Corp.
BEE .....	Beecham Laboratories Div.	PD .....	Parke-Davis Div. of Warner-Lambert Co.
BEW .....	Beecham Western Hemisphere, Inc.	PEN .....	Penick Corp.
BIB .....	Beckman Instruments, Inc., Spline Div.	PFN .....	Pfanstiehl Laboratories, Inc.
BKC .....	J. T. Baker Chemical Co.	PHR .....	Pharmachem Corp.
BOC .....	Blocraft Laboratories, Inc.	RCN .....	Racon, Inc.
BOT .....	The Boots Company	RDA .....	Rhone-Poulenc, Inc.
BRS .....	Bristol-Myers Co.	REG .....	Regis Chemical Co.
BUR .....	Burroughs Wellcome Co.	RIK .....	Riker Laboratories, Inc. Sub of 3M Co.
CGY .....	Ciba-Geigy Corp.	RIL .....	Reilly Industries, Inc.
CHL .....	Chemol Co.	RSA .....	R. S. A. Corp.
CHO .....	Ducon	SAL .....	Solvay Animal Health, Inc.
CHT .....	Chatterm, Inc.	SCH .....	The Schering Corp.
CPR .....	Certified Processing Corp.	SCP .....	Henkel Corp.
CWN .....	Upjohn Co., Fine Chemicals	SD .....	Sterling Drug, Inc.:
DAN .....	Dan River, Inc., Chemical Products Div.		Sterling Pharmaceuticals, Inc.
DOW .....	Dow Chemical Co.	SDW .....	Sterling Organics Div.
DPW .....	Deepwater, Inc.	SK .....	Smithkline Beecham Chemicals
DUP .....	E. I. duPont de Nemours & Co., Inc.	SPR .....	Scientific Protein Laboratories
	Medical Products Dept.	SRL .....	G. D. Searle & Co.
EK .....	Eastman Kodak Co.:	TKD .....	Takeda Chemical Product USA, Inc.
EKT .....	Tennessee Eastman Co. Div.	TMH .....	Harcros Chemicals, Inc.
FLM .....	Fleming Laboratories, Inc.	TNA .....	Ethyl Corp.
GAF .....	GAF Corp., Chemical Group	TRD .....	Bristol Myers Squibb Co.
GAN .....	Ganes Chemicals, Inc.	TX .....	Texaco Chemical Co.
HFT .....	Syntex Agribusiness, Inc.	UCC .....	Union Carbide Corp., Industrial Chemical Div.
HOF .....	Hoffmann-LaRoche, Inc.	UPJ .....	Upjohn Co.
HXL .....	Hexcel Corp., Hexcel Chemical Products	VTM .....	Vitamins, Inc.
IMC .....	IMC Pittman-Moore, Inc.	WYK .....	Wyckoff Chemical Co., Inc.
ISP .....	Inspec Chemical Corp.	WYT .....	Wyeth Laboratories, Inc., Wyeth Laboratories Div. of American Home Products Corp.
KAN .....	Kanasco, LTD		
KLM .....	Kalama Chemical, Inc.		
LEM .....	Napp Chemicals, Inc.		
LIL .....	Eli Lilly & Co., Eli Lilly Industries, Inc.		
LLI .....	Lee Laboratories, Inc.		

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.



## Section 7 Flavor and Perfume Materials

Flavor and perfume materials are organic chemicals used to impart flavors and aromas to foods, beverages, cosmetics, and soaps. These aroma chemicals are also utilized to neutralize or mask unpleasant odors in industrial processes and products, as well as in consumer products.

Total domestic production of flavor and perfume materials in 1989 amounted to 64.3 million kilograms (see figure 7-1). Sales of these materials in 1989 amounted to 38.4 million kilograms, valued at \$1,005.2 million, compared with 43.1 million kilograms, valued at \$866.1 million, in 1988. U.S. production of flavor and perfume materials in 1989 decreased by 12.5 percent from the level in 1988 while the value of sales increased by 16.1 percent.

Production of cyclic flavor and perfume materials in 1989 amounted to 38.1 million kilograms; sales amounted to 27.5 million

kilograms, valued at \$908.5 million. Individual publishable chemicals in the cyclic group produced in the greatest volume in 1989 were anethole (1.2 million kilograms), and eugenol (131 thousand kilograms).

U.S. output of acyclic flavor and perfume materials in 1989 amounted to 26.2 million kilograms; sales of these materials amounted to 10.9 million kilograms, valued at \$96.8 million. Individual publishable acyclic flavor and perfume chemicals produced in the greatest volume in 1989 were geranyl acetate (93 thousand kilograms) and citronellyl acetate (30 thousand kilograms).

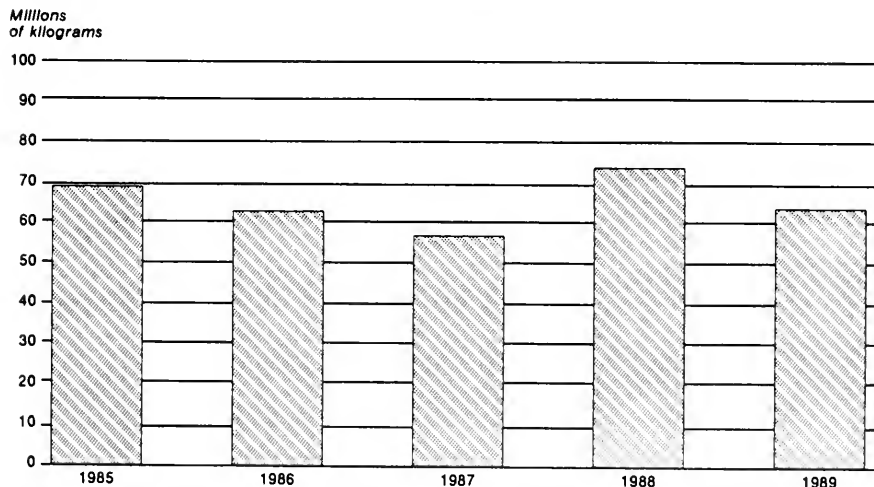
Table 7-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 7-3.

*Eric Land*

202-252-1349

(Effective 1/14/91 202-205-3349)

**Figure 7-1**  
Flavor and perfume materials: U.S. production, 1985-89



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 7

Table 7-1

Flavor and perfume materials: U.S. production and sales, 1989

Flavor and perfume materials	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	Per kilogram
	1,000 kilograms	1,000 kilograms	1,000 dollars	
<b>Grand total</b> .....	<b>64,324</b>	<b>38,420</b>	<b>1,005,243</b>	<b>\$26.16</b>
<b>Cyclic</b>				
<b>Total</b> .....	<b>38,097</b>	<b>27,502</b>	<b>908,457</b>	<b>33.03</b>
<b>Benzenoid and Naphthalenoid</b>				
<b>Total</b> .....	<b>29,425</b>	<b>21,911</b>	<b>839,812</b>	<b>38.33</b>
4-Allyl-2-methoxyphenol (Eugenol) .....	131	52	356	6.85
Anisyl acetate .....	9	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
2-Ethyl hexyl salicylate .....	57	43	297	6.87
p-Methoxybenzyl alcohol (Anisyl alcohol) .....	5	5	112	20.93
Phenethyl isobutyrate .....	7	7	110	14.77
2-Phenethyl phenylacetate .....	13	8	122	14.86
p-Propenylanisole (Anethole) .....	1,179	1,223	11,006	9.00
All other benzenoid and naphthalenoid materials .....	28,024	20,573	827,809	40.24
<b>Terpenoid, Heterocyclic, and Alicyclic</b>				
<b>Total</b> .....	<b>8,672</b>	<b>5,591</b>	<b>68,845</b>	<b>12.28</b>
Cedryl acetate .....	81	55	712	12.82
gamma-Methylionone .....	589	326	6,657	20.44
alpha-Terpineol .....	1,114	863	1,798	2.08
Vetiveryl acetate .....	( <sup>2</sup> )	4	538	129.74
All other terpenoid, heterocyclic, and alicyclic materials .....	6,888	4,343	58,940	13.57
<b>Acyclic</b>				
<b>Total</b> .....	<b>28,227</b>	<b>10,918</b>	<b>96,786</b>	<b>8.86</b>
Citronellyl acetate .....	30	18	285	15.63
Citronellyl formate .....	8	5	105	19.92
3,7-Dimethyl-cis-2,6-octadienol, acetate (Neryl acetate) .....	10	10	124	11.91
Ethyl hexanoate .....	14	9	102	11.72
Geranyl formate .....	4	3	74	22.04
Geranyl acetate .....	93	85	800	9.36
Rhodinol .....	2	1	403	294.15
All other acyclic materials .....	26,066	10,787	94,893	8.80

<sup>1</sup> Calculated from unrounded figures.<sup>2</sup> Reported data are accepted in confidence and may not be published, or no data were reported.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 7-2

Flavor and perfume materials for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Flavor and perfume materials	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 7-3)
<b>Cyclic:</b>		
<b>Benzenoid and naphthalenoid:</b>		
Acetaldehyde ethyl phenethyl acetal	No	IFF.
Acetaldehyde phenethyl propyl acetal	No	IFF.
2'-Acetonaphthone ( $\beta$ -Methyl naphthyl ketone)	No	GIV.
1-Acetoxy-2-sec-butyl-1-ethenylcyclohexane	No	GIV.
p-Allylanisole	No	SCM, (*).
4-Allyl-1,2-dimethoxybenzene (4-Allylveratrole)	No	Cl.
4-Allyl-2-methoxyphenol (Eugenol)	Yes	BDS, Cl, ELN, FB, GIV.
$\alpha$ -Amyl cinnamic aldehyde	No	FB.
Amyl cinnamic aldehyde dimethyl acetal	No	FB.
Amyl cinnamyl alcohol	No	IFF.
p-Anisaldehyde	No	FB.
Anisyl acetate	Yes	ELN, FB, GIV.
Aurantol	No	BDS, FB.
Benzaldehyde glyceryl acetal	No	FB, GIV.
Benzophenone	No	CWN, PD.
Benzyl acetate	No	FB, HAR.
Benzyl benzoate	No	KLM, MRF.
Benzyl butyrate	No	ELN, FB, HAR.
Benzyl cinnamate	No	FB.
Benzyl formate	No	FB.
Benzyl isobutyrate	No	ELN.
Benzyl isopentyl ether	No	GIV.
Benzyl isovalerate	No	ELN.
1-(Benzoyloxy)-2-methoxy-4-propenylbenzene (Benzyl Isoeugenyl ether)	No	GIV.
Benzyl phenylacetate	No	ELN, GIV.
Benzyl propionate	No	ELN, FB.
Benzyl salicylate	No	FB, HAR.
p-tert-Butyl- $\alpha$ -methylhydrocinnamaldehyde	No	GIV.
N-(3-(p-tert-Butylphenyl)-2-methylpropylidene)-anthranillic acid, methyl ester	No	GIV.
Carvacrol	No	GIV.
Cineole [eucalyptol]	No	SCM.
Cinnamaldehyde	No	FB.
Cinnamyl acetate	No	ELN, FB.
Cinnamyl alcohol	No	FB.
Cinnamyl butyrate	No	FB.
Cinnamyl cinnamate	No	FB.
Cinnamyl nitrile	No	IFF.
Cinnamyl propionate	No	ELN.
Coumarin	No	RDA.
Cumyllyl acetate	No	IFF.
Cumyllyl alcohol	No	GIV.
trans-Decahydro- $\beta$ -naphthol	No	IFF.
trans-Decahydro- $\beta$ -naphthyl acetate	No	IFF.
2-4-Dibromo-6-nitro-m-cresyl methyl ether	No	GIV.
Dihydrocoumarin	No	ARS.
1,2-Dimethoxy-4-propenylbenzene (4-Propenylveratrole)	No	Cl.
$\beta$ ,4-Dimethyl-3-cyclohexene-1-propanal	No	(*).
$\gamma$ ,4-Dimethyl-3-cyclohexene-1-propanol	No	Cl.
3,7-Dimethyl-1,6-octadien-3-yl formate	No	GIV.
3,7-Dimethyl-2,6-octadienyl phenylacetate (Geranyl phenylacetate)	No	GIV.
$\alpha$ , $\alpha$ -Dimethylphenethyl acetate	No	IFF.
N-(p-Ethoxycarbonylphenyl)-N'-ethyl-N'-phenylformamidine	No	GIV.
2-Ethoxynaphthalene	No	GIV.

See footnotes at end of table.

Table 7-2—Continued

Flavor and perfume materials for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Flavor and perfume materials	Separate statistics <sup>a</sup>	Manufacturers' identification codes (according to list in table 7-3)
<b>Cyclic—Continued:</b>		
<b>Benzenoid and naphthalenoid—Continued</b>		
Ethyl anthranilate	No	FB.
Ethyl cinnamate	No	ELN.
Ethyl- $\alpha$ , $\beta$ -epoxy- $\beta$ -methylhydrocinnamate	No	ELN.
2-Ethylhexyl-p-methoxy cinnamate	No	GIV.
2-Ethyl hexyl salicylate	Yes	FB, FEL, HAR.
Ethyl phenylacetate	No	ELN.
Ethyl salicylate	No	FB.
Heliotropyl acetate	No	IFF.
Heliotropyl acetone	No	AMB.
Hexahydro-5-methoxy-4,7-methano-1H-indene	No	( <sup>1</sup> ).
cis-3-Hexenyl salicylate	No	BDS, IFF.
$\alpha$ -Hexylcinnamaldehyde	No	CI.
Hydratropaldehyde, dimethyl acetal	No	FB, IFF.
Hydrocinnamic acid	No	ELN.
Hydrocoumarin	No	ELN, GIV.
Hydroxycitronellal methyl anthranilate	No	GIV, IFF.
4-Hydroxy-3-ethoxybenzaldehyde (Ethylvanillin)	No	RDA.
3-Hydroxy-4-methoxybenzaldehyde (Iso-vanillin)	No	RDA.
4-Hydroxy-3-methoxybenzaldehyde [Vanillin]	No	RAY.
4(4-Hydroxy-3-methoxyphenyl)-2-butanone (Vanillylacetone)	No	GIV.
p-Hydroxy phenylbutanone	No	GIV.
Indole	No	FB.
Isoamyl phenylacetate	No	ELN.
Isoamyl salicylate	No	FB.
Isobutyl phenylacetate	No	ELN, FB.
Isobutylquinoline	No	IFF.
Isobutyl salicylate	No	FB.
Isohexenyl tetrahydrobenzaldehyde (Myrac aldehyde)	No	IFF.
Isopentyl benzoate	No	GIV.
Isopentyl salicylate	No	HAR.
l-Limonene	No	SCM.
l-Nalyl anthranilate	No	BDS.
p-Mentha-1,8-diene (Limonene)	No	IFF.
o-Methoxy benzaldehyde	No	CI.
p-Methoxybenzyl alcohol (Anisyl alcohol)	Yes	ELN, FB, GIV.
2-Methoxynaphthalene	No	GIV.
1-p-Methoxyphenyl penten-1-one-3 ( $\alpha$ -Methyl-anisalacetone)	No	GIV.
3-(2-Methoxyphenyl)-2-propenal	No	CI.
2-Methoxy-4-propenylphenol (Isoeugenol)	No	CI, FB.
2-Methoxy-4-propenylphenol acetate	No	ELN.
2-Methoxy-4-propylphenol	No	CI.
4'-Methylacetophenone	No	CWN.
p-Methylanisole	No	GIV.
Methyl anthranilate	No	FB, PSG.
$\beta$ -Methylbenzene propanal	No	CI.
Methyl benzoate	No	KLM, MRF.
$\alpha$ -Methylbenzyl acetate (Styralyl acetate)	No	IFF.
$\alpha$ -Methylcinnamaldehyde	No	FB, IFF.
Methyl cinnamate	No	FB.
1,2-Methylenedioxy-4-propylene benzene (IsoSafrole)	No	AMB.
p-Methylhydratropaldehyde	No	GIV.
3-Methylindole (Skatole)	No	GIV.
Methyl-N-methylantranilate	No	AMB.
$\alpha$ -Methyl-3,4-methylene dioxylhydrocinnamaldehyde	No	GIV.
Methyl phenylacetate	No	ELN, FB, GIV.
3-Methyl-5-phenyl-1-pentanol	No	IFF.
Methyl salicylate	No	KLM, MON, RDA.

See footnotes at end of table.

Table 7-2—Continued

Flavor and perfume materials for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Flavor and perfume materials	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 7-3)
<b>Cyclic—Continued:</b>		
<b>Benzenoid and naphthalenoid—Continued</b>		
Octahydro-5-methoxy-4,7-methano-1H-Indene, 2-carboxaldehyde	No	CI.
1,1,3,3,5-Pentamethyl-4,6-dinitroindan (Moskene)	No	GIV.
$\alpha$ -Pentylcinnamaldehyde	No	CI.
Phenethyl acetate	No	FB, IFF.
Phenethyl alcohol	No	FB, IFF.
Phenethyl formate	No	ELN.
Phenethyl isobutyrate	Yes	ELN, FB, GIV, IFF.
Phenethyl isovalerate	No	ELN.
2-Phenethyl phenylacetate	Yes	BDS, ELN, FB, GIV, IFF.
Phenethyl propionate	No	ELN.
Phenethyl salicylate	No	GIV.
2-Phenoxyethyl isobutyrate	No	FB, IFF.
Phenylacetaldehyde	No	GIV, (2).
Phenylacetaldehyde, dimethyl acetal	No	CI.
Phenylacetic acid	No	GIV.
Phenylacetic acid isopentyl ester	No	GIV.
$\alpha$ -Phenylanisole	No	GIV.
4-Phenyl-3-buten-2-one	No	FB.
Phenylethyl benzoate	No	IFF.
Phenylethyl 2-methyl butyrate	No	SCM.
Phenylethyl tiglate	No	FB.
3-Phenyl-1-propanol (Hydrocinnamic alcohol)	No	FB.
3-Phenylpropyl acetate	No	ELN, GIV.
3-Phenylpropyl cinnamate	No	FB.
Piperonal (Heliotropin)	No	AMB.
p-Propenylanisole (Anethole)	Yes	ARZ, FB, NCI, SCM.
p-Propylanisole (Dihydroanethole)	No	GIV.
p-Tolualdehyde	No	GIV.
p-Tolylacetaldehyde	No	GIV.
p-Tolyl acetate	No	ELN.
p-Tolyl isobutyrate	No	IFF.
p-Tolyl octanoate	No	IFF.
p-Tolylphenylacetate	No	GIV.
Trimethyl benzyl dioxane	No	IFF.
Trimethylcyclohexyl salicylate	No	ARS.
<b>Sweeteners, synthetic:</b>		
Cyclohexanesulfamic acid (Cyclamic acid)	No	ABB.
Cyclohexanesulfamic acid, sodium salt (Sodium cyclamate)	No	ABB.
Saccharin (1,2-Benzisothiazolin-3-one, -1,1-dioxide)	No	PSG.
Saccharin, sodium salt	No	PSG.
Tetramethyl, octahydro acetophenone	No	IFF.
Tetramethyl octahydro acetyl naphthalene	No	IFF.
All other synthetic sweetener material	No	NSW.
All other benzenoid or naphthalenoid chemicals	No	FB, IFF.
<b>Terpenoid, heterocyclic, and alicyclic:</b>		
Acetyl-n-butyl (2,3-Hexanedione)	No	FB.
Acetyl cedrene (Vertoflex)	No	BDS.
Acetyl isovaleryl (5-Methyl-2,3-hexanedione)	No	FB.
Acetyl methyl anthranilate	No	AMB.
Acetyl propionyl (2,3-Pentanedione)	No	FB.
Allo-ocimene	No	SCM, (2).
Allyl cyclohexyl propionate	No	GIV.
Amyl cyclohexyl acetate	No	IFF.
Amyris acetate	No	GIV.
Beta methyl ionone coeur	No	IFF.
2-tert-Butyl cyclohexanol	No	IFF.
2-sec-Butylcyclohexanone	No	GIV.

See footnotes at end of table.

Table 7-2—Continued

Flavor and perfume materials for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Flavor and perfume materials	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 7-3)
<b>Cyclic—Continued:</b>		
<b>Terpenoid, heterocyclic, and alicyclic—Continued</b>		
o-tert-Butylcyclohexyl acetate	No	CI, IFF.
p-tert-Butylcyclohexyl acetate (Verbenlax)	No	IFF.
Canrenoate, potassium	No	IFF.
l-Carvone	No	SCM.
β-Caryophyllene	No	BDS, GIV, SCM.
Cedarwood acetate	No	IFF.
α-Cedrene epoxide (Andrane)	No	BDS.
Cedrenol	No	ELN, IFF.
Cedrol	No	ELN, IFF.
Cedryl acetate	Yes	BDS, ELN, IFF.
Cedryl formate	No	IFF.
Dihydro-Cyclacet	No	IFF.
Dihydronordicyclopentadienyl acetate (Cyclacet)	No	CI.
Dihydronordicyclopentadienyl propionate (Cyclaprop) (Verdyl propionate extra)	No	CI.
Dihydro terpineol	No	NCI, SCM.
Dimethyl-α-ionone	No	FB.
Dimethyl cyclohexane methanol	No	IFF.
2, 6-Dimethylheptan-2-ol	No	GIV.
Ethyl furoate	No	IFF, SCM.
Fenchol	No	SCM.
Galaxolide (1, 3, 4, 6, 7, 8-Hexahydro-4, 6, 6, 7, 8, 8-hexamethyl-cyclopenta-γ-2-benzopyran)	No	IFF.
Gualacwood acetate	No	ELN, FB.
Guaiene	No	FB.
2-Heptylcyclopentanone	No	IFF.
Hexadecanolide	No	IFF.
2-Hexyl-2-cyclopenten-1-one	No	FB.
3-Hydroxy-2-ethyl-4-pyrone (Ethylmaltol)	No	PFZ.
4-(4-Hydroxy-4-methyl pentyl)-3-cyclohexene-10-carboxaldehyde (Lyral)	No	IFF.
3-Hydroxy-2-methyl-4-pyrone (Maltol)	No	PFZ.
4-Hydroxyxynonanonic acid, γ-lactone (γ-Nonalactone)	No	ELN.
4-Hydroxyundecanolic acid, γ-lactone (γ-Undecalactone)	No	ELN.
Ionone(α- and β-)	No	BDS, GIV, NCI.
α-ionone	No	GIV, IFF.
Isobornyl acetate	No	SCM.
Isobornyl methyl ether	No	SCM.
Isobornyl propionate	No	ELN.
Isolongifolene epoxide	No	GIV.
Isomenthone	No	GIV.
6-Isopropyldecalone	No	GIV.
Isopulegyl acetate	No	GIV.
p-Mentha-1,3-diene (α-Terpinene)	No	SCM.
p-Mentha-1,4-diene (β-Terpinene)	No	SCM.
p-Mentha-6,8-dien-z-ol (Carveol)	No	FB.
p-Mentha-6,8-dien-z-one (Carvone, Carvol)	No	FB.
1-p-Mentha-6,8-dien-2-yl acetate (Carvyl acetate)	No	FB.
p-Menth-8-en-3-ol (Isopulegol)	No	GIV.
p-Menth-1-en-3-one (Piperitone)	No	GIV.
p-Menth-4-(8)-en-3-one (Pulegone)	No	GIV.
1-1-p-Menthen-6-yl-1-propanone	No	GIV.
dl-Menthol, synthetic	No	AMB, GIV, HAR, NCI.
l-Menthol, synthetic	No	HAR, SCM.
Menthyl acetate	No	GIV, SCM.
l-Menthyl acetate	No	SCM.
α-Methylcyclohexanemethanol	No	(?).
Methylionone(α- and β-)	No	GIV, IFF, NCI.
γ-Methylionone	Yes	BDS, GIV, IFF, NCI.

See footnotes at end of table.

Table 7-2—Continued

Flavor and perfume materials for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Flavor and perfume materials	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 7-3)
<b>Cyclic—Continued:</b>		
<b>Terpenoid, heterocyclic, and alicyclic—Continued</b>		
6-Methyl- $\alpha$ -ionone	No	BDS, GIV.
Nopyl acetate	No	NCI, SCM.
para-Cymene	No	SCM.
Propyl furylacrylate	No	AMB.
Rose oxide	No	FB.
Terpene-ol	No	SCM.
$\alpha$ -Terpineol	Yes	HPC, NCI, SCM.
$\alpha$ -Terpinyl acetate	No	NCI, SCM.
$\alpha$ -Terpinyl propionate	No	ELN.
3,3,5-Trimethyl cyclohexanol (m-Homomenthol)	No	ARS.
Trimethyl cyclohexenyl butenone	No	IFF.
1-(2,6,6-Trimethyl-2-cyclohexen-1-yl)-1,6-heptadien-3-one (Allyl- $\alpha$ -ionone)	No	IFF.
$\alpha$ , $\alpha$ ,5-Trimethyl-5-vinyl-furfuryl alcohol and tetrahydro-2,2,6-trimethyl-6-vinyl-3-ol	No	GIV.
5-(2,2,3-Trimethyl(cyclopent-3-en-1-yl)-3-methylpentan-2-ol	No	GIV.
Vetiveneol	No	FB, GIV, IFF.
Vetivenyl acetate	Yes	BDS, ELN, FB, GIV, IFF.
All other terpenoid, heterocyclic, or alicyclic flavor and perfume chemicals	No	CI, GPI, IFF, SCM, STG, (*), (*).
<b>Acyclic:</b>		
Allyl disulfide	No	IFF.
Allyl heptanoate	No	ELN, FB.
Allyl hexanoate	No	ELN, FB.
Butanoic acid, 1-cyclohexylethyl ester	No	CI.
Butyl butyryl lactate	No	ELN, FB.
Citral dimethyl acetal	No	FB, IFF.
Citronellyl acetate	Yes	BDS, ELN, GIV, IFF, SCM.
Citronellyl formate	Yes	BDS, ELN, FB, GIV, IFF.
Citronellyl isobutyrate	No	ELN, GIV, IFF.
Citronellyl propionate	No	IFF.
Crude acetate mixture (Linalyl, neryl, geranyl acetates, main components)	No	(?).
Decanal (Capraldehyde)	No	CI.
Decyl acetate	No	GIV.
Diethyl acetal	No	FB.
Diethyl sebacate	No	ELN.
Diethyl succinate	No	MRF.
Dihexyl fumarate	No	FB.
Dihydrocarvone	No	SCM.
Dihydrolinalool	No	SCM.
Dihydro myrcenol	No	SCM, (?).
Dihydro pentamethyl indanone	No	IFF.
Dihydroterpinyl acetate	No	IFF, NCI, SCM.
1,1-Dimethoxy octane	No	IFF.
4-(1,1-Dimethylethyl)cyclohexanol	No	(?).
Dimethyl hexanediol	No	(?).
2,5-Dimethyl-3-hexyne-2,5-diol	No	(?).
3,7-Dimethyl-trans-2,6-octadienal (Citral A; Geraniol)	No	BDS.
3,7-Dimethyl-2,6-octadienal (citral a & b)	No	NCI, SCM.
3,7-Dimethyl-2,6-octadienenitrile	No	CI.
3,7-Dimethyl-cis-2,6-octadien-1-ol (Nerol)	No	ELN, FB, GIV, NCI, SCM.
3,7-Dimethyl-trans-2,6-octadien-1-ol (Geraniol)	No	ELN, FEL, GIV, IFF, NCI, SCM.
3,7-Dimethyl-1,6-octadien-3-ol (Linalool)	No	FB, IFF, SCM.
(Linalyl alcohol)	No	FB, IFF, SCM.

See footnotes at end of table.

## Section 7

Table 7-2—Continued

Flavor and perfume materials for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Flavor and perfume materials	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 7-3)
<b>Acyclic:—Continued:</b>		
3,7-Dimethyl-cis-2,6-octadienol, acetate (Neryl acetate) . . . . .	Yes	ELN, GIV, IFF, SCM.
3,7-Dimethyl-1,6-octadien-3-ol,acetate (Linalyl acetate) . . . . .	No	FB, GIV, SCM.
3,7-Dimethyl-1,6-octadien-3-yl isobutyrate (Linalyl isobutyrate) . . . . .	No	GIV.
3,7-Dimethyl-1,6-octadien-3-yl propionate (Linalyl propionate.) . . . . .	No	GIV.
Dimethyloctanal . . . . .	No	GIV, SCM.
3,7-Dimethyloctanol-1 (Tetrahydrogeraniol) . . . . .	No	GIV, IFF, NCI, SCM.
3,7-Dimethyl-3-octanol . . . . .	No	FB, SCM.
Dimethyloctanyl acetate . . . . .	No	GIV, IFF.
3,7-Dimethyl-6-octen-1-al (Citronellal) . . . . .	No	IFF, SCM.
3,7-Dimethyl-6-octenitrile . . . . .	No	CI.
3,7-Dimethyl-6-octen-1-ol (Citronellol) . . . . .	No	ELN, GIV, IFF, NCI, SCM.
3,7-Dimethyl-7-octenol 70%, 6-octenol isomer 30% . . . . .	No	GIV.
Ethyl acetate . . . . .	No	FB.
Ethyl butyrate . . . . .	No	FB, HPC, NW.
Ethyl caprate . . . . .	No	FB.
Ethyl formate . . . . .	No	FB.
Ethyl heptanoate . . . . .	No	ELN, FB, FEL.
Ethyl hexanoate . . . . .	Yes	ELN, FB, NW.
Ethyl isobutyrate . . . . .	No	FB.
Ethyl isovalerate . . . . .	No	ELN.
Ethyl laurate . . . . .	No	ELN, FB.
Ethyl-2-methyl butyrate . . . . .	No	FB, SCM.
Ethyl-2 methyl pentanoate . . . . .	No	HPC.
Ethyl myristate . . . . .	No	ELN.
Ethyl octanoate . . . . .	No	FB.
Ethyl propionate . . . . .	No	FB, NW.
Ethyl trimethyl cyclopentenyl buterol . . . . .	No	IFF.
Ethyl valerate . . . . .	No	ELN.
Geranyl acetate . . . . .	Yes	BDS, CI, ELN, FB, FEL, GIV, IFF, NCI, SCM.
Geranyl butyrate . . . . .	No	ELN, GIV.
Geranyl crotonate . . . . .	No	FB.
Geranyl ethyl ether . . . . .	No	IFF.
Geranyl formate . . . . .	Yes	BDS, ELN, GIV.
Geranyl isobutyrate . . . . .	No	IFF.
Geranyl isovalerate . . . . .	No	FB.
Geranyl nitrile (Citralva) . . . . .	No	IFF, SCM.
Geranyl propionate . . . . .	No	ELN, FB.
Geranyl tiglate . . . . .	No	FB.
Heptyl formate . . . . .	No	FB.
Hexadecyl acetate . . . . .	No	FB.
N-Hexanal . . . . .	No	CI.
2-Hexenal . . . . .	No	FB, GIV.
2-Hexenol . . . . .	No	FB.
cis-3-Hexen-1-yl acetate . . . . .	No	BDS, GIV, IFF.
cis-3-Hexenyl butyrate . . . . .	No	SCM.
cis-3-Hexenyl methyl carbonate . . . . .	No	IFF.
cis-3-Hexenyl tiglate . . . . .	No	BDS.
Hexoxyacetaldehyde dimethyl acetal . . . . .	No	FB.
Hexyl 2-methylbutyrate . . . . .	No	SCM.
Hydroxycitronellol . . . . .	No	SCM.
7-Hydroxy-3,7-dimethyl-1-octanal (Hydroxycitronellal) . . . . .	No	FB, GIV, IFF, SCM.
7-Hydroxy-3,7-dimethyl octanal, dimethyl acetal (Hydroxycitronellal, dimethyl acetal) . . . . .	No	GIV.
Isoamyl caproate . . . . .	No	FB.
Isoamyl propionate . . . . .	No	FB.
Isobutyl acetate . . . . .	No	FB, NW.

See footnotes at end of table.



Table 7-2—Continued

Flavor and perfume materials for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Flavor and perfume materials	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 7-3)
<b>Acyclic:—Continued:</b>		
Isobutyl-2-butenate	No	AMB.
Isobutyl butyrate	No	FB.
Isopentyl acetate (isoamyl acetate)	No	ELN, FB, NW.
Isopentyl butyrate	No	FB, GIV, NW.
Isopentyl formate	No	ELN, FB.
Isopentyl isovalerate	No	ELN, FB, HPC.
3-Methyl-2-butenyl acetate	No	IFF.
3-Methyl butyl acetate	No	FB.
3-Methyl butyl butyrate	No	FB.
Methyl butynol	No	(?)
2-Methyldecanal	No	CI.
2-Methylene undecanal	No	(?)
Methyl hexyl ether	No	SCM.
Methyl isobutyrate	No	HPC.
Methyl isovalerate	No	FB.
Methyl-2-methyl butyrate	No	SCM.
3-Methyl-2-[and 3]nonene nitrile	No	GIV.
Methyl pentynol	No	(?)
Methyl propionate	No	FB.
2-Methylundecanal	No	CI, GIV.
Myrcenyl acetate	No	IFF.
Myristaldehyde	No	GIV.
Nonanal	No	CI.
1,3-Nonanediol acetate	No	ELN, GIV, SBC.
Ocimene	No	IFF.
Ocimenyl acetate	No	IFF.
Octanal	No	CI.
N-Octyl acetate	No	SCM.
Octyl formate	No	FB.
Octyl isobutyrate	No	FB.
Octyl isovalerate	No	GIV.
Pentyl acetate	No	FB.
N-Propyl acetate	No	NW.
Pseudo linalyl acetate (Neobergamate)	No	IFF.
Rhodinol	Yes	FB, GIV, IFF.
Tepyl acetate	No	ELN.
Tetrahydro-allocimerol(50/50 mixture of tetrahydro-linalool and tetrahydro-myrcenol)	No	(?)
Tetrahydromyrcenol	No	SCM.
Trimethyl-cyclododeca-trienyl ethanone	No	IFF.
3,5,5-Trimethyl hexanal	No	IFF.
Undecanal	No	CI, GIV.
All other acyclic flavor and perfume materials	No	FB, GIV, IFF, (?)

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 7-3

Flavor and perfume materials: Directory of manufacturers, alphabetical by code, 1989

<i>Code</i>	<i>Name of company</i>	<i>Code</i>	<i>Name of company</i>
ABB . . . . .	Abbott Laboratories	MON . . . . .	Monsanto Co.
AMB . . . . .	American Bio-Synthetics Corp.	MRF . . . . .	Morflex Inc.
ARS . . . . .	Arsynco, inc., Sub. Div., of Aceto Corp.	NCI . . . . .	Unlon Camp Corp., BBA Div.
ARZ . . . . .	Arizona Chemical Co.	NSW . . . . .	Nutrasweet Co.
BDS . . . . .	Fragrance Resources, Inc.	NW . . . . .	Northwestern Chemical Co.
CI . . . . .	Firmenich, Inc.	PD . . . . .	Parke-Davis, Div. of Warner-Lambert Co.
CWN . . . . .	Upjohn Co., Fine Chemicals	PFZ . . . . .	Pfizer, Inc.
ELN . . . . .	Elan Chemical Co.	PSG . . . . .	PMC Inc., Specialties Group, Inc.
FB . . . . .	Fritzsche Dodge & Olcott, Inc.	RAY . . . . .	Rayonier Chemical Products Inc.
FEL . . . . .	Felton Worldwide, Inc.	RDA . . . . .	Rhone-Poulenc, Inc.
GIV . . . . .	Glvaudan Corp.	SBC . . . . .	Scher Chemicals, Inc.
GPI . . . . .	Grindsted Products, Inc.	SCM . . . . .	SCM Corp., Glidco Organics
HAR . . . . .	Haarmann & Reimer Corp.	STG . . . . .	McCormick & Co., Inc.
HPC . . . . .	Hercules, Inc.		McCormick-Stange Flavor Div.
IFF . . . . .	International Flavors & Fragrances, Inc.		

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 8 Plastics and Resin Materials

Plastics and resin materials are high molecular weight polymers which, at some stage in their manufacture, exist in such physical condition that they can be shaped or otherwise processed by the application of heat and pressure. The terms "plastics," "resin," and "polymers," can be (and often are) used interchangeably by the trade. Depending on the chemical composition, manufacturing process, or intended use, the commercial products may contain plasticizers, fillers, extenders, stabilizers, coloring agents, or other additives. There are about 40 to 50 basic plastics and resins which are available commercially. These basic materials are available in literally thousands of individual compounds each with its distinct properties depending on the molecular weight of the resin and the types and amounts of the additives present. Plastics materials may be molded, cast, or extruded into semifinished or finished solid forms. Resin materials may be in the form of solutions, pastes, or emulsions for applications such as protective coatings, adhesives, or paper and textile treatment.

Statistics on U.S. production and sales of synthetic plastics and resin materials for 1989 are given in table 8-1. U.S. production of plastics and resin materials in 1989 totaled 26,995 million kilograms, or 6.3 percent less than the 28,820 million kilograms produced in 1988. From 1985-89, the production of plastics and resin materials increased irregularly from 22,679 million kilograms in 1985 to 26,995 million kilograms in 1989, or at an average, annual rate of growth of 4.5 percent (see figure 8-1). Sales in 1989 totaled 23,819 million kilograms, valued at \$32,180 million, compared with 25,057 million kilograms, valued at \$33,831 million, in 1988.

Thermosetting materials are those which harden with a change in composition in the final treatment so that in their final state as finished articles they are substantially infusible and insoluble; that is, they cannot again be softened by heat or solvents. U.S. production of thermosetting materials totaled 4,033 million kilograms in 1989, compared with 4,352 million kilograms in 1988. Production of the most important products in 1989 included phenolic (834 million kilograms), amino (urea and melamine) resins (1,015 million kilograms), polyester resins, unsaturated (608 million kilograms), and alkyd resins (322 million kilograms).

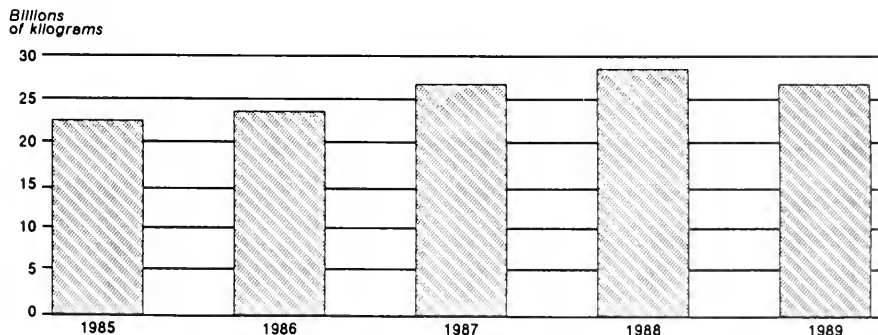
Thermoplastic materials are those which in their final state as finished articles can be repeatedly softened by heat and hardened by a decrease in temperature. U.S. production of thermoplastic materials totaled 22,962 million kilograms in 1989 (or 85.1 percent of the total plastics and resin materials output for 1989), compared with 24,468 million kilograms in 1988. Production of the most important products in 1989 included polyethylene (7,613 million kilograms), polypropylene (3,039 million kilograms), vinyl resins (4,733 million kilograms), and styrene type materials (3,591 million kilograms). In 1989, production of saturated polyester resins reached 1,535 million kilograms (polyethylene terephthalate alone reached 1,212 million kilograms). Production of engineering plastics, in the aggregate, amounted to 883 million kilograms in 1989.

Table 8-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 8-3.

*Edward J. Taylor*  
202-252-1362

(Effective 1/14/91 202-205-3362)

**Figure 8-1**  
Plastics and resin materials: U.S. production, 1985-89



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 8

Table 8-1

Plastics and resin materials: U.S. Production and sales, 1989

Plastics and resin materials	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms dry basis <sup>2</sup>	1,000 kilograms dry basis <sup>2</sup>	1,000 dollars	Per kilogram
<b>Grand total</b> .....	<b>26,995,481</b>	<b>23,819,400</b>	<b>32,180,380</b>	<b>\$1.35</b>
<b>Thermosetting resins</b>				
Total .....	4,033,128	3,133,613	4,901,593	1.56
<b>Alkyd resins, total</b> .....	<b>322,475</b>	<b>218,430</b>	<b>382,070</b>	<b>1.75</b>
Phthalic anhydride type .....	251,889	172,284	270,029	1.57
Polybasic acid type .....	12,649	7,035	13,329	1.89
Styrenated-alkyds or copolymer alkyds .....	10,510	2,714	4,669	1.72
Vinyl toluene alkyds .....	12,415	10,059	15,825	1.57
All other alkyd resins .....	35,012	26,338	78,218	2.97
Dicyandiamide resins (an amino resin) .....	1,258	1,161	2,972	2.56
Epoxy resins: <sup>3 4</sup>				
Unmodified .....	259,044	174,669	436,105	2.50
Advanced .....	(127,340)	(76,918)	(224,224)	(2.92)
Furfuryl type resins .....	7,881	7,818	12,091	1.55
Glyoxal-formaldehyde resins .....	10,610	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )
Melamine-formaldehyde resins (an amino resin) .....	81,613	69,168	135,115	1.95
Phenolic and other tar acid resins .....	833,554	517,047	972,066	1.88
Polyester resins, unsaturated <sup>6</sup> .....	607,899	582,309	1,651,262	2.84
Polyether and polyester polyols for urethanes <sup>7</sup> .....	700,576	558,617	532,891	.95
<b>Polyurethane elastomers and plastics products, total</b> .....	<b>216,760</b>	<b>101,482</b>	<b>364,024</b>	<b>3.59</b>
Elastomers <sup>8</sup> .....	173,941	56,989	237,878	4.17
Plastics .....	42,819	44,493	126,146	2.84
Urea-formaldehyde resins (an amino resin) <sup>9</sup> .....	933,877	851,717	255,815	.30
All other thermosetting resins <sup>10</sup> .....	57,581	51,195	157,182	3.07
<b>Thermoplastic resins</b>				
Total .....	22,962,353	20,685,787	27,278,787	1.32
<b>Acrylic resins, total<sup>11</sup></b> .....	<b>734,635</b>	<b>554,121</b>	<b>1,415,032</b>	<b>2.55</b>
Homopolymer resins, except PMMA, of acrylic or methacrylic acid esters .....	29,455	22,346	50,377	2.25
Polymethyl methacrylate (PMMA) resins .....	291,416	189,329	450,152	2.38
Thermosetting acrylic resins .....	63,881	19,352	53,283	2.75
All other acrylic resins .....	349,883	323,094	861,220	2.67
Engineering plastics <sup>12</sup> .....	883,394	685,595	2,414,183	3.52
Petroleum hydrocarbons resins .....	163,272	145,622	158,494	1.09
<b>Polyamide resins, total</b> .....	<b>323,643</b>	<b>285,532</b>	<b>787,500</b>	<b>2.76</b>
Nylon type <sup>11 13</sup> .....	290,737	253,652	722,635	2.85
Non-nylon type .....	32,906	31,880	64,865	2.03
<b>Polyester resins, saturated, total<sup>11 14</sup></b> .....	<b>1,535,414</b>	<b>1,285,481</b>	<b>2,392,695</b>	<b>1.86</b>
Polyethylene terephthalate (PET) .....	1,211,704	1,019,478	1,620,969	1.59
All other saturated polyesters, including Polybutylene terephthalate, (PBT) resins .....	323,710	266,003	771,726	2.90

See footnotes at end of table.

Table 8-1—Continued

Plastics and resin materials: U.S. Production and sales, 1989

Plastics and resin materials	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms dry basis <sup>2</sup>	1,000 kilograms dry basis <sup>2</sup>	1,000 dollars	Per kilogram
<b>Thermoplastic resins—Continued</b>				
Polyethylene resins, total	7,613,260	7,189,525	7,739,620	\$1.08
Ethylene-vinyl acetate and other copolymer resins	294,470	260,169	362,145	1.39
Specific gravity 0.940 and below, total <sup>1a</sup>	4,121,040	3,864,415	3,891,069	1.01
Low density polyethylene (LDPE) resins	3,028,564	2,793,091	2,883,139	1.03
Linear low density polyethylene (LLDPE) resins	1,092,476	1,071,324	1,007,930	.94
Specific gravity over 0.940	3,197,750	3,064,941	3,486,406	1.14
Polypropylene resins	3,039,309	2,973,768	2,473,616	.83
Polyterpene resins	12,677	13,444	31,942	2.39
Polytetrafluoroethylene (PTFE) resins	(5)	12,482	174,665	13.99
Rosin modifications, total	152,363	131,681	174,418	1.32
Modified rosin (unesterified)	67,487	53,598	48,752	.91
Modified rosin esters	65,579	59,704	99,286	1.66
Rosin esters, unmodified (Ester gums)	19,297	18,379	26,380	1.44
Styrene plastics materials, total	3,591,407	3,021,437	4,476,538	1.48
Acrylonitrile-butadiene-styrene terpolymer (ABS) resins	547,436	500,304	1,021,475	2.04
Methyl methacrylate-butadiene-styrene (MBS) resins and certain other styrene type plastics materials	135,758	135,433	278,056	2.05
Polystyrene homopolymers, total	2,400,264	1,955,474	2,464,229	1.26
Expandable polystyrene beads	315,828	259,183	403,757	1.56
Rubber modified polystyrene	808,919	741,966	940,092	1.27
Straight polystyrene	1,275,517	954,325	1,120,380	1.17
Styrene latexes, total	290,808	306,028	456,928	1.49
Styrene-butadiene latexes	275,402	289,872	431,631	1.49
All other styrene latexes	15,406	16,156	25,297	1.57
All other styrene plastics materials <sup>1a</sup>	217,141	124,198	255,850	2.06
Vinyl resins, total <sup>17</sup>	4,732,869	4,233,739	4,401,723	1.04
Polyvinyl acetate <sup>18</sup>	296,642	215,566	347,714	1.61
Polyvinyl chloride and copolymers	4,002,595	3,648,741	3,459,578	.95
Polyvinylidene chloride resins, latex type	11,502	10,716	21,474	2.00
Vinyl acetate-acrylate copolymers	215,433	204,263	228,048	1.12
All other vinyl and vinylidene resins <sup>19</sup>	206,697	154,453	344,909	2.23
All other thermoplastic resins <sup>20</sup>	180,110	153,360	638,361	4.16

<sup>1</sup> Calculated from unrounded figures.<sup>2</sup> Dry weight basis unless otherwise specified. Dry weight basis is the total weight of the materials including resin and coloring agents, extenders, fillers, plasticizers, and other additives, but excluding water and other liquid diluents unless they are an integral part of the materials.<sup>3</sup> Includes reactive diluents which are an integral part of the resin. Excludes the weight of hardeners sold in association with the resin as part of a two-component system.<sup>4</sup> Data shown for advanced epoxy resins are that part of the unmodified epoxy resins which is further processed; therefore, the total in parentheses are not included in the grand total.<sup>5</sup> Reported data were accepted in confidence and may not be published, or no data were reported.<sup>6</sup> Polyester resins are unsaturated alkyd resins, later to be copolymerized with a monomer (Such as styrene or methyl methacrylate), and polyalkyl resins (such as diallyl phthalate and diglycol carbonate). Data are on an "as sold" basis, including monomer if part of the resin system.<sup>7</sup> In addition to the polyols, the other principal starting materials used in the production of urethane products are the isocyanic acid derivatives, mainly the 80/20 mixture of toluene-2,4- and 2,6-diliscyanate.

Statistics for the isocyanic acid derivatives are reported in the "Cyclic Intermediates" section of the Synthetic Organic Chemicals report.

## Footnotes for table 8-1—Continued

\* The data on urethane elastomers are believed to be not fully representative of the total urethane market in view of the very large number of urethane elastomer producers. The commission has begun reporting statistics for urethane elastomers in two sections, section VIII, plastics and resin materials, and section X, elastomers (synthetic rubber). Henceforth those polyurethane products classified as "thermoplastic" urethane elastomers will be reported in SOC section X; all other urethane elastomers will remain in SOC section VIII.

<sup>9</sup> Includes thiourea resins.

<sup>10</sup> Includes acetone-formaldehyde resins, glyoxal-formaldehyde resins (sales only), polybutadiene resins, silicone resins, and certain other thermosetting resins.

<sup>11</sup> Does not include production or sales for fiber use.

<sup>12</sup> Engineering plastics: Includes acetal, polycarbonate, polyetheretherketone (PEEK) resins, polyimide and amide-imide polymers, polyphenylene oxide, polyphenylene sulfide, and polysulfone. Engineering plastics are defined in *Whittington's Dictionary of Plastics*, as "All plastics, with or without fillers or reinforcements, which have mechanical, chemical and thermal properties suitable for use in construction, machine components and chemical processing equipment." The above list of plastics (all of which are thermoplastic) was selected from a larger group in this source. Certain other plastics named in *Whittington's Dictionary* as engineering plastics, such as ABS resins, acrylic resins, and nylon resins, are not included in the above list as they are published separately.

<sup>13</sup> Statistics for nylon 6 and nylon 6/6 which are used in plastics applications (e.g., molding, etc.) are included here.

<sup>14</sup> Statistics are included here for polyethylene terephthalate used in plastics applications (e.g., molding, etc.) Statistics also are included here for production only when the starting materials are converted directly to a finished product (i.e., "in situ" production); polyester film and tape are examples of such a conversion.

<sup>15</sup> Data shown for LLDPE resins are incomplete because several of the leading producers of LLDPE (e.g., Union Carbide Corp.) still continue to aggregate these data with that of LDPE.

<sup>16</sup> Includes data for  $\alpha$ -methyl styrene polymers, styrene acrylonitrile (SAN) copolymer resins, styrene-allyl alcohol copolymer resins, styrene-divinylbenzene copolymer resins, styrene-maleic anhydride copolymers resins and styrene-methyl methacrylate copolymers resins, and other styrene resins.

<sup>17</sup> Data are on the basis of dry resin content, excluding the weight of plasticizers, extenders, fillers coloring agents, stabilizers, or impact modifiers, unless otherwise noted.

<sup>18</sup> Data for polyvinyl acetate produced and sold in latex form includes the weight of any protective colloids which are used as emulsion stabilizers and form an integral part of the resin system. Production and sales do not include polyvinyl acetate used as a reactive intermediate for polyvinyl alcohol or other vinyl resins.

<sup>19</sup> Includes polyvinyl alcohol, polyvinyl butyral, polyvinyl formal, polyvinylidene chloride (solid type), and other vinyl resins.

<sup>20</sup> Includes cellulose plastics, coumarone-indene resins, fluorocarbon resins, (except PTFE sales), phenoxy resins, polybutylene type resins, polyphenyl aromatic ester resins, and certain other thermoplastic materials.

Note.—Data reported to the U.S. International Trade Commission do not necessarily coincide with that reported to the Society of the Plastics Industry (SPI) because of differences in both the reporting instructions and in the coverage of certain resins.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 8-2

Plastics and resin materials for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

<i>Plastics and resin materials</i>	<i>Separate statistics<sup>1</sup></i>	<i>Manufacturers' identification codes (according to list in table 8-3)</i>
<b>Thermosetting resins</b>		
Acetone-formaldehyde resins .....	No	ACY, CMP, FLH, GP.
Alkyd resins: .....	Yes	
Acrylate-alkyd copolymer resins .....	No	CPV, DRC, DRR, FRE, MNP, PPG, REL.
Alkoyl phenol .....	No	( <sup>2</sup> ).
Phthalic anhydride type alkyd resins .....	Yes	ACO, ACY, AKZ, BAL, BLC, BRU, CCC, CGL, CJO, CPV, DSO, DUP, EW, FOC, FRE, GLD, GRG, GRV, HAN, HIL, ICF, IMI, JNS, LIC, MMM, MNP, NCP, NTL, OBC, PPG, PRT, QCP, RCI, REL, REZ, SRY, SW, TCC, UNO, ( <sup>2</sup> ), ( <sup>2</sup> ), ( <sup>2</sup> )
 Polybasic acid type alkyd resins .....	Yes	ACY, BAL, CJO, CPV, DSO, FOC, GLD, HAN, ICF, IMI, IOV, NTL, OBC, PPG, REL, SCN, SW.
Styrenated-alkyds, or copolymer alkyds .....	Yes	BLC, CJO, CPV, DRC, DSO, EW, FRE, GLD, IMI, JNS, MNP, MRT, REL, RUO, SW, ( <sup>2</sup> ).
Vinyl toluene alkyds .....	Yes	BLC, CGL, CJO, CPV, FRE, GLD, IMI, JNS, MNP, PRT, REL, SW.
All other alkyd copolymers .....	No	BLC, CGL, CJO, DUP, MNP, SW.
Amino resins:		
Melamine-formaldehyde resins .....	Yes	AUX, BOR, CBD, CGL, CPV, DGO, GP, GRG, HCL, MNP, MON, OCF, PLS, PMC, PPG, PPL, PST, RCI, REL, REZ, SCN, SQA, SYT, TCC, UCC, UTC, WRD.
Thiourea resins .....	No	CMP.
Urea-formaldehyde resins .....	Yes	ACY, AUX, BOR, CBD, CGL, CMP, CPV, DSO, GP, GRV, MMM, PMC, PST, REL, REZ, SAC, SOR, SQA, WPG.
Dicyandiamide resins .....	Yes	CMP, ECC, HCL, S, TCC, UTC.
Epoxy resins:		
Epoxy, resins advanced .....	Yes	AKZ, ASL, CGL, CGY, CJO, CNI, CPV, DOW, DSO, EW, GE, GLD, GRG, GRV, HAN, HXL, HYA, ICF, MID, MIL, MMM, MNP, MRT, OCF, PAC, PPG, RCI, REZ, SMO.
Epoxy, resins unmodified .....	Yes	ASH, CGY, CLU, DAN, DOW, PRT, RCI, REZ, SHC, UCC, ( <sup>2</sup> ).
Furfuryl type resins .....	Yes	CLU, DRR, HVG, UNO, WRD.
Glyoxal-formaldehyde resins .....	Yes	AIP, AUX, CMP, HCL, RBI, SQA, TCC, WPG.
Phenolic and other tar acid resins .....	Yes	ACY, ADC, ASH, BAL, BME, BOR, BSC, BTL, CBD, CLU, CPV, DRR, DSO, EW, GE, GP, HCL, HER, HKD, HPC, HVG, ICF, IMI, IRI, ISP, LII, MCA, MID, MMM, NCI, NTL, OBC, OCF, PLS, PSG, RCI, RH, SCN, SPL, UNO, USR, VSV, WCA, WRD, ( <sup>2</sup> ), ( <sup>2</sup> ), ( <sup>2</sup> ), ( <sup>2</sup> ).
Polybutadiene resins .....	No	CSC, CNI, CRS, LC, PSL.
Polyester resins, unsaturated, and allyl resins: .....	Yes	
Allyl resins .....	No	CMS, IMI.
Diallyl isophthalate .....	No	ATR, CMS.
Polyester resins, unsaturated .....	No	ACY, ADC, APH, ART, ASH, CGL, CPV, DSO, EW, FJI, FRE, GLD, GRG, ICF, ICI, IMI, IPC, LII, MRT, NCP, OCF, PPG, PPL, RCI, SCN, SHX, SIC.
Polyether and polyester polyols for urethanes .....	Yes	BAS, BMC, BPT, CHC, CPV, CXI, DOW, DSO, FRE, GRG, HCF, ICI, JNS, MRT, NTL, OMC, PPG, PPL, RCI, RUO, SLC, SYT, UCC, WM.
Polyurethane elastomer and plastic products:		
Polyurethane elastomers .....	Yes	ACY, ADC, ARK, ARO, BAS, BPT, CAS, CGY, CNI, DCC, DNS, EPI, EW, FMX, GLC, GRD, HXL, HYC, ICF, IMI, INP, MRT, PLN(E), PPG, PRC, QUN, RUO, SCN, SLC, SMO, SYT, USM, USR.

See footnotes at end of table.

## Section 8

Table 8-2—Continued

Plastics and resin materials for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Plastics and resin materials	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 8-3)
<b>Thermosetting resins</b>		
Polyurethane elastomer and plastic products—Continued		
Polyurethane resins	Yes	ACO, CGL, DSO, DUP, GLD, INP, LC, MID, MOB, OMC, PEL, SHX, SIF, SW, CJO, DCC, PEL, SPD.
Silicone resins	No	ACY, AKZ, BAS, DSO, FRE, GLD, MID, MIL, MNP, OBC, REL, RTC, S, SYT, TCC, (2), (2).
All other thermosetting resins	Yes	
<b>Thermoplastic resins:</b>		
<b>Acrylic resins:</b>		
Copolymer resins of acrylic and/or methacrylic acid resins:	Yes	
Butyl acrylate ethyl acrylate copolymer resins	No	AIP, BFG, DSO, ICI, RH, UOC.
Butyl methacrylate-ethyl methylacrylate copolymer resins	No	CGL, UOC.
2-Ethylhexyl acrylate-methyl acrylate copolymer resins	No	UOC.
Lauryl methacrylate-stearyl methacrylate copolymer resins	No	ICI.
All other copolymer resins of acrylic and/or methacrylic acid	No	ACO, AIP, BPT, CGL, CHP, CPV, DRB, DRC, DSO, FLH, GGI, GLD, ICF, ICI, JNS, KMP, MON, NSC, PPG, PRA, PYI, RCI, RH, SCP, SW, SYT, TCC, TNA, UCC, (2).
Homopolymer resins of acrylic and/or methacrylic acid resins:		
Other homopolymer resins of acrylic and/or methacrylic acid esters	Yes	CGL, CPV, DUP, GRV, ICF, PYI, RH, SAR, SCP, SW, UOC.
Polymethyl methacrylate (PMMA)	Yes	ACY, ART, CTP, CYR, DUP, ICF, JNS, MRT, PKL, RH, SAR, SQA, TCC.
Thermosetting acrylate resins	Yes	AIP, AKZ, CGL, CPV, DRC, DSO, DUP, FRE, GRV, ICF, MID, MNP, PPG, PRA, REL, REZ, SCP, SM, SW, (2).
<b>Cellulose plastics and resins:</b>		
Cellulose acetate	No	EKT.
Cellulose acetate butyrate	No	EKT.
Cellulose acetate propionate	No	EKT.
Ethyl cellulose	No	(2).
Coumarone-indene resins	No	CPV.
<b>Engineering plastics:</b>		
Acetal resins	No	DUP, HCL, PRT, RAS.
Polycarbonate resins	No	DOW, GE, GEP, MOB, SQA.
Polyetheretherketone (PEEK) resins	No	EKT.
Polyimides and amide-imide polymers	No	DUP, EW, GE, GEP, GRG, PDI, SCN.
Polyphenylene oxide type resins	No	GE, GEP, NTL.
Polyphenylene sulfide resins	No	HCL, PLC.
<b>Fluorocarbon resins:</b>		
Ethylene/chlorotrifluoro ethylene copolymer (Halar)	No	AUS.
Polytetrafluoroethylene (PTFE)	Yes	AUS, DUP, ICI.
Polyvinylidene fluoride resin	No	PAS.
All other fluorocarbon resins	No	DUP.
Petroleum hydrocarbon resins	No	CFX, CXI, EKX, ENJ, GYR, HPC, ICF, LII, NEV, RCI, (2).
Phenoxy (R) resin (other than for coating and adhesives)	No	NEV, UCC.
Plastics alloys or blends	No	MOB.
<b>Polyamide resins:</b>		
Non-nylon type, polyamide resins	Yes	BAL, COO, EFH, GP, HCL, LII, NCI, OBC, PAC, S, SCP, SQA, USM.
Nylon type, polyamide resins	Yes	ACS, AGI, BAS, BCM, CTR, DGO, DUP, GRG, HCL, MON, RSN, SCP, SHX, SKP, USM.

See footnotes at end of table.



Table 8-2—Continued

Plastics and resin materials for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Plastics and resin materials	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 8-3)
<b>Thermoplastic resins—Continued:</b>		
Polybutylene type resins	No	ENJ, SHC.
Polyester resins, saturated:	Yes	
Polybutylene terephthalate (PBT)	No	BAS, DUP, GE, GEP, HCL, MOB, USM, ACS, DUP, EKT, FBI, GEP, GYR, HCL, ICI, IMI, MOB, USM, (?).
Polyethylene terephthalate (PET)	Yes	COO, CPV, DUP, EKT, GLD, GRG, GYR, HCL, ICF, ICI, MNP, PPG, REL, SCN, SW.
All other polyester resins, saturated	Yes	
Polyethylene and copolymers resins:		
Ethylene-acrylic acid resins (EAA)	No	DOW.
Ethylene-vinyl acetate (EVA) copolymer resins	Yes	COO, ENJ, NSC, RCI, USI, EKT, EKX, ENJ, EVL, RH, SQA.
Other ethylene copolymer resins	No	
Specific gravity 0.940 and below (conventional low density)	Yes	ACS, DOW, DUP, EKX, ELP, ENJ, LYP, SM, SOC, SQA, UCC, USI, (?).
Specific gravity 0.940 and below (linear low density)	Yes	CMP, DOW, ENJ, SM, USI.
Specific gravity over 0.940	Yes	ACS, CNE, DOW, ENJ, HCL, HIM, PLC, SLT, SOC, UCC, USI.
Polyphenyl aromatic ester resins	No	HPC.
Polypropylene polymer and copolymer resins	Yes	AMO, ART, BAS, CSD, EKX, ELP, ENJ, HIM, PLC, SHC, SLT, USI, ARZ, HPC, RCI.
Polyterpene resins	Yes	
Rosin modifications:		
Modified rosin (Unesterified)	Yes	ARZ, CJO, HPC, ICF, NCI, SYL, WVA, CPV, EW, FJI, FRP, GLD, GP, GRV, HCL, HPC, LII, NCI, RCI, SYL, WVA.
Modified rosin esters	Yes	ARZ, CPV, FRP, HPC, NCI, RCI.
Rosin esters, unmodified (Ester gums)	Yes	
Styrene type plastics materials:		
Acrylonitrile-butadiene-styrene (ABS) terpolymer resins	Yes	DOW, GE, GRD, MON.
Methyl methacrylate-butadiene styrene (MBS) resins and certain other styrene type copolymer plastics	Yes	AIP, ARZ, ASL, CPV, CYR, DSO, EW, FLH, GE, GEP, GGI, GYR, HPC, JNS, MON, MRT, OBC, PLC, RCD, RH, TCC.
$\alpha$ -Methyl styrene polymers	No	AIP, AMO, CPV, GGI, JNS, BFG, DOW, GE, ICI, MON.
Styrene-acrylonitrile copolymer resins (SAN)	No	
Polystyrene:		
Expandable polystyrene beads	No	ATR, BAS, DPI, HMN, TXS.
Rubber modified polystyrene	No	API, CSD, DOW, DPI, HMN, SM.
Straight polystyrene	No	AEP, AMO, API, ATR, CSD, DOW, DPI, GAF, HGC, HMN, HPC, KTP, SM, SOC, TXS.
Styrene latexes:		
Styrene-butadiene latexes	No	DOW, GRD, GYR, PYI, RCI, UOC.
All other styrene latexes	No	ADC, CCS, CRS, FRS, GRD, SPO, UCC, UOC.
Other styrene copolymers:		
Styrene-allyl alcohol copolymer resins	No	HPC, MON.
Styrene-divinylbenzene copolymer resins	No	EK, RH, TCC.
Styrene-maleic anhydride copolymer resins	No	ATR, JNS, MON.
Styrene-methyl methacrylate copolymer resins	No	ADC, GGI, RCD.
All other, styrene type plastics materials	No	FER, ICI.
<b>Vinyl resins:</b>		
Polyvinyl acetate resins	Yes	AIP, CGL, DSO, FLH, FLN, GLD, GRD, JNS, MNP, MON, NSC, PRA, PYI, RCI, SQA, TCC, UCC, UOC, (?).
Polyvinyl alcohol resins	No	AIP, DUP.
Polyvinyl butyral resins	No	MON.
Polyvinyl formal resin	No	GRG, MON.

See footnotes at end of table.

Table 8-2—Continued

Plastics and resin materials for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Plastics and resin materials	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 8-3)
<b>Thermoplastic resins—Continued</b>		
Vinyl resins—Continued		
Vinyl acetate-acrylate copolymers .....	Yes	ACO, CMP, DAN, DSO, FLH, FLN, GLD, NCJ, NTC, OBC, PRA, RCI, RH, SPC, SQA, UCC, UOC.
Polyvinyl chloride and copolymer resins: .....		
Polyvinyl chloride homopolymer resins .....	No	AIP, BCP, BFG, CNT, FOR, GGC, GYR, HKP, KYS, SHT, UCC, VST, VYN.
All other polyvinyl chloride copolymer resins .....	No	BFG, HKP, VYN.
Vinyl chloride-acetate copolymer resins .....	No	BCP, KYS.
Polyvinylidene chloride resins:		
Latex type polyvinylidene chloride resins .....	Yes	BFG, DOW, GRD, UOC.
Solid type polyvinylidene chloride resins .....	No	DOW.
Vinyl resins, all other .....	Yes	DUP, EW, FLH, GLD, NTC, RH, UCC, (2).
All other, thermoplastic resins, benzenoid .....	Yes	DUP, ENJ, HCL, LII, NES, UOC. (2).

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals or which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 8-3

Plastics and resin materials: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
ACO	Adco Chemical Co.	CPV	Cook Paint & Varnish Co.
ACS	Allied Signal, Inc.	CRS	Colorado Resins, Inc.
	Engineered Materials Sector.	CSD	Fina Oil & Chemical Co., Cosden Chemical Div.
	Engineered Plastic Div.	CTP	Continental Polymers, Inc.
	High Density Polyethylene Business	CTR	Custom Resins Div. of Bemis Co., Inc.
ACY	American Cyanamid Co.	CXI	Chemical Exchange Industries, Inc.
ADC	Anderson Development Co.	CYR	CYRO Industries
AEP	A & E Plastics Corp.	DAN	Dan River, Inc., Chemical Products Div.
AGI	EMS-American Grillon, Inc.	DCC	Dow Corning Corp.
AIP	Air Products & Chemicals, Inc.	DGO	Day-Glo Color Corp.
AKZ	Akzo Coating, Inc.	DNS	Dennis Chemical Co.
AMO	Amoco Corp.	DOW	Dow Chemical Co.
APH	Alpha Corporation of Tennessee	DPI	Dart Polymers, Inc., Sub of Dart Container Corp.
API	American Polymers, Inc.	DRB	Rohm Tech, Inc.
ARK	Armstrong World Industries, Inc.	DRC	Dock Resins Corp.
ARO	Arnco	DRR	Delta Resins & Refractories
ART	Aristech Chemical Corp.	DSO	DeSoto, Inc.
ARZ	Arizona Chemical Co.	DUP	E. I. duPont de Nemours & Co., Inc. Automotive Product Dept. Chemicals and Pigments Dept. ED/IMG Dept. Petrochemicals Dept. Polymer Products Dept.
ASH	Ashland Oil, Inc.	ECC	Eastern Color & Chemical Co.
ASL	Specialtychem Products Corp.	EFH	E. F. Houghton & Co.
ATR	Atlantic Richfield Co., Arco Chemical Co.	EK	Eastman Kodak Co.:
AUS	Ausimont N.V.	EKT	Tennessee Eastman Co. Div.
AUX	Auralux Corp.	EKX	Texas Eastman Co. Div.
BAL	Sherwin-Williams Co., Consumer Div.	ELP	Rexene Products Company
BAS	BASF Corp.	ENJ	Exxon Chemical Americas
BCM	Belding Chemical Industries	EPI	Eagle Picher Industries, Orthane Div.
BCP	Borden Chemical & Plastics Delaware Limited Partnership	EVL	Eval Company of America
BFG	B. F. Goodrich Co.	EW	Westinghouse Electric Corp., Insulating Materials Div.
BLC	Ranbar Technology, Inc.	FBI	Fibers Industries, Inc.
BMC	Brin-Mont Chemicals, Inc.	FER	Ferro Corp., Kell Chemical Div.
BME	Allied Signal Bendix Corp., Friction Materials Div.	FJI	Cincinnati Varnish Co.
BOR	Borden, Inc., Packaging & Industrial Products Div.	FLH	H. B. Fuller Co.
BPT	Permethane Coatings, Inc.	FLN	Franklin International
BRU	M. A. Bruder & Sons, Inc.	FMX	Foamex Products, Inc., Div., of Knoll International
BSC	Cascade Resins, Inc.	FOC	Handschy Industries, Inc., Ink & Chemicals Div.
BTL	BTL Specialty Resin Corp.	FOR	Formosa Plastics Corp. - U.S.A.
CAS	CasChem, Inc.	FRE	Freeman Chemical Corp.
CBD	Chembond Corp.	FRP	Akzo Coatings, Inc.
CCC	C. N. C. International Inc.	FRS	Firestone Tire & Rubber Co., Firestone Synthetic Rubber & Latex Co. Div.
CCS	Colorado Chemical Specialties, Inc.	GAF	GAF Chemical Corp.
CFX	Chemfax, Inc.	GE	General Electric Co.: Electromaterials Div. Specialty Chemical Group
CGL	Cargill, Inc.	GEP	Plastics Div.
CGY	Ciba-Gelgy Corp.		
CHC	Carpenter Chemical Co.		
CHP	C. H. Patrick & Co., Inc.		
CJO	C. J. Osborn Chemicals, Inc.		
CLU	CL Industries, Inc.		
CMP	Commercial Products Co., Inc.		
CMS	Cosmic Plastics, Inc.		
CNE	Oxy Petrochemicals, Inc.		
CNI	Conap, Inc.		
CNT	CertainTeed Corp.		
COO	H.B. Fuller Co.		

See note at end of table.

Table 8-3—Continued

Plastics and resin materials: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
GGC .....	Georgia-Gulf Corp.,: PVC Compound Div. Plaquemine Div.	MID .....	Dexter Corp., Dexter Specialty Coatings
GGI .....	Grow Group, Inc.	MIL .....	Milliken & Co., Milliken Chemical Co.
GLC .....	General Latex & Chemical Corp.	MMM .....	Minnesota Mining & Manufacturing Co.
GLD .....	Glidden Co.	MNP .....	Mcwurther, Inc.
GP .....	Georgia-Pacific Corp.: Resins Operations	MOB .....	Mobay Chemical Corp., Pittsburgh Div.
GRD .....	W. R. Grace & Co., Organic Chemicals Div.,	MON .....	Monsanto Co.
GRG .....	P. D. George Co.	MRT .....	Morton International Inc., Morton Chemical Div.
GRV .....	Guardman Chemicals, Inc.	NCI .....	Union Camp Corp.
Gyr .....	Goodyear Tire & Rubber Co.	NCJ .....	National Casein of New Jersey
HAN .....	Akzo Coatings	NCP .....	Niles Chemical Paint Co.
HCF .....	Cape Industries	NES .....	Rutgers-Nease Chemical Co.
HCL .....	Hoechst Celanese Corp.: Bayport Works Engineering Plastics Div. Fibers Industrial Div. Sou-TEX Works	NEV .....	Neville Chemical Co.
HER .....	Heresite Protective Coatings, Inc.	NSC .....	National Starch & Chemical Corp.
HGC .....	Goodson Polymers, Inc.	NTC .....	National Casein Co.
HIL .....	Hilton Davis Company	NTL .....	NL Industries, Inc.
HIM .....	Hilmont U.S.A., Inc. Occidental Chemical Corp.:	OBC .....	O'Brien Corp.
HKD .....	Durez Div.	OCF .....	Owens-Corning Fiberglas Corp.
HKP .....	Polymers and Plastics Div.	OMC .....	Olin Corp.
HMN .....	Huntsman Chemical Corp.	PAC .....	Pacific Anchor Chemical Corp.
HPC .....	Hercules, Inc.	PAS .....	Atochem North America, Inc.
HVG .....	Ametek, Inc., Haveg Div.	PDI .....	Phelps Dodge Industries, Inc., Phelps Dodge Magnet Wire Co. Div.
HXL .....	Hexcel Corp., Hexcel Chemical Products Dexter Corp.	PEL .....	Peiron Corp.
HYA .....	Dexter Adhesives and Structural Material Div.	PKL .....	Plaskolite, Inc.
HYC .....	Dexter Electronic Materials Div.	PLC .....	Phillips 66 Co.
ICF .....	BASF Corp., Coating and Colorants	PLN .....	Disogrin Industries Corp.
ICI .....	ICI Americas: Film Group Div. Resin Div. Specialty Chemical Div.	PLS .....	Plastics Engineering Co.
IMI .....	Insulating Materials, Inc.	PMC .....	Plastics Manufacturing Co.
INP .....	Synlar Corp.	PPG .....	PPG Industries, Inc.
IOV .....	Akzo/Iovite, Inc.	PPL .....	Pioneer Plastics Corp.
IPC .....	Interplastic Corp.	PRA .....	Para-Chem Southern, Inc.
IRI .....	Stuart-Ironsidles, Inc.	PRC .....	Products Research & Chemical Corp.
ISP .....	Indspec Chemical Corp.	PRT .....	Pratt & Lambert, Inc.
JNS .....	S.C. Johnson & Son, Inc.	PSG .....	PMC Specialites Group
KMP .....	Kelly-Moore Paint Co., Inc.	PSL .....	Plaslok Corp.
KTP .....	Kama Corp.	PST .....	Perstorp Compounds, Inc.
KYS .....	Keysor Century Corp.	PYI .....	Morton International, Inc., Morton Chemical Div.
LC .....	Lord Corp., Chemical Products Group	QCP .....	Quaker Chemical Corp.
LIC .....	Lilly Industrial Coatings, Inc.	QUN .....	K. J. Quinn & Co., Inc.
LII .....	Lawter International, Inc.	RAS .....	Surface Coatings, Inc.
LYP .....	Lyondell Petrochemical Co.	RBI .....	Reeves Brothers, Inc.
MCA .....	Masonite Corp., Alpine Resin Div.	RCD .....	Polysar, Inc.
		RCI .....	Reichhold Chemicals, Inc.
		REL .....	Akzo Coatings, Inc.
		REZ .....	Hi-Tek Polymers, Inc.
		RH .....	Rohm & Haas Co.
		RSN .....	Atochem, Inc., Polymers Div.
		RTC .....	Mount Vernon Mills, Inc.
		RUO .....	Ruco Polymer Corp.
		S .....	Sandoz Chemicals Corp., Color and Chemicals Div.

See note at end of table.

Table 8-3—Continued

Plastics and resin materials: Directory of manufacturers, alphabetical by code, 1989

<i>Code</i>	<i>Name of company</i>	<i>Code</i>	<i>Name of company</i>
SAC .....	Southeastern Adhesives Co.	SPO .....	Ameripol Synpol Co. Div. of Unroyal Goodrich Tire Co.
SAR .....	Esschem, Inc.	SQA .....	Sequa Chemicals, Inc.
SCN .....	Schenectady Chemicals, Inc.	SRY .....	Synray Corp.
SCP .....	Henkel Corp.	SW .....	Sherwin-Williams Co.
SHC .....	Shell Chemical Co.	SYL .....	Arizona Chemical Co.
SHT .....	Shlntech, Inc.	SYT .....	Synthron, Inc.
SHX .....	Sherex Chemical Co.	TCC .....	Sybron Chemicals, Inc.
SIC .....	BP Chemicals, Inc., Silmar Div.	TNA .....	Ethyl Corp.
SIF .....	BP Chemicals, Inc., Filon Div.	TXS .....	Scott Polymers, Inc.
SKP .....	Shakespeare Co. Monofilament Div.	UCC .....	Union Carbide Corp., Industrial Chemical Div.
SLC .....	Soluol Chem Co., Inc.	UNO .....	United-Erie, Inc.
SLT .....	Soltex Polymer Corp.	UOC .....	Union Oil Co. of California
SM .....	Mobil Oil Corp.:	USI .....	Quantum Chemical Corp., USI Division
	Mobil Chemical Co.:	USM .....	Emhart Corp., Bostik Div.
	Chemical Products Div.	UTC .....	Unltex Chemical Corp.
	Petrochemicals Div.	VST .....	Vista Chemical Co.
	Polystyrene Business Group	VSV .....	Valentine Sugars, Inc.
SMO .....	Smooth-On, Inc.	VYN .....	Vygen, Inc.
SOC .....	Chevron Corp., Chevron Chemical Co.	WCA .....	West Coast Adhesives Co.
SOR .....	MW Manufacturers, Inc., Southern Resin Div.	WM .....	Inolex Chemical Co.
SPC .....	Insilco Corp., Sinclair Paint Co. Div.	WPG .....	West Point-Pepperell, Inc., Grifftex Chemical Co. Sub.
SPD .....	General Electric Co., Silicone Products Dept.	WRD .....	Weyerhaeuser Co.
SPL .....	Spaulding Composites Co., Inc.	WVA .....	Westvaco Corp.

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.



## Section 9 Rubber-Processing Chemicals

Rubber-processing chemicals are organic compounds that are added to natural and synthetic rubber to give them qualities necessary for their conversion into finished rubber goods. In this report, statistics are given for cyclic and acyclic compounds by use—such as accelerators, antioxidants, and vulcanizing agents. Data on production and sales of rubber-processing chemicals in 1989 are given in table 9-1. Data on production of rubber-processing chemicals during 1985-89 are given in figure 9-1.

Production of rubber-processing chemicals as a group in 1989 amounted to 176 million kilograms, or 10 percent more than the 160 million kilograms produced in 1988. Sales of rubber-processing chemicals in 1989 amounted to 129 million kilograms, valued at \$473 million, compared with 121 million kilograms, valued at \$424 million, in 1988.

The production of cyclic rubber-processing chemicals in 1989 amounted to 155 million kilograms, or 7 percent more than the 144 million kilograms produced in 1988. Sales of cyclic rubber-processing chemicals in 1989 totaled 109 million kilograms, valued at \$430 million, compared with 107 million kilograms, valued at

\$397 million, in 1988. Of the total production of cyclic rubber-processing chemicals in 1989, antioxidants, antiozonants, and stabilizers accounted for 68 percent, and accelerators, activators, and vulcanizing agents for 29 percent. Production of antioxidants, antiozonants, and stabilizers, which amounted to 105 million kilograms in 1989, included 64 million kilograms of amino compounds and 41 million kilograms of phenolic and phosphite compounds. Sales of amino antioxidants, antiozonants, and stabilizers in 1989 amounted to 46 million kilograms, valued at \$174 million; sales of phenolic and phosphite compounds were 26 million kilograms, valued at \$91 million.

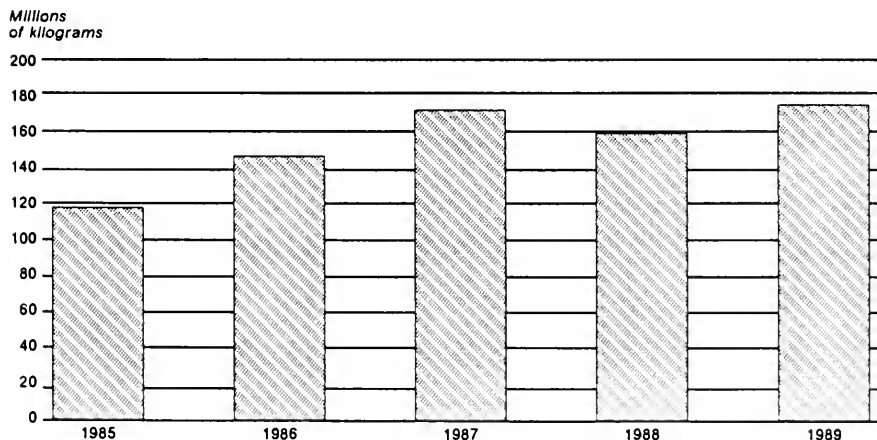
Production of acyclic rubber-processing chemicals in 1989 amounted to 21 million kilograms, or 34 percent more than the 16 million kilograms produced in 1988. Sales in 1989 totaled 20 million kilograms, valued at \$43 million, compared with 13 million kilograms, valued at \$27 million, in 1988.

Table 9-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 9-3.

*Cynthia Trainor*  
202-252-1354

(Effective 1/14/91 202-205-3354)

**Figure 9-1**  
Rubber-processing chemicals: U.S. production, 1985-89



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 9-1

Rubber-processing chemicals: U.S. production and sales, 1989

Rubber-processing chemicals	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Grand Total</b> .....	<b>175,865</b>	<b>128,846</b>	<b>472,892</b>	<b>\$3.67</b>
<b>Cyclic</b>				
<b>Total</b> .....	<b>155,035</b>	<b>108,721</b>	<b>429,565</b>	<b>3.95</b>
<b>Accelerators, activators, and vulcanizing agents total</b> .....	<b>45,107</b>	<b>32,417</b>	<b>130,075</b>	<b>4.01</b>
Thiazole derivatives, total .....	38,709	26,516	91,819	3.46
N-tert-Butyl-2-benzothiazolesulfenamide .....	10,307	9,293	37,520	4.04
2,2'-Dithiobis[benzothiazole] .....	5,105	5,250	13,375	2.55
All other thiazole derivatives .....	23,297	11,973	40,924	3.42
All other accelerators, activators, and vulcanizing agents <sup>2,3</sup> .....	6,398	5,901	38,256	6.48
<b>Antioxidants, antiozonants, and stabilizers, total</b> ..	<b>105,327</b>	<b>71,498</b>	<b>265,205</b>	<b>3.71</b>
Amino compounds, total .....	64,072	45,815	174,367	3.81
Substituted p-phenylenediamines .....	41,810	24,730	112,892	4.56
All other amino compounds <sup>4</sup> .....	22,262	21,085	61,475	2.92
Phenolic and phosphite compounds, total <sup>5</sup> .....	41,255	25,683	90,838	3.54
Polyphenolics .....	3,699	3,086	24,995	8.10
All other phenolic and phosphite compounds .....	37,556	22,597	65,843	2.91
All other cyclic rubber-processing chemicals <sup>6</sup> .....	4,601	4,806	34,285	7.13
<b>Acyclic</b>				
<b>Total</b> .....	<b>20,830</b>	<b>20,125</b>	<b>43,327</b>	<b>2.15</b>

<sup>1</sup> Calculated from unrounded figures.<sup>2</sup> Includes aldehyde-amine reaction products, dithiocarbamates, and other accelerators, activators, and vulcanizing agents.<sup>3</sup> Data on dithiocarbamates included in this table are for materials used chiefly in the processing of natural and synthetic rubber. Data on dithiocarbamates, which are used chiefly as fungicides, are included in the section on "Pesticides and Related Products."<sup>4</sup> Includes aldehyde- and acetone-amine reaction products and other amines.<sup>5</sup> Also includes other antioxidants, antiozonants, and stabilizers.<sup>6</sup> Includes blowing agents and other cyclic rubber-processing chemicals.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.



Table 9-2

Rubber-processing chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Rubber-processing chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 9-3)
<b>Cyclic:</b>		
<b>Accelerators, activators, and vulcanizing agents:</b>		
<b>Aldehyde-amine reaction products:</b>		
Heptaldehyde-aniline condensate .....	No	USR.
Triethyltrimethylenetriamine .....	No	USR.
All other aldehyde-amine reaction products, cyclic ..	No	DUP.
<b>Dithiocarbamic acid derivatives:</b>		
Dibenzylidithiocarbamic acid, sodium salt .....	No	USR.
Dibenzylidithiocarbamic acid, zinc salt .....	No	USR.
Dibutylidithiocarbamic acid, diphenylguanidine salt .....	No	RCI.
<b>Guanidines:</b>		
Dicatechol borate, di-o-tolylguanidine salt .....	No	VNC.
All other guanidines, cyclic .....	No	VNC.
<b>Thiazole derivatives:</b>		
N-tert-Butyl-2-benzothiazolesulfenamide .....	No	BFG, MON, USR.
N-Cyclohexyl-2-benzothiazolesulfenamide .....	No	MON, USR.
2,2'-Dithiobis [benzothiazole] .....	No	BFG, MON, USR.
2-Mercaptobenzothiazole .....	No	MON, USR.
2-Mercaptobenzothiazole, copper salt .....	No	ACY.
2-Mercaptobenzothiazole, zinc salt .....	No	USR, VNC.
N-Morpholinyl-2-benzothiazolyl disulfide .....	No	GYR.
N-Oxydiethylene-2-benzothiazolesulfenamide .....	No	BFG, USR.
N-Oxydiethylenethiocarbamyl-N'-oxydiethylenesulfenamide .....	No	BFG.
All other thiazole derivatives, cyclic .....	No	( <sup>2</sup> ).
<b>All other cyclic accelerators, activators, and vulcanizing agents:</b>		
Bis(morpholinthiocarbamoyl) disulfide .....	No	ACY.
Dibenzylamine .....	No	HXL.
1,3-Dihydro-4(or 5)-methyl-2H-benzimidazole-2-thione .....	No	VNC.
Dimethylammonium hydrogen isophthalate .....	No	VNC.
Di-N,N'-pentamethylenethiuram tetrasulfide .....	No	DUP, VNC.
4,4'-Dithiodimorpholine .....	No	MON.
2-Mercaptotoluimidazole, zinc salt .....	No	VNC.
m-Phenylenbismaleimide .....	No	DUP.
All other accelerators, activators, and vulcanizing agents, cyclic .....	No	DUP, USR.
<b>Antioxidants, antiozonants, and stabilizers:</b>		
<b>Amino antioxidants, antiozonants, and stabilizers:</b>		
<b>Aldehyde- and acetone-amine reaction products:</b>		
Diphenylamine-acetone aldehyde .....	No	USR.
Diphenylamine-acetone condensate .....	No	BFG, USR.
All other aldehyde and acetone-amine reaction products, cyclic .....	No	USR.
<b>Substituted p-phenylenediamines:</b>		
Alkylaryl-p-phenylenediamines .....	No	MON.
N,N'-Bis(1,4-dimethylpentyl)-p-phenylenediamine ..	No	MON, UPM.
N,N'-Bis(1-ethyl-3-methylpentyl)-p-phenylenediamine .....	No	UPM.
N,N'-Bis(1-methylheptyl)-p-phenylenediamine .....	No	UPM.
N-Cyclohexyl-N'-phenyl-p-phenylenediamine .....	No	USR.
Diarylenediamines, mixed .....	No	GYR.
N-(1,3-Dimethylbutyl)-N'-phenyl-p-phenylenediamine .....	No	UPM, USR.
N,N'-Di-2-naphthyl-p-phenylenediamine .....	No	BFG.
N,N'-Diphenyl-p-phenylenediamine .....	No	BFG.
N-Isopropyl-N'-phenyl-p-phenylenediamine .....	No	USR.
N-(1-Methylheptyl)-N'-phenyl-p-phenylenediamine ..	No	UPM.
N-(1-Methylpentyl)-N'-phenyl-p-phenylenediamine ..	No	USR.

See footnotes at end of table.

Table 9-2—Continued

Rubber-processing chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Rubber-processing chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 9-3)
<b>Cyclic—Continued</b>		
<b>Antioxidants, antiozonants, and stabilizers—Continued</b>		
<b>Amino antioxidants, antiozonants, and stabilizers—Cont.</b>		
<b>Substituted p-phenylenediamines—Continued</b>		
All other p-phenylenediamines, substituted	No	KPI, USR.
<b>Other amines:</b>		
p-Anilinophenol	No	BFG.
1,2-Dihydro-2,2,4-trimethylquinoline	No	BFG, MON, USR.
N-(1,4-Dimethylpentyl)-N-phenyl-para-phenylenediamine	No	USR.
Nonyldiphenylamine mixture (Mono-, di-, and tri-)	No	USR.
Octyldiphenylamine	No	BFG, USR.
Octyldiphenylamine, alkylated	No	BFG.
p-(p-Toluenesulfonamido)diphenylamine	No	USR.
<b>Phenolic and phosphite antioxidants and stabilizers:</b>		
<b>Phosphites:</b>		
Alkylaryl phosphites mixed	No	FER, GE.
Nonylphenyl phosphites, mixed	No	GE, USR.
Polymeric phosphites	No	GE.
Polyphenolic phosphites, polyalkylated	No	BFG, GE.
Triaryl phosphites	No	GE.
<b>Polyphenolics (including bisphenols):</b>		
Bisphenol, hindered	No	USR.
4,4'-Butyldenebis(6-tert-butyl-m-cresol)	No	MON.
2,5-Di-sec-butyldecylhydroquinone	No	USR.
2,5-Di-(1,1-dimethylpropyl)hydroquinone	No	MON.
2,2'-Methylenebis(6-tert-butyl-p-cresol)	No	ACY, FER.
2,2'-Methylenebis(6-tert-butyl-4-ethylphenol)	No	ACY.
1,1,3-Tr(2-methyl-4-hydroxy-5-tert-butylphenyl)butane	No	ICI.
<b>All other phenolic antioxidants, and stabilizers:</b>		
Phenol, alkylated	No	ACY, BFG, GYR, NEV, RCI.
Phenol, hindered	No	FER, GYR, OMC, USR.
Phenol, styrenated, mixtures	No	NEV, USR.
N-Stearoyl-p-aminophenol	No	HXL.
All other phenolic antioxidants and stabilizers	No	USR.
All other antioxidants, antiozonants, and stabilizers, cyclic	No	USR.
<b>Blowing agents:</b>		
p,p'-Oxybis(benzenesulfonhydrazide)	No	USR.
5-Phenyltetrazole	No	OMC.
p-Toluenesulfonylhydrazide	No	USR.
p-Toluenesulfonylsemicarbazide	No	USR.
All other blowing agents, cyclic	No	OMC.
<b>All other cyclic rubber-processing chemicals:</b>		
p-tert-Amylphenol sulfide (Tackflier)	No	PAS.
N-(Cyclohexylthio)phthalimide	No	MON.
Diphenyl-4,4'-diphenylmethylenediphenylmethane	No	USR.
All other rubber-processing chemicals, cyclic	No	ACY, FER.
<b>Acyclic:</b>		
<b>Accelerators, activators, and vulcanizing agents:</b>		
<b>Dithiocarbamic acid derivatives:</b>		
Dialkyldithiocarbamic acid derivative	No	(?)
Dibutyldithiocarbamic acid, nickel salt	No	USR, VNC.
Dibutyldithiocarbamic acid, sodium salt	No	DUP, USR, VNC.
Dibutyldithiocarbamic acid, zinc salt	No	VNC.
Diethyldithiocarbamic acid, cadmium salt and bis(diethyldithiocarbamoyl)disulfide, mixture	No	VNC.

See footnotes at end of table.

Table 9-2—Continued

Rubber-processing chemicals for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Rubber-processing chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 9-3)
<b>Acyclic—Continued</b>		
<b>Accelerators, activators, and vulcanizing agents—Cont.</b>		
<b>Dithiocarbamic acid derivatives—Continued</b>		
Diethyldithiocarbamic acid, sodium salt .....	No	VNC.
Diethyldithiocarbamic acid, tellurium salt .....	No	VNC.
Diethyldithiocarbamic acid, zinc salt .....	No	VNC.
Dimethyldithiocarbamic acid, bismuth salt .....	No	VNC.
Dimethyldithiocarbamic acid, copper salt .....	No	VNC.
Dimethyldithiocarbamic acid, lead salt .....	No	VNC.
Dimethyldithiocarbamic acid, selenium salt .....	No	VNC.
Dimethyldithiocarbamic acid, zinc salt .....	No	VNC.
All other dithiocarbamic acid derivatives, acyclic .....	No	( <sup>2</sup> ).
<b>Thiurams:</b>		
Bis(dibutylthiocarbamoyl) disulfide .....	No	VNC.
<b>Xanthates and sulfides:</b>		
Di-n-butylxantho disulfide .....	No	USR.
Zinc isopropyl xanthate .....	No	VNC.
All other xanthates and sulfides, acyclic .....	No	USR.
All other accelerators, activators, and vulcanizing agents, acyclic .....	No	DUP
Blowing agents, acyclic .....	No	( <sup>2</sup> ).
<b>Polymerization regulators:</b>		
n-Dodecyl mercaptans .....	No	PAS, PLC.
tert-Nonyl mercaptan .....	No	PAS, PLC.
n-Octyl mercaptan .....	No	PAS, PLC.
All other polymerization regulators, acyclic .....	No	PLC, USR.
<b>Shortstops:</b>		
Dimethyldithiocarbamic acid, potassium salt .....	No	USR.
Dimethyldithiocarbamic acid, sodium salt .....	No	ALC, USR, VCC, VNC.
<b>All other acyclic rubber-processing chemicals:</b>		
Cobalt borate neodecanoate complexes .....	No	KCH.
Waxes and paraffinic products .....	No	DUP.
Zinc laurate (Activator, physical property improver, and processing auxiliary) .....	No	USR.
All other rubber-processing chemicals, acyclic .....	No	VNC.

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 9-3

Rubber-processing chemicals: Directory of manufacturers, alphabetical by code, 1989

<i>Code</i>	<i>Name of company</i>	<i>Code</i>	<i>Name of company</i>
ACY . . . . .	American Cyanamid Co.	ICI . . . . .	ICI Americas, Inc., Specialty Chemicals Div.
ALC . . . . .	Alco Chemical Corp.	KCH . . . . .	Manchem, Inc.
BFG . . . . .	B.F. Goodrich Co., B.F. Goodrich Chemical Group	KPI . . . . .	Kenrich Petrochemicals, Inc.
DUP . . . . .	E. I. duPont de Nemours & Co., Inc. Chemicals and Pigments Dept.	MON . . . . .	Monsanto Co.
. . . . .	Polymer Products Dept.	NEV . . . . .	Neville Chemical Co.
FER . . . . .	Ferro Corp., Bedford Chemical Div.	OMC . . . . .	Olin Corp.
GE . . . . .	General Electric Co., Specialty Chemical Group	PAS . . . . .	Atochem North America, Inc.
GYR . . . . .	Goodyear Tire & Rubber Co.	PLC . . . . .	Phillips 66 Co.
HXL . . . . .	Hexcel Corp., Hexcel Chemical Products	RCI . . . . .	Reichhold Chemicals, Inc.
		UPM . . . . .	UOP, Inc.
		USR . . . . .	Uniroyal Chemical Co., Inc.
		VCC . . . . .	Vinings Chemical Co.
		VNC . . . . .	Vanderbilt Chemical Corp.

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A.  
Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 10 Elastomers

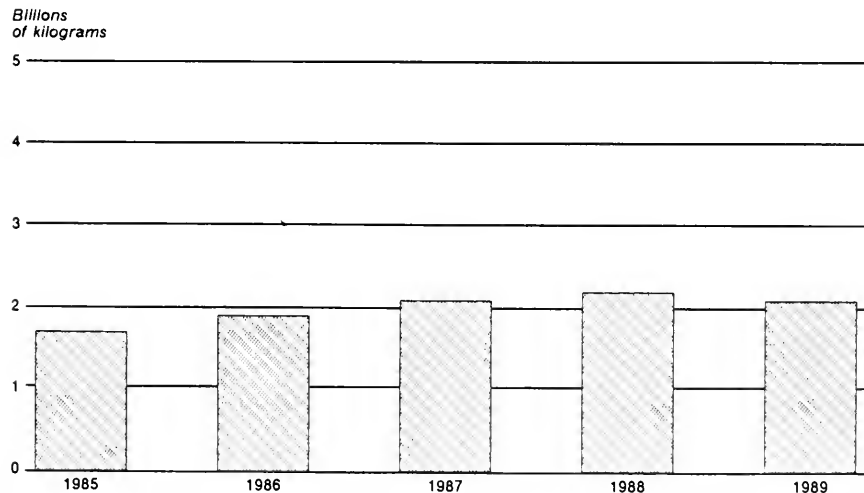
Elastomers (synthetic rubber) are high polymeric materials with properties similar to those of natural rubber. The term "elastomers" as used in this report means substances, whether in bale, crumb, powder, latex, or other crude form, which can be vulcanized or similarly processed into a material that can be stretched to at least twice their original length; and, after having been so stretched and the stress removed, will return with force to approximately their original length. U.S. production and sales of elastomers in 1989 are shown in table 10-1.

Total U.S. production<sup>1</sup> of synthetic rubber in 1989 amounted to 2,091 million kilograms, a decrease of 6.0 percent from that produced in 1988. The production of synthetic rubber increased irregularly from 1,736 million kilograms in 1985 to 2,091 million kilograms in 1989, or by 20.4 percent. (see figure 10-1). Total sales of elastomers in 1989 amounted 1,395 million kilograms, a decrease of 4.9 percent from that sold in 1988.

Styrene-butadiene rubber (SBR-type rubber) in 1989 continued to be the elastomer produced

<sup>1</sup> Until now urethane type elastomers have been included in the section VIII "Plastics and Resin Materials." The Commission has now begun reporting statistics for urethane elastomers in two sections, section VIII, plastics and resin materials, and section X, elastomers (synthetic rubber). Henceforth those polyurethane products classified as "thermoplastic" urethane elastomers will be reported in SOC section X; all other urethane elastomers will remain in SOC section VIII.

Figure 10-1  
Elastomers: U.S. production, 1985-89



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

in the greatest quantity as it has been for more than 35 years. U.S. production of SBR-type rubber, including 10 million kilograms of its vinylpyridine sub-type, amounted to 909 million kilograms, 1989. Polybutadiene rubber, mainly solution-polymerized type, was produced domestically in 1989 in the next largest amount—300 million kilograms. Other principal types of synthetic elastomers for which U.S. production data are reported separately are ethylene-propylene rubber, production of which was 221 million kilograms in 1989; butadiene-acrylonitrile (nitrile or NBR-type) rubber, production of which was 57 million kilograms; and thermoplastic elastomers (a family of products), production of which was 182 million kilograms in 1989.

Sales of SBR-type rubber, including 7 million kilograms of its vinylpyridine sub-type, by U.S. producers in 1989 amounted to 555 million kilograms. Sales of polybutadiene rubber amounted to 111 million kilograms, and those of ethylene-propylene rubber to 192 million kilograms. Sales of nitrile or NBR-type rubber amounted to 44 million kilograms, silicone type elastomer sales amounted to 40 million kilograms, and sales of thermoplastic elastomers amounted to 160 million kilograms in 1989.

Table 10-2 lists the products reported in this section and indicates the manufacture(s) of each by code. These codes are identified by company names in table 10-3.

Edward J. Taylor

202-252-1362

(Effective 11/14/91 202-205-3362)

Table 10-1

Elastomers (synthetic rubber):<sup>1</sup> U.S. production and sales, 1989

Elastomers	Production <sup>2</sup>	Sales		Average Unit value <sup>3</sup>
		Quantity <sup>2</sup>	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Grand total</b>	<b>2,091,080</b>	<b>1,394,902</b>	<b>2,872,241</b>	<b>\$2.06</b>
Butadiene-acrylonitrile type (nitrile) (NBR-type)	56,513	44,262	93,633	2.12
Ethylene-propylene type (EP-type)	220,932	191,831	409,573	2.14
Polybutadiene type (BR-type)	300,414	111,000	115,752	1.04
Silicone (Q) type elastomers	51,959	39,957	354,523	8.87
Styrene-butadiene type (SBR-type) <sup>4</sup>	899,297	548,123	629,629	1.15
Styrene-butadiene-vinylpyridine type	10,054	6,876	15,363	2.23
Thermoplastic elastomers (such as styrene-block copolymers, thermoplastic olefin elastomers, thermoplastic polyurethane elastomers, and co-polyesters)	182,010	159,508	482,602	3.03
All other elastomers <sup>5</sup>	369,901	293,345	771,166	2.63

<sup>1</sup> The term "elastomers" is defined as substances in bale, crumb, powder, latex, and other crude forms which can be vulcanized or similarly processed into materials that can be stretched at 68° F. to at least twice their original length and, after having been stretched and the stress removed, will return with force to approximately their original length.

<sup>2</sup> Includes oil content of oil-extended elastomers.

<sup>3</sup> Calculated from unrounded figures.

<sup>4</sup> About four-fifth of SBR elastomer production is the dry type of product.

<sup>5</sup> Includes butyl, chlorinated natural rubber, chlorinated polyethylene, epichlorohydrin, fluoroelastomers, polyacrylic ester type, polychloroprene (neoprene) type, polyisoprenes (including cyclorubber), polysulfide, and miscellaneous elastomers.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 10-2

Elastomers for which U.S. production and/or sales were reported, identified by manufacturer, 1989

<i>Elastomers</i>	<i>Separate statistics<sup>1</sup></i>	<i>Manufacturers' identification codes (according to list in table 10-3)</i>
<b>Cyclic</b>		
Epichlorohydrin elastomers (CO, ECO) type .....	No	BFG.
Styrene-butadiene (S or SBR) type:	Yes	
Styrene-butadiene, dry type .....	No	CPY, FRS, GRD, GYR, SPO.
Styrene-butadiene, latex type .....	No	BAS, BFG, GNT, GYR, MMM
Styrene-butadiene-vinylpyridine .....	Yes	BFG, FRS, GNT, GYR.
All other styrene-butadiene type elastomers .....	No	ASY, LC.
Thermoplastic elastomers (such as styrene-block copolymers, thermoplastic olefin elastomers, thermoplastic polyurethanes elastomers, and copolyester) .....	Yes	BFG, DOW, EEP, ENJ, FRS, GEP, HCL, MON, SHC.
All other cyclic elastomers .....	No	TNA.
<b>Acyclic</b>		
Butadiene-acrylonitrile (nitrile) (NBR) type .....	Yes	BFG, CPY, GYR, MMM, USR.
Butyl(isobutylene-isoprene) type .....	No	ENJ.
Chlorinated rubber, natural and synthetic .....	No	HPC.
Chlorosulfonated polyethylene (CSM) type .....	No	DUP.
Ethylene-propylene (EP) type .....	Yes	CPY, DUP, ENJ, USR.
Fluorelastomers (CFM, FKM, FFKM) type .....	No	DUP, MMM.
Polyacrylic (ACM) type elastomers .....	No	ACY, BFG.
Polyalkylene oxide .....	No	PRC.
Polybutadiene acrylic acid acrylonitrile terpolymer (PBAN) .....	No	ASY.
Polybutadiene (BR) type:	Yes	
Polybutadiene, emulsion-polymerized .....	No	GYR, RCI, SPO.
Polybutadiene, solution-polymerized .....	No	FRS, GYR, PLC.
All other polybutadiene (BR) type elastomers .....	No	FRS, RCI.
Polychloroprene (Neoprene) (CR) type .....	No	DKA, DUP.
Polyisoprene (IR) type .....	No	GYR.
Polysulfide (T) type elastomers .....	No	MRT.
Silicone (Q) type elastomers .....	Yes	DCC, DUP, SPD, SWS.
All other acyclic elastomers .....	No	MRT.

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 10-3

Elastomers (synthetic rubber): Directory of manufacturers, alphabetical by code, 1989

<i>Code</i>	<i>Name of company</i>	<i>Code</i>	<i>Name of company</i>
ACY .....	American Cyanamid Co.	HCL .....	Hoechst Celanese Corp., Engineering Plastics Div.
ASY .....	American Synthetic Rubber Corp.	HPC .....	Hercules, Inc.
BAS .....	BASF Corp.	LC .....	Lord Corp., Chemical Products Group
BFG .....	B. F. Goodrich Co.	MMM .....	Minnesota Mining and Manufacturing Co.
CPY .....	Copolymer Rubber & Chemical Corp.	MON .....	Monsanto Co.
DCC .....	Dow Corning Corp.	MRT .....	Morton International, Inc., Morton Chemical Div.
DKA .....	Mobay Synthetics Corp.	PLC .....	Phillips 66 Co.
DOW .....	Dow Chemical Co.	PRC .....	Products Research & Chemical Corp.
DUP .....	E. I. duPont de Nemours & Co., Inc., Polymer Products Dept.	RCI .....	Reichold Chemicals, Inc.
EEP .....	Furon Company	SHC .....	Shell Chemical Co.
ENJ .....	Exxon Chemical Americas	SPD .....	General Electric Co., Silicone Products Dept.
FRS .....	Firestone Tire & Rubber Co., Firestone Synthetic Rubber & Latex Co. Div.	SPO .....	Ameripol Synpol Co., Div. of Uniroyal Goodrich Tire Co.
GEP .....	General Electric Co., Plastic Div.	SWS .....	Wacker Silicones Corp.
GNT .....	Gencorp Polymers Products	TNA .....	Ethyl Corp
GRD .....	W. R. Grace & Co., Organic Chemicals Div.	USR .....	Uniroyal Chemical Co., Inc.
GYR .....	Goodyear Tire & Rubber Co. Polymers & Chemical Div.		

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app A.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.



## Section 11 Plasticizers

Plasticizers are organic chemicals that are added to synthetic plastics and resin materials to (1) improve workability during fabrication, (2) extend or modify the natural properties of these materials, or (3) develop new improved properties not present in the original material. Table 11-1 presents statistics on U.S. production and sales of plasticizers in as great detail as is possible without revealing the operations of individual producers.

U.S. production of plasticizers totaled 976 million kilograms in 1989, a decrease of 6.4 percent from the 1,043 million kilograms reported for 1988. The trend of production of these products is shown in the graph in figure 11-1. Sales of plasticizers totaled 837 million kilograms, valued at \$1,046 million, in 1989 compared with 850 million kilograms, valued at \$1,001 million, in 1988.

Production of cyclic plasticizers in 1989, which consisted chiefly of the esters of phthalic anhydride, phosphoric acid, and trimellitic acid, amounted to 735 million kilograms, an decrease

of 8.7 percent from the 805 million kilograms reported for 1988. Sales of cyclic plasticizers in 1989 totaled 634 million kilograms, valued at \$704 million, compared with 653 million kilograms, valued at \$700 million, in 1988. The most important cyclic plasticizers were the dioctyl phthalates, with production of 139 million pounds, in 1989.

Production of acyclic plasticizers in 1989 totaled 242 million kilograms, an increase of 1.4 percent from the 239 million kilograms reported for 1988. Sales of acyclic plasticizers totaled 202 million kilograms, valued at \$342 million, in 1989, compared with 197 million kilograms, valued at \$301 million, in 1988. Adipic acid esters were the most important acyclic plasticizers in 1989 with production of 71 million kilograms.

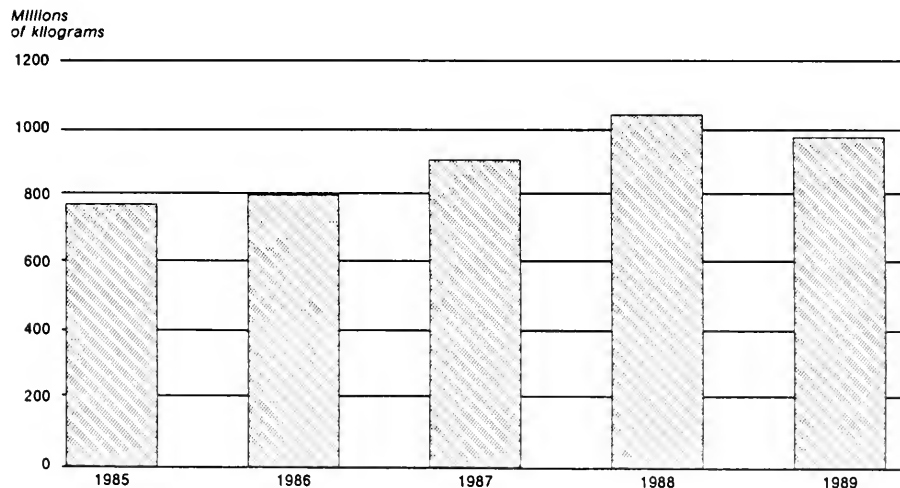
Table 11-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 11-3.

*Jesse Lawrence Johnson*

202-252-1351

(Effective 11/14/91 202-205-3351)

Figure 11-1  
Plasticizers: U.S. production, 1985-89



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 11

Table 11-1

Plasticizers: U.S. production and sales, 1989

Plasticizers	Production <sup>1</sup>	Sales		Average Unit value <sup>2</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
Grand total	976,391	836,589	1,045,527	\$1.25
Benzenoid <sup>3</sup>	840,230	710,565	836,872	1.18
Nonbenzenoid	136,161	126,024	208,655	1.66
<b>Cyclic</b>				
Total	734,653	634,202	703,942	1.11
Phthalic anhydride esters, total	660,726	559,631	567,602	1.01
Dibutyl phthalates (including diisobutyl phthalates)	9,725	8,108	9,188	1.13
Diethyl phthalates (including diisoethyl phthalates)	10,999	8,363	31,657	3.79
Dilsodecyl phthalate <sup>4</sup>	84,435	82,723	75,451	.91
Dilsononyl phthalate	99,441	100,240	88,770	.89
Dimethyl phthalate (including dimethyl isophthalate)	5,187	5,266	6,565	1.25
Dioctyl phthalates <sup>4</sup>	138,828	139,588	121,917	.87
DI-tridecyl phthalate	11,923	11,488	14,279	1.24
All other phthalic anhydride esters	300,188	203,855	219,775	1.08
Trimellitic acid esters	26,136	28,969	47,108	1.63
All other cyclic plasticizers <sup>5</sup>	47,791	45,602	89,232	1.96
<b>Acyclic</b>				
Total	241,738	202,387	341,585	1.69
Adipic acid esters, total	71,101	45,639	75,506	1.65
DI(2-ethylhexyl) adipate	22,239	24,249	30,387	1.25
Dilsodecyl adipate	1,756	1,028	1,503	1.46
All other adipic acid esters	47,106	20,362	43,616	2.15
Complex linear polyesters and polymeric plasticizers	37,406	29,226	60,205	2.06
Epoxidized esters, total	62,150	63,654	85,034	1.34
Epoxidized soya oil esters	55,161	55,831	74,460	1.33
All other epoxidized esters	6,989	7,823	10,574	1.35
Myristic acid ester	1,012	1,123	4,046	3.60
Oleic acid esters, total	6,013	5,760	8,614	1.50
Butyl oleate	544	580	910	1.57
All other oleic acid esters	5,469	5,180	7,704	1.49
2-Ethylhexyl palmitate	662	702	1,538	2.19
DI(2-ethylhexyl) sebacate	4,676	1,263	4,333	3.43
Stearic acid esters, total	4,784	4,875	8,712	1.79
Isobutyl stearate	691	717	1,166	1.63
All other stearic acid esters	4,093	4,158	7,546	1.81
All other acyclic plasticizers <sup>6</sup>	53,934	50,145	93,597	1.87

Table 11-1—Continued

Plasticizers: U.S. production and sales, 1989

<sup>1</sup> Includes data for compounds used principally (but not exclusively) as primary plasticizers. Does not include clearly defined extenders or secondary plasticizers.

<sup>2</sup> Calculated from unrounded figures.

<sup>3</sup> Includes benzenoid products as defined in part 1, schedule 4, of the Tariff Schedules of the United States Annotated.

<sup>4</sup> The difference between the production reported here and that shown on the *Preliminary Report on U.S. Production of Selected Organic Chemicals (Including Synthetic Plastics and Resin Materials), 1989*, results from a combination of incorrect reporting by some companies, end-of-year inventory adjustments, and rounding.

<sup>5</sup> Includes data for cresyl diphenyl phosphate, dibutyl phenyl phosphate, diphenyl octyl phosphate, tricresyl phosphate, triphenyl phosphate, and other cyclic phosphoric acid esters, glycol dibenzoates, toluenesulfonamides, tetrahydrofurfuryl oleate, and other cyclic plasticizers.

<sup>6</sup> Includes data for azelaic acid esters, citric and acetylcitric acid esters, myristic acid esters, pelargonic acid esters, ricinoleic and acetylricinoleic acid esters, glyceryl and glycol esters, and other acyclic plasticizers.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 11-2

Plasticizers for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Plasticizers	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 11-3)
<b>Cyclic</b>	<b>Yes</b>	
N-n-butyl benzenesulfonamide	No	UTC.
Diethylene glycol dibenzoate	No	KLM, VEL.
Dipropandiol dibenzoate (Dipropylene glycol dibenzoate)	No	KLM, VEL.
N-Ethyl-p-toluenesulfonamide	No	NES, TNA, UTC.
<b>Phosphoric acid esters:</b>		
Isodecyl diphenyl phosphate	No	MON.
Tricresyl phosphate	No	FMC.
Triphenyl phosphate	No	FMC, MON.
All other phosphoric acid esters	No	FMC, MON, SCP, SM.
<b>Phthalic anhydride esters:</b>	<b>Yes</b>	
Bis(2-ethylhexyl)terephthalate	No	EKT.
Butyl benzyl phthalate	No	MON.
Butyl 2-ethylhexyl phthalate	No	BAS.
Butyl octyl phthalate	No	ART.
Di(2-butoxyethyl) phthalate	No	HAL.
Dibutyl phthalate (including diisobutyl phthalate)	No	ART, BAS, EKT, MRF, NOD, UTC, WTH.
Dicyclohexyl phthalate	No	UTC, (2).
Diethylene glycol phthalate	No	CMB.
Diethyl isophthalate	No	(2).
Diethyl phthalate	No	EKT, MON, MRF.
Di-(n-heptyl-n-nonyl) phthalate	No	BAS, SC.
Di-(n-heptyl-n-nonyl) undecyl phthalate	No	BAS, ENJ, SC.
Dilsodecyl phthalate	Yes	ART, BAS, ENJ, HCC, MON, NOD, TEK.
Dilsohexyl phthalate	No	ENJ.
Dilsononyl phthalate	Yes	ART, BAS, ENJ, TEK.
Dimethyl isophthalate	No	UTC, (2).
Dimethyl phthalate	No	EKT, MRF, UTC, WTC.
Dinonyl phthalate	No	ENJ, MRF, SC.
Dinonyl undecyl phthalate	No	TEK.
Di-tridecyl phthalate	Yes	ART, ENJ, HCC, NOD, SM, TEK.
Dlundecyl phthalate	No	ART, BAS, SC, TEK.
2-Ethylhexyl cyclohexyl phthalate	No	HCC.
Hexyl n-decyl phthalate	No	VST.
n-Octyl n-decyl phthalate	No	ART, VST.
Phthalic acid, diallyl ester	No	TNA.
<b>Dioctyl phthalates:</b>	<b>Yes</b>	
Di(2-ethylhexyl) phthalate	No	ART, BAS, EKT, ENJ, HCC, TEK.
Dilso-octyl phthalate	No	ENJ, HAL, HCC, NOD, TEK.
Di-n-octyl phthalate	No	EK.
All other dioctyl phthalates	No	BAS, HCC.
<b>Glycol phthalate esters:</b>	<b>No</b>	
Butyl phthalyl butyl glycolate	No	HAL, (2).
All other glycol phthalate esters	No	HAL.
All other phthalic anhydride esters	Yes	BAS, MON, NOD, SC, TEK, WTC.
Polyethylene glycol dibenzoate	No	VEL.
Tetrahydrofurfuryl oleate	No	WTC.
Toluenesulfonamide o-, p-mixtures	No	UTC.
<b>Trimellitic acid esters:</b>	<b>Yes</b>	
Tri(2-ethylhexyl) trimellitate	No	BAS, ENJ, HCC, TEK.
Tri-n-hexyltrimellitate	No	(2).
Trilsodecyl trimellitate	No	ENJ, HCC.
Trilsononyl trimellitate	No	ART, TEK.
Trilso-octyl trimellitate	No	ENJ, HAL, NOD, TEK.
Trimethyl trimellitate	No	FER, (2).
Tri-n-octyl n-decyl trimellitate	No	HAL.
Trloctyl trimellitate	No	ART, EKT, HAL.
All other trimellitic acid esters	No	ART, BAS, TEK, (2), (2).
All other cyclic plasticizers	No	BOE, NEV, NOD, UTC.

See footnotes at end of table.

Table 11-2—Continued

Plasticizers for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Plasticizers	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 11-3)
<b>Acylic</b>	<b>Yes</b>	
<b>Adipic acid esters:</b>	<b>Yes</b>	
Butylene glycol adipate	No	HAL.
Di(2-(2-butoxyethoxy)ethyl) adipate	No	HAL, MON.
Dibutoxyethyl adipate	No	EKT, HAL.
Di(2-ethylhexyl) adipate	Yes	ART, BAS, CAS, EKT, ENJ, HAL, HCC, MON, MRF, NOD, TEK, WTH.
Di-n-hexyl adipate	No	EKT, MON.
Dilsobutyl adipate	No	HAL, WTC. (2).
Dilsodecyl adipate	Yes	HAL, HCC, NOD.
Dilsononyl adipate	No	ART, ENJ, TEK.
Dilso-octyl adipate	No	HAL, HCC.
Dilso-propyl adipate	No	VND, WTH.
Dimethyl adipate	No	MRF. (2).
Di-n-octyl adipate	No	WTH.
Di-tridecyl adipate	No	HCC, NOD, SM, WM.
Ethylene glycol adipate	No	HAL.
Neopentyl glycol adipate	No	HAL.
n-Octyl n-decyl adipate	No	HCC.
All other adipic acid esters	Yes	HAL, MON, PCI, SCP, WM, WTC.
<b>Azelic acid esters:</b>	<b>No</b>	
Di(2-ethylhexyl) azelate	No	HAL, SCP, TEK.
All other azelac acid esters	No	SCP.
<b>Citric and acetylcitric acid esters:</b>	<b>No</b>	
Tributyl acetylcitrate	No	UTC.
Tributyl citrate	No	(2).
Triethyl acetylcitrate	No	(2).
Triethyl citrate	No	(2).
All other citric and acetylcitric acid esters	No	CCL. (2).
<b>Complex linear polyesters and polymeric plasticizers:</b>	<b>Yes</b>	
Adipic acid type complex linear polyesters and polymeric plasticizers	No	HAL, MRF, SCP, TEK, WTC, WTH.
All other complex linear polyesters and polymeric plasticizers	No	EKX, HPC, SBC, SCP, SM, TEK, VND, WTC.
<b>Epoxidized esters:</b>	<b>Yes</b>	
Epoxidized linseed oils	No	UCC, VIK, WTC.
Epoxidized pentaerythritol tetraphthalate	No	UCC.
Epoxidized soya oils	Yes	FER, FMB, TEK, UCC, VIK, WTC.
2-Ethylhexyl epoxytallate	No	UCC, WTC.
All other epoxidized esters	Yes	REZ, UCC, VIK, EKT.
Glyceryl tripropionate	No	
<b>Glutaric acid esters:</b>	<b>No</b>	
Neopentyl glycol glutarate	No	HAL.
All other glutaric acid esters	No	HAL.
<b>Lauric acid esters</b>	<b>No</b>	<b>HAL.</b>
<b>Myristic acid esters:</b>	<b>Yes</b>	
Isopropyl myristate	No	CAS, WM, WTH.
All other myristic acid esters	No	CAS, SCP, WTH.
<b>Octandic acid esters:</b>	<b>No</b>	
2-Butoxyethyl oleate	No	HAL.
<b>Oleic acid esters:</b>	<b>Yes</b>	
Butyl oleate	No	HAL, SCP, WTC, WTH.
Decyl oleate	No	SBC, SCP, VND.
2-Ethylhexyl oleate	No	HAL.
Glyceryl trioleate (Triolein)	No	SCP, WTC.
Isobutyl oleate	No	SBC.
Iso-octyl oleate	No	HAL.
Methyl oleate	No	SCP, WTC.
Neopentyl glycol dioleate	No	HCC.
Oleyl oleate	No	CAS, SBC.

See footnotes at end of table.

Table 11-2—Continued

Plasticizers for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Plasticizers	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 11-3)
Acyclic	Yes	
Oleic acid esters—Continued	Yes	
Propyl oleates:		
n-Propyl oleate	No	SCP.
Trimethylolpropane trioleate	No	HCC.
All other oleic acid esters	No	HAL.
Palmitic acid esters:		
2-Ethylhexyl palmitate	Yes	VND, WM, WTH.
Isopropyl palmitate	No	CAS, WM, WTH.
All other palmitic acid esters	No	SBC.
Pelargonic acid esters:	No	
Glycol pelargonate	No	SCP.
Isodecyl pelargonate	No	SCP.
All other pelargonic acid esters	No	CAS, HCL, SBC, WM.
Phosphoric acid esters:	No	
Tri(2-butoxyethyl) phosphate	No	FMC, MON.
Tributyl phosphate	No	FMC.
Triethyl phosphate	No	EKT.
Ricinoleic and acetylricinoleic acid esters:	No	
n-Butyl acetylricinoleate	No	CAS.
Butyl ricinoleate	No	CAS.
Glyceryl monoricinoleate	No	CAS.
Glyceryl tri(acetylricinoleate)	No	CAS.
Methyl ricinoleate	No	CAS, SCP.
Propylene glycol monoricinoleate	No	CAS.
All other ricinoleic and acetylricinoleic acid esters	No	CAS.
Sebacic acid esters:	No	
Dibutoxyethyl sebacate	No	HAL.
Dibutyl sebacate	No	HAL, WM, (?).
Di(2-ethylhexyl) sebacate	Yes	HAL, HCC, TEK, (?).
Dilsopropyl sebacate	No	SBC, (?).
Dimethyl sebacate	No	SCP, (?), (?).
Propylene glycol sebacate	No	HAL.
Stearic acid esters:	Yes	
n-Butyl stearate	No	SCP, WM, WTC, WTH.
Diethylene glycol succinate	No	CMB.
2-Ethylhexyl stearate	No	CAS, HCL, WM.
Glyceryl triacetyl stearate	No	CAS.
Hexadecyl stearate	No	HCL.
Isobutyl stearate	Yes	SCP, WM, WTC, WTH.
Isopropyl stearate	No	CAS.
Myristyl stearate	No	VND.
2-Octyldecyl-12-stearoyl stearate	No	VND.
Tridecyl stearate	No	HCC, WM.
All other stearic acid esters	Yes	CAS, SBC, SCP, VND, WM, WTC.
Sucrose acetate isobutyrate	No	EKT, UCC.
Tetraethylene glycol di(2-ethylhexanoate)	No	HAL.
Triethylene glycol di(caprylate-caprate)	No	HAL.
Triethylene glycol di(2-ethylbutyrate)	No	HAL.
Triethylene glycol di(2-ethylhexanoate)	No	EKT, HAL.
2,2,4-Trimethyl-1,3-pentanediol diisobutyrate	No	EKX.
All other acyclic plasticizers	Yes	ARZ, HCC, HCL, HPC, SCP, WM, WTC.

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 11-3

Plasticizers: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
ART	Aristech Chemical Corp., Chemical Div.	MRF	Morflex Chemical Co., Inc.
ARZ	Arizona Chemical Co.	NES	Ruetgers-Nease Chemical Co.
BAS	BASF Corp.	NEV	Neville Chemical Co.
BOE	Boehme Filatex, Inc.	NOD	Huis America, Inc.
CAS	CasChem, Inc.	PCI	Piedmont Chemical Industries, Inc.
CCL	Catawba-Charlab, Inc.	REZ	Hi-Tek Polymers, Inc.
CMB	Cambridge Industries Co.	SBC	Scher Chemicals, Inc.
EK	Eastman Kodak Co.:	SC	Sterling Chemical, Inc.
EKT	Tennessee Eastman Co. Div.	SCP	Henkel Corp.
EKX	Texas Eastman Co. Div.	SM	Mobil Oil Corp. Chemical Products Div.
ENJ	Exxon Chemical Americas	TEK	Teknor Apex Co.
FER	Ferro Corp.:	TNA	Ethyl Corp.
	Bedford Chemical Div.	UCC	Union Carbide Corp., Industrial Chemicals Div.
	Grant Chemical Div.	UTC	Unitex Chemical Corp.
FMB	FMC Corp., Chemical Products Group	VEL	Vescol Chemical Corp.
FMC	FMC Corp., Nitro Div.	VIK	M & T Chemicals, Inc.
HAL	C. P. Hall Co.	VND	Van Dyk Div. of Mallinckrodt, Inc.
HCC	Hatco Chemical Corp.	VST	Vista Chemical Co.
HCL	Hoechst Celanese Corp., Sou-Tex Works	WM	Inolex Chemical Co.
HPC	Hercules, Inc.	WTC	Witco Chemical Corp.
KLM	Kalama Chemical, Inc.	WTH	Union Camp Corp., Chemical Div.
MON	Monsanto Co.		

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A.  
Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.





## Section 12 Surface-Active Agents

The surface-active agents included in this report are organic chemicals that reduce the surface tension of water or other solvents and are used chiefly as detergents, dispersing agents, emulsifiers, foaming agents, or wetting agents in either aqueous or nonaqueous systems. Waxes and products used chiefly as plasticizers are excluded. Surface-active agents are produced from natural fats and oils, from silvichemicals such as lignin, rosin, and tall oil, and from chemical intermediates derived from coal tar and petroleum. A major part of the output of the bulk chemicals shown in this report is consumed in the form of packaged soaps and detergents for household and industrial use. The remainder is used in the processing of textiles and leather, in ore flotation and oil-drilling operations, and in the manufacture of agricultural sprays, cosmetics, elastomers, foods, lubricants, paint, pharmaceuticals, and many other products.

The statistics for production and sales of surface-active agents (table 12-1) are grouped by ionic class and by chemical class and subclass. All quantities are reported in terms of 100-percent organic surface-active ingredients and thus exclude all inorganic salts, water, and other diluents. Sales statistics reflect sales of bulk surface-active agents only; sales of formulated products are excluded. Data for the production of surface-active agents during 1985-89 are shown in figure 12-1.

Total U.S. production of surface-active agents in 1989 amounted to 3,085 million kilograms, or 7 percent less than the 3,319 million kilograms reported for 1988. Sales of bulk surface-active agents in 1989 amounted to 1,724 million kilograms, valued at \$2,086 million, compared with sales in 1988 of 1,933 million kilograms,

valued at \$2,303 million. In terms of quantity, sales in 1989 were 11 percent less than in 1988.

Production of anionic surface-active agents in 1989 amounted to 2,031 million kilograms, or 66 percent of the total surfactant output reported for 1989. Sales of anionics in 1989 amounted to 870 million kilograms, valued at \$612 million.

Production of cationic surface-active agents in 1989 amounted to 293 million kilograms, 8 percent less than the 319 million kilograms reported in 1988. Production of nonionic surface-active agents amounted to 743 million kilograms in 1989, 20 percent less than the 913 million kilograms reported in 1988. Sales of cationic surface-active agents in 1989 decreased by 7 percent in terms of quantity, and by 2 percent in terms of value when compared with sales as reported in 1988. Sales of nonionics in 1989 decreased by 16 percent in terms of quantity, and by 15 percent in terms of value when compared with sales as reported in 1988.

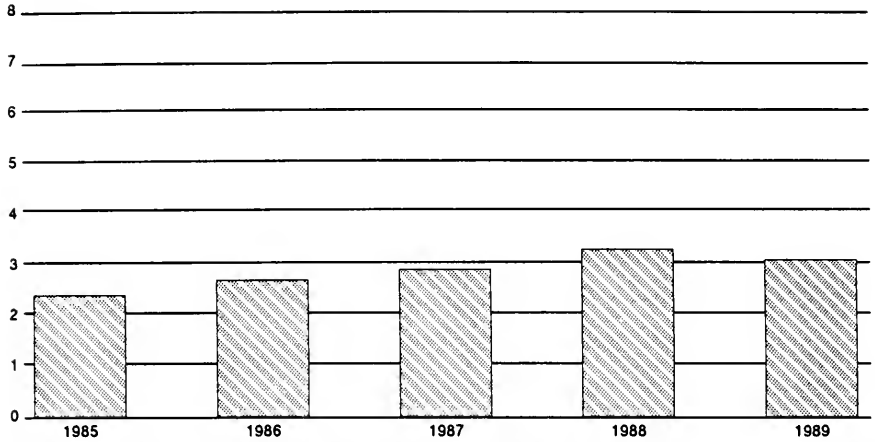
The difference between production and sales reflects inventory changes and captive consumption of surface-active agents by synthetic rubber producers, and by manufacturers of cosmetics, packaged detergents, bar soaps, and other formulated consumer products. In some instances the difference may also reflect quantities of surface-active agents used as chemical intermediates, e.g., nonionic alcohol and alkylphenol ethoxylates, which may be converted to anionic surface-active agents by phosphation or sulfation.

Table 12-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 12-3.

*Eric Land*  
202-252-1349  
(Effective 1/14/91 202-205-3349)

Figure 12-1  
Surface-active agents: U.S. production, 1985-89

Billions  
of kilograms



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 12-1  
Surface-active agents: U.S. production and sales, 1989

Surface-active agents	Production <sup>1</sup>	Sales <sup>2</sup>		Average Unit value <sup>3</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
Grand total	3,085,374	1,724,035	2,085,847	\$1.21
Benzenoid <sup>4</sup>	651,765	350,322	500,429	1.43
Nonbenzenoid	2,433,609	1,373,713	1,585,418	1.15
Amphoteric				
Total	17,853	16,234	34,100	2.10
(Carboxymethyl) [3-(coconut oil amido)propyl] dimethylammonium hydroxide, inner salt	1,884	1,657	4,105	2.48
N-Dodecyl-3-limnolpropionic acid, disodium salt	98	98	327	3.34
(Mixed alkyl) sulfobetaine	204	176	388	2.20
All other amphoteric surface active agents	15,667	14,303	29,280	2.05
Anionic				
Total	2,031,362	870,371	612,217	.70
Carboxylic acids (and salts thereof), total	499,264	98,486	101,772	1.03
Amine salts of fatty, rosin, and tall oil acids	2,478	1,848	3,415	1.85
Coconut oil acids, potassium salt	( <sup>5</sup> )	688	4,996	7.28
Coconut oil acids, sodium salt	92,434	3,698	3,847	1.04
Oleic acid, sodium salt	35	34	61	1.79
Rosin acids, potassium salt	35,227	36,347	22,243	.61
Stearic acid, sodium salt	( <sup>5</sup> )	23	39	1.70
Tall oil acids, potassium salt	4,271	1,055	1,185	1.12
Tallow acids, sodium salts	196,917	17,623	10,525	.60
All other carboxylic acids (and salts thereof)	167,902	37,170	55,461	1.49
Phosphoric and polyphosphoric acid esters (and salts thereof), total	35,149	21,244	48,172	2.27
Alcohols and phenols, alkoxylated and phosphated, total	27,860	16,388	35,024	2.14
Dinonylphenol, ethoxylated and phosphated	733	517	1,226	2.37
Mixed linear alcohols, ethoxylated and phosphated	2,051	1,563	3,972	2.54
Nonylphenol, ethoxylated and phosphated	3,922	3,096	6,948	2.24
Phenol, ethoxylated and phosphated	799	867	1,675	1.93
Tridecyl alcohol, ethoxylated and phosphated	2,569	1,754	3,457	1.97
All other alcohols and phenols, alkoxylated and phosphated	17,786	8,591	17,746	2.07
Decyl and octyl phosphate	826	743	1,607	2.16
2-Ethylhexyl phosphate	605	404	887	2.20
Hexyl phosphate	132	127	323	2.54
Mixed alkyl phosphate	1,115	875	2,665	3.05
All other phosphoric and polyphosphoric acid esters (and salts thereof)	4,611	2,707	7,666	2.83
Sulfonic acids (and salts thereof), total	1,075,203	614,595	287,991	.47
Alkylbenzenesulfonates, total	346,834	87,389	113,996	1.30
Dodecylbenzenesulfonic acid	195,075	48,668	56,556	1.16
Dodecylbenzenesulfonic acid, calcium salt	2,678	2,303	7,359	3.20
Dodecylbenzenesulfonic acid, isopropylamine salt	2,330	1,805	3,619	2.00
Dodecylbenzenesulfonic acid, monoethanolamine salt	51	51	158	3.10
Dodecylbenzenesulfonic acid, sodium salt	81,154	26,707	35,563	1.33
Dodecylbenzenesulfonic acid, triethanolamine salt	6,530	6,536	8,563	1.31
All other alkylbenzene sulfonates	59,016	1,319	2,178	1.65
Benzene-, cumene-, toluene-, and xylenesulfonates, total	63,511	53,308	30,062	.56
Xylenesulfonic acid, sodium salt	39,644	35,894	19,174	.53
All other benzene-, cumene-, toluene-, and xylenes sulfonates	23,867	17,414	10,888	.63

See footnotes at end of table.

## Section 12

Table 12-1—Continued  
Surface-active agents: U.S. production and sales, 1989

Surface-active agents	Production <sup>1</sup>	Sales <sup>2</sup>		Average Unit value <sup>3</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Anionic—Continued</b>				
<b>Sulfonic acids (and salts thereof)—Continued</b>				
Ligninsulfonates and naphthalenesulfonates, total	581,282	445,378	77,459	\$0.17
Ligninsulfonic acid, ammonium salt	( <sup>5</sup> )	2,377	560	.24
Ligninsulfonic acid, calcium salt	246,337	254,674	27,484	.11
Ligninsulfonic acid, sodium salt	302,856	157,591	29,787	.19
All other ligninsulfonates and naphthalene-sulfonates	32,089	30,736	19,628	.64
Mixed linear olefin sulfonate	10,270	10,070	14,448	1.43
Sulfosuccinamic acid derivatives	1,640	1,586	2,462	1.55
Sulfonic acids having ester or other linkages, total	64,216	12,597	38,479	3.05
Sulfosuccinic acid esters, total	12,659	10,863	27,229	2.51
Sulfosuccinic acid, bis(2-ethylhexyl)ester, sodium salt	9,473	8,400	21,090	2.51
All other sulfosuccinic acid esters	3,186	2,463	6,139	2.49
All other sulfonic acids having ester or ether linkages	51,557	1,734	11,250	6.49
All other sulfonic acids (and salts thereof)	7,450	4,267	11,085	2.60
Sulfuric acid esters (and salts thereof), total <sup>6</sup>	421,746	136,046	174,282	1.28
Acids, amides, and esters, sulfated, total	4,462	3,467	6,325	1.82
Butyl oleate, sulfated, sodium salt	427	406	527	1.30
All other acids, amides, and esters, sulfated	4,035	3,061	5,798	1.89
Alcohols, sulfated, total	163,180	42,204	61,911	1.47
Decyl sulfate, sodium salt	646	418	505	1.21
Dodecyl sulfate, ammonium salt	14,184	7,864	12,967	1.65
Dodecyl sulfate, magnesium salt	202	37	145	3.92
Dodecyl sulfate, sodium salt	10,798	10,607	23,045	2.17
Dodecyl sulfate, triethanolamine salt	3,081	2,310	5,380	2.33
2-Ethylhexyl sulfate sodium salt	876	876	2,202	2.51
All other alcohols, sulfated	133,393	20,092	17,667	.88
Ethers, sulfated, total <sup>6</sup>	241,531	79,464	95,474	1.20
Dodecyl alcohol, ethoxylated and sulfated, ammonium salt	382	382	984	2.58
Dodecyl alcohol, ethoxylated and sulfated, sodium salt	5,006	5,006	11,365	2.27
Mixed linear alcohols, ethoxylated and sulfated, ammonium salt	60,382	7,707	10,477	1.36
Mixed linear alcohols, ethoxylated and sulfated, sodium salt	98,554	17,188	23,040	1.34
All other ethers, sulfated <sup>6</sup>	77,207	49,181	49,608	1.01
Natural fats and oils, sulfated, total	12,573	10,911	10,572	.97
Castor oil, sulfated, sodium salt	2,237	2,014	3,573	1.77
Lard, sulfated sodium salt	1,003	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )
Mixed fish oils, sulfated, sodium salt	279	279	222	.80
Tall oil, sulfated, sodium salt	634	586	571	.97
Tallow, sulfated, sodium salt	201	162	176	1.09
All other natural fats and oils, sulfated	8,219	7,870	6,030	.77
<b>Cationic</b>				
Total	292,775	170,219	375,416	2.21
<b>Amine oxides and oxygen-containing amines (except those having amide linkages), total</b>				
	67,474	25,403	54,623	2.15
<b>Acyclic, total</b>				
(Coconut oil alkyl)amine, ethoxylated	63,398	22,567	45,243	2.00
(Hydrogenated tallow alkyl)amine, ethoxylated	2,792	2,527	3,412	1.35
(9-Octadecenyl)amine, ethoxylated	492	500	894	1.79
(9-Octadecenyl)amine, ethoxylated	961	885	1,780	2.01
Octadecylamine, ethoxylated	615	572	1,636	2.86
(Soybean oil alkyl)amine, ethoxylated	173	187	550	2.94
(Tallow alkyl)amine, ethoxylated	3,572	3,281	7,500	2.29

See footnotes at end of table.

Table 12-1—Continued

Surface-active agents: U.S. production and sales, 1989

Surface-active agents	Production <sup>1</sup>	Sales <sup>2</sup>		Average Unit value <sup>3</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Cationic—Continued</b>				
Amine oxides and oxygen-containing amines (except those having amide linkages)—Continued				
Acyclic—Continued				
N-(Tallow alkyl) trimethylene diamine, ethoxylated . . . .	424	323	740	\$2.29
All other acyclic amine oxides and oxygen containing amines (except those having amide linkages) . . . . .	54,369	14,292	28,731	2.01
Cyclic (including imidazoline and oxazoline derivatives), total . . . . .				
1-(2-Hydroxyethyl)-2-nonyl-2-imidazoline . . . . .	4,078	2,836	9,380	3.31
1-(2-Hydroxyethyl)-2-nor(tall oil alkyl)-2-imidazoline . . . . .	436	441	1,432	3.25
All other cyclic amine oxides and oxygen containing amines (except those having amide linkages) . . . . .	705	225	1,728	7.68
All other cyclic amine oxides and oxygen containing amines (except those having amide linkages) . . . . .	2,935	2,170	6,220	2.87
Amines and amine oxides having amide linkages . . . . .	22,105	17,818	28,057	1.57
Amines, not containing oxygen (and salts thereof), total . . . . .	103,531	40,179	75,670	1.88
Amines salts . . . . .				
Amine salts, diamines and polyamines . . . . .	11,623	8,366	13,832	1.65
Monoamines, total . . . . .	90,112	30,040	58,369	1.94
(Coconut oil alkyl)amine . . . . .	4,206	443	1,120	2.53
N,N-Dimethyloctadecylamine . . . . .	588	253	707	2.79
(Hydrogenated tallow alkyl)amine . . . . .	3,988	1,884	2,714	1.44
Methyl didecylamine . . . . .	758	185	616	3.33
9-Octadecenylamine . . . . .	3,126	1,662	3,166	1.90
Octadecylamine . . . . .	434	463	1,203	2.60
(Soybean oil alkyl)amine . . . . .	2,857	2,400	3,212	1.34
(Tallow alkyl)amine . . . . .	( <sup>9</sup> )	5,710	6,913	1.21
All other monoamines . . . . .	74,157	17,040	38,718	2.27
Quaternary ammonium salts, containing oxygen, total . . . . .	20,716	18,039	43,145	2.39
(Coconut oil alkyl)bis(2-hydroxyethyl, ethoxylated)-methylammonium chloride . . . . .	152	146	415	2.84
All other quaternary ammonium salts, containing oxygen . . . . .	20,564	17,893	42,730	2.39
Quaternary ammonium salts, not containing oxygen, total . . . . .	73,943	66,994	146,005	2.18
Acyclic, total . . . . .	61,267	58,348	125,674	2.15
Bis(coconut oil alkyl)dimethylammonium chloride . . . . .	1,451	1,428	3,925	2.75
Bis(hydrogenated tallow alkyl)dimethylammonium chloride . . . . .	34,271	31,589	57,659	1.83
N-(coconut oil alkyl) aminobutyric acid, sodium salt . . . . .	1,065	1,050	3,558	3.39
All other acyclic quaternary ammonium salts, not containing oxygen . . . . .	24,480	24,281	60,532	2.49
Benzenoid, total <sup>4</sup> . . . . .	12,676	8,646	20,331	2.35
Benzyl(coconut oil alkyl)dimethylammonium chloride . . . . .	557	536	1,092	2.04
Benzyl(hydrogenated tallow alkyl)dimethylammonium chloride . . . . .	2,833	2,757	8,077	2.93
Benzyl(mixed alkyl)dimethylammonium chloride . . . . .	297	88	433	4.94
Benzyltrimethylammonium chloride . . . . .	1,783	1,265	2,213	1.75
All other benzenoid quaternary ammonium salts, not containing oxygen . . . . .	7,206	4,000	8,516	2.13
All other cationic surface-active agents . . . . .	5,006	1,786	27,916	15.63

See footnotes at end of table.

Table 12-1—Continued  
 Surface-active agents: U. S. production and sales, 1989

Surface-active agents	Production <sup>1</sup>	Sales <sup>2</sup>		Average Unit value <sup>3</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Nonionic—Continued</b>				
Total .....	743,384	667,211	1,064,114	\$1.59
Carboxylic acid amides, total .....	35,154	31,665	59,436	1.88
Diethanolamine condensates, amine/acid ratio = 2/1, total .....	8,171	7,780	14,039	1.80
Coconut oil acids .....	1,463	1,408	2,593	1.84
Coconut oil and tallow acids .....	4,222	4,220	7,917	1.88
Lauric and myristic acids .....	138	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )
Oleic acid .....	295	252	482	1.91
Stearic acid .....	22	28	66	2.36
Tall oil acids .....	859	824	699	.85
All other diethanolamine condensates, amine/acid ratio = 2/1 .....	1,172	1,050	2,282	2.17
Diethanolamine condensates (other amine/acid ratios), and other carboxylic acid amides, total .....	17,051	15,240	26,733	1.75
Coconut oil acids, amine/acid ratio = 1/1 .....	12,996	11,860	18,839	1.57
Lauric acid, amine/acid ratio = 1/1 .....	931	875	2,087	2.38
Lauric and myristic acids, amine/acid ratio = 1/1 .....	460	458	1,255	2.74
Linoleic acid, amine/acid ratio = 1/1 .....	111	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )
Stearic acid, amine/acid ratio = 1/1 .....	69	45	94	2.09
All other diethanolamine condensates (other amine/acid ratios), and other carboxylic acid amides .....	2,484	2,002	4,858	2.33
Other alkanolamine condensates .....	9,932	8,645	18,664	2.16
Carboxylic acid esters, total .....	158,528	122,550	233,880	1.91
Anhydrosorbitol esters, total .....	19,543	18,454	28,319	1.72
Anhydrosorbitol monolaurate .....	3,325	2,770	5,672	2.05
Anhydrosorbitol mono-oleate .....	6,050	3,621	6,305	1.74
Anhydrosorbitol monostearate .....	6,461	6,573	10,082	1.53
Anhydrosorbitol sesquileate .....	386	404	792	1.96
Anhydrosorbitol trioleate .....	2,079	1,932	3,284	1.70
All other anhydrosorbitol esters .....	1,242	1,154	2,184	1.89
Diethylene glycol esters, total .....	3,271	2,419	2,927	1.21
Diethylene glycol monolaurate .....	116	123	181	1.47
Diethylene glycol monostearate .....	29	29	75	2.55
All other diethylene glycol esters .....	3,128	2,267	2,671	1.18
Ethoxylated anhydrosorbitol esters, total .....	14,558	13,981	29,847	2.13
Ethoxylated anhydrosorbitol monolaurate .....	3,128	2,966	8,718	2.26
Ethoxylated anhydrosorbitol mono-oleate .....	4,540	4,539	9,143	2.01
Ethoxylated anhydrosorbitol monostearate .....	5,012	4,840	10,246	2.12
Ethoxylated anhydrosorbitol trioleate .....	1,264	992	2,207	2.22
Ethoxylated anhydrosorbitol tristearate .....	285	295	632	2.15
All other ethoxylated sorbitol and anhydrosorbitol esters .....	329	349	901	2.58
Ethoxylated sorbitol esters .....	1,563	1,541	3,784	2.46
Ethylene glycol distearate .....	2,106	2,003	3,348	1.67
Ethylene glycol monostearate .....	1,692	1,550	2,728	1.76
Glycerol esters, total .....	48,651	33,772	64,313	1.90
Glycerol mono-oleate .....	4,011	3,608	6,448	1.79
Glycerol monostearate .....	10,668	6,274	11,004	1.75
All other glycerol esters .....	33,972	23,890	46,861	1.96
Natural fats and oils, ethoxylated, total .....	17,842	13,974	28,733	2.06
Castor oil, ethoxylated .....	7,176	6,287	11,659	1.85
Hydrogenated castor oil, ethoxylated .....	1,924	1,531	3,321	2.17
Lanolin, ethoxylated .....	652	641	1,050	1.64
Tall oil acids, ethoxylated .....	621	228	358	1.57
All other natural fats and oils, ethoxylated .....	7,469	5,287	12,345	2.33
Polyethylene glycol esters, total .....	27,312	21,618	42,062	1.95
Polyethylene glycol diester of tall oil acids .....	2,196	321	604	1.88
Polyethylene glycol dilaurate .....	547	510	1,139	2.23
Polyethylene glycol dioleate .....	1,858	697	1,344	1.93

See footnotes at end of table.

Table 12-1—Continued

Surface-active agents: U.S. production and sales, 1989

Surface-active agents	Production <sup>1</sup>	Sales <sup>2</sup>		Average Unit value <sup>3</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Nonionic—Continued</b>				
<b>Carboxylic acid esters—Continued</b>				
<b>Polyethylene glycol esters—Continued</b>				
Polyethylene glycol distearate . . . . .	1,044	981	2,833	\$2.89
Polyethylene glycol monoester of coconut oil acids . . . . .	112	108	228	2.15
Polyethylene glycol monoester of tall oil acids . . . . .	625	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )
Polyethylene glycol monolaurate . . . . .	3,456	3,292	5,595	1.70
Polyethylene glycol mono-oleate . . . . .	1,878	1,582	3,210	2.03
Polyethylene glycol monopalmitate . . . . .	648	776	1,085	1.40
Polyethylene glycol monopalargonate . . . . .	1,494	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )
Polyethylene glycol monostearate . . . . .	2,819	2,716	5,709	2.10
Polyethylene glycol sesquiester of tall oil acids . . . . .	906	867	1,511	1.74
All other polyethylene glycol esters . . . . .	9,729	9,770	18,804	1.92
Polyglycerol esters, total . . . . .	620	526	1,764	3.35
Polyglycerol mono-oleate . . . . .	369	301	867	2.98
All other polyglycerol esters . . . . .	251	225	897	3.86
1,2-Propanediol monostearate . . . . .	848	453	1,150	2.54
All other carboxylic acid esters . . . . .	18,522	14,259	24,905	1.75
Ethers, total . . . . .	537,069	507,109	747,925	1.47
<b>Benzenoid ethers, total<sup>4</sup></b>				
Dinonylphenol, ethoxylated . . . . .	190,876	172,225	274,767	1.60
Dodecylphenol, ethoxylated . . . . .	2,101	2,512	3,589	2.37
Dodecylphenol, ethoxylated . . . . .	1,728	1,556	3,191	2.05
Iso-octylphenol, ethoxylated . . . . .	25,391	17,358	44,596	2.57
(Mixed alkyl)phenol-formaldehyde, alkoxylated . . . . .	6,560	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )
Nonylphenol, ethoxylated . . . . .	136,845	134,642	181,573	1.35
Nonylphenol, ethoxylated and propoxylated . . . . .	653	603	1,563	2.59
Nonylphenol-formaldehyde, alkoxylated . . . . .	2,069	( <sup>6</sup> )	( <sup>6</sup> )	( <sup>6</sup> )
All other benzenoid ethers . . . . .	15,529	18,554	40,255	2.43
<b>Nonbenzenoid ethers, total</b>				
Chemically-defined linear alcohols, ethoxylated, total . . . . .	304,615	300,779	402,106	1.34
Decyl alcohol, ethoxylated . . . . .	11,471	11,153	25,329	2.27
Dodecyl alcohol, ethoxylated . . . . .	4,974	4,867	9,105	1.87
Dodecyl alcohol, ethoxylated . . . . .	1,713	1,774	3,676	2.07
Hexadecyl alcohol, ethoxylated . . . . .	468	509	1,436	2.82
9-Octadecenyl alcohol, ethoxylated . . . . .	871	506	1,600	3.16
Octadecyl alcohol, ethoxylated . . . . .	1,130	1,262	3,652	2.89
Oleyl alcohol, ethoxylated . . . . .	330	300	1,077	3.59
All other chemically-defined linear alcohols, ethoxylated . . . . .	1,985	1,935	4,783	2.47
Mixed linear alcohols, alkoxylated, total . . . . .	293,144	289,626	376,777	1.30
Mixed linear alcohols, ethoxylated . . . . .	271,186	269,234	342,232	1.27
Mixed linear alcohols, ethoxylated and propoxylated . . . . .	8,424	7,794	13,382	1.72
All other mixed linear alcohols, alkoxylated . . . . .	13,534	12,598	21,163	1.68
Other ethers and thioethers, total . . . . .	41,578	34,105	71,052	2.08
Mixed alcohols, ethoxylated . . . . .	372	307	475	1.55
Poly(mixed ethylene, propylene) glycol . . . . .	5,875	1,780	3,689	2.07
Tridecyl alcohol, ethoxylated . . . . .	4,023	3,331	5,321	1.60
All other ethers and thioethers . . . . .	31,308	28,687	61,567	2.15
All other nonionic surface-active agents . . . . .	14,633	5,887	22,873	3.89

<sup>1</sup> All quantities are given in terms of 100 percent organic surface-active ingredient.<sup>2</sup> Sales include products sold as bulk surface-active agents only.<sup>3</sup> Calculated from unrounded figures.<sup>4</sup> The term "benzenoid" used in this report, describes any surface-active agent, except lignin derivatives, whose molecular structure includes 1 or more 6-membered carbocyclic or heterocyclic rings with conjugated double bonds (e.g., the benzene ring or the pyridine ring).<sup>5</sup> Reported data were accepted in confidence and may not be published, or no data were reported.<sup>6</sup> Includes all other anionic surface-active agents.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 12-2

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Amphoteric</b>		
1,1-Bis(carboxymethyl)-2-undecyl-2-imidazolium chloride, disodium salt	No	BRD.
Bis(2-hydroxyethyl)tallow ammonium ethanoate	No	MIR.
Capramidopropyl betaine	No	AAC.
3-[Caprylamidoethylene-(2-hydroxyethyl)amino]-propionic acid	No	MIR.
Caprylamphopropionate	No	MOA.
1-Carboxyethyl-1-(2-hydroxyethyl)-2-heptyl-2-imidazolium hydroxide, sodium derivative, sodium salt	No	MIR.
1-Carboxyethyl-1-(2-hydroxyethyl)-2-nonyl-2-imidazolium hydroxide, sodium derivative, sodium salt	No	MIR.
(1-Carboxyheptadecyl)trimethylammonium hydroxide, inner salt	No	DUP.
Carboxymethyl-3-cocoamidopropyl dimethyl ammonium chloride, sodium salt	No	ENJ.
(Carboxymethyl) [3-(coconut oil amido)propyl]-dimethylammonium hydroxide, inner salt	Yes	AAC, GAF, MIR, PPG, SCP, SHX, WM, WTC, (?).
1-Carboxymethyl-2-heptadecyl-1-(2-hydroxyethyl)-2-imidazolium hydroxide, sodium derivative, sodium salt	No	MIR.
1-Carboxymethyl-1-(2-hydroxyethyl)-2-heptyl-2-imidazolium hydroxide, sodium derivative, sodium salt	No	MIR.
1-Carboxymethyl-1-(2-hydroxyethyl)-2, imidazolium hydroxide sodium derivative, sodium salt	No	BRD.
1-Carboxymethyl-1-(2-hydroxyethyl)-2-nonyl-2-imidazolium hydroxide, sodium derivative, sodium salt	No	BRD, MIR.
1-Carboxymethyl-1-(2-hydroxyethyl)-2-undecyl-2-imidazolium hydroxide, sodium derivative, sodium salt	No	MIR.
1-Carboxymethyl-1-(2-hydroxyethyl)-2-undecyl-2-imidazolium hydroxide, sodium derivative, sodium salt	No	MIR.
(Carboxymethyl)-3-(lauryl amido propyl dimethyl ammonium hydroxide inner salt	No	MIR.
Cocoamidoamphoglycinate	No	MOA.
Cocoamidopropyl betaine	No	MOA.
N-Cocoamido-propyl-N,N-dimethylamine oxide	No	MOA.
3-[3-(Cocoamidopropyl)dimethylammonio]-2-hydroxypropane sulfonate	No	MIR.
3-Cocoamidopropyl-2-hydroxy-3-sulfopropyl dimethyl ammonium hydroxide, inner salt	No	SHX.
Cocoamphocarboxyglycinate	No	MOA.
Cocoamphocarboxypropionate	No	MOA.
Cocoamphopropionate	No	MOA.
3-[(Coconut oil alkyl)amidoethylene-(2-hydroxyethyl)-amino]propionic acid	No	MIR.
N,N-Dl(hydroxyethyl)-n-carboxymethyl tallow ammonium quat, inner salt	No	SHX.
Dodecyl disodium banaline, N-(2-carboxyethyl), sodium salt	No	GAF, MOA.
N-Dodecyl-3-linodipropionic acid	No	AAC, MIR, MOA, SCP.
N-Dodecyl-3-linodipropionic acid, disodium salt	Yes	MIR.
N-Dodecyl-3-lirino-dipropionic acid, monosodium salt	No	MIR.
Heptadecylmethylbenzimidazolinesulfonic acid, sodium salt	No	BRD.

See footnotes at end of table.



Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Amphoteric—Continued</b>		
Hexylsolanylamidocarboxylic acid, monoethanolamine salt	No	HCL.
1-Hydroxyethyl-1-(2-hydroxy-3-sodiumsulfonatopropyl)-2-capryl-2-imidazolium hydroxide	No	MIR.
1-Hydroxyethyl-1-(2-hydroxy-3-sodiumsulfonatopropyl)-2-nor-coconut oil fatty acids-2-imidazolium hydroxide	No	MIR.
1-(2-Hydroxyethyl)-1-(sodium carboxymethylenoxyethylene)-2-nor-coconut oil fatty acids-2-imidazolium hydroxide	No	MIR.
Isodecyloxypropylminopropionic acid, monosodium salt	No	ENJ.
Isononylamidocaproic acid, triethanolamine salt	No	SHX.
Isostearic amphoproponate	No	MOA.
Laurylamidopropyl betaine	No	MOA.
Laurylamphoglycinate	No	MOA.
Hexylsolanylamidocarboxylic acid, monoethanolamine salt	No	HCL.
Mixed acyclic primary amines, ethoxylated and sulfated, sodium salt	No	RH.
(Mixed alkyl) sulfobetaine	Yes	BRD, MOA, PPG, SBC, WM, (?).
Oleamidopropyl betaine	No	AAC.
Oleic acid-ethylenediamine condensate, propoxylated and sulfated, sodium salt	No	MOA.
Oleyl betaine	No	AAC.
1-(Sodium carboxyethylene)-1-(sodium carboxymethylenoxyethylene)-2-nor-(tall oil fatty acids)-2-imidazolium hydroxide	No	MIR.
1-(Sodium carboxymethyl)-1-(sodium carboxymethylenoxyethylene)-2-nor-(coconut oil fatty acids)-2-imidazolium lauryl sulfate	No	MIR.
N-(Tallow alkyl)-3-iminodipropionic acid, disodium salt	No	MIR, MOA, SCP.
Tridecyloxypoly(ethyleneoxy)propionic acid, potassium salt	No	MRV.
All other acyclic amphoteric surface-active agents	No	BRD, CGY, DUP, MIR, MOA, PPG, S, SCP, (?).
All other cyclic amphoteric surface-active agents	No	PPG, SBC.
<b>Antonic</b>		
<b>Carboxylic acids (and salts thereof):</b>		
<b>Amine salts of fatty, rosin, and tall oil acids:</b>		
Coconut oil acids, diethanolamine salt	No	AAC, SHX.
Coconut oil acids, ethanolamine salt	No	SBP.
Coconut oil acids, triethanolamine salt	No	SCP.
Isostearic acid, mixed isopropanolamines salt	No	(2).
Isostearic acid, triethanolamine salt	No	PCI.
Oleic acid, diethanolamine salt	No	AAC.
Oleic acid, mixed isopropanolamine salt	No	UTC, (?).
Oleic acid, triethanolamine salt	No	(?).
3-Propanoic acid, cocoamine, sodium salt	No	PCI.
Rosin acids, triethanolamine salt	No	CPC.
Stearic acid, N,N,N',N'-tetrakis(2-hydroxyethyl)-ethylenediamine salt	No	ICI.
Stearic acid, triethanolamine salt	No	BRD, PCI, SBP, (?).
Tall oil acids, diethanolamine salt (condensate)	No	AAC, SHX.
Tall oil acids, triethanolamine salt	No	PNX.
(Tall oil, fatty acids), triethanolamine salt	No	WVA.
Tallow acids, triethanolamine salt	No	CPC, ENJ, SBP.
All other amine salts of fatty, rosin, and tall oil acids	No	S, (?).

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Anionic—Continued</b>		
<b>Carboxylic acids (and salts thereof)—Continued</b>		
<b>Carboxylic acids having amide, ester, or ether linkages:</b>		
Butoxyethylene oxyacetic acid, sodium salt . . . . .	No	MIR.
5(or 6)-Carboxy-4-hexyl-2-cyclohexene-1-octanoic acid, reaction products with castor oil . . . . .	No	( <sup>2</sup> ).
N-(Coconut oil acyl)sarcosine, sodium salt . . . . .	No	ENJ, HMP.
N,N-Dimethyl capramide . . . . .	No	PEL.
Dodecyloxy poly(ethyleneoxy)acetic acid, sodium salt . . . . .	No	MIR.
N-Lauroylsarcosine, sodium salt . . . . .	No	AAC, HMP.
Maleic acid, monoalkyl ester . . . . .	No	( <sup>2</sup> ).
Mixed(secondary linear alcohol)polyethylene propionic acid, sodium salt . . . . .	No	CHP.
Naphthenic acid, ethoxylated . . . . .	No	( <sup>2</sup> ).
Nonylphenol poly(ethyleneoxy)acetic acid, sodium salt . . . . .	No	BRI.
Poly(oxy-1,2-ethanedyl), ω-(2-carboxyethoxy)-ω'-hydroxy-α,α'-(iminodi-2,1-ethanedyl) bis-,N-tallow alkyl derivs., potassium salt . . . . .	No	MIR.
Poly(oxy-1,2 ethanedyl)-α-carboxymethyl, ω-(tri-decyloxy), potassium salt . . . . .	No	PCI.
Tridecyloxy poly(ethyleneoxy)acetic acid, sodium salt . . . . .	No	FTX, HCL, HMP.
All other carboxylic acids with amide, ester or ether linkages . . . . .	No	SCP, WM.
<b>Potassium and sodium salts of fatty, rosin, and tall oil acids:</b>		
Alkoxy triacryl titanate . . . . .	No	KPI.
5(or 6)carboxy-4-hexyl-2-cyclohexene-1-octanoic acid, potassium/sodium salts . . . . .	No	( <sup>2</sup> ).
Castor oil acids, potassium salt . . . . .	No	CAS, DEX, GRL.
Castor oil acids, sodium salt . . . . .	No	HEW.
Citric acid, sodium salts (50%) in sodium phosphates (20%) . . . . .	No	HCL.
Coconut oil acids and oleic acid, potassium salt . . . . .	No	HCL.
Coconut oil acids, potassium salt . . . . .	Yes	AGP, CON, ESS, GRL, HEW, HIP, HNT, LUR, NMC, PG, PNX.
Coconut oil acids, sodium salt . . . . .	Yes	BSW, CON, CP, ENJ, HEW, LEV, NMC, PG, PLX, PNX, ( <sup>2</sup> ).
Corn oil acids, potassium salt . . . . .	No	HNT.
Corn oil acids, sodium salt . . . . .	No	NMC.
Gluconic acid, potassium and sodium salts, with a 20 percent mix of sodium bisulfite-formaldehyde . . . . .	No	HCL.
Heptanoic acid, potassium salt . . . . .	No	( <sup>2</sup> ).
Hexyl (isononyl amide) carboxylic acid, mono-, triethanolamine salts . . . . .	No	HCL.
Hexyl(isononyl amide) carboxylic acid, tri-, diethanolamine, mixed salts . . . . .	No	HCL.
Isonanoic acid, sodium salt . . . . .	No	HCL.
Isostearic acid, isoproxy titanium salt . . . . .	No	KPI.
Lauric acid, potassium salt . . . . .	No	PG.
Mixed vegetable fatty acids, potassium salt . . . . .	No	CRT, EFH, GRL.
Mixed vegetable fatty acids, sodium salt . . . . .	No	NPR.
Mixed wool grease and tall oil fatty acids . . . . .	No	SLM.
Neoalkoxy, trineodecanoyl titanate . . . . .	No	KPI.
Neoalkoxy, trineodecanoyl zirconate . . . . .	No	KPI.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Anionic—Continued</b>		
<b>Carboxylic acids (and salts thereof)—Continued</b>		
<b>Potassium and sodium salts of fatty, rosin, and tall oil acids—Continued</b>		
Oleic acid, ammonium salt	No	CCC.
Oleic acid, potassium salt	No	BSW, HNT, PG, VKR, WBG, (2).
Oleic acid, sodium salt	Yes	BSW, NMC, SCP, WBG.
Olive oil acids, potassium salt	No	HNT.
Palmitic and stearic acids, sodium salt	No	BRI.
Palm kernel oil acids, potassium salt	No	PG.
Palm kernel oil acids, sodium salt	No	PG.
Palm oil acids, sodium salt	No	BSW.
Rosin acids, potassium salt	Yes	ARZ, PG, WVA, (2).
Rosin acids, sodium salt	No	ARZ, SLM, (2).
Stearic acid, ammonium salt	No	BSW.
Stearic acid, potassium salt	No	CCC, CON, HEW, SCP.
Stearic acid, sodium salt	Yes	CON, CRT, LEV, PNX.
Tall oil acids, potassium salt	Yes	CCC, CON, DAN, ESS, FER, HAL, HIP, HNT, LEA, PNX, SCP, WVA.
Tall oil acids, sodium salt	Yes	NMC, WVA, (2).
Tallow acids, potassium salt	No	AGP, CRT, PG, PNX.
Tallow acids, sodium salt	Yes	BSW, CON, CP, CRT, HEW, LEV, NMC, PG, (2).
All other potassium and sodium salts of fatty, rosin, and tall oil acids	No	MOA, USR, WVA.
All other carboxylic acids	No	SCP, WVA.
<b>Phosphoric and polyphosphoric acid esters (and salts thereof):</b>		
<b>Alcohols and phenols, alkoxyated and phosphated:</b>		
C <sub>12</sub> -C <sub>18</sub> Alcohol, ethoxylated, propoxylated and phosphated	No	GAF.
Butyl alcohol, ethoxylated and phosphated	No	AAC.
Decyl alcohol, ethoxylated and phosphated	No	MCP, OC, RPC.
Dinonylphenol, ethoxylated and phosphated	Yes	CPC, ETC, GAF, PPG, WTC.
Dodecyl alcohol, ethoxylated and phosphated	No	CPC, ENJ, GAF, HCL.
Dodecyl alcohol, ethoxylated and polyphosphated	No	PG.
Dodecylphenol, ethoxylated and phosphated	No	DEX, GAF.
2-Ethylhexanol and ethoxylated nonylphenol, polyphosphated	No	CCC.
2-Ethylhexanol and ethoxylated nonylphenol, polyphosphated, sodium salt	No	CCC.
2-Ethylhexanol, ethoxylated and phosphated	No	CPC, ETC, HCL, SCP, UTC, WTC.
2-Ethylhexanol, ethoxylated, phosphated, potassium salt	No	BRI.
Mixed linear alcohols, alkoxyated and phosphated, potassium salt	No	PCI.
Mixed linear alcohols, ethoxylated and phosphated	Yes	AAC, BAS, CTL, ENJ, ETC, FER, FTX, GAF, HCL, HIP, HRT, LUR, MOA, MRV, RPC, SOS, WTC, (2), (2).
Mixed linear alcohols, ethoxylated and phosphated, sodium salt	No	CHP.
Mixed tridecyl alcohol and 2-ethylhexanol, phosphated, potassium salt	No	CHP.
Nonylphenol, ethoxylated and phosphated	Yes	AAC, ARL, CPC, CTL, DEX, ENJ, ESS, ETC, GAF, GDC, HCL, HDG, HRT, LEA, MCP, MOA, OC, OMC, PPG, RPC, UTC, VKR, WTC.
Nonylphenol, ethoxylated and phosphated, diethanolamine salt	No	OMC, WTC.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Anionic—Continued</b>		
<b>Phosphoric and polyphosphoric acid esters (and salts thereof)—Continued</b>		
<b>Alcohols and phenols, alkoxylated and phosphated—Continued</b>		
Nonylphenol, ethoxylated and phosphated, sodium salt	No	WTC.
9-Octadecenyl alcohol, ethoxylated and phosphated	No	ETC, GAF, HCL, WTC.
Octylphenol, ethoxylated and phosphated	No	LUR, RH, RPC, WTC.
Phenol, ethoxylated and phosphated	Yes	AAC, ETC, HDG, LUR, MOA, PEL, PPG, WTC.
Polyhydric alcohol, ethoxylated and phosphated	No	AAC, DEX, GAF.
Polypropylene glycol, phosphated	No	BAS.
Tridecyl alcohol, ethoxylated and phosphated, polyalkylene polyamine salt	No	( <sup>2</sup> ).
Tridecyl alcohol, ethoxylated and phosphated	Yes	CPC, DAN, DEX, ETC, GAF, HCL, HIP, MIL.
Tridecyl alcohol ethoxylated and phosphated, potassium salt	No	DEX.
All other alcohols and phenols, alkoxylated and phosphated or polyphosphated	No	ETC, SCP, SDC, TCC, ( <sup>2</sup> ).
<b>Alcohols, phosphated or polyphosphated:</b>		
Butyl methyl pyrophosphate isopropoxy titanium salt octyl phosphite adduct	No	KPI.
Butyl phosphate	No	HRT.
Butyl phosphate, potassium salt	No	DUP.
Decyl and octyl phosphate	Yes	APC, ENJ, ETC, HCL, SCP, SHX.
Decyl polyphosphate, sodium salt	No	CRD.
Ethyl alcohol, phosphated, amine salt	No	UTC.
2-Ethylhexyl phosphate	Yes	APC, BRD, CHP, ETC, FER, HIP, LUR, MCP, OC, OMC, SOS, VKR, ( <sup>2</sup> ).
2-Ethylhexylphosphate, potassium salt	No	PCI.
2-Ethylhexyl phosphate, sodium salt	No	CHP, DAN, ENJ, PAT, S.
2-Ethylhexyl polyphosphate, sodium salt	No	DEX.
Hexadecylphosphate	No	( <sup>2</sup> ).
Hexadecylmonophosphate	No	( <sup>2</sup> ).
Hexyl phosphate	Yes	ETC, HCL, ICI.
Hexyl phosphate, potassium salt	No	FTX, ICI.
Isooctyl phosphate	No	BOE, BRI, QCP.
Isooctyl phosphate, potassium salt	No	QCP.
Lauryl alcohol, phosphated, potassium salt	No	BOE.
Methylbutyl pyrophosphate, ethylenedioxy titanium salt	No	KPI.
Mixed alkyl phosphate, sodium salt	No	( <sup>2</sup> ).
Mixed alkyl phosphate	Yes	CTL, DUP, HCL, SCP, WTC, ( <sup>2</sup> ).
Mixed alkyl phosphate, alkylamine salt	No	( <sup>2</sup> ).
Mixed alkyl phosphate, diethanolamine salt	No	DUP, SCP.
Mixed alkyl phosphate, potassium salt	No	HCL, QCP, ( <sup>2</sup> ).
Mixed alkyl phosphate, triethanolamine salt	No	( <sup>2</sup> ).
Neoalkoxy tris(dioctyl)pyrophosphate zirconate	No	KPI.
Octyl phosphate	No	SCP.
Octyl phosphate, alkylamine salt	No	( <sup>2</sup> ).
Octyl phosphate, isopropoxy titanium salt	No	KPI.
Octyl phosphate neoalkoxy titanium salt	No	KPI.
Octyl polyphosphate	No	DEX.
Octyl polyphosphate, potassium salt	No	DEX.
Octyl pyrophosphate, ethylenedioxy titanium salt	No	KPI.
Octyl pyrophosphate, isopropoxy titanium salt	No	KPI.
Octyl pyrophosphate, neoalkoxy titanium salt	No	KPI.
Octyl pyrophosphate, oxoethylenedioxy titanium salt	No	KPI.
Octyl pyrophosphate titanium salt	No	KPI.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Anionic—Continued</b>		
<b>Phosphoric and polyphosphoric acid esters (and salts thereof)—Continued</b>		
<b>Alcohols, phosphated or polyphosphated—Continued</b>		
<b>N-(C<sub>8</sub>-C<sub>17</sub>) Alkylamido-N-carboxyethyl-N-2-hydroxyethyl, 3-amino-2-hydroxypropyl</b>		
phosphate, diodium salt	No	MOA.
Tridecyl phosphate	No	HCL.
All other phosphated and polyphosphated alcohols	No	TCC, (2).
<b>Other phosphoric and polyphosphoric acid esters:</b>		
Blend of fatty and phosphate esters	No	MIL.
Glycerol, ethoxylated and phosphated	No	(2).
Glycerol monoester of mixed fatty acids, phosphated	No	WTC.
Octadecylamine, ethoxylated and phosphated, sodium salt	No	GDC.
All other phosphoric and polyphosphoric acid esters	No	ENJ, MOA, SCP, WTC, (2).
<b>Sulfonic acids (and salts thereof):</b>		
<b>Alkylbenzenesulfonates:</b>		
<b>Dodecylbenzenesulfonates:</b>		
Dodecylbenzenesulfonic acid	Yes	EMK, ENJ, JLP, LEV, PIL, STP, TEN, VST, WTC, (2).
Dodecylbenzenesulfonic acid, (mixed alkyl)amine salt	No	ECC, FTX, JLP, (2).
Dodecylbenzenesulfonic acid, ammonium salt	No	CCC, LEV, WTC, (2).
Dodecylbenzenesulfonic acid, calcium salt	Yes	HCL, ICI, RH, STP, TMH, WTC, (2).
Dodecylbenzenesulfonic acid, diethanolamine salt	No	AAC, VKR.
Dodecylbenzene sulfonic acid, DMAP salt	No	WTC.
Dodecylbenzenesulfonic acid, ethylenediamine salt	No	SCP.
Dodecylbenzenesulfonic acid, isopropanolamine salt	No	PIL.
Dodecylbenzenesulfonic acid, isopropylamine salt	Yes	AAC, ICI, KPI, SCP, STP, WTC, (2).
Dodecylbenzenesulfonic acid, monoethanolamine salt	Yes	AAC, PCI, RPC, (2).
Dodecylbenzenesulfonic acid, oleyl amine, ethoxylated, salt	No	HCL.
Dodecylbenzenesulfonic acid, potassium salt	No	BRI, GDC, LEA.
Dodecylbenzenesulfonic acid, sodium salt	Yes	AAC, APC, BLA, BOE, BRI, CP, CPC, CTL, DOW, DUP, ECC, LEA, LEV, NPR, PCI, PIL, PNX, STP, TEN, VKR, VST, WTC.
Dodecylbenzenesulfonic acid, triethanolamine salt	Yes	AAC, BRD, BRI, CCC, CPC, CTL, ESS, FTX, PCI, PIL, PPG, SCP, STP, WTC, ENJ.
All other dodecylbenzenesulfonates	No	ENJ.
<b>Other alkylbenzenesulfonates:</b>		
Didodecylbenzenesulfonic acid, sodium salt	No	ENJ.
Isopropyl 4-amino benzene sulfonyl di(dodecylbenzenesulfonyl) titanate	No	KPI.
Neoalkoxy, dodecylbenzene-sulfonyl titanate	No	KPI.
Tridecylbenzenesulfonic acid	No	CP, PLX.
Tridecylbenzenesulfonic acid, sodium salt	No	BLA, CMT, PG.
<b>Benzene-, cumene-, toluene-, and xylenesulfonates:</b>		
Benzenesulfonic acid	No	WTC.
Cumenesulfonic acid, ammonium salt	No	NES.
Cumenesulfonic acid, sodium salt	No	NES, STP, WTC.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Anionic—Continued</b>		
<b>Sulfonic acids (and salts thereof)—Continued</b>		
<b>Benzene-, cumene-, toluene-, and xylenesulfonates—Continued</b>		
Toluenesulfonic acid, potassium salt	No	NES.
Toluenesulfonic acid, sodium salt	No	NES, PG, VST.
Toluene-, xylenesulfonic acid	No	WTC.
Xylenesulfonic acid, ammonium salt	No	NES, PG, STP, WTC.
Xylenesulfonic acid, sodium salt	Yes	ICI, NES, PIL, PLX, SHC, STP, WTC.
All other benzene-, cumene-, toluene-, and xylenesulfonates	No	SCP.
<b>Ligninsulfonates:</b>		
Ligninsulfonic acid, ammonium salt	Yes	MAR, PSP, RAY, SPA.
Ligninsulfonic acid, calcium salt	Yes	FPC, LKY, MAR, PSP.
Ligninsulfonic acid, chromium salt	No	PSP, RAY.
Ligninsulfonic acid, iron salt	No	MAR, PSP.
Ligninsulfonic acid, manganese salt	No	MAR.
Ligninsulfonic acid, mixed chromium and iron salts	No	PSP.
Ligninsulfonic acid, potassium salt	No	PSP.
Ligninsulfonic acid, sodium salt	Yes	ENJ, MAR, PSP, RAY, WVA.
Ligninsulfonic acid, zinc salt	No	MAR, PSP.
<b>Naphthalenesulfonates:</b>		
Butylnaphthalenesulfonic acid, sodium salt	No	SCP, UDI.
Di(C <sub>6</sub> -C <sub>8</sub> alkyl)naphthalenesulfonic acid	No	(?)
Dibutylnaphthalenesulfonic acid	No	UDI.
Diisopropylnaphthalenesulfonic acid, sodium salt	No	DUP, SCP, UDI.
Isopropylnaphthalenesulfonic acid	No	UDI.
Methylnaphthalenesulfonic acid, sodium salt	No	CPC, SCP, UDI.
Methylnonylnaphthalenesulfonic acid, sodium salt	No	UDI.
Naphthalene sulfonic acid, sodium salt, formaldehyde condensate	No	ICI, UDI.
All other naphthalenesulfonates	No	HAL, SCP.
<b>Sulfonic acids having amide linkages:</b>		
<b>Sulfosuccinamic acid derivatives:</b>		
N-(1,2-Dicarboxyethyl)-N-octadecyl sulfosuccinamic acid, tetrasodium salt	No	ACY, MOA.
N-Octadecylsulfosuccinamic acid, disodium salt	No	ACY.
Oleamidolsulfosuccinamic acid, disodium salt	No	SBC.
N-(Oleoyloxypropyl)sulfosuccinamic acid	No	WTC.
<b>Taurine derivatives:</b>		
N-(Coconut oil acyl)-N-methyltaurine, sodium salt	No	FTX, GAF.
N-Methyl-N-oleoyltaurine, sodium salt	No	CPC, FTX, GAF, HCL.
N-Methyl-N-palmitoyltaurine, sodium salt	No	GAF.
N-Methyl-N-(tall oil acyl)taurine, sodium salt	No	CCC, GAF, WVA.
All other sulfonic acids having amide linkages	No	HCL.
<b>Sulfonic acids having ester or ether linkages:</b>		
<b>Sulfosuccinic acid esters:</b>		
Sulfosuccinic acid, bis(dilsobutyl)ester, amidodisodium salt	No	MOA.
Sulfosuccinic acid, bis(2,6-dimethyl-4-heptyl)-ester, sodium salt	No	MOA, NSC.
Sulfosuccinic acid, bis(2-ethylhexyl)ester, sodium salt	Yes	ACY, AMU, APX, BRI, CCC, CHP, ECC, EMK, ENJ, FTX, HCL, HDG, MCP, MOA, RH, RPC, WTC.
Sulfosuccinic acid, dihexyl ester, sodium salt	No	ACY, MOA.
Sulfosuccinic acid, dilsobutyl ester, sodium salt	No	FTX.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Anionic—Continued</b>		
<b>Sulfonic acids esters (and salts thereof)—Continued</b>		
<b>Sulfonic acids having ester or ether linkages—Continued</b>		
<b>Sulfosuccinic acid esters—Continued</b>		
Sulfosuccinic acid, dilsodecyl ester, sodium salt	No	ACY.
Sulfosuccinic acid, dilaooctyl ester, sodium salt	No	ARI, SOS.
Sulfosuccinic acid, dioctyl ester, sodium salt	No	MOA.
Sulfosuccinic acid, dipentyl ester, sodium salt	No	ACY.
Sulfosuccinic acid, ditridecyl ester, sodium salt	No	ACY, MOA.
Sulfosuccinic acid, (lauryl polyethylene glycol ether) ester, disodium salt	No	SHX.
Sulfosuccinic acid, (coconut oil alkyl)-iminolopropanol half-ester, sodium salt	No	MOA.
Sulfosuccinic acid, monolaurate ester, disodium salt	No	AAC, MIR, MOA.
Sulfosuccinic acid, myristyl ester, disodium monoethanolamine salt	No	WTC.
Sulfosuccinic acid, nonoxynyl-10 ester, disodium salt	No	MOA.
Sulfosuccinic acid, oleamidopolyethyleneglycol, disodium salt	No	MOA.
Sulfosuccinic acid, ricinoleamide monoethanolamine, disodium salt	No	AAC.
All other sulfosuccinic acid esters	No	MOA, SCP, SHX, WTC.
<b>All other sulfonic acids having ester or ether linkages:</b>		
Coconut oil acids, 2-sulfoethyl ester, sodium salt	No	FTX, GAF, LEV. (2).
Dodecyl(diphenyloxy)disulfonic acid	No	(2).
Dodecyl(diphenyloxy)disulfonic acid, disodium salt	No	AAC, CTL, PIL.
Dodecyl sulfoacetate, sodium salt	No	STP.
2-Hydroxy, 3-(lauryl-myristyl) (oxy-1 propane sulfonic acid), sodium salt	No	PG.
Iso-octylphenol, ethoxylated and sulfonated, sodium salt	No	GAF, RH.
n-Octylphenol, ethoxylated and sulfonated, sodium salt	No	APX.
All other sulfonic acids having ester or ether linkages	No	AC, PG, PPG, SCP.
<b>Other sulfonic acids:</b>		
Allyl sulfonate, sodium salt	No	ARD.
Diphenylsulfone sulfonic acid, potassium salt	No	UPF.
Mixed alkanesulfonic acid	No	(2).
Mixed alkane sulfonic acid, sodium salt	No	DUP, SLM, WTC, (2).
Mixed linear olefin sulfonate	Yes	AAC, STP, WVA.
n-Octanesulfonic acid, sodium salt	No	(2).
Oleyloxyethylamide oxypropanol sulfonic acid	No	S.
Petroleum sulfonic acid, water soluble (acid layer), sodium salt	No	PIL.
All other sulfonic acids	No	CGY, CLU, HAL.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Anionic—Continued</b>		
Sulfuric acids esters (and salts thereof)		
Acids, amides, and esters, sulfated:		
Coconut oil acids-ethanolamine salt, sulfated, potassium salt .....	No	EMK, ENJ.
Mixed alkyl phenol sulfate, ethoxylated, triethanolamine salt .....	No	MIL.
Carboxylic acid esters (except natural fats and oils), sulfated:		
Esters of sulfated oleic acid:		
Butyl oleate, sulfated, sodium salt .....	Yes	HIP, ICI, LUR, MCP, MRV, NSC.
Isopropyl oleate, sulfated, sodium salt .....	No	DEX.
Methyl oleate, sulfated, sodium salt .....	No	ACT, ICI.
Oleic acid, sulfated, disodium salt .....	No	MCP.
Oleic acid, sulfated, sodium salt .....	No	ACY, CIN.
Propyl oleate, sulfated, sodium salt .....	No	MRV.
All other esters of sulfated oleic acid .....	No	SCP.
Other sulfated esters:		
Glycerol monoester of coconut oil acids, sulfated, sodium salt .....	No	CP.
9-Octadecenyl acetate, sulfated, sodium salt .....	No	DUP.
Tall oil acids, oxobottom ester, sulfated, sodium salt .....	No	LUR.
Tall oil acids, sulfated, sodium salt .....	No	ICI.
All other sulfated esters .....	No	( <sup>2</sup> ).
Alcohols, sulfated:		
Decyl and octyl sulfate, sodium salt .....	No	WTC.
Decyl sulfate, sodium salt .....	Yes	AAC, ARI, SCP, WTC.
Dodecylsulfate salts:		
Dodecyl sulfate, ammonium salt .....	Yes	AAC, BRD, LEV, STP, TNI, WTC, ( <sup>2</sup> ).
Dodecyl sulfate, diethanolamine salt .....	No	BRD, DUP, JRG, STP.
Dodecyl sulfate, N,N-diethylcyclohexylamine salt .....	No	DUP, S.
Dodecyl sulfate, isopropanolamine salt .....	No	JRG.
Dodecyl sulfate, magnesium salt .....	Yes	AAC, BRD, PG, STP.
Dodecyl sulfate, potassium salt .....	No	PG.
Dodecyl sulfate, sodium salt .....	Yes	AAC, BRD, DUP, STP, WTC.
Dodecyl sulfate, triethanolamine salt .....	Yes	AAC, BRD, SHX, STP, TNI.
3,9-Diethyl-6-tridecyl sulfate, sodium salt .....	No	NCC.
2-Ethylhexyl sulfate, sodium salt .....	Yes	AAC, BRD, NCC, SCP, WTC.
7-Ethyl-2-methyl-4-undecyl sulfate, sodium salt .....	No	NCC.
Hexadecyl sulfate, sodium salt .....	No	AAC, MIL.
Hexyl sulfate, potassium salt .....	No	DEX.
Mixed linear alcohols, sulfated, ammonium salt .....	No	CP, SCP, WTC, ( <sup>2</sup> ).
Mixed linear alcohols sulfated, mixed sodium/cocodithanolamine salts .....		
Mixed linear alcohols, sulfated, sodium salt .....	No	AAC.
Mixed linear alcohols, sulfated, triethanolamine salt .....	No	DUP, PG, SCP, WTC.
Octyl sulfate, sodium salt .....	No	SCP, WTC.
Octyl sulfate, sodium salt .....	No	AAC, DUP.
Oleyl sulfate, sodium salt .....	No	AAC, DUP.
Oxoalcohol bottoms, sulfated, sodium salt .....	No	WVA.
Tridecyl sulfate, sodium salt .....	No	AAC.
All other linear alcohols, sulfated .....	No	PG, PLX, SCP.

See footnotes at end of table.



Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Anionic—Continued</b>		
<b>Sulfuric acids esters (and salts thereof)—Continued</b>		
<b>Ethers, sulfated:</b>		
<b>Alkylphenols, ethoxylated and sulfated:</b>		
(Mixed alkyl)phenol, ethoxylated and sulfated, sodium salt	No	( <sup>2</sup> ), SCP.
1-Naphthol, ethoxylated and sulfated, free acid	No	
Nonylphenol, ethoxylated and sulfated, ammonium salt	No	AAC, GAF, RPC, STP.
Nonylphenol, ethoxylated and sulfated, sodium salt	No	GAF, WTC.
Octylphenol, ethoxylated and sulfated, sodium salt	No	AAC, RH, AAC.
Octylphenoxy polyethoxy ethyl sulfate	No	
All other sulfated cyclic ethers	No	
<b>Dodecyl alcohol, ethoxylated and sulfated, ammonium salt</b>		
	Yes	AAC, MOA, STP.
<b>Dodecyl alcohol, ethoxylated and sulfated, sodium salt</b>		
	Yes	AAC, SCP, STP.
<b>Dodecyl and tetradecyl alcohols, ethoxylated and sulfated, ammonium salt</b>		
	No	PG, ( <sup>2</sup> ).
<b>Isobutanol, ethoxylated and sulfated, ammonium salt</b>		
	No	( <sup>2</sup> ).
<b>Mixed linear alcohols, ethoxylated and sulfated, ammonium salt</b>		
	Yes	BRD, PG, SCP, SHC, STP, VST, WTC, ( <sup>2</sup> ), ( <sup>2</sup> ).
<b>Mixed linear alcohols, ethoxylated and sulfated, sodium salt</b>		
	Yes	AAC, BRD, DUP, PG, PIL, SCP, SHC, STP, VST, WTC, WVA.
<b>Tridecyl alcohol, ethoxylated and sulfated, sodium salt</b>		
	No	AAC, BRD, SCP.
<b>All other sulfated ethers</b>		
	No	
<b>Natural fats and oils, sulfated:</b>		
Castor oil, sulfated, sodium salt	Yes	ACT, ACY, ARI, ARL, CRT, DEX, HIP, ICI, LEA, LUR, MRV, S, SCP, WHW.
Coconut oil, sulfated, sodium salt	No	ACY.
Cod oil, sulfated, ammonium salt	No	ARI.
Cod oil, sulfated, sodium salt	No	WHW.
Grease, other than wool, sulfated, sodium salt	No	WHW.
Herring oil, sulfated	No	SLM.
Herring oil, sulfated, sodium salt	No	ARI, SLM, WHW.
Lard, sulfated, sodium salt	Yes	CIN, CRT, LUR, WHW.
<b>Mixed animal and vegetable oil, sulfated, sodium salt</b>		
	No	SLM.
<b>Mixed fish oils, sulfated, ammonium salt</b>		
	No	CIN.
<b>Mixed fish oils, sulfated, sodium salt</b>		
	Yes	CRT, LUR, SLM, WHW.
<b>Mixed vegetable oils, sulfated, ammonium salt</b>		
	No	LUR.
<b>Mixed vegetable oils, sulfated, sodium salt</b>		
	No	CPC, CRT.
<b>Mustard seed oil, sulfated, sodium salt</b>		
	No	CRT.
<b>Neatsfoot oil, sulfated, sodium salt</b>		
	No	ARI, WHW.
<b>Peanut oil, sulfated, sodium salt</b>		
	No	ACY.
<b>Soybean oil, sulfated, sodium salt</b>		
	No	ACT, SCP.
<b>Synthetic fatty alcohol ester, sulfated, sodium salt</b>		
	No	SLM.
<b>Tall oil, sulfated, ammonia salt</b>		
	No	CIN.
<b>Tall oil, sulfated, sodium salt</b>		
	Yes	ACT, ARI, CIN, CRT, WHW, WTC.
<b>Tallow, sulfated, sodium salt</b>		
	Yes	ARI, CCC, CRT, LUR, NSC, SCP, WHW.
<b>All other natural fats and oils, sulfated</b>		
	No	LUR, SCP, TEN.
<b>All other sulfuric acid esters</b>		
	No	SCP.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Anionic—Continued</b>		
Other anionic surface-active agents:		
Alkylalcohol ethoxylated and carbonated, sodium salt	No	MIL.
Ethoxylated acetic acid, sodium salt	No	S.
Half-phthalic acid ester of tallow alkanolamide/monoglyceride	No	EFH.
Lignin, sodium salt	No	WVA.
Mixed alpha-olefins and vegetable	No	SLM.
Mixed linear alcohols, ethoxylated and carbonated, sodium salt	No	S.
Nonylphenol, ethoxylated and carbonated, sodium salt	No	WTC.
Stearoyl iso-lactylate, sodium salt	No	BFP.
Stearoyl lactylate, mixed sodium and calcium salt	No	BFP.
Stearoyl lactylate, sodium salt	No	BFP.
Stearoyl lactylate, sodium salt	No	BFP.
Tridecyl alcohol, ethoxylated and carbonated, sodium salt	No	S.
All other anionic surface-active agents	No	DUP, MOA, SDC, WVA.
<b>Cationic</b>		
Amine oxides and oxygen-containing amines (except those having amide linkages):		
Acyclic:		
3-(C <sub>12</sub> -C <sub>18</sub> alkyloxy)-1-propanamine	No	ENJ.
3-(C <sub>12</sub> -C <sub>18</sub> alkyloxy)-1-propanamine	No	ENJ.
N-(C <sub>12</sub> -C <sub>18</sub> alkyl)oxypropyl trimethylene diamine	No	ENJ.
N,N-Bis(2-hydroxyethyl)(coconut oil alkyl)amine	No	ARC.
N,N-Bis(2-hydroxyethyl)(coconut oil alkyl)amine oxide	No	SHX.
Bis-(2-hydroxyethyl)isodecylxypropylamine oxide	No	ENJ.
N,N-Bis(2-hydroxyethyl)octadecylamine	No	ARC, SHX.
N,N-Bis(2-hydroxyethyl)(tallow alkyl)amine	No	ARC, ENJ, HCL, JTO, SHX.
Cocoamidopropyl dimethyl amine	No	(?).
(Coconut oil alkyl)amine, ethoxylated	Yes	ARC, BAS, ENJ, ETC, ICI, PPG, SCP, SHX, SVC, WTC, (?), (?).
(Coconut oil alkyl)amine, ethoxylated, acetate	No	BRD.
(Coconut oil alkyl)amine, ethoxylated and phosphated	No	(?).
(Coconut oil alkyl)amine, propoxylated	No	SHX.
Dithylenetriamine, alkoxyated	No	(?).
N,N-Dimethyl(coconut oil alkyl)amine oxide	No	ARC.
N,N-Dimethyldodecylamine oxide	No	(?).
N,N-Dimethyldodecylamine oxide	No	AAC, CTL, PG, PPG, SHX.
N,N-Dimethylhexadecylamine oxide	No	ARC, BRD, PPG.
N,N-Dimethyl(mixed alkyl)amine oxide	No	PG, S.
Ethylenediamine, alkoxyated	No	(?).
Ethylene diamine ethoxiated	No	KPI.
Hexyloxypropyl amine	No	DUP, ENJ.
(Hydrogenated tallow alkyl)amine, ethoxylated	Yes	ENJ, ETC, SHX, WTC.
N-(2-Hydroxyethyl)-N,N',N'-tris(2-hydroxypropyl)-ethylenediamine	No	(?).
2-Imidazoline-1-(2-aminoethyl)-2-(tall oil alkyl), ethoxylated	No	(?).
Isodecylxypropylamine	No	ENJ.
Isodecylxypropylamine, ethoxylated	No	ENJ.
3-(3-Isodecylxy)propylaminopropyl amine	No	SHX.
N-Isodecylxypropyl trimethylene diamine	No	ENJ.
Isodicyclopropyl amine propoxylated acetate	No	SHX.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Cationic—Continued</b>		
<b>Amine oxides and oxygen-containing amines (except those having amide linkages)—Continued</b>		
<b>Acyclic—Continued</b>		
Isononyloxypropylamine	No	ENJ.
Isopropoxy-tris(2-ethylenediamino)ethyl titanate	No	KPI.
Isotridecyloxypropylamine	No	ENJ.
N-Isotridecyloxypropyl trimethylene diamine	No	ENJ.
3-(3-Mixed alkoxy)propylaminopropyl amine	No	SHX.
(Mixed alkyl)amine, ethoxylated	No	ICI, RH, SHX.
Neoalkoxy, tri(m-amino)-phenyl titanate	No	KPI.
Neoalkoxy, tris(m-amino) phenyl zirconate	No	KPI.
(9-Octadecenyl)amine, ethoxylated	Yes	ETC, GAF, HCL, SCP, WTC, (2).
Octadecylamine, ethoxylated	Yes	ARC, ETC, SCP, WTC.
Octyldimethylamine oxide	No	HNT.
Polyether amine, ethoxylated	Yes	RH.
(Soybean oil alkyl)amine, ethoxylated	No	ARC, ENJ, ETC, JTO, SHX, SVC.
(Tallow alkyl)amine, ethoxylated	Yes	AAC, ARC, BAS, DUP, ENJ, ETC, GAF, JTO, S, SCP, SHX, WTC, (2), (2).
(Tallow alkyl)amine, propoxylated	No	SHX.
N-(Tallow alkyl)trimethylenediamine, ethoxylated	Yes	ARC, ENJ, ETC, GAF, JTO, (2).
(Tallow ethyl alkyl)amine, ethoxylated, sulfate	No	ETC, RPC.
N,N,N',N'-Tetrakis(2-hydroxyethyl)ethylenediamine	No	BAS, HCL.
N,N,N',N'-Tetrakis(2-hydroxyethyl)ethylenediamine, propoxylated	No	HCL.
N,N,N',N'-Tetrakis(2-hydroxypropyl)ethylene diamine	No	BAS.
N,N,N',N'-Tetrakis(2-hydroxypropyl)ethylene diamine, propoxylated and ethoxylated	No	BAS.
3-(3-Tridecyloxy)propylaminopropyl amine	No	SHX.
Triethanolamine, ethoxylated	No	MIL, SCP.
Triethanolamine phosphate ester	No	(2).
Triethanolamine salicylate	No	RSA.
All other acyclic amine oxides and oxygen-containing amines (except those with amide linkages)	No	ARC, JTO, LUR, MOA, PG, SCP, WTC, (2).
<b>Cyclic:</b>		
Aniline, ethoxylated	No	MIL.
2-Butenedioic acid-( $\xi$ )-diamina - 1-(2-aminoethyl)-		
2-(Tall oil alkyl)-2-imidazoline condensate	No	(2).
2,5-Dimethoxyaniline, ethoxylated	No	MIL.
2-(8-Heptadecenyl)-4,4-bis(hydroxymethyl)-2-oxazoline	No	ENJ, GAF.
2-Heptadecyl-1,4-hydroxymethyl-4-ethyl-2-oxazoline	No	BRD.
N-Hexadecylmorpholine	No	BRD.
N-(2-Hydroxyethyl)-1,2-diphenylethylenediamine	No	MIR.
1-(2-Hydroxyethyl)-2-nonyl-2-imidazoline	Yes	BRD, MIR, MOA, SHX, WTC.
1-(2-Hydroxyethyl)-2-nor(coconut oil alkyl)-2-imidazoline	No	BRD, FTX, MOA.
1-(2-Hydroxyethyl)-2-nor(soya oil alkyl)-2-imidazoline	No	MIR.
1-(2-Hydroxyethyl)-2-nor(tall oil alkyl)-2-imidazoline	Yes	BRD, GAF, HDG, MIR, MOA, (2).
1-(2-Hydroxyethyl)-2-(tall oil alkyl)imidazoline, fatty acid salt	No	(2).
Lignin amine	No	WVA.
Rosin amine, ethoxylated	No	HPC, (2).
m-Toluidine, ethoxylated	No	MIL.
All other cyclic amine oxides and oxygen-containing amines (except those having amine linkages)	No	SCP, (2).

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Cationic—Continued</b>		
<b>Amines and amine oxides having amide linkages—Continued</b>		
<b>Carboxylic acid-diamine and polyamine condensates:</b>		
Acetic acid, amides with polyalkylene polyamines, salt	No	(?)
Caprylic acid tetraethylene-pentamine condensate	No	ICI.
Coconut oil acids-N,N-dimethyltrimethylenediamine condensate	No	ENJ.
Mixed fatty acids-polyalkylenepolyamine condensate	No	SCP.
Naphthenic acids-polyalkylene polyamine condensate	No	(?)
Naphthenic acids-tall oil fatty acids-polyalkylene polyamine condensate	No	(?)
2-Nor-tall oil alkyl-1-tall oil amido-ethyl imidazoline	No	SHX.
Oleic acid-N,N-dimethyltrimethylenediamine condensate	No	CCW.
Peargonic acid-tetraethylenepentamine condensate	No	ETC, HCL, ICI, OC.
Stearic acid-diethylenetriamine condensate	No	ARC, ARI, OC, S, SCP, SQA.
Stearic acid-diethylenetriamine condensate, ethyl sulfate	No	GDC.
Stearic acid, N,N-dimethylamino-propylamine condensate	No	MOA.
Stearic acid-ethylenediamine condensate	No	CLD, SOS, (?)
Stearic acid mixed amine condensate	No	HCL.
Stearic acid-tetraethylenepentamine condensate	No	(?)
Tall oil acids-aminoethylpiperazine condensate	No	ENJ.
Tall oil acids-diethylenetriamine condensate	No	WTC, WVA.
Tall oil acids-polyalkylenepolyamine condensate	No	FER, WVA, (?)
Tall oil acids-polyalkylene polyamine condensate, salts, with dodecylbenzene sulfonic acid and/or tall oil fatty acids	No	(?)
Tallow fatty acids-aminoethylethanolamine condensates	No	OC.
All other carboxylic acid-diamine and polyamine condensates	No	ARI, SCP, WVA.
<b>Carboxylic acid-diamine and polyamine condensates, alkoxylated:</b>		
Mixed fatty acids-alkylenediamine condensate, polyethoxylate	No	SHX, WTC.
Palm oil acids-ethylenediamine condensate, monoethoxylated	No	FTX.
Stearic acid-ethylenediamine condensate, monoethoxylated	No	APC, DEX, GDC, ICI, VKR.
All other carboxylic acid-diamine and polyamine condensates, alkoxylated	No	SCP, VKR.
<b>Other amines and amine oxides having amide linkages:</b>		
Cocoamidopropyl dimethyl amine oxide	No	AAC, PAT, SBC, SHX.
N,N'-(Di-tall oil acid)amidoethylamine	No	(?)
1-(2-Hydrogenated tallow amidoethyl)-2-nor(hydrogenated tallow)-2-imidazoline	No	SHX.
3-Lauramido-N,N-dimethylpropylamine oxide	No	FTX, SQA.
Oleamidopropylidimethylamine	No	WM.
Stearamidoethylidimethylamine	No	S.
Stearamidoethylethanolamine acetate	No	S.
Stearic acid, diethanolamine condensate, methyl sulfate	No	DUP.
Stearylamidopropylidimethylamine	No	AAC, WM.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Cationic—Continued</b>		
<b>Amines, not containing oxygen (and salts thereof):</b>		
<b>Amine salts:</b>		
(Coconut oil alkyl) amine acetate	No	ENJ.
N,N-Dimethyl-N-alkylamine phosphate	No	( <sup>2</sup> ).
(Hydrogenated tallow alkyl) amine acetate	No	ARC.
(Mixed alkyl) amine phosphate	No	( <sup>2</sup> ).
Octadecylamine acetate	No	ARC, HCL.
(Tallow alkyl) amine acetate	No	ARC.
N-(Tallow alkyl) trimethylenediamine acetate	No	ARC.
All other amine salts (not containing oxygen)	No	CRT, SHX.
<b>Diamines and polyamines:</b>		
<b>Imidazoline derivatives:</b>		
1-(2-Aminoethyl)-2-naphthyl-2-imidazoline	No	( <sup>2</sup> ).
1-(2-Aminoethyl)-2-nor(tall oil alkyl)-2-imidazoline	No	WTC, ( <sup>2</sup> ).
N-(Coconut oil alkyl) trimethylenediamine	No	ARC, JTO, SHX.
N-(Dimeraclidalkyl) trimethylenediamine	No	ENO.
N-Dodecyl diethylenetriamine	No	SCO.
2-Heptadecyl-2-imidazoline	No	CGY.
N-(Mixed alkyl) polyethylenepolyamine	No	CCW.
N-(9-Octadecenyl) trimethylenediamine	No	ARC, JTO, SHX.
Polyalicyclic polyamines and salts and quats	No	( <sup>1</sup> ).
Polyamine/tall oil imidazoline	No	WTC.
1-Propanamine, 3-(C <sub>12</sub> -C <sub>16</sub> alkoxy derivatives)	No	SHX.
N-(Soybean oil alkyl) trimethylenediamine	No	ENO, WTC.
Stearamidodecyl-2-heptadecyl imidazoline	No	ICI.
3-(Tall oil amino) propyl amine	No	SHX.
N-(Tallow alkyl) dipropylenetriamine	No	ARC, ENJ, SHX.
N-(Tallow alkyl) trimethylenediamine	No	ARC, ENJ, JTO.
All other diamines and polyamines	No	ARC, JTO, SHX, WTC, ( <sup>2</sup> ).
<b>Primary monoamines:</b>		
Alkyl dimethyl amine oxide	No	HCL.
Arachidylbehenylalkyl amine	No	ENO.
(Coconut oil alkyl) amine	Yes	ARC, ENO, JTO, SHX, WTC.
Dimeraclidalkyl amine	No	ENO, WTC.
Dodecylamine	No	ARC, JTO, SHX.
[Erucyl alkyl] amine	No	ENO.
Hexadecylamine	No	ARC, ENO.
(Hydrogenated tallow alkyl) amine	Yes	ARC, ENO, JTO, SHX, WTC.
(Mixed alkyl) amine	No	JTO, SHX.
9-Octadecenylamine	Yes	ARC, ENO, JTO, SHX, WTC.
Octadecylamine	Yes	ENO, JTO, SHX, WTC.
(Soybean oil alkyl) amine	Yes	ARC, ENO, JTO, WTC.
(Tallow alkyl) amine	Yes	ARC, ENJ, ENO, JTO, SHX, WTC.
All other primary monoamines	No	ARC.
<b>Secondary and tertiary monoamines:</b>		
Bis(coconut oil alkyl) amine	No	ARC.
Bis(hydrogenated tallow alkyl) amine	No	ARC, ENO, WTC.
Bis(tallow alkyl) amine	No	ARC.
1-Decanamine, N,N-didodecyl	No	SHX.
N,N-Dimethylbenzylarachidylamine	No	WTC.
N,N-Dimethyl(coconut oil alkyl) amine	No	ARC, JTO, PG.
N,N-Dimethyldodecylamine	No	ARC, SHX, TNA, WTC.
N,N-Dimethylerucylamine	No	ENO.
N,N-Dimethylhexadecylamine	No	ARC, SHX.
N,N-Dimethyl(hydrogenated tallow alkyl) amine	No	ARC, CPC.
N,N-Dimethyl(mixed alkyl) amine	No	BRD.
N,N-Dimethyl(9-octadecenyl-alkyl) amine	No	ENO.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Cationic—Continued</b>		
Amines, not containing oxygen (and salts thereof)—Cont.		
Secondary and tertiary monoamines—Continued		
N,N-Dimethyloctadecylamine	Yes	ARC, ENO, SHX, WTC.
N,N-Dimethyl(soybean oil alkyl)amine	No	ARC, ENO, JTO, WTC.
N,N-Dimethyltetradecylamine	No	BRD, SHX.
N-Methylbis(coconut oil alkyl)amine	No	ARC, JTO.
N-Methylbis(hydrogenated tallow alkyl)amine	No	ARC, ENO, SHX, WTC.
Methyl dodecylamine	Yes	ARC, SHX, TNA.
N-Methyldodecylamine	No	ARC, SCP, SHX.
Tridodecylamine	No	ARC.
Tri(hydrogenated tallow) amine	No	SHX.
Trisodocylamine	No	SCP.
Trilaurylamine	No	SCP.
Tri(mixed alkyl)amine	No	SHX, TNA.
Trioctylamine	No	SHX.
Tri(tridecyl)amine	No	SHX.
All other secondary and tertiary monoamines	No	ARC, JTO.
Oxygen-containing quaternary ammonium salts:		
β-Alanine-N-(2-hydroxyethyl)-N-2,1-[(oxococoyl amino) ethyl, sodium salt	No	SHX.
2-(C <sub>13</sub> -C <sub>17</sub> Alkyl)-1-(C <sub>14</sub> -C <sub>18</sub> amidoethyl) 4,5-dihydro-3-methylimidazolium, methyl sulfate	No	DOW, SVC.
(2-Aminoethyl)ethyl(hydrogenated tallow alkyl)(2-hydroxyethyl)ammonium ethyl sulfate	No	OC.
Benzyl(coconut oil alkyl)bis(2-hydroxyethyl)-ammonium chloride	No	ARC, (?).
1-Benzyl-2-heptadecyl-1-(2-hydroxyethyl)-2-imidazolium chloride	No	HDG.
1-Benzyl-1-(2-hydroxyethyl)-2-nor(tall oil alkyl)-2-imidazolium	No	(?).
Benzyl(tallow alkyl)bis(2-hydroxyethyl)ammonium chloride	No	DUP.
Bis(N-amidopropyl)-N,N-dimethyl-N-ethylammonium ethyl sulfate, dimer acid	No	SBC.
Bis(N,N'-ethyl(stearic/arachidic/behenic)amide)-cyanoethyl ethylammonium ethosulfate	No	PCI.
Bis(2-hydroxyethyl, ethoxylated)methyl(9-octadecenyl)-ammonium chloride	No	SHX.
Bis(2-hydroxyethyl, ethoxylated)-methyloctadecyl ammonium chloride	No	SHX.
Bis-2-hydroxyethyl-hydrogenated tallow-ethyl sulfate	No	ICI.
Bis[2-hydroxyethyl)methyl(tallow alkyl)ammonium chloride	No	ARC, JTO.
Bis-2-hydroxyethyl-octyl-methyl-p-toluene sulfonate (Coconut oil alkyl)bis(2-hydroxyethyl, ethoxylated)-methylammonium chloride	Yes	HXL.
(Coconut oil alkyl)-bis-(hydroxyethyl)methyl ethoxylated mono-(2-carboxyethyl)ether methyl sulfate, potassium salt	No	ENJ, GAF, JTO, SHX.
Distearyldimethyl ammonium methosulfate	No	SVC.
Ethoxylated(hydrogenated tallow amine), methyl ammonium chloride	No	HXL.
Ethoxylated, quaternized (C <sub>12</sub> -C <sub>18</sub> alkyl) oxypropyl trimethylene diamine	No	ENJ.
Ethoxylated, quaternized reaction product of formaldehyde and tallow diamine	No	ENJ.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Cationic—Continued</b>		
<b>Oxygen-containing quaternary ammonium salts—Continued</b>		
N-Ethyl-N,N-bis(polyoxyethylene)tallow ammonium ethyl sulfate	No	SHX.
1-Ethyl-2-(8-heptadecenyl)-1-(2-hydroxyethyl)-2-imidazolium ethyl sulfate	No	ICI, SHX.
N-Ethyl-N-hexadecylmorpholinium ethyl sulfate	No	BRD, ICI.
Ethyl(polyoxyethylene, cocoamine) ethylsulfate	No	S.
N-Ethyl-N-(soybean oil alkyl)morpholinium ethyl sulfate	No	ICI, PCH.
$\alpha$ -Glucanamidopropyl dimethyl-2-hydroxyethyl ammonium chloride	No	VND.
(2-Hydroxyethyl) dimethyl(3-stearamidopropyl)ammonium dihydrogen phosphate	No	ACY.
(2-Hydroxyethyl) dimethyl(3-stearamidopropyl)ammonium nitrate	No	ACY.
Hydroxyethyl-2-undecyl-2,3-imidazoline	No	MOA.
N-2-Hydroxy propyl-n-methyl-N,n-bis[tallow amide ethyl] ammonium ethyl sulfate	No	SHX.
Imidazolium, 1-carboxymethyl)-4,5-dihydro-1-(hydroxyethyl)-2-nor(cocoalkyl), hydroxides, monosodium salts	No	SHX.
Imidazolium, 1-(carboxymethyl)-2-heptyl-1-(2-hydroxyethyl), hydroxide, sodium salt	No	SHX.
Isostearamidopropyl dimethylamino glycolate	No	SBC.
(3-Lauramidopropyl)trimethylammonium methyl sulfate	No	ACY.
Methyl, bis-(2-hydroxyethyl) hydrogenated tallow alkylammonium chloride	No	ENJ.
Methyl, bis-(2-hydroxyethyl)isodecylloxypropyl ammonium chloride	No	ENJ.
Methyl, bis-(2-hydroxyethyl)isotridecylloxypropyl ammonium chloride	No	ENJ.
Methyl, bis-(2-hydroxyethyl)soya-alkylammonium chloride	No	ENJ.
Methyldioleylethoxy ammonium methyl sulfate	No	SHX.
Methyl-di(tallow)imidazolium methosulfate	No	SVC.
1-Methyl-2-(8-heptadecenyl)-1-(9-octadecenyl) amidoethyl	No	SHX.
Methyl(hydrogenated tallow alkyl)diethylamine condensate, polyethoxylated, methyl sulfate	No	SVC.
N-Methyl-N-polyoxyethylene-N,N-bis(hydrogenated tallow amidoethyl)ammonium	No	SHX.
N-Methyl-N-polyoxyethylene-N,N-bis(tallow amidoethyl)	No	SHX.
Methyl(tallow)diethylenetriamine condensate, polyethoxylated, methyl sulfate	No	SVC.
Methyl(tallow)diethylenetriamine condensate, polypropoxylated, methyl sulfate	No	SVC.
Mixed alkyl imidazoline derivative, ethoxylated	No	MOA.
Mixed(coco and soya fatty acids), reaction products with chloromethane and diethylenetriamine, ethoxylated, quaternized	No	ENJ.
Mixed fatty acid amide with diethylenetriamine, ethyl sulfate	No	EFH.
N-Octadecyl-N,N-di(2-hydroxyethyl)-N-methylammonium chloride	No	SHX.
Polyethyleneimine methyl ammonium sulfate	No	HCL.
Poly(oxyethanyl-1,2-diyl)- $\alpha$ -[2-bis(2-aminoethyl)-methylammoniumethyl]- $\omega$ -hydroxy-N,N'-di(C14-C18 alkyl methyl sulfate	No	SVC.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Cationic—Continued</b>		
Oxygen-containing quaternary ammonium salts—Continued		
Polypropoxy diethylmethyl ammonium chloride	No	WTC.
1-Propanaminium, N-ethyl-N,N-dimethyl-3-[(1-oxooctadecyl)amino]-, ethyl sulfate	No	SBC.
Soya fatty acids, reaction products with chloromethane and diethylenetriamine, ethoxylated, quaternized	No	ENJ.
Soya fatty acids, reaction products with chloromethane and diethylenetriamine, propoxylated, quaternized	No	ENJ.
Stearamidopropyl dimethylcetylammonium tosylate and propylene glycol	No	VND.
Stearylamidopropyl dimethyl myristyl acetate ammonium chloride	No	VND.
(Tallow alkyl)amine, ethoxylated, diethosulfate	No	ETC.
Tallow amine, ethoxylated, quaternary ammonium salt	No	DUP, VND.
All other oxygen-containing quaternary ammonium salts	No	ARC, BRD, SBC, SCP, SHX, (2) (2).
Quaternary ammonium salts, not containing oxygen:		
Acyclic:		
Bis (coconut oil alkyl) dimethylammonium chloride	Yes	ARC, ENJ, JTO, PPG, SHX.
Bis (hydrogenated tallow alkyl) dimethylammonium chloride	Yes	ARC, ENO, SHX, WTC.
Bis (hydrogenated tallow alkyl)-dimethylammonium methyl sulfate	No	ARC, SHX.
Bis (tallow alkyl) dimethylammonium chloride	No	ARC, SHX.
N-(Cocamidopropyl; N,N-acetic acid) ammonium salt	No	(2).
Cocodimethyl ethyl ammonium ethyl sulfate	No	SHX.
N-(Coconut oil alkyl) aminobutyric acid, sodium salt	Yes	ARC, BRD, JTO, PPG, SHX.
Didecyl dimethylammonium chloride	No	HNT.
Dimethyl di(C <sub>12</sub> -C <sub>18</sub> ) ammonium chloride (mixed straight and branched chains)	No	SHX.
Dimethyloctadecyl ammonium chloride	No	SHX.
N,N-Dioctyl-N,N-dimethyl ammonium chloride	No	BRD, HNT.
Di (tallow) amido ammonium sulfate	No	CRD.
Dodecyl trimethyl ammonium bromide	No	RSA.
Dodecyl trimethyl ammonium chloride	No	ARC, SHX.
Ethyl dimethyl (mixed alkyl) ammonium ethyl sulfate	No	DEX.
Hexadecyl trimethyl ammonium bromide	No	ARC.
Hexadecyl trimethyl ammonium chloride	No	AAC, ARC, BRD, SHX.
Hexane-1,6-bis (tributyl ammonium bromide)	No	HXL.
(Hydrogenated tallow alkyl) trimethyl ammonium chloride	No	SHX.
Hydroxypropyl ammonium cyano acetate	No	(2).
Lauryl pyridinium chloride	No	WTC.
Methyl (tri-hydrogenated tallow alkyl) ammonium chloride	No	WTC.
Methyl-1-(tallow) amidoethyl-2-(tallow) imidazolium-methyl sulfate	No	CRD.
Methyl tri (C <sub>8</sub> -C <sub>10</sub> ) ammonium chloride	No	SHX.
Methyl tri octyl ammonium chloride	No	SCP.
(Mixed alkyl) ammonium chloride	No	MIL.
(Mixed linear alkyl) dimethyl ammonium methyl sulfate	No	HCL.

See footnotes at end of table.



Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Cationic—Continued</b>		
<b>Quaternary ammonium salts, not containing oxygen—Continued</b>		
<b>Acyclic—Continued</b>		
Mixture of N-octyl, N-decyl, N,N-dimethyl ammonium chloride and benzyl, dimethyl, (mixed alkyl) ammonium chloride	No	BRD.
Octyldecyldimethylammonium chloride	No	HNT.
N-Octyl, N-decyl, N,N-dimethyl ammonium chloride	No	BRD.
N,N,N',N',N'-Pentamethyl-N-(tallow alkyl)-trimethylene-bis [ammonium chloride]	No	ARC, SHX.
Stearic acid ethylene diamine methyl ammonium sulfate	No	HCL.
Stearylpyridium chloride	No	WTC.
Tetraheptylammonium bromide	No	EK.
Tributylmethylammonium chloride	No	TNA.
Trihydrogenated (tallow) ammonium chloride	No	ENO.
Trimethyloctadecylammonium chloride	No	SHX.
Trimethyl (soybean oil alkyl) ammonium chloride	No	ARC, JTO, SHX.
Trimethyl (tallow alkyl) ammonium chloride	No	ARC, ENO, SHX, WTC.
All other quaternary ammonium salts, not containing oxygen, acyclic	No	ARC, MOA, (2), (2).
<b>Cyclic:</b>		
Benzyl (alkylpyridinium) chloride	No	(2).
Benzyl (cocamidopropyl) dimethyl ammonium chloride	No	(2).
Benzyl (coconut oil alkyl) dimethyl ammonium chloride	Yes	ENJ, ENO, GDC, HRT, LUR, WTC, (2).
Benzyl-di (hydrogenated tallow alkyl) methyl-ammonium chloride	No	WTC.
Benzyl dimethyl (mixed alkyl) ammonium chloride	Yes	BKM, BRD, CRD, HNT, PCI, SHX, TCC, (2), (2).
Benzyl dimethyloctadecyl ammonium chloride	Yes	AAC, PPG, SHX, TNI.
Benzyl dimethyloleyl ammonium chloride	No	AAC.
Benzyl dimethyl (tallow alkyl) ammonium chloride	No	BOE, ENO, WTC.
Benzyl hexadecyldimethyl ammonium chloride	No	BKM, PPG.
Benzyl (hydrogenated tallow alkyl) dimethyl ammonium chloride	No	ARC, ENO, WTC.
Benzyl-methyl-bis (hydrogenated tallow) ammonium chloride	No	ENO.
Benzyl (mixed alkyl) pyridinium chloride	No	(2).
Benzyl picolinium chloride	No	GDC, LUR.
1-Benzylpyridinium chloride	No	BRD.
1-Benzylquinolinium chloride	No	(2).
Benzyl trimethyl ammonium chloride	Yes	HIP, PCI, RSA, SHX, TCC, UTC.
Butylpicolinium bromide	No	HXL.
2,4-Dichlorobenzyl dimethyl (mixed alkyl) ammonium chloride	No	(2).
1-Dodecylpyridinium chloride	No	CCL.
(Ethylbenzyl) dimethyl (mixed alkyl) ammonium chloride	No	DAN, HNT.
Octadecyl-dibenzyl trimethyl-1,3-propane diammonium chloride	No	GDC.
1-Phenethyl-2-picolinium bromide	No	HXL.
All other cyclic quaternary ammonium salts not containing oxygen	No	(2), (2).
All other cationic surface-active agents	No	BRI, CGY, CRT, DUP, JTO, LUR, MIR, MOA, RPC, S, SCP, SDC, WM, WTC, WVA.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Nonionic</b>		
<b>Carboxylic acid amides:</b>		
Diethanolamine condensates, amine/acid ratio = 2/1:		
Capric acid	No	SCP.
Castor oil acids	No	AAC, NSC.
Coconut oil acids	Yes	AAC, ARD, ARL, BRI, CCC, CON, CRT, CTL, ECC, EFH, GDC, HNT, HRT, LEA, LUR, MCP, MOA, MRV, PNx, PPG, RPC, SBC, SCP, SHX, STP, WTC.
Coconut oil and tallow acids	Yes	BRD, ENJ, ESS, MOA, SBC, UNN.
Lauric acid	No	CRD, MOA, PPG.
Lauric and myristic acids	Yes	CRD, FTX, SBC, STP.
Linoleic acid	No	MOA.
Mixed carboxylic acids	No	FER, RPC, SOS.
Mixed fatty acids, neutralized	No	FTX.
Mixed vegetable oil acids	No	SHX.
Oleic acid	Yes	AAC, CRT, CTL, EFH, LEA, MOA, PPG, SBC, STP, WTC.
Palmitic and stearic acids	No	RPC.
Soybean oil acids	No	AAC.
Stearic acid	Yes	AAC, AIP, OC.
Tall oil acids	Yes	BRI, ECC, HCL, MOA, PNx, PPG, SBC, WVA.
Tallow acids	No	ICI.
All other diethanolamine condensates, amine/acid ratio = 2/1	No	AAC, LUR, MOA.
Diethanolamine condensates, other amine/acid ratios:		
Capric acid (ratio = 1/1)	No	MOA.
Coconut oil acids (ratio = 1/1)	Yes	AAC, ARD, BRD, CCL, CPC, CTL, EMK, ETC, FTX, GAF, HNT, HTN, JRG, LUR, MIR, MOA, PIL, PPG, QCP, SBC, SCP, SHX, STP, TMH, VND, WTC, (?).
Lard oil acids (ratio = 1/1)	No	QCP.
Lauric acid (ratio = 1/1)	Yes	AAC, HTN, MOA, SBC, TNI, WTC.
Lauric and myristic acids (ratio = 1/1)	Yes	AAC, BRD, FTX, MOA, SBC.
Linoleic acid (ratio = 1/1)	Yes	MOA, PPG, SBC, VND.
Mixed carboxylic acids	No	SOS, WTC.
Mixed fatty acids (amine/acid ratio = 1/1)	No	AAC, QCP, WTC.
Myristic acid (ratio = 1/1)	No	MOA.
Oleic acid (ratio = 1/1)	No	SBC.
Palm kernel oil acids (ratio = 1/1)	No	SVC, TMH.
Rapeseed acids (ratio = 1/1)	No	EFH.
Soybean oil acids (ratio = 1/1)	No	AAC, MOA, SBC.
Stearic acid (ratio = 1/1)	Yes	AAC, BRD, CHP, ECC, ENJ, HIP, LEA, MRV.
Tall oil acids	No	QCP, WTC, (?).
Tallow acids	No	MOA.
All other diethanolamine condensates, other amine/acid ratios	No	EFH, MOA, SCP.
<b>All other carboxylic acid amides:</b>		
Coconut oil acids (ratio = 1/1)	No	AAC, FTX, MOA, PG, PPG, SOS.
Coconut oil acids (ratio = 2/1)	No	ENJ, MOA, STP.
Coconut oil acids	No	HTN, MOA, PAT, STP.
Coconut oil acids—dimethylaminopropylamine condensate (amine/acid ratio = 1/1)	No	(?).
Coconut oil acids—ethanolamine condensate, ethoxylated	No	BRD, STP.
Dioleic acid (ratio = 1/2)	No	(?).
Hydrogenated tallow acids, aminoethylethanolamide, acetate salt	No	PCI.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Nonionic—Continued</b>		
<b>Carboxylic acid amides—Continued</b>		
<b>All other carboxylic acid amides—Continued</b>		
Hydrogenated tallow glycerides diethylenediamine condensate	No	LEA.
Hydrogenated tallow glycerides diethylenetriamine condensate	No	HRT.
Isonanoic acid, mono- and triethanolamine salt	No	HCL.
Isostearic acid, aminoethylethanolamide, acetate salt	No	PCI.
Lauric acid	No	HTN, MOA.
Lauric acid (ratio = 1/1)	No	AAC.
Lauric and myristic acids	No	AAC.
Lauric and myristic acids (ratio = 1/1)	No	MOA.
Mink amidopropyl dimethyl amine (amine acid ratio = 1/1)	No	VND.
Mixed fatty acids, diethanolamine condensate	No	WTC.
Oleic acid-ethanolamine condensate, ethoxylated	No	SHX.
Stearic acid (ratio = 1/1)	No	AAC, MOA, VND.
Stearic acid (ratio = 2/1)	No	ECC.
Stearic acid aminoethanolamine (amine acid ratio = 1.0/1.65)	No	CHP.
Stearic acid-N-aminoethyl ethanolamine condensate	No	BOE.
Stearic acid-ethylenediamine condensate (ratio = 1/2)	No	SCP, SLC.
Stearic acid monoethanolamine condensate	No	WTC.
Tall oil acids-dimethylamine condensate (ratio = 1/1)	No	BKM.
Tall oil fatty acids (ratio = 1/2)	No	EFH.
Tall oil fatty acids (ratio = 2.7/1)	No	EFH.
Tall oil fatty acids (ratio = 1.5/1)	No	EFH.
Tall oil fatty acids-triethanolamine condensate	No	(?).
Tallow acids (ratio = 1.00/1.65)	No	PAT.
Tallow, N-[3-(dimethylamino)propyl] (ratio = 1/3)	No	PAT.
All other carboxylic acid amides	No	CGY, CRT, JTO, LUR, MOA, SBC, ROB, SCP, (?).
<b>Carboxylic acid esters:</b>		
<b>Anhydrosorbitol esters:</b>		
Anhydrosorbitol dioleate	No	ICI.
Anhydrosorbitol monoester of tall oil acids	No	HDG.
Anhydrosorbitol monooleate	Yes	BRD, ICI, PPG, SCP.
Anhydrosorbitol mono-oleate	Yes	BRD, HDG, ICI, PPG, SCP.
Anhydrosorbitol monopalmitate	No	ICI, PPG.
Anhydrosorbitol monostearate	Yes	BRD, HDG, ICI, PPG.
Anhydrosorbitol sesquileate	Yes	BRD, HDG, SCP.
Anhydrosorbitol triester of tall oil acids	No	(?).
Anhydrosorbitol trioleate	Yes	BRD, HDG, ICI, PPG, SCP.
Anhydrosorbitol tristearate	No	BRD, PPG.
All other anhydrosorbitol esters	No	BRD.
<b>Diethylene glycol esters:</b>		
Diethylene glycol distearate	No	BRD.
Diethylene glycol monoester of tall oil acids	No	BKM.
Diethylene glycol monoester of tallow acids	No	ENJ.
Diethylene glycol monooleate	Yes	CTL, ECC, HDG, PPG.
Diethylene glycol monostearate	Yes	AAC, ECC, HDG, STP.
Diethylene glycol sesquilester of tall oil acids	No	ECC, WVA.
Diethylene glycol sesquileurate	No	BRD.
Diethylene glycol terephthalate	No	UPF.
All other diethylene glycol esters	No	VND.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Nonionic—Continued</b>		
<b>Carboxylic acid esters—Continued</b>		
<b>Ethoxylated anhydrosorbitol esters:</b>		
Ethoxylated anhydrosorbitol monolaurate	Yes	BRD, ETC, HDG, ICI, PPG, SCP, SVC.
Ethoxylated anhydrosorbitol mono-oleate	Yes	BRD, ETC, HDG, ICI, PPG, SCP, SVC.
Ethoxylated anhydrosorbitol monopalmitate	No	HDG, ICI, PPG.
Ethoxylated anhydrosorbitol monostearate	Yes	BRD, ETC, HDG, ICI, PPG, SCP.
Ethoxylated anhydrosorbitol triester of tall oil acids	No	ICI, WTC.
Ethoxylated anhydrosorbitol trioleate	Yes	BRD, ETC, HDG, ICI, PPG, SCP.
Ethoxylated anhydrosorbitol tristearate	Yes	BRD, HDG, ICI, PPG.
All other ethoxylated anhydrosorbitol esters	No	BRD.
<b>Ethoxylated sorbitol esters:</b>		
Ethoxylated sorbitol beeswax ester	No	ICI.
Ethoxylated sorbitol hexaester of tall oil acids	No	SCP.
Ethoxylated sorbitol hexaoleate	No	ICI, PPG.
Ethoxylated sorbitol lanolin ester	No	ICI.
Ethoxylated sorbitol mono-oleate	No	CPC, ICI.
Ethoxylated sorbitol monostearate	No	CPC, SCP.
Ethoxylated sorbitol oleate, acetylated	No	ICI.
Ethoxylated sorbitol pentalaurate	No	PPG.
Ethoxylated sorbitol tetraester of lauric and oleic acids	No	ICI.
Ethoxylated sorbitol tetraester of tall oil acids	No	(?).
Ethoxylated sorbitol tetraoleate	No	ICI.
Ethoxylated sorbitol tetrastearate	No	ICI.
<b>Ethylene glycol esters:</b>		
Ethylene glycol distearate	No	AAC, ENJ, HDG, PPG, SCP, STP, WM, WTC.
Ethylene glycol monostearate	No	AAC, BRD, HDG, PPG, SCP, STP, VND, WM, WTC.
Ethylene glycol sesquitearate	No	JTO, STP.
All other ethylene glycol esters	No	SCP.
<b>Glycerol esters:</b>		
<b>Complex glycerol esters:</b>		
Glycerol diacetyltritartrate monostearate	No	EKT.
Glycerol mono- and diesters of mixed fatty acids	No	ICI.
Glycerol monoester of mixed fatty acids, acetylated	No	EKT.
Glycerol monoester of mixed fatty acids, succinylated	No	EKT.
All other complex glycerol esters	No	BRD, SCP.
<b>Glycerol esters of chemically defined acids:</b>		
Glycerol dilaurate	No	LEV, STP, VND.
Glycerol monolaurate	No	BRD, HDG.
Glycerol mono-oleate	Yes	BRD, EFH, HAL, HDG, PPG, SCP, STP, SVC, WTC.
Glycerol monoricinoleate	No	BRD, HDG.
Glycerol monostearate	Yes	BRD, CCC, CHL, CPC, HAL, HDG, HRT, LUR, PPG, SCP, SOS, SQA, STP, VND, WM, WTC.
Glycerol trioctanoate/decanoate	No	WM.
All other glycerol esters of chemically defined acids	No	SCP.
<b>Glycerol esters of mixed acids:</b>		
Glycerol mono-, di-, and triesters of hydrogenated tallow acids	No	WPG.
Glycerol monoester of C <sub>8</sub> -C <sub>10</sub> acids	No	SVC.
Glycerol monoester of coconut oil acids	No	BRD.
Glycerol monoester of cottonseed oil acids	No	EKT.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Nonionic—Continued</b>		
<b>Carboxylic acid esters—Continued</b>		
<b>Glycerol esters—Continued</b>		
<b>Glycerol esters of mixed acids—Continued</b>		
Glycerol monoester of hydrogenated cottonseed oil acids	No	EKT, WM.
Glycerol monoester of hydrogenated lard acids	No	EKT.
Glycerol monoester of hydrogenated soybean oil acids	No	BFP, EKT, PPG.
Glycerol monoester of lard acids	No	EKT.
Glycerol monoester of palm oil acids	No	EKT.
Glycerol monoester of safflower oil acids	No	EKT.
Glycerol monoester of tall oil acids	No	FER, PPG.
Glycerol monoester of tallow acids	No	EKT.
Glycerol sesquilester of hydrogenated tallow acids	No	PCI.
Glycerol triester of mixed fatty acids	No	SVC.
All other glycerol esters of mixed acids	No	BFP.
<b>Natural fats and oils, ethoxylated:</b>		
Castor oil, ethoxylated	Yes	AAC, CPC, ETC, GAF, HCL, HTN, ICI, MIL, PPG, S, SCP, SVC, TMH, WTC. (2).
Coconut oil, ethoxylated	No	ETC, HCL.
Hydrogenated castor oil, ethoxylated	Yes	ETC, HCL, ICI, MIL, PPG, SCP.
Lanolin, ethoxylated	Yes	AAC, CRD, HCL, SCP, (2).
Mixed fatty acids, alkyl ether, ethoxylated	No	(2).
Mixed tall oil and rosin acids, ethoxylated	No	HCL.
Oleic acid, ethoxylated and propoxylated	No	MIL.
Tall oil acids, ethoxylated	Yes	AAC, GAF, HCL.
Tall oil acids, ethoxylated and propoxylated	No	(2).
Tall oil, refined, ethoxylated	No	SCP, (2).
Tallow fatty acids, ethoxylated	No	GAF.
All other natural fats and oils, ethoxylated	No	BAS, HCL, HDG, MIL, VND.
<b>Polyethylene glycol esters:</b>		
<b>Polyethylene glycol esters of chemically defined acids:</b>		
Polyethylene glycol dilaurate	Yes	BRD, EFH, ETC, HDG, PPG, SCP, STP, WM.
Polyethylene glycol dioleate	Yes	BRD, EFH, ETC, HAL, HDG, MIL, OC, PPG, QCP, SCP, SOS, STP, (2).
Polyethylene glycol distearate	Yes	AAC, BRD, HDG, PPG, STP, WTC.
Polyethylene glycol monocaprylate	No	ECC.
Polyethylene glycol monoisostearate	No	PPG.
Polyethylene glycol monolaurate	Yes	BRD, CCA, CGY, ECC, EFH, ENJ, ETC, HAL, HDG, ICI, PPG, SCP, STP, SVC.
Polyethylene glycol mono-oleate	Yes	BOE, BRD, CCA, CRT, ECC, EFH, ETC, GDC, HAL, HCL, HDG, HIL, LUR, MRT, MRV, OC, PPG, SCP, SHX, STP, SVC, WTC, (2).
Polyethylene glycol monopalmitate	Yes	BRD, ETC, HCL, ICI, SHX.
Polyethylene glycol monopelargonate	Yes	ETC, HCL, SCP, SOS.
Polyethylene glycol monopelargonate, methoxylated	No	SCP.
Polyethylene glycol monoricinoleate	No	S.
Polyethylene glycol monostearate	Yes	AAC, APC, BRD, CPC, CRT, EFH, ETC, GDC, HDG, HIL, HRT, ICI, LUR, OC, PPG, SCP, SOS, STP, SVC, VKR, VND.
Polyethylene glycol sesquinoleate	No	ETC, SCP, SOS.
Polyethylene glycol terephthalate	No	BOE, PCI.
All other polyethylene glycol esters of chemically defined acids	No	ETC, HCL, RPC.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Nonionic—Continued</b>		
<b>Carboxylic acid esters—Continued</b>		
<b>Polyethylene glycol esters—Continued</b>		
<b>Polyethylene glycol esters of mixed acids:</b>		
Polyethylene glycol diester of coconut oil and oleic acids	No	EFH.
Polyethylene glycol diester of mixed linear alkyl acids/oleic acid	No	PCI.
Polyethylene glycol diester of tall oil acids	Yes	ARI, EFH, ETC, LUR, PAT, PPG, QCP, RDA, (2).
Polyethylene glycol ester of mixed fatty acids	No	SHX, SOS.
Polyethylene glycol monoester of coconut oil acids	Yes	CRT, ICI, LUR, WM.
Polyethylene glycol monoester of soybean oil acids	No	BAS, BRD.
Polyethylene glycol monoester of tall oil acids	Yes	BKM, CCC, EFH, FER, LUR, PPG, RDA.
Polyethylene glycol (mixed ester) of tall oil acids	No	CRT.
Polyethylene glycol sesquilester of coconut oil acids	No	ENJ, MRT, PAT, SCP.
Polyethylene glycol sesquilester of tall oil acids	Yes	ICI, SLM, WTC, (2).
Polyethylene glycol sesquilester of tallow acids	No	PAT, RPC, SCP, SHX, (2).
All other polyethylene glycol esters of mixed acid	No	ETC, LEA, SCP, WTC.
<b>Polyglycerol esters:</b>		
Hexaglycerol	No	SVC.
Mixed oleic, lauric, stearic, and palmitic hexaglycerol esters	No	SVC.
Polyglycerol decaoleate	No	SCP.
Polyglycerol distearate	No	BRD, PPG.
Polyglycerol mono-oleate	Yes	HDG, PPG, WTC.
Polyglycerol monostearate	No	BRD, HDG, PPG, SVC.
Polyglycerol tetraoleate	No	PPG.
All other polyglycerol esters	No	BRD.
<b>Propanediol esters:</b>		
1,2-Propanediol dioctanoate/decanoate	No	SVC, WM.
1,2-Propanediol dipelargonate	No	WM.
1,2-Propanediol monolaurate	No	SBC.
1,2-Propanediol mono-oleate	No	EFH.
1,2-Propanediol monostearate	Yes	BRD, EKT, HAL, PPG, SBC, WM.
<b>Other carboxylic acid esters:</b>		
DI-Isobutylene maleate	No	RH.
Ethoxylated 1,3-butylene glycol stearate	No	HCL.
Ethoxylated castor oil, ditiidecylmaleate	No	UPF.
Ethoxylated glycerol mono- and diesters of hydrogenated tallow acids	No	SVC.
Ethoxylated glycerol and propylene glycol esters of coco fatty acids	No	SVC.
Ethoxylated 1,2-propanediol monostearate	No	ICI.
Ethoxylated and propoxylated glycerol mono- and diesters of tallow acids	No	SVC.
Linoleic acid dimers, alkoxylated	No	(2).
Maleic anhydride, polypropylene glycol copolymer	No	PCI.
Methylglucoside laurate	No	HDG.
Mixed alkyl benzoate	No	APC.
Mixed alkyl stearate	No	SOS.
Pentaerythritol stearate	No	PPG, SCP.
Polyalkylene glycol oleate	No	SOS.
Polycarboxylic acid, alkylate	No	(2).
Polycarboxylic acid, alkylphenoxyalkoxylate	No	(2).
Polypropylene glycol diester of tall oil acids	No	RDA.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Nonionic—Continued</b>		
<b>Carboxylic acid esters—Continued</b>		
<b>Other carboxylic acid esters—Continued</b>		
Polypropylene glycol dioleate	No	(2).
Propylene glycol esters of hydrogenated palm oil	No	PG, VND.
All other carboxylic acid esters	No	ARI, CHP, HDG, MOA, ROB, SCP, SYL, WM, (2), (2).
<b>Ethers:</b>		
<b>Benzenoid ethers:</b>		
Amylphenol-formaldehyde, alkoxyated	No	(2).
Bisphenol A, ethoxylated and propoxylated	No	PPG.
Bisphenol A, ethoxylated	No	PPG.
P-tert-Butylphenol-formaldehyde, alkoxyated	No	(2).
Dilsobutylphenol, ethoxylated	No	GAF.
Dinonylphenol, ethoxylated	Yes	CPC, ETC, GAF, HTN, PPG, RH, S, SCP, (2).
Dodecylphenol, ethoxylated	Yes	AAC, ETC, MON, SCP, TMH.
Epiclorohydrin bisphenol A, ethoxylated	No	(2).
Furfuryl alcohol, ethoxylated	No	SVC.
Iso-octylphenol, ethoxylated	Yes	AAC, BAS, GAF, PPG, RH, TMH.
(Mixed alkyl)phenol, alkoxyated	No	(2).
(Mixed alkyl)phenol epiclorohydrin-formaldehyde, alkoxyated	No	(2).
(Mixed alkyl)phenol, ethoxylated	No	BAS, MIL.
(Mixed alkyl)phenol, ethoxylated, butyl ether	No	RH.
(Mixed alkyl)phenol-formaldehyde, alkoxyated	Yes	ENJ, HCL, WTC, (2), (2).
Naphthalene sulfonic acid, polymer with formaldehyde and 4,4'-dihydroxydiphenyl sulfone	No	PCI.
Naphthalenesulfonic acid, polymer with formaldehyde, sodium salt	No	PCI.
Naphthalenesulfonic acid, polymer with formaldehyde and 4,4'-dihydroxydiphenyl sulfone, ammonium salt	No	PCI.
Nonylphenol, ethoxylated	Yes	AAC, BAS, CPC, ENJ, ETC, GAF, HCL, HDG, HTN, ICI, MIL, MOA, MON, OMC, PLX, PPG, RH, S, SCP, SHX, STP, TMH, TX, UCC, WTC, (2), (2), (2).
Nonylphenol, ethoxylated, phosphate esters	No	OMC.
Nonylphenol, ethoxylated and propoxylated	Yes	GAF, HCL, RH, SCP, TMH, WTC, (2).
Nonyl phenol, ethoxylated with mixed fatty acids	No	SOS.
Nonylphenol-formaldehyde, alkoxyated	Yes	WTC, (2), (2).
Nonyl phenol oleate, ethoxylated	No	SOS.
Nonylphenoxy poly(ethyleneoxy)ethyl iodide	No	GAF.
n-Octylphenol, ethoxylated	No	DUP, GAF, SCP.
tert-Octylphenol-formaldehyde, ethoxylated	No	SDW.
Phenol, ethoxylated	No	AAC, GAF, ICI, MIL, PPG, SCP.
Phenol-formaldehyde resin (with lignite)	No	PSP.
Phenol, propoxylated	No	RH.
Phenylstyrene, ethoxylated	No	HCL.
All other alkylphenol-formaldehyde condensates, alkoxyated	No	(2).
All other phenols, ethoxylated	No	AAC, HCL, SCP, SHX.
<b>Nonbenzenoid ethers:</b>		
<b>Linear alcohols, alkoxyated:</b>		
Butanol, ethoxylated	No	GAF.
Decyl alcohol, ethoxylated	Yes	BAS, CPC, ENJ, GAF, HCL, ICI, MIL, S, SCP.
Decyl alcohol, ethoxylated and propoxylated	No	GAF.
Decyloxy poly(ethyleneoxy)ethyl chloride	No	GAF.
Dodecyl alcohol, ethoxylated	Yes	AAC, BAS, GAF, HDG, ICI, MIL, PPG, (2).
Glycerol, ethoxylated	No	AAC, SVC.
Hexadecyl alcohol, ethoxylated	Yes	AAC, ICI, SCP.

See footnotes at end of table.

Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Nonionic—Continued</b>		
<b>Ethers—Continued</b>		
<b>Nonbenzenoid ethers—Continued</b>		
<b>Linear alcohols,</b>		
alkoxylated—Continued		
Isodecyl alcohol, alkoxylated	No	S.
Isostearyl alcohol, ethoxylated	No	SHX.
Methyl alcohol, alkoxylated	No	( <sup>2</sup> ).
9-Octadecenyl alcohol, ethoxylated	Yes	AAC, GAF, ICI, MIR, S, SCP.
Octadecyl alcohol, ethoxylated	Yes	AAC, HCL, HTN, ICI, PPG, SCP.
Oleyl alcohol, ethoxylated	Yes	CPC, CRD, HCL, SHX.
Pelargonic alcohol, ethoxylated	No	GAF.
Stearyl alcohol, propoxylated	No	SVC.
All other chemically defined linear alcohols,		
alkoxylated	No	BAS, HDG, PPG, SCP.
Coconut oil alcohol, ethoxylated	No	ETC, GAF, HCL, TX.
Decyl and octyl alcohols, ethoxylated	No	AAC, GAF, SHX.
Decyl and octyl alcohols, ethoxylated and		
propoxylated	No	PPG.
Mixed linear alcohols, alkoxylated	No	WTC, ( <sup>2</sup> ).
Mixed linear alcohols, ethoxylated	Yes	AAC, BAS, DUP, GAF, HCL, HDG, ICI, MIL, MOA, PLX, RH, S, SCP, SHC, SHX, TMM, TNA, TX, UCC, VST, WTC.
Mixed linear alcohols, ethoxylated, benzyl ether	No	( <sup>2</sup> ).
Mixed linear alcohols, ethoxylated and propoxylated	Yes	AAC, DUP, ETC, GAF, MIL, OMC, PPG, S, SCP, SHX, STP, SVC, UCC, ( <sup>2</sup> ).
Myristyl alcohol, propoxylated	No	WTC.
Sperm oil alcohol, ethoxylated	No	BAS.
Stearyl alcohol, propoxylated	No	AAC, WTC.
Tallow alcohol, ethoxylated	No	AAC, ENJ, ETC, HCL, PPG, TX.
Wool wax alcohols, ethoxylated	No	CRD.
All other mixed linear alcohols, alkoxylated	No	BRD, RH, SHC, ( <sup>2</sup> ).
<b>Other ethers and thioethers:</b>		
Bis-cumylphenyl-oxoethylene titanate	No	KPI.
1,3-Butylene glycol, ethoxylated	No	HCL.
Coconut fatty acid-ethoxylated nonylphenol ester	No	TCC.
tert-Dodecyl mercaptan, ethoxylated	No	AAC, GAF.
Glycerine, alkoxylated	No	( <sup>2</sup> ).
Glycerol, alkoxylated, toluene diisocyanate copolymer	No	( <sup>2</sup> ).
Isodecyl alcohol, ethoxylated	No	AAC, ETC, PPG.
Isodecyl alcohol, ethoxylated and propoxylated	No	AAC, ETC.
Iso-octyl alcohol, ethoxylated	No	ETC, PPG.
Lignin, ethoxylated	No	WVA.
Mixed alcohols, ethoxylated	Yes	ENJ, MIL, RH, SHX, WM, ( <sup>2</sup> ).
Polyepichlorohydrin	No	( <sup>2</sup> ).
Polyether diols	No	WTC.
Polyether triols	No	WTC.
Polyethoxylate/polypropoxylate dibenzyl ether	No	( <sup>2</sup> ).
Polyethylene glycol mono(nonylphenol) ether ammonium sulfate	No	( <sup>2</sup> ).
Poly(mixed ethylene, propylene) glycol	Yes	BAS, ETC, S, UCC, WTC, ( <sup>2</sup> ), ( <sup>2</sup> ).
Poly(mixed ethylene, propylene) glycol, capped with alkyl oxirane	No	( <sup>2</sup> ).
Polyoxyalkylene glycols, alkoxylated	No	GAF.
Poly(oxy-1,2-ethanedyl), $\alpha$ -phenylmethyl- $\omega$ -hydroxy, C <sub>12</sub> -C <sub>18</sub> alkyl ethers	No	PCI.
Poly(oxy-1,2-ethanedyl), $\alpha$ -phenylmethyl- $\omega$ -hydroxy, ethoxylated nonylphenol alkyl ether	No	PCI.

See footnotes at end of table.



Table 12-2—Continued

Surface-active agents for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Surface-active agents	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 12-3)
<b>Nonionic—Continued</b>		
<b>Ethers—Continued</b>		
<b>Other ethers and thioethers—Continued</b>		
Polypropylene glycol, alkoxyated, polymer with maleic anhydride, acrylic acid, and alkylphenol-formaldehyde resin, alkoxyated	No	(?)
Polypropylene glycol, ethoxyated	No	BAS, ETC, GAF, HCL, HDG, PPG, SCP, WTC, (?)
Polypropylene glycol glycerol triether, copolymer with epichlorohydrin bisphenol epoxy resin	No	(?)
2,4,7,9-Tetramethyl-5-decyne-4,7-diol, ethoxyated	No	GAF, SCP
Tridecyl alcohol, ethoxyated	Yes	AAC, CPC, DUP, ETC, HCL, ICI, MIL, PPG, S, SCP, WTC, (?)
Tridecyl alcohol, propoxyated and ethoxyated	No	ETC, GAF, HTN, PPG, TX
Trimethylnonyl alcohol, ethoxyated	No	PPG, UCC
Trimethylpropane, alkoxyated	No	AAC, BAS, GAF, WTC, (?)
All other ethers and thioethers	No	HCL, OMC, RH, SCP
<b>Other nonionic surface-active agents:</b>		
Cumyl phenolate, isopropoxytitanium salt	No	KPI
Formaldehyde, dicyandiamide, ethylene sulfate polymers	No	PCI
(Mixed alkyl)phenol alkylenediaminealkanolamine formaldehyde	No	(?)
Mixed fatty acid-ethoxyated nonylphenol ester	No	RPC
Tetra-(2,2-dialloxyethylene)-1-butoxytitanium bis-(ditridecyl) phosphite	No	KPI
Tetra-isopropoxytitanium(bis dioctyl)phosphite	No	KPI
Tetra-octyloxytitanium(bis-tridecyl)phosphite	No	KPI
Tri(castor oil alkyl)phosphate	No	BRD
All other nonionic surface-active agents	No	BAS, BRI, CGY, CLU, DUP, GAF, HCL, ICI, LUR, MIL, MOA, PG, SCP, WM, WVA, (?), (?)

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

**Table 12-3**  
**Surface-active agents: Directory of manufacturers, alphabetical by code, 1989**

<i>Code</i>	<i>Name of company</i>	<i>Code</i>	<i>Name of company</i>
AA	Alcolac, Inc.	GDC	Gresco Mfg., Inc.
AC	AC& S, Inc.	GRL	Calgon Corp., Calgon Vestal Laboratories Div.
ACT	Climax Performance Materials Corp.	HAL	C. P. Hall Co.
ACY	American Cyanamid Co.	HCL	Hoechst Celanese Corp., Sou-Tex Works
AGP	Dial Corp.	HDG	Hodag Chemical Corp.
AIP	Air Products & Chemicals, Inc.	HEW	Hewitt Soap Co., Inc.
AMU	RPM American Emulsion Co., Inc.	HIL	Hilton Davis Company
APC	Apollo Chemicals Corp.	HIP	High Point Chemical Corp.
APX	Apex Chemical Co., Inc.	HMP	W. R. Grace & Co., Hampshire Chemicals Div. and Organic Chemical Div.
ARC	Akzo Chemicals, Inc.	HNT	Huntington Laboratories, Inc.
ARD	Ardmore Chemical Co., Inc.	HPC	Hercules, Inc.
ARI	Atlas Refinery, Inc.	HRT	Hart Products Corp.
ARL	Arol Chemical Products Co.	HTN	Heterene Chemical Co.
ARZ	Arizona Chemical Co.	HXL	Hexcel Corp., Hexcel Chemical Products
BAS	BASF Corp.	ICI	ICI Americas, Inc., Specialty Chemicals Div.
BFP	American Ingredients Company	JLP	J. L. Prescott Co.
BKM	Buckman Laboratories, Inc.	JRG	Andrew Jergens Co.
BLA	Astor Products, Inc., Blue Arrow Div.	JTO	Jetco Chemicals, Inc.
BOE	Boehme Filatex, Inc.	KPI	Kenrich Petrochemicals, Inc.
BRD	Lonza, Inc.	LEA	Leatex Chemical Co.
BRI	Sedgefield Specialties	LEV	Lever Brothers Co.
BSW	Original Bradford Soap Works, Inc.	LKY	Lake States Div. of Rhinelander Paper Co.
CAS	CasChem, Inc.	LUR	Reilly Whiteman, Inc.
CCA	Akzo Chemicals, Inc.	MAR	Daishowa Chemicals, Inc.
CCC	C.N.C. International, Inc.	MCP	Moretux Chemical Products, Inc.
CCL	Catawba-Charlab, Inc.	MIL	Milliken & Co., Milliken Chemical Div.
CCW	Morton International, Inc. (Specialty Chemicals Group).	MIR	Miranol Chemical Co., Inc.
CGY	Ciba-Gelby Corp.	MOA	Mona Industries, Inc.
CHL	Chemol Co.	MON	Monsanto Co.
CHP	C. H. Patrick & Co., Inc.	MRT	Morton International, Inc., Morton Chemical Div.
CIN	Stockhausen, Inc.	MRV	Marlowe-Van Loan Corp.
CLD	Colloids, Inc.	NCC	Niacet Corp.
CLU	CL Industries, Inc.	NES	Ruetgers-Nease Chemical Co.
CMT	Chemithon Corp.	NMC	Namco, Inc.
CON	Concord Chemical Co., Inc.	NPR	Safeway Stores, Inc.
CP	Colgate-Palmolive Co.	NSC	National Starch & Chemical Corp.
CPC	Grant Industries, Inc.	OC	Omega Chemicals, Inc.
CRD	Croda, Inc.	OMC	Olin Corp.
CRT	Reilly-Whiteman, Inc.	PAT	Pat-Chem, Inc.
CTL	Continental Chemical Co.	PCH	Prochem
DAN	Dan River, Inc., Chemical Products Div.	PCI	Piedmont Chemical Industries, Inc.
DEX	Dexter Chemical Corp.	PEL	Petron Corp.
DOW	Dow Chemical Co.	PG	Procter & Gamble Co., Procter & Gamble Mfg. Co.
DUP	E. I. duPont de Nemours & Co., Inc. Chemicals & Pigments Dept.	PIL	Pilot Chemical Co.
ECC	Eastern Color & Chemical Co.	PLX	Desoto, Inc.
EFH	E. F. Houghton & Co.	PNX	Murphy-Phoenix Co.
EK	Eastman Kodak Co.:	PPG	PPG Industries, Inc.
EKT	Tennessee Eastman Co. Div.	PSP	Georgia-Pacific Corp., Bellingham Div.
EMK	Emkay Chemical, Inc.	QCP	Quaker Chemical Corp.
ENJ	Exxon Chemical Americas	RAY	Rayonier Chemical Products, Inc.
ENO	Enenco, Inc.		
ESS	Essential Industries, Inc.		
ETC	Ethox Chemicals, Inc.		
FER	Ferro Corp., Kell Chemical Div.		
FPC	Flambeau Paper Corp.		
FTX	Finetex, Inc.		
GAF	GAF Chemical Corp.		

Table 12-3—Continued  
 Surface-active agents: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
RDA .....	Rhone-Poulenc, Inc.	TCC .....	Sybron Chemicals, Inc.
RH .....	Rohm & Haas Co.	TEN .....	Tennessee Chemical Co.
ROB .....	Robeco Chemicals, Inc.	TMH .....	Harcros Chemicals, Inc.
RPC .....	Colloids, Inc., Lyndal Div	TNA .....	Ethyl Corp.
RSA .....	R.S.A. Corp.	TNI .....	Gillette Chemical Co.
S .....	Sandoz, Chemical Corp., Colors & Chemicals Div.	TX .....	Texaco Chemical Co.
SBC .....	Scher Chemicals, Inc.	UCC .....	Union Carbide Corp., Industrial Chemical Div.
SBP .....	SBS Products Inc.	UDI .....	Desoto, Inc.
SCO .....	Scholler, Inc.	UNN .....	United Aniline Co.
SCP .....	Henkel Corp.	UPF .....	Sloss Industries
SDC .....	Sandoz Chemical Corp.	USR .....	Unifroyal Chemical Co., Inc.
SDW .....	Sterling Drug, Inc., Sterling Organics Div.	UTC .....	Unitex Chemical Corp.
SHC .....	Shell Oil Co., Shell Chemical Co.	VKR .....	Virkler Co.
SHX .....	Sherex Chemical Co., Inc.	VND .....	Van Dyk, Div. of Mallinckrodt, Inc.
SLC .....	Soluol Chemical Co., Inc.	VST .....	Vista Chemical Inc.
SLM .....	Salem Oil & Grease Co.	WBG .....	Dryden Oil Co., White and Bagley Div.
SOS .....	SSC Industries, Inc.	WHW .....	Whittemore-Wright Co., Inc
SPA .....	Scott Paper Co.	WM .....	Inolex Chemical Co.
SQA .....	Sequa Chemicals, Inc.	WPG .....	West Point-Pepperell, Inc., Griffitex Chemical Co. Sub.
STP .....	Stepan Chemical Co.	WTC .....	Witco Chemical Corp.
SVC .....	Capital City Products Co.	WVA .....	Westvaco Corp.
SYL .....	Arizona Chemical Co.		

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A.  
 Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.



## Section 13 Pesticides and Related Products

Pesticides and related products include fungicides, herbicides, insecticides, rodenticides, and related products such as plant growth regulators, seed disinfectants, soil conditioners, soil fumigants, and synergists. The data are given in terms of 100 percent active materials; they exclude such materials as diluents, emulsifiers, and wetting agents.

U.S. production of pesticides and related products in 1989 amounted to 572 million kilograms, 8 percent more than the 528 million kilograms reported for 1988 (table 13-1). Sales in 1989 were 461 million kilograms, an increase of 9 percent, as compared with 424 million kilograms reported in 1988; the value of sales was \$5,203 million in 1989, compared with \$4,354 million in 1988—an increase of 20 percent. Data for production of pesticides and related products during 1985-89 are shown in figure 13-1.

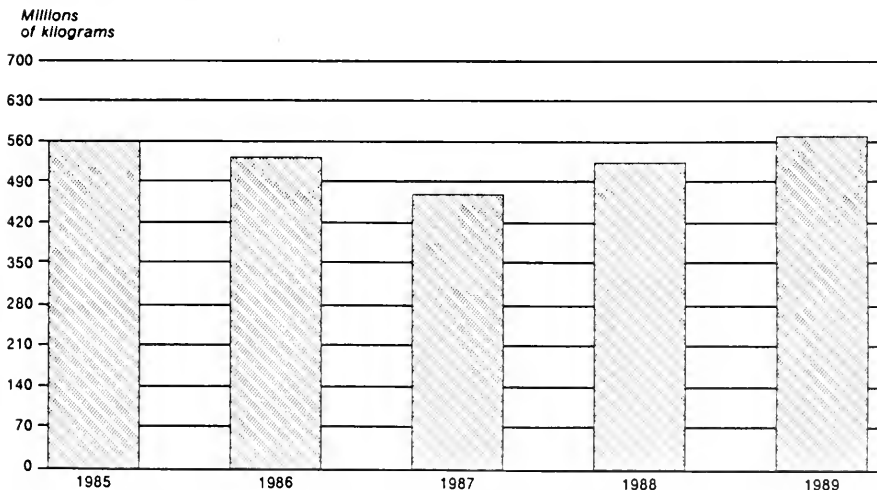
The output of cyclic pesticides and related products amounted to 366 million kilograms in 1989, 6 percent more than the 345 million kilograms produced in 1988. Sales in 1989 were 287 million kilograms, valued at \$3,639 million, compared with 259 million kilograms, valued at \$3,054 million, in 1988.

Production of acyclic pesticides and related products in 1989 amounted to 206 million kilograms, compared with 183 million kilograms reported for 1988. Sales in 1989 were 174 million kilograms, compared with 165 million kilograms reported for 1988; the value of sales was \$1,563 million in 1989, compared with \$1,299 million in 1988.

Table 13-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 13-3.

*Stephen Wanser*  
202-252-1363  
(Effective 1/14/91 202-205-3363)

**Figure 13-1**  
Pesticides and related products: U.S. production, 1985-89



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 13-1

Pesticides and related products: U.S. production and sales, 1989

Pesticides and related products	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Grand total</b> .....	<b>572,386</b>	<b>461,172</b>	<b>5,202,782</b>	<b>\$11.28</b>
<b>Cyclic</b>				
<b>Total</b> .....	<b>365,900</b>	<b>286,745</b>	<b>3,639,436</b>	<b>12.69</b>
Fungicides <sup>2</sup> .....	40,385	33,297	253,075	7.60
Herbicides and plant growth regulators, total .....	262,400	200,450	2,464,433	12.29
3',4'-Dichloropropionanilide (Propanil) .....	5,008	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Phenoxyacetic acid derivatives .....	11,655	26,234	70,080	2.67
All other cyclic herbicides <sup>4</sup> .....	245,737	174,216	2,394,353	13.74
Insecticides and rodenticides, total .....	59,484	50,442	878,419	17.41
Chlorinated insecticides .....	1,621	1,396	15,132	10.84
Organophosphorus insecticides <sup>5</sup> .....	25,828	19,815	324,981	16.40
All other cyclic insecticides and rodenticides <sup>6</sup> .....	32,035	29,231	538,306	18.42
All other cyclic pesticides .....	3,631	2,556	43,509	17.02
<b>Acyclic</b>				
<b>Total</b> .....	<b>206,486</b>	<b>174,427</b>	<b>1,563,346</b>	<b>8.96</b>
Fungicides <sup>7</sup> .....	9,932	6,868	41,843	6.09
Herbicides and plant growth regulators <sup>8</sup> .....	53,700	59,174	834,907	14.11
Insecticides, rodenticides, soil conditioners, and fumigants, total .....	132,904	98,619	643,173	15.85
Organophosphorus insecticides <sup>9</sup> .....	39,283	18,510	274,301	14.82
N-Methylthiocarbamic acid (Metham) .....	14,809	12,206	16,108	1.32
Trichloronitromethane (chloropirrin) .....	11,998	3,892	8,998	2.31
All other acyclic insecticides, rodenticides, soil conditioners, and fumigants <sup>10</sup> .....	66,814	64,011	343,766	5.37
All other acyclic pesticides .....	9,950	9,766	43,423	4.45

<sup>1</sup> Calculated from unrounded figures.<sup>2</sup> Includes benomyl, captan, chlorothalonil, DMTT, folpet, iprop, and others.<sup>3</sup> Reported data were accepted in confidence and may not be published, or no data were reported.<sup>4</sup> Includes alachlor, atrazine, benfenit, bensulfide, 2,4-D and other 2,4-D esters and salts, dicamba, dinitrophenol compounds, diuron, DNBP, isopropyl phenylcarbamates (IPC and CIPC), maleic hydrazide, molinate, NPA, picloram, prometon, triazines, trifluralin, plant growth regulators, and others.<sup>5</sup> Includes diazinon, methyl parathion, and other phosphorothioates and phosphorodithioates.<sup>6</sup> Includes carbaryl, chlorinated insecticides (chlordan, heptachlor, and others), insect attractants, DEET and other insect repellents, small amounts of rodenticides, and others.<sup>7</sup> Includes dithiocarbamates.<sup>8</sup> Includes butylate, EPTC, methanearsonic acid salts, thiocarbamates, and organophosphorus herbicides, and others.<sup>9</sup> Includes acephate, disulfoton, ethion, malathion, phorate, and other organophosphorus insecticides.<sup>10</sup> Includes methyl bromide, soil conditioners and fumigants, small quantities of rodenticides, and others.

Note.—Does not include data for the insect fumigant, p-dichlorobenzene, nor the fungicide, o-phenylphenol. These data are included in the section on "Cyclic Intermediates." It also does not include data for the fungicides, dimethyldithiocarbamic acid, sodium salt and dimethyldithiocarbamic acid, zinc salt (i.e., ziram). These data are included in the section on "Rubber-Processing Chemicals." The data for ethylene dibromide, a fumigant, are included in the "Miscellaneous End-Use Chemicals and Chemical Products" section.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 13-2

Pesticides and related products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Pesticides and related products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 13-3)
<b>Cyclic</b>	<b>Yes</b>	
<b>Fungicides:</b>		
2-Bromo-4'-hydroxyacetophenone	No	BKM.
1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1,2,4-triazol-1-yl)-butan-2-one	No	CHG.
$\alpha$ -(2-Chlorophenyl)- $\alpha$ -(4-chlorophenyl)-5-pyrimidinemethanol	No	LIL.
$\alpha$ -(2-(4-chlorophenyl)ethyl)- $\alpha$ -(1,1-dimethylethyl)-1h-1,2,riazole-1-ethanol	No	CHG.
$\alpha$ -(2-Chlorophenyl)- $\alpha$ -(4-fluorophenyl)-5-pyrimidinemethanol	No	LIL.
2,4-Dichloro-6-(o-chloroanilino)-s-triazine	No	CHG.
1,4-Dichloro-2,5-dimethoxybenzene (Chloroneb)	No	CHF.
Hexahydro-1,3,5-triethyl-s-triazine	No	VNC.
Hexahydro-1,3,5-tri(2-hydroxyethyl)-s-triazine	No	(?).
2-Mercaptobenzothiazole, sodium salt	No	(?).
Methyl-1-(butylcarbamoyl)-2-benzimidazolecarbamate (Benomyl)	No	DUP, GTL.
3-(2-Methylpiperidino)propyl-3,4-dichlorobenzoate (Pipron)	No	LIL, USR.
Naphthenic acid, copper salt	No	CCA, NOD, TRO.
2-n-Octyl-4-isothiazolin-3-one	No	RH.
Pentachlorophenol, sodium salt	No	FRO.
8-Quinolol, copper salt	No	NOD.
8-Quinolol, magnesium salt	No	FMT.
2,4,5,6-Tetrachloroisophthalonitrile	No	SDS.
Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione (DMTT)	No	BKM, MRK, VCC.
2-(Thiocyanomethylthio)benzothiazole	No	BKM.
N-Trichloromethylthio-4-cyclohexene-1,2-dicarboximide (Captan)	No	ICI, VNC.
N-Trichloromethylthiophthalimide (Folpet)	No	ICI.
All other cyclic fungicides	No	FER, NOD.
<b>Herbicides and plant growth regulators:</b>	<b>Yes</b>	
3-Amino-2,5-dichlorobenzoic acid, ammonium salt (2,5-Dichloro-3-aminobenzoic acid, ammonium salt)	No	RDA.
4-Amino-6-(1,1-dimethylethyl)-3-(methylthio)-1,2,4-triazin-5-(4H)-one	No	CHG, DUP.
4-Amino-3,5,6-trichloropicolinic acid (Picloram)	No	DQW, ICI.
S-Benzyl thiocarbamate	No	
4,6-Bis(isopropylamino)-2-methoxy-s-triazine (Prometon)	No	CGY.
2,4-Bis(isopropylamino)-6-(methylthio)-s-triazine (Prometryn)	No	CGY.
5-Bromo-3-sec-butyl-6-methyluracil (Bromacil)	No	DUP.
2-(sec-Butylamino)-4-ethylamino-6-methoxy-s-triazine	No	CGY.
2-(tert-Butylamino)-4-ethylamino-6-(methylthio)-s-triazine	No	CGY.
3-tert-Butyl-5-chloro-6-methyluracil	No	DUP.
N-Butyl-N-ethyl- $\alpha$ , $\alpha$ , $\alpha$ -trifluoro-2,6-dinitro-p-toluidine (Benefin)	No	LIL.
Butyl 2-[4-[[5-(trifluoromethyl)-2-pyridinyl]oxy]phenoxy]propanoate	No	(?).
1-(Carboethoxy)ethyl 5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-nitrobenzoate	No	SOC.
2-Chloro-4,6-bis(ethylamino)-s-triazine (Simazine)	No	CGY.
2-Chloro-4,6-bis(isopropylamino)-s-triazine (Propazine)	No	CGY.
2-Chloro-2',6'-diethyl-N-(n-butoxymethyl)-acetanilide (Butachlor)	No	MNA.

See footnotes at end of table

Table 13-2—Continued

Pesticides and related products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Pesticides and related products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 13-3)
Cyelic—Continued	Yes	
Herbicides and plant growth regulators—Continued		
2-Chloro-2',6'-diethyl-N-(methoxymethyl)acetanilide (Alachlor)	No	MNA.
2-Chloro-N-ethoxymethyl-N-(2-ethyl-6-methylphenyl)-acetamide (Acetochlor)	No	MNA.
2-Chloro-1-(3-ethoxy-4-nitrophenoxy)-4-(trifluoromethyl)benzene (Oxyfluorfen)	No	RH.
2-Chloro-4-(ethylamino)-6-(isopropylamino)-s-triazine (Atrazine)	No	CGY, DUP.
2-[4-Chloro-6-(ethylamino)-s-triazin-2-ylamino]-2-methylpropanitrile (Cyanazine)	No	DUP.
2-Chloro-N-isopropylacetanilide (Propachlor)	No	MNA.
2-Chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)-aminocarbonyl]benzenesulfonamide	No	DUP.
2-(4-Chloro-2-methylphenoxy)propionic acid, dimethylamine salt	No	RIV.
2-(2-Chlorophenyl)methyl-4,4-dimethyl-3-isoxazolone	No	FMN, (?).
3-Cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4-(1H,3H)-dione	No	DUP.
3,5-Dibromo-4-hydroxybenzotrile (Bromoxynil)	No	RDA.
3,6-Dichloro-2-anisic acid (Dicamba)	No	ZOC.
2,6-Dichlorobenzotrile	No	USA.
2-(2,4-Dichlorophenoxy)propionic acid, dimethylamine salt	No	RIV.
2-(2,4-Dichlorophenoxy)propionic acid, isooctyl ester	No	RIV.
3-(3,4-Dichlorophenyl)-1,1-dimethylurea (Diuron)	No	DUP.
3-(3,4-Dichlorophenyl)-1-methoxy-1-methylurea (Linuron)	No	DUP.
2-(3,4-Dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione (Methazole)	No	ZOC.
1-[(2,4-Dichlorophenyl)4-propyl-1,3-dioxolan-2-yl-methyl]-1H-1,2,4-triazole	No	ICI.
2-(3,5-Dichlorophenyl)-2-(2,2,2-trichloroethyl)-oxirane (tridiphane)	No	DOW.
3,6-Dichloropicolinic acid	No	DOW.
3',4'-Dichloropropionanilide (Propanil)	Yes	CED, CYT, RH.
3,7-Dichloro-8-quinolinic acid	No	BAS, NES.
S-(O,O-Diisopropyl phosphorodithioate) ester of N-( $\alpha$ -mercaptoethyl)benzenesulfonamide (Bensulfide)	No	ICI.
1,1'-Dimethyl-4,4'-bipyridinium dichloride	No	(?).
Dimethyl-2,3,5,6-tetrachloroterephthalate (DCPA)	No	SDS.
N-[5-1,1-Dimethyl-1,3,4-thiadiazol-2-yl]-N,N-dimethylurea (Tebuthiuron)	No	LIL.
1,1-Dimethyl-3-( $\alpha,\alpha,\alpha$ -trifluoro-m-tolyl)urea (Fluometuron)	No	CGY.
Dinitrobutylphenol (DNBP)	No	CED.
2,6-Dinitro-N,N-dipropyl cumldine	No	LIL.
3,5-Dinitro-N4,N4-dipropylsulfanilamide	No	LMC.
2-(Ethylamino)-4-(isopropylamino)-6-(methylthio)-s-triazine (Ametryne)	No	CGY.
Ethyl 2-[[[(4-chloro-6-methoxypyrimidin-2-yl)-amino]carbonyl]amino]sulfonyl]benzoate (Chlorimuron ethyl)	No	DUP.
S-Ethyl cyclohexylmethylthiocarbamate	No	ICI.
S-Ethyl-hexahydro-1H-azepine-1-carbothioate (Mollnate)	No	ICI.
(+)-5-Ethyl-2-(4-isopropyl-4-methyl-5-oxo-2-imidazoln-2-yl)colitic acid	No	ACY.

See footnotes at end of table.



Table 13-2—Continued

Pesticides and related products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Pesticides and related products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 13-3)
<b>Cyclic—Continued</b>		
<b>Herbicides and plant growth regulators—Continued</b>		
N-[3-(1-Ethyl-1-methylpropyl)-5-Isoxazolyl]-2,6-dimethoxybenzamide (Flexidor) .....	No	LIL.
N-(1-Ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine .....	No	ACY.
Imazaquin 2-4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1hidazol-2-ylquinoline-carboxylic acid .....	No	ACY.
Imazethabenz methyl ester (ci22,293) .....	No	ACY.
Isopropyl N-(3-chlorophenyl)carbamate (CIPC) .....	No	SOC.
Methyl-3-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]-2-thiophene-carboxylic acid .....	No	DUP.
2-(2-Methyl-4-chlorophenoxy)propionic acid, diethanolamine salt .....	No	RIV.
2-(2-Methyl-4-chlorophenoxy)propionic acid, iso-octyl ester .....	No	RIV.
1-(2-Methylcyclohexyl)-3-phenylurea (Slduron) .....	No	ADC, DUP.
Methyl 5-(2',4'-dichlorophenoxy)-2-nitrobenzoate .....	No	RDA.
Methyl 2-[[[(4,6-dimethoxy-pyrimidin-2-yl)-amino]carbonyl]amino]sulfonyl]methyl]benzoate (Bensulfuron) (Londax) .....	No	DUP.
Methyl 2-[[[(4,6-dimethyl-2-pyrimidinyl)amino]-carbonyl]amino]sulfonyl]benzoate .....	No	DUP.
Methyl 2[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)-amino]carbonyl]amino]sulfonyl]benzoate (Metsulfuron methyl) .....	No	DUP.
Methyl 2-[[[(N-(4-methoxy-6-methyl-1,3,5-triazin-2-yl)thylamino)carbonyl]amino]sulfonyl]benzoate .....	No	DUP.
1-Methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1H)-pyridone (Fluridone) .....	No	LIL.
N-1-Naphthylphthalamic acid (NPA) .....	No	USR.
Nicotinic acid, 2-(4-Isopropyl-4-methyl-5-oxo-2-Imidazolin-1) .....	No	ACY.
7-Oxabicyclo-[2.2.1]-heptane-2,3-dicarboxylic acid, disodium salt (Endothal) .....	No	PAS.
<b>Phenoxyacetic acid derivatives:</b>	Yes	
4-Chloro-2-methylphenoxyacetic acid, dimethylamine salt .....	No	RIV.
4-Chloro-2-methylphenoxyacetic acid, iso-octyl ester .....	No	RIV.
<b>2,4-Dichlorophenoxyacetic acid, esters and salts:</b>		
2,4-Dichlorophenoxyacetic acid (2,4-D) .....	No	DOW, GTH.
2,4-Dichlorophenoxyacetic acid,2-butoxyethyl ester .....	No	DOW.
2,4-Dichlorophenoxyacetic acid, n-butyl ester .....	No	RIV.
2,4-Dichlorophenoxyacetic acid, sec-butyl ester .....	No	DOW.
2,4-Dichlorophenoxyacetic acid, dimethylamine salt .....	No	DOW, PBI, RIV.
2,4-Dichlorophenoxyacetic acid, ethanolamine and isopropanolamine salts .....	No	DOW.
2,4-Dichlorophenoxyacetic acid, iso-octyl ester .....	No	DOW, RIV.
2,4-Dichlorophenoxyacetic acid, isopropyl ester .....	No	AMV.
Trimethylsulfoniumcarboxymethyl aminophosphonate .....	No	ICI.
All other phenoxyacetic acid derivatives .....	No	RDA.
<b>Plant growth regulators:</b>	No	
N-[(Acetylamino)methyl]-2-chloro-N-(2,6-diethylphenyl)acetamide .....	No	MNA.
2-Chloro-N-(2,6-dinitro-4-(trifluoromethyl)phenyl)-N-ethyl-6-fluorobenzenemethanamine .....	No	CGY

See footnotes at end of table.

Table 13-2—Continued

Pesticides and related products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Pesticides and related products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 13-3)
<b>Cyclic—Continued</b>		
<b>Herbicides and plant growth regulators—Continued</b>		
<b>Plant growth regulators—Continued</b>		
β-(4-Chlorophenyl)methyl-α-(1,1-dimethylethyl)-1,2,4-triazole-1-ethanol	No	(?)
2-Chloro-6-(trichloromethyl)pyridine	No	DOW.
α-Cyclopropyl-α-(p-methoxyphenyl)-5-pyrimidine methanol (Ancymidol)	No	LIL.
2,3-Dihydro-5,6-dimethyl-1,4-dithiin-1,1,4,4-tetraoxide	No	NES.
1,2-Dihydro-3,6-pyridazinedione (Maleic hydrazide) (MH)	No	DRX, USR.
1,1-Dimethylpiperidinum chloride	No	BAS.
N-[2,4-Dimethyl-5-[[trifluoromethyl]sulfonyl]amino]phenyl]acetamide, diethanolamine salt	No	MMM.
Gibberellic acid	No	ABB.
α-(1-Methylethyl-α-4-trifluoro-methoxy]phenyl)-5-pyrimidinmethanol (Flurprimidol)	No	LIL.
3,5,6-Trichloro-2-pyridinylloxyacetic acid	No	DOW.
α, α, α-Trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine (Trifluralin)	No	LIL.
α, α, α-Trifluoro-2,6-dinitro-N-ethyl-N-(2-methyl-2-propenyl)-p-toluidine (Ethylfluralin)	No	LIL.
All other cyclic herbicides	No	FRI, RH, SOC.
Insect attractants and repellents:	No	
N,N-Diethyltoluamide (DEET)	No	HCL, PAC, TNA, (?)
All other insect attractants	No	(?)
Insecticides:	Yes	
Bacillus thuringiensis	No	ABB, ZOC.
Bis(pentachloro-2,4-dicyclopentadien-1-yl)	No	ZOC.
2,3,4,5-α-2-Butenyliene-tetrahydrofurfural	No	PLC.
2-(p-tert-Butylphenoxy)cyclohexyl-2-propynyl sulfite	No	USR.
Cyano(4-fluoro-3-phenoxyphenyl)methyl-3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate	No	FMN.
Cyano-3-phenoxybenzyl-cis, trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylate	No	(?)
Cyano(3-phenoxyphenyl)methyl-4-chloro-α-(1-methylethyl)benzeneacetate	No	DUP.
N-Cyclopropyl-1,3,5-triazine-2,4,6-triamine	No	CGY.
Cypermethrin	No	CED, FMN.
O,O-Diethyl O-(2-diethylamino-6-methyl-4-pyrimidinyl)phosphorothioate	No	ICI.
2,3-Dihydro-2,2-dimethyl-7-benzofuranyl[(diethylamino)thio]methyl carbamate	No	FMN, NES.
2,3-Dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate	No	FMN.
2,3-Dihydroxy-2,2-dimethyl-7-benzofuranyl	No	(?)
5,6-Dimethyl-2-dimethylamino-4-pyrimidinyl dimethyl carbamate	No	FSN.
Di-n-propylsocinchomeronate	No	MGK.
Distinnaxane, hexakis(2-methyl-2-phenylpropyl)	No	DUP.
O-Ethyl S,s-di-sec-butyl phosphorodithioate	No	FMN.
Methyl 3-(2,2-dichloroethenyl)-2,2-dimethyl-3-cyano-3-phenoxyphenylcyclopropanecarboxylate	No	FMN.
1-Naphthyl N-methylcarbamate (Carbaryl)	No	RDA.

See footnotes at end of table.

Table 13-2—Continued

Pesticides and related products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Pesticides and related products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 13-3)
<b>Cyclic—Continued</b>		
<b>Insecticides—Continued</b>		
3-(Phenoxyphenyl) methyl-cis, trans-3-(2,2-dichloroethenyl)-2,2-dimethyl cyclopropanecarboxylate	No	CED, FMN, (?).
Tetrahydro-3,5-dimethyl-2(1H)-pyrimidinone [3-[4-(trifluoromethyl)phenyl]-1-[2-[4-(trifluoromethyl)phenyl]ethenyl]-2-propenylidene]hydrozone	No	ACY.
All other cyclic insecticides	No	FMN, ZOC, (?).
<b>Chlorinated insecticides:</b>	<b>Yes</b>	
2-Chloro-N-[[[4-(trifluoromethoxy)phenyl]amino]-carbonyl]benzamide	No	CHG.
Heptachloro-tetrahydro-endo-methanoindene (Heptachlor)	No	VEL.
Octachlorohexahydro-4,7-methanoindene (Chlordan)	No	VEL.
1,1,1-Trichloro-2,2-bis(p-methoxyphenyl)ethane (Methoxychlor)	No	CHF.
All other chlorinated insecticides, cyclic	No	DUP.
<b>Organophosphorus insecticides:</b>	<b>Yes</b>	
O-(2,4-Dichlorophenyl) O-ethyl S-propyl phosphorodithioate	No	CHG.
O-(2-(Diethylamino)-6-methyl (4-pyrimidinyl) O,O-dimethyl phosphorothioate	No	(?).
O,O-Diethyl O-(2-isopropyl-4-methyl-6-pyrimidinyl) phosphorothioate (Diazinon)	No	CGY.
O,O-Diethyl 0-3,5,6-trichloro-2-pyridyl phosphorothioate	No	DOW.
O,O-Dimethyl O-[4-(methylthio)-m-tolyl]-phosphorothioate (Fenthion)	No	CHG.
O,O-Dimethyl S-[(4-oxo-1,2,3-benzotriazin-3(3H)-yl)methyl]phosphorodithioate (Azinphos-methyl)	No	CHG, DUP.
O-Ethyl O-[4-(methylthio)phenyl] S-propyl phosphorodithioate	No	CHG.
N-(Mercaptomethyl)phthalimide S-(O,O-dimethylphosphorodithioate)	No	ICI.
O,O'-(Thiodi-4,1-phenylene)bis(O,O-dimethyl phosphorothioate (Tempos)	No	ICI.
All other organophosphorus insecticides, cyclic	No	(?).
<b>Rodenticides:</b>	<b>No</b>	
3-( $\alpha$ -Acetylbenzyl)-4-hydroxycoumarin (Warfarin)	No	MOT.
3-[3-(4'-Bromo[1,1'-biphenyl]-4-yl)-1,2,3,4-tetrahydro-1-naphthalenyl]-4-hydroxy-2H-1-benzopyran-2-one	No	LIL, (?).
2-Diphenylacetyl-1,3-indandione and sodium salt	No	MOT.
2-Isovaleryl-1,3-indandione	No	MOT.
2-Pivaloyl-1,3-indandione (Plindone)	No	MOT.
All other cyclic pesticides:		
$\alpha$ -[2-(2-n-Butoxyethoxy)ethoxy]-4,5-methylenedioxy-2-propyltoluene (Piperonyl butoxide)	No	ALP, TNA.
N,N-diallyl-2,2-dichloroacetamide	No	ICI.
N-(2-Ethylhexyl)bicyclo(2.2.1)-5-heptene-2,3-dicarboximide	No	MGK.
1-Methyl-3,5,7-triazole-1-azonia tricyclodecane chloride	No	BKM.
2,2,5-Trimethyl-3-(dichloroacetyl)-1,3-oxazolidine	No	ICI.
All other pesticides and related products, cyclic	No	MNA, (?).
<b>Acyclic</b>		
<b>Fungicides:</b>	<b>Yes</b>	
Bis-1,4-bromoacetoxy-2-butene	No	VIN.

See footnotes at end of table.

Table 13-2—Continued

Pesticides and related products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Pesticides and related products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 13-3)
<b>Acyclic—Continued</b>		
<b>Fungicides—Continued</b>		
Bis(tributyltin) oxide	No	( <sup>2</sup> ).
1,2-Dibromo-2,4-dicyanobutane	No	MRK.
Disodium cyanodithiolimidocarbonate	No	BKM.
n-Dodecylguanidine acetate (Dodine)	No	ACY, MRK.
Methylenebis(thiocyanate)	No	MRK, VIN.
Poly[oxyethylene(dimethylimino)-ethylene(dimethylimino)ethylene dichloride]	No	BKM.
Tributyltin chloride	No	( <sup>2</sup> ).
<b>Dithiocarbamic acid fungicides:</b>		
Dimethyldithiocarbamic acid, potassium salt	No	ALC, BKM.
Ethylene bis(dithiocarbamic acid), disodium salt (Nabam)	No	ALC, VCC.
Ethylene bis(dithiocarbamic acid), manganese salt with zinc ions	No	DUP.
Ethylene bis(dithiocarbamic acid), zinc and manganese salts	No	RH.
Hydroxymethyl(methyl)dithiocarbamic acid, potassium salt	No	BKM.
N-Methyldithiocarbamic acid, potassium salt	No	BKM.
<b>Herbicides and plant growth regulators:</b>		
2-Chloroallyl diethyldithiocarbamate (CDEC)	Yes	AC.
S-Ethyl diisobutylthiocarbamate (Butylate)	No	ICI, SOC.
S-Ethyl dipropylthiocarbamate (EPTC)	No	ICI, SOC.
Methanearsonic acid, disodium salt (DSMA)	No	VIN.
Methanearsonic acid, dodecyl- and octyl- ammonium salts	No	VIN.
Methanearsonic acid, monosodium salt (MSMA)	No	SDS, VIN.
Methylthiosulfonic acid, S-(2-hydroxypropyl) ester	No	BKM.
N-(Phosphonomethyl)glycine, isopropylamine salt	No	MNA.
S-Propyl butylethylthiocarbamate (Pebulate)	No	ICI.
S-Propyl dipropylthiocarbamate (Vernolate)	No	ICI.
Thiocyanic acid, methylene ester	No	BKM.
S,S,S-Tributyl phosphorotrithioate	No	CHG.
Tributyl phosphorotrithioate (Merphos)	No	RDA.
<b>Plant growth regulators:</b>		
6-Benzyladenine (BAP)	No	ABB.
2-(Chloroethyl)phosphonic acid	No	RDA.
N-(Phosphonomethyl)glycine, sodium sesqui salt	No	MNA.
All other acyclic herbicides	No	DUP, VIN.
<b>Insecticides:</b>		
Ethyl 3,7,11-trimethyldodeca-2,4-dienoate	No	DOW, ZOC, ( <sup>2</sup> ).
Isopropyl-11-methoxy-3,7,11-trimethyldodeca-2,4-dienoate	No	ZOC, ( <sup>2</sup> ).
Methyl N',N'-dimethyl-N-[(methylcarbamoyl)oxy]-1-thiooxamidate	No	DUP.
S-Methyl-N-[(methylcarbamoyl)oxy]thioacetimidate (Methomyl)	No	DUP, RDA.
2-Methyl-2-(methylthio)propionaldehyde O-(methylcarbamoyl)oxime (Aldicarb)	No	RDA.
N,N'-thiobis-(methylimino)carbonyloxy bis-ethanimidothioate	No	RDA.
<b>Organophosphorus Insecticides:</b>		
S-[1,2-Bis(ethoxycarbonyl)ethyl]O,O-dimethyl phosphorodithioate (Malathion)	No	ACY.
2-Carbomethoxy-1-propen-2-yl dimethyl phosphate	No	AMV, DUP.
1,2-Dibromo-2,2-dichloroethyl dimethyl phosphate (Naled)	No	AMV.
O,O-Diethyl S-[2-(ethylthio)ethyl] phosphorodithioate (Disulfoton)	No	CHG.

See footnotes at end of table.

Table 13-2—Continued

Pesticides and related products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

<i>Pesticides and related products</i>	<i>Separate statistics<sup>1</sup></i>	<i>Manufacturers' identification codes (according to list in table 13-3)</i>
<b>Acyclic—Continued</b>		
<b>Insecticides—Continued</b>		
<b>Organophosphorus insecticides—Continued</b>		
O,O-Diethyl S-[(ethythio)methyl] phosphorodithioate (Phorate) .....	No	ACY.
3-[Dimethoxyphosphinyloxy]-N,N-dimethyl-cis-crotonamide .....	No	DUP.
O,S-Dimethylacetylphosphoramidothioate (Acephate) .....	No	SOC.
O,O-Dimethyl-O-2,2-dichlorovinyl phosphate (DDVP) .....	No	AMV.
S-[[[(1,1-Dimethylethyl)thio]methyl] O,O-diehy] phosphorodithioate (Turbufos) .....	No	ACY.
Dimethyl phosphate of 3-hydroxy-N-methyl-cis-crotonamide .....	No	DUP.
O,S-Dimethyl phosphoramidothioate .....	No	CHG.
O,O,O',O'-Tetraethyl S,S'-methylene bisphosphorodithioate (Ethion) .....	No	FMN.
All other acyclic insecticides .....	No	DUP.
<b>Rodenticides:</b> .....	No	
2-Hydroxyethyl n-octyl sulfide .....	No	PLC.
Sodium fluoroacetate .....	No	TUL.
<b>Soil conditioners:</b> .....		
Polyacrylonitrile, hydrolyzed, sodium salt .....	No	ACY.
<b>Soil fumigants:</b> .....		
1,3-Dichloropropane .....	No	DOW.
O-Ethyl S,S-dipropyl phosphorodithioate .....	No	RDA.
Methyl bromide (Bromomethane) .....	No	GTL.
N-Methyldithiocarbamic acid, sodium salt (Metham) .....	Yes	AMV, BKM, CED, ICI.
Methyl isothiocyanate and 1,3-dichloropropane .....	No	MRT.
Trichloronitromethane (Chloropicrin) .....	Yes	GTL, LCP, NLO, TNA.
<b>All other acyclic pesticides:</b> .....	No	
3-Alkoxy-2-hydroxypropyl trimethyl ammonium chloride .....	No	( <sup>a</sup> ).
Ammonium oxydiethylenebis (alkyl* dimethyl chloride) .....		
* Alkyl—40% C <sub>12</sub> , 50% C <sub>14</sub> , 10% C <sub>16</sub> .....	No	BKM.
Bromoacetic acid .....	No	VIN.
N-Cocoalkyl-1,3-propylenediamine acetate .....	No	(2).
2-[(Hydroxymethyl)amino]-2-methylpropanol .....	No	TRO.
2-(Hydroxymethyl)ethanol .....	No	TRO.
3-Iodo-2-propynyl butylcarbamate .....	No	TRO.
All other pesticides and related products, acyclic .....	No	CHD, USR, ZOC.

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 13-3

Pesticides and related products: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
ABB .....	Abbott Laboratories	ICI .....	ICI Americas, Inc., Agricultural Chemicals Div.
AC .....	AC&S, Inc.	LCP .....	LCP Chemicals-Maine
AGY .....	American Cyanamid Co.	LIL .....	Eli Lilly & Co.
ADC .....	Anderson Development Co.	LMC .....	Lomac, Inc.
ALC .....	Alco Chemical Corp.	MGK .....	McLaughlin Gormley King Co.
ALP .....	Alpha Laboratories, Inc.	MMM .....	Minnesota Mining & Manufacturing Co.
AMV .....	Amvac Chemical Corp.	MNA .....	Monsanto Agricultural Co.
BAS .....	BASF Corp.	MOT .....	Motomco, Ltd.
BKM .....	Buckman Laboratories, Inc.	MRK .....	Merck & Co., Inc.
CCA .....	Akzo Chemicals, Inc.	MRT .....	Morton International, Inc., Morton Chemical Div.
CED .....	Cedar Chemical Co.	NES .....	Rutgers-Nease Chemical Co.
CGY .....	Ciba-Geigy Corp.	NLO .....	Niklor Chemical Co., Inc.
CHD .....	Chemdesign Corp.	NOD .....	Huls America, Inc.
CHF .....	Kincaid Enterprises, Inc.	PAC .....	Pacific Anchor Chemical Corp.
CHG .....	Mobay Chemical Corp., Agricultural Chemicals Div.	PAS .....	Atochem North America, Inc.
CYT .....	Cumberland International Corp.	PBI .....	PBI-Gordon Corp.
DOW .....	Dow Chemical Co.	PLC .....	Phillips 66 Co.
DRX .....	Drexel Chemical Corp.	RDA .....	Rhone-Poulenc, Inc.
DUP .....	E. I. duPont de Nemours & Co., Inc. Agricultural Products	RH .....	Rohm & Haas Co.
FER .....	Ferro Corp., Bedford Chemical Div.	RIV .....	Riverdale Chemical Co.
FMN .....	FMC Corp., Agricultural Chemical Group	SDS .....	Fermenta, ASC Corp.
FMT .....	Fairmount Chemical Co., Inc.	SOC .....	Chevron Corp., Chevron Chemical Co.
FRI .....	Farmland Industries, Inc.	TNA .....	Ethyl Corp.
FRO .....	Vulcan Materials Co., Chemicals Div.	TRO .....	Troy Chemical Corp.
FSN .....	Nor-am Chemical Co.	TUL .....	Tull Chemical Co., Inc.
GTH .....	Guth Corp.	USR .....	Uniroyal Chemical Co., Inc.
GTL .....	Great Lakes Chemical Corp.	VCC .....	Vinings Chemical Co.
HCL .....	Hoescht Celanese Corp., Fine Chemicals, Div.	VEL .....	Velsicol Chemical Corp.
		VIN .....	Vineland Chemical Co., Inc.
		VNC .....	Vanderbilt Chemical Corp.
		ZOC .....	Sandoz Crop Protection

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in app. A.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 14 Miscellaneous End-Use Chemicals and Chemical Products

This section incorporates those end-use groups which are not readily classifiable within the prior sections of this report. Both cyclic and acyclic chemicals fall within this section. Production and sales of the end-use chemicals contained within this section continue to follow a general increase since 1986.

In 1989, the production of miscellaneous end-use chemicals amounted to 13,503 million kilograms, an increase of 4.3 percent from the calculated 12,940 million kilograms of production for 1988 (table 14-1). Production of these chemicals remained nearly level but steadily increasing throughout 1986-89 (figure 14-1). Sales in 1989 totaled 9,278 million kilograms, valued at \$9,759 million (table 14-1). The sales quantity decreased 9.2 percent from that of 1988 with the value of sales increasing by 3.3 percent. Polymers for fibers and end uses of urea

collectively accounted for 59 percent of the 1989 production of these miscellaneous end-use chemicals. The total published end-uses for urea accounted for 54.7 percent of the 1989 sales quantity of these chemicals.

Production of end-use chemicals used in the auto and motor fuels market indicated continued upward trends. Production of fuel additives for 1989 totaled 3,988 million kilograms, an increase of 43.8 percent from the previous year. Approximately 93.6 percent of production in this category was methyl t-butyl ether. The increase of 57.3 percent in reported production from 1987 is due to the increasing demand for this chemical as an octane enhancer as well as adjustments to production data for companies that had failed legal reporting requirements.

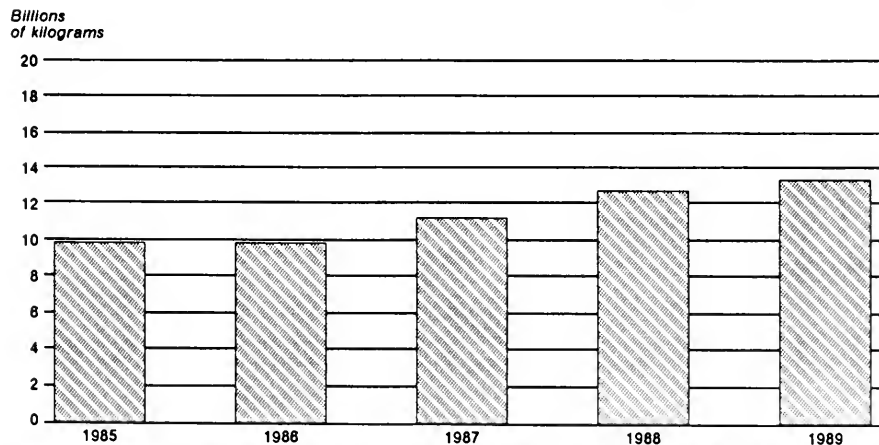
Table 14-2 lists the products reported in this section and indicates the manufacturer(s) of each by code. These codes are identified by company name in table 14-3.

*David G. Michels*

202-252-1352

(Effective 1/14/91 202-205-3352)

**Figure 14-1**  
**Miscellaneous End-Use Chemicals and Chemical Products: U.S. production, 1985-89**



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 14-1

Miscellaneous end-use chemicals and chemical products: U.S. production and sales, 1989

Miscellaneous end-use chemicals and chemical products	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
Grand total	13,502,723	9,278,044	9,759,477	\$1.05
Chelating agents, nitriloacids and salts, total	111,019	90,670	137,869	1.52
(Diethylenetri-nitrilo)pentaacetic acid, pentasodium salt	9,558	6,144	10,335	1.68
(Ethylenedinitrilo)tetraacetic acid (EDTA)	2,546	1,503	3,254	2.16
(Ethylenedinitrilo)tetraacetic acid, disodium salt	740	718	3,243	4.51
(Ethylenedinitrilo)tetraacetic acid, monosodium iron salt	818	681	2,320	3.41
(Ethylenedinitrilo)tetraacetic acid, tetrasodium salt	29,283	23,032	35,486	1.54
(N-Hydroxyethylthylenedinitrilo)triacetic acid, trisodium salt	5,103	1,646	2,798	1.70
All other chelating agents, nitriloacids and salts	62,971	56,946	80,433	1.41
Chemical indicators	2	2	408	269.76
Chemical reagents and fine chemicals	326	317	51,640	162.86
Enzymes:				
Bacterial amylase	( <sup>2</sup> )	( <sup>2</sup> )	22,727	( <sup>2</sup> )
Other hydrolytic enzymes	( <sup>2</sup> )	( <sup>2</sup> )	5,766	( <sup>2</sup> )
Rennin	( <sup>2</sup> )	( <sup>2</sup> )	16,997	( <sup>2</sup> )
Flotation reagents	9,088	8,010	5,878	.73
Fuel additives, total <sup>3</sup>	3,988,314	1,441,583	1,144,360	.79
Methyl t-butyl ether <sup>4</sup> * *	3,731,816	1,263,519	614,058	.49
All other fuel additives	256,498	178,064	530,302	2.98
Lubricating oil and grease additives, total	327,897	302,469	513,774	1.70
Oil soluble petroleum sulfonate, barium salt	2,070	1,824	6,684	3.66
Oil soluble petroleum sulfonate, calcium salt	98,813	86,931	157,677	1.81
All other lubricating oil and grease additives	227,014	213,714	349,413	1.63
Paint driers, naphthenic acid salts, total <sup>7</sup> *	3,164	2,831	9,869	3.49
Cobalt naphthenate	1,131	1,074	5,772	5.37
All other paint driers	2,033	1,757	4,097	2.33
Photographic chemicals	8,949	4,644	59,766	12.87
Polymers for fibers, total <sup>8</sup>	2,614,198	1,476,570	5,082,993	3.44
Nylon 6 and 6/6 <sup>4</sup> *	1,157,971	714,208	2,731,828	3.82
Polyacrylonitrile and acrylonitrile copolymers <sup>9</sup>	238,906	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
All other polymers for fibers	1,217,321	762,362	2,351,165	3.08
Polymers, water soluble, total	295,636	247,986	670,765	2.70
Cellulose esters and ethers:				
Hydroxethylcellulose	15,906	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Sodium carboxymethylcellulose	22,247	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Polyacrylic acid salts, total	119,260	100,508	234,398	2.33
Sodium ammonium polyacrylate and copolymers	64,928	61,110	133,959	2.19
All other polyacrylic acid salts	54,332	39,398	100,439	2.55
All other water soluble polymers	138,223	147,477	436,367	2.96

See footnotes at end of table.



Table 14-1—Continued

Miscellaneous end-use chemicals and chemical products: U.S. production and sales, 1989

Miscellaneous end-use chemicals and chemical products	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
Poly- $\alpha$ -olefins .....	51,512	51,162	114,283	2.23
Tanning materials synthetic .....	17,839	8,793	19,321	2.20
Textile chemicals, other than surface-active agents .....	22,328	20,692	31,005	1.50
Urea in compounds or mixtures:				
In feed compounds .....	172,603	168,007	27,846	.17
In liquid fertilizer .....	1,275,520	1,061,381	170,034	.16
In solid fertilizer .....	3,920,334	3,844,652	498,463	.13
All other miscellaneous end-use chemicals and chemical products* .....	683,994	548,276	1,175,713	2.14

<sup>1</sup> Calculated from unrounded figures.<sup>2</sup> Reported data were accepted in confidence and may not be published, or no data were reported.<sup>3</sup> Statistics exclude production and sales of tricresyl phosphate. Statistics on tricresyl phosphate are given with the section on "Plasticizers."<sup>4</sup> The difference between the production reported here and that shown on the *Preliminary Report on U.S. Production of Selected Organic Chemicals (Including Synthetic Plastics and Resins Materials, 1989)*, results from a combination of incorrect reporting by some companies, end-of-year inventory adjustment, and rounding.<sup>5</sup> Production totals shown for this chemical include quarterly production data in instances where companies reported inaccurate annual data or failed to report annual data. Totals also include reporting by companies which failed to report on a quarterly basis.<sup>6</sup> Production totals shown for this chemical include quarterly production in instances where annual data were determined to be inaccurate.<sup>7</sup> Quantities are given on the basis of solid naphthenate.<sup>8</sup> Statistics exclude production and sales of copper naphthenate. Statistics for copper naphthenate are given in the section on "Pesticides and Related Products."<sup>9</sup> Quarterly production data for polyethylene terephthalate are incorrect reporting. Annual production figures cannot be published because disclosure would result.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 14-2  
Miscellaneous end-use chemicals and chemical products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Miscellaneous end-use chemicals and chemical products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 14-3)
<b>Amino acids and their salts:</b>		
Aspartic acid . . . . .	No	PFZ
N,N-Bis(2,2-acetamido)glycine . . . . .	No	PIC.
N,N-Dimethylglycine . . . . .	No	MCK.
N,N-Dimethylglycine hydrochloride . . . . .	No	MCK.
Glutamic acid hydrochloride . . . . .	No	LEM.
Glycine (Aminoacetic acid), non-medical . . . . .	No	CHT, HMP.
Phenyl alanine . . . . .	No	NSW.
Potassium glutamate . . . . .	No	LEM.
<b>Methionine and its salts:</b>		
Methionine (animal feed grade) . . . . .	No	DGC.
Methionine, hydroxy analogue, calcium salt . . . . .	No	MNA.
Protein hydrolysates . . . . .	No	BRS.
Sarcosine . . . . .	No	HMP.
All other amino acids and salts, cyclic . . . . .	No	AJ, HCC.
All other amino acids and salts, acyclic . . . . .	No	TRD.
<b>Biological stains:</b>		
Biological stains . . . . .	No	ALD, EK.
<b>Chelating agents, nitriloacids and salts:</b>		
N-alkylamine bismethylenephosphonic acid . . . . .	No	DUP.
(Diethylenetriamine)pentamethylenephosphonic acid . . . . .	No	MYO, (2).
(Diethylenetriamine)pentamethylenephosphonic acid, sodium salt . . . . .	No	MYO.
(Diethylenetriamino)triacetic acid . . . . .	No	CGY, DOW, HMP.
(Diethylenetriamino)triacetic acid, monosodium hydrogen ferric salt . . . . .	No	CGY.
(Diethylenetriamino)triacetic acid, pentasodium salt . . . . .	Yes	CGY, DOW, HMP.
N,N-Dihydroxyethylglycine, sodium salt . . . . .	No	HMP.
Ethanoldiglycine, disodium salt . . . . .	No	HMP.
(Ethylenedinitrilo)tetraacetic acid (EDTA) . . . . .	Yes	CGY, DOW, HMP.
(Ethylenedinitrilo)tetraacetic acid, calcium disodium salt . . . . .	No	CGY, DAN, DOW.
(Ethylenedinitrilo)tetraacetic acid, diammonium salt . . . . .	No	CGY, DOW, HMP.
(Ethylenedinitrilo)tetraacetic acid, disodium copper salt, dihydrate . . . . .	No	DAN, DOW, HMP.
(Ethylenedinitrilo)tetraacetic acid, disodium salt . . . . .	Yes	CGY, DOW, HMP.
(Ethylenedinitrilo)tetraacetic acid, disodium zinc salt, dihydrate . . . . .	No	CGY, DOW, HMP.
(Ethylenedinitrilo)tetraacetic acid, magnesium salt . . . . .	No	SHC.
(Ethylenedinitrilo)tetraacetic acid, manganese salt . . . . .	No	CGY, HMP.
(Ethylenedinitrilo)tetraacetic acid, monoammonium ferric salt . . . . .	No	DOW.
(Ethylenedinitrilo)tetraacetic acid, monosodium iron salt . . . . .	Yes	CGY, FER, HMP.
(Ethylenedinitrilo)tetraacetic acid, tetraammonium salt . . . . .	No	CGY, DOW.
(Ethylenedinitrilo)tetraacetic acid, tetrapotassium salt . . . . .	No	HMP, (2).
(Ethylenedinitrilo)tetraacetic acid, tetrasodium salt . . . . .	Yes	CGY, DOW, HMP.
(Ethylenedinitrilo)tetraacetic acid, trisodium salt . . . . .	Yes	CGY, HMP, TX.
Glucosheptonic acid, $\beta$ -isomer, sodium salt . . . . .	No	BLZ.
Glucosheptonic acid, sodium salt . . . . .	No	BLZ, PFN.
Hexamethylenediaminetetra(methylenephosphonic acid), potassium salt . . . . .	No	MYO.
Hydroxyethane-1-diphosphonic acid . . . . .	No	MYO.
(N-Hydroxyethylethylenedinitrilo)triacetic acid, iron salt . . . . .	No	DOW, HMP.
(N-Hydroxyethylethylenedinitrilo)triacetic acid, magnesium salt . . . . .	No	DOW.

See footnotes at end of table.

Table 14-2—Continued

Miscellaneous end-use chemicals and chemical products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Miscellaneous end-use chemicals and chemical products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 14-3)
<b>Chelating agents, nitriloacids and salts—Continued</b>		
(N-Hydroxyethylethylenedinitrilo)triacetic acid, trisodium salt	Yes	CGY, DOW, HMP.
Hydroxyethylidene diphosphonic acid, potassium salt	No	( <sup>2</sup> ).
Hydroxyethylidene diphosphonic acid, sodium salt	No	MYO, ( <sup>2</sup> ).
Nitriloacetic acid, zinc salt	No	HMP.
Nitrilotriacetic acid	No	HMP, MON.
Nitrilotriacetic acid, trisodium salt	No	HMP.
Nitrilo-tris-methylene triphosphonic acid	No	BKM, MYO, ( <sup>2</sup> ).
Nitrilo-tris-methylene triphosphonic acid, potassium salt	No	( <sup>2</sup> ).
Nitrilo-tris-methylene triphosphonic acid, sodium salt	No	MYO, ( <sup>2</sup> ), ( <sup>2</sup> ).
2-Phosphonobutane-1,2,4-tricarboxylic acid, sodium salt	No	( <sup>2</sup> ).
Polyamine polymethane phosphonic acid	No	( <sup>2</sup> ), ( <sup>2</sup> ).
Polyamine polymethane phosphonic acid, magnesium salt	No	RPC.
All other chelating agents, nitriloacids and salts	No	BKM, CGY, HMP, OMC, ( <sup>2</sup> ), ( <sup>2</sup> ).
Chemical indicators	Yes	ALD, EK, GFS.
Chemical reagents and fine chemicals	Yes	ALD, COC, EK, ENJ, GFS, PAH, PFN, PIC, PLB, REG, RSA, UPJ, UPM, ( <sup>2</sup> ).
<b>Enzymes:</b>	<b>Yes</b>	
<b>Hydrolytic enzymes:</b>		
<b>Amylases:</b>		
Bacterial amylase	Yes	GBF, GNR, MLS, NBI, PMP.
Glucoamylase	No	GBF, MLS, NBI.
All other amylases	No	GBF, TX.
<b>Proteases:</b>		
Cellulase	No	GBF.
Papain	No	GBF, PFZ.
Pepsin	No	CHH.
Protease (bacterial)	No	NBI.
Rennin	Yes	CHH, MLS, PFZ.
All other proteases	No	GBF, GNR, MLS, SPR.
<b>Other hydrolytic enzymes:</b>		
Cholesterol esterase	No	BCK.
Hydrolytic enzyme mixtures	No	JFR.
Lipase	No	CHH, GNR.
Pectinase	No	GBF, GNR.
All other hydrolytic enzymes	No	GNR, PMP, ( <sup>2</sup> ).
<b>Non-hydrolytic enzymes:</b>		
Cholesterol oxidase	No	BCK, UPJ.
Glucose oxidase	No	BCK.
Glucose-6-phosphate dehydrogenase	No	BCK.
<b>Flotation reagents:</b>		
Allyl n-butyl trithiocarbonate	Yes	CED.
<b>Phosphorodithioates, used as flotation reagents:</b>		
Dicresylphosphorodithioic acid	No	ACY.
Dicresylphosphorodithioic acid, ammonium salt	No	ACY.
Dicresylphosphorodithioic acid, sodium salt	No	( <sup>2</sup> ).
Rosin amines	No	HPC, SHX.
Thiocarbamide (Diphenylthiourea)	No	ACY.
<b>Xanthates and sulfides, used as flotation reagent:</b>		
Sodium n-butylxanthate	No	USR.
Sodium ethylxanthate	No	SCP.
All other flotation reagents	No	CED, DAN, SHX, ( <sup>2</sup> ).
<b>Fuel additives:</b>		
<b>Diesel fuel additives:</b>		
Hexyl nitrate	No	DUP.
All other diesel fuel additives, acyclic	No	TNA.
All other diesel fuel additives, cyclic	No	PAH.

See footnotes at end of table.

Table 14-2—Continued  
Miscellaneous end-use chemicals and chemical products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Miscellaneous end-use chemicals and chemical products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 14-3)
<b>Fuel additives—Continued</b>		
<b>Fuel oil additives:</b>		
Adipic acid-diethylenetriamine-epichlorohydrin polymer	No	(2).
Barium hydrocarbon phosphate ester	No	(2).
Di-tert-amyl-phenyl acid phosphate	No	ALW.
4,4'-Di-sec-butylaminodiphenylmethane	No	UPM.
N,N-Dimethyl-1,3-propanediamine polymer with epichlorohydrin, sulfate	No	(2).
N,N'-Disalicyldene-1,2-propanediamine	No	DUP, FER, SM, TNA.
Ethoxylated hydantoin glycol dicocate	No	BRD.
Formaldehyde polymer with ethylenediamine and nonyl phenol derivatives	No	(2).
Imidazoline from tall oil fatty acids and diethylenetriamine	No	(2).
Methylene-bis(dimethyl)hydantoin and derivatives	No	BRD.
Mixed aryl diimides	No	SM.
Polybutylether carbamate	No	SOC.
Poly(dimethylimino(2-hydroxytrimethylene)chloride)	No	(2).
Polyethylenepolyamine polymer with 1,4-dihydroxy-2-butyne	No	(2).
Rust preventing additives	No	ALX.
Tetrahydropyrimidine from tall oil fatty acids and propylenediamine	No	(2).
All other fuel additives, acyclic	No	DUP, SM, UPM.
<b>Gasoline additives:</b>		
N,N'-Di-sec-butyl-p-phenylenediamine	No	DUP, UPM.
N,N'-Diisopropyl-p-phenylenediamine	No	DUP, TNA.
Ethylene dibromide	No	GTL, TNA.
Methyl-t-amyl ether	No	CXI.
Methyl-t-butyl ether	Yes	AMO, ATR, CGO, CSD, GSP, DA, DUP, ENJ, GRS, LYP, MOC, SM, PLC, SOG, SUN, SWR, TPC, TX, VLR.
Methylcyclopentadienylmanganese tricarbonyl	No	TNA.
N-(1-Methylheptyl)ethanolamine	No	UPM.
Tetraethyl lead	No	DUP.
All other gasoline additives, acyclic	No	ATR, TNA, TX, UPM, (2).
All other gasoline additives, cyclic	No	VNC.
<b>Lubricating oil and grease additives:</b>		
Alkene thiophosphonate	No	TX.
Alkyl imidazoline	No	(2).
Alkyl succinic anhydride	No	SM, TNA.
Alkyl terephthalamate	No	SOC.
Bornyl phenylamine	No	SOC.
<b>Chlorosulfurizer and sulfurized compounds:</b>		
Chlorosulfurized sperm oil	No	ELC.
Sulfurized lard oil	No	CCW.
Sulfurized sperm oil substitutes	No	CCW, ELC.
Di-2-ethylhexylphosphorodithiolic acid	No	ELC.
Diisopropyl hydrogen phosphite	No	ALW.
Di-N-propylphosphorodithiolic acid	No	ELC.
Dodecyl succinic anhydride	No	TX.
Dodecyl succinic acid, benzotriazole salt	No	SM.
Dodecylphenyl- $\alpha$ -naphthylamine	No	SM.
Dodecylphenyl- $\alpha$ -naphthylamine, dioctyl diphenylamine co-polymer	No	SM.
Ethylene-propylene copolymer	No	TX.
Fatty acid polyamine condensate	No	SOC.
Hydrocarbon carboxylic acid derivatives	No	SCP, (2), (2), (2).
Hydrocarbon phosphorous acid, barium salt	No	(2).
Hydrocarbon phosphoryl derivatives	No	(2).

See footnotes at end of table.

Table 14-2—Continued

Miscellaneous end-use chemicals and chemical products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Miscellaneous end-use chemicals and chemical products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 14-3)
<b>Lubricating oil and grease additives—Continued</b>		
Methylene-bridged polyalkyl phenols .....	No	TX.
Mixed polyesters .....	No	HCC.
<b>Oil-soluble petroleum sulfonates:</b>		
Oil-soluble petroleum sulfonate, barium salt .....	Yes	PAR, TNA, WTC, (?).
Oil-soluble petroleum sulfonate, calcium salt .....	Yes	PAR, SOC, TNA, TX, WTC, (?).
Oil-soluble petroleum sulfonate, magnesium salt .....	No	WTC, (?).
Oil-soluble petroleum sulfonate, mixed salts .....	No	(?).
Oil-soluble petroleum sulfonate, sodium salt .....	No	GLC, WTC.
All other oil-soluble petroleum sulfonate .....	No	DUP, MON, SOC.
Oleyl acid phosphate .....	No	FER.
Oxidized hydrocarbon mixture .....	No	ALX, ELC, FER.
Pentaerythritol esters .....	No	HCC.
<b>Phenol salts:</b>		
Alkylphenol, calcium salt .....	No	SOC.
Alkyl phenols .....	No	(?).
Dodecylphenol, sulfurized, calcium salt .....	No	SOC, TX.
Nonylphenol, barium salt .....	No	CCA, FER, WTC.
All other phenol salts .....	No	TNA.
<b>Phosphorodithioates (dithiophosphates):</b>		
Bis(1,3-dimethylbutyl)phosphorodithioate oleyl amine salt .....	No	ELC.
All other phosphorodithioates used as lubricating oil and grease additives .....	No	ELC, (?).
Polyisobuteryl succinic anhydride .....	No	TX.
<b>Succinimides:</b>		
Alkenyl succinimide .....	No	SOC, TNA, TX, (?).
Dodecyl- <i>n</i> -acetic succinimide .....	No	SM.
Modified succinimides .....	No	CXI.
All other succinimides .....	No	(?).
<b>Sulfur compounds:</b>		
Aliphatic hydrocarbon sulfides .....	No	ELC, FER, (?).
Di-tertiary nonylpolysulfide .....	No	PAS.
Trisobutylene polysulfide .....	No	TX.
All other sulfur compounds .....	No	CHD, FER, TNA, UPJ, (?).
1,3,4-Thiadiazole, 2,5-bis(dialkylidithio) derivatives .....	No	ELC.
Tributyl phosphite .....	No	ALW.
Trimethylol propane ester .....	No	HCC, QCP, SCP.
Very high molecular weight (>1000) hydrocarbons .....	No	(?).
Zinc dialkylidithiophosphate .....	No	ELC, SOC, TNA, TX.
Zinc dialkylphenol dithiophosphate .....	No	SOC.
Zinc dibutyl phosphorodithioate .....	No	ELC.
Zinc hydrocarbon dithiophosphate .....	No	(?).
All other lubricating oil and grease additives, cyclic .....	No	CGY, ENJ, SM, TNA, (?), (?).
All other lubricating oil and grease additives, acyclic .....	No	ALW, DUP, ELC, QCP, SCP, SM, TNA, TX, (?), (?).
<b>Paint driers, naphthenic acid salts:</b>		
Cadmium naphthenate .....	No	CCA.
Calcium naphthenate .....	No	MCI, NOD.
Chromium naphthenate .....	No	MCI.
Cobalt naphthenate .....	Yes	CCA, MCI, NOD, SHP, TRO.
Copper naphthenate .....	No	NOD.
Iron naphthenate .....	No	MCI, NOD.
Lead naphthenate .....	No	MCI, NOD.
Manganese naphthenate .....	No	MCI, NOD.
Naphthenate driers, mixed salts .....	No	MCI.
Rare earths naphthenate .....	No	NOD.
Zinc naphthenate .....	No	MCI, NOD, TRO.

See footnotes at end of table.

Table 14-2—Continued

Miscellaneous end-use chemicals and chemical products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Miscellaneous end-use chemicals and chemical products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 14-3)
Photographic chemicals:	Yes	
N-2-(4-Amino-N-ethyl-m-toluidino)ethyl methane-sulfonamide	No	WAY.
Aryl alkyl polyether alcohol	No	DIX.
5-Chlorobenzotriazole	No	FMT.
4-Diazo-2,5-diethoxymorpholinobenzene	No	ALL.
2,5-Diethoxy-4-morpholinobenzenediazonium chloride	No	ALL.
p-Diethylaminobenzenediazonium chloride (p-Diazo-N,N-diethylaniline zinc chloride)	No	ALL.
p-Dimethylaminobenzenediazonium chloride (p-Diazo-N,N-dimethylaniline zinc chloride)	No	ALL.
p-Diphenylaminodiazonium sulfate	No	ALL.
p-[Ethyl(2-hydroxyethyl)amino]benzenediazonium chloride -diazo-n-hydroxyethylaniline zinc chloride	No	ALL.
(N-Ethyl-N-(2-hydroxyethyl)-3-methyldehydrogen sulfate)p-phenylenediamine	No	(?).
Hydroquinone (Hydroquinol)	No	EKT.
p-Methylaminophenol sulfate (Metol)	No	EK.
2-Methylbenzoxazole	No	DUP.
5-Methyl-1,7-dihydroxy-1,3,4-triazalindolizine	No	FMT.
3-Methyl-N-[2(methylsulfonamidoethyl)-N-ethyl-p-phenylenediamine] sequisulfate monohydrate	No	(?).
4-Methyl-1-phenyl-3-pyrazolidione	No	CWN.
p-Morpholinyl-2,5-dibutoxybenzene diazonium chloride	No	ALL.
6-Nitrobenzimidazole	No	FMT.
Phenyl-5-mercaptotetrazole	No	FMT.
1-Phenyl-3-pyrazolidone	No	CWN.
Poly(vinyl-o-sulfobenzal)	No	DUP.
4-N-(1-Pyrrolidyl)-m-toluenediazonium chloride	No	ALL.
All other photographic chemicals	No	ARN, CHD, DUP, FMT, WAY, (?), (?).
Polymers for fibers:	Yes	
Cellulose acetate	No	EKT, MIL.
Copolyurethane urea	No	DUP.
Nylon 6 and 6/6:		
Nylon 6 (polymer for fiber, only)	No	ACS, CNP, (?).
Nylon 6/6	No	DUP, MON.
Polyacrylonitrile and acrylonitrile copolymers	Yes	ACY, BKM, DUP, MON.
Polyethylene terephthalate	No	DUP, EKT, FRF, GYR.
Poly-m-phenylene isophthalamide	No	DUP.
Poly-p-phenylene terephthalamide	No	DUP.
All other polymers for fibers	No	ATR, HCL.
Polymers, water soluble:	Yes	
Acrylamide polymers and co-polymers:		
Acrylamide-2-acrylamido-2-methylpropanesulfonic acid, sodium salt polymer	No	ENJ, (?).
Acrylamide-acrylic acid copolymer	No	CHP.
Acrylamide-acrylic acid copolymer, sodium salt	No	BKM, (?).
Acrylamide-trimethylaminoethyl acrylate chloride polymer	No	(?).
Acrylamide-trimethylaminoethyl methacrylate chloride	No	(?).
Adipic acid-crosslinked polyacrylamide	No	BKM, ENJ, HCL, SCP, (?), (?).
Polyacrylamide	No	ACY, ENJ, MRK, SQA, (?).
All other polyacrylamide copolymers	No	HCL, (?).
Cellulose esters and ethers:		
Hydroxyethylcellulose	No	AQU, DOW, UCC, UPJ.
Hydroxyethyl hydroxypropyl cellulose	No	(?).
2-Hydroxypropyl cellulose	No	AQU.
Methylcellulose	No	DOW.
Sodium carboxymethylcellulose (100%)	No	AQU, CBC, LCS, MAK.
All other cellulose ethers and esters	No	AQU, DIX, S, (?).

See footnotes at end of table.

Table 14-2—Continued

Miscellaneous end-use chemicals and chemical products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Miscellaneous end-use chemicals and chemical products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 14-3)
<b>Polymers, water soluble—Continued</b>		
Dimethylamine epichlorohydrin ethylenediamine copolymer	No	( <sup>2</sup> ).
Ethyl acrylate methacrylic acid copolymer	No	ALC.
Hydroxypropyl guar gum	No	AQU.
Poly(acrylic acid, ethyl ester)	No	DUP.
Poly(acrylic acid, methyl ester/ethylene/1,1-dichlorosuccinic acid, methylene-)	No	DUP.
Poly(acrylic acid, methyl ester/ethylene/1,1-dichlorosuccinic acid, methylene-) with ethyl acrylate	No	DUP.
<b>Polyacrylic acid salts:</b>		
Ammonium polyacrylate	No	CCL, RH, ( <sup>2</sup> ), ( <sup>2</sup> ).
Polyacrylate methacrylate copolymers	No	BFG, RH, ( <sup>2</sup> ).
Polyacrylate poly(hydroxypropylacrylate) copolymer	No	( <sup>2</sup> ).
Polyacrylic acid	No	MYO, ( <sup>2</sup> ), ( <sup>2</sup> ).
Sodium ammonium polyacrylate and copolymers	No	ALC, BAS, BFG, RH, SCP, ( <sup>2</sup> ), ( <sup>2</sup> ).
Sodium carboxymethyl amylose	No	CCL.
Sodium carboxymethyl starch	No	( <sup>2</sup> ).
Sodium polyacrylate	No	BKM, DOW, EFH, MYO, SYT.
Sodium polyacrylate, grafted	No	( <sup>2</sup> ).
All other polyacrylic acid salts	No	ENJ, ( <sup>2</sup> ), ( <sup>2</sup> ), ( <sup>2</sup> ).
Polyacrylonitrile, hydrolyzed	No	BKM, DIX(E), GPC, RH.
Polyacrylonitrile, starch hydrolyzed polymer	No	GPC.
Polyamines	No	ENJ, QCP, ( <sup>2</sup> ).
Polydextrose	No	PFZ.
Poly(diallyldimethylammonium chloride)	No	CPS, MRK, ( <sup>2</sup> ).
Polyethyleneimine	No	DAN.
All other polymers, water soluble	No	BKM, DAN, EFH, PRA, RH, RPC, SCP, SYT, ( <sup>2</sup> ), ( <sup>2</sup> ), ( <sup>2</sup> ), ( <sup>2</sup> ).
Polymethacrylic acid, sodium salt	No	ALC, CPS.
Poly(1,1'-(methylimino)bis(3-chloro-2-propanol)-tetramethylethylenediamine)	No	BKM.
<b>I-Vinyl-2-pyrrolidinone, copolymers with vinyl</b>		
acetate	No	DAN.
1-Vinyl-2-pyrrolidinone, polymers	No	CCL, DAN, GAF, ( <sup>2</sup> ).
Xanthan gum	No	PFZ.
<b>Poly-olefins:</b>		
Poly-olefins	Yes	
Poly- $\alpha$ -olefins	No	CO, SM, SOC.
Poly- $\alpha$ -olefins, sulfurized	No	SM.
<b>Rare sugars:</b>		
l-Arabinose	No	PFN.
D-Galactose	No	PFN.
D-Maltose	No	PFN.
<b>Silicone greases:</b>		
Silicone greases	No	DCC, SPD, SWS.
<b>Tanning materials, synthetic:</b>		
1-Naphthalenesulfonic acid, formaldehyde condensate and salt	No	RH.
2-Naphthalenesulfonic acid, formaldehyde condensate and salt	No	GRD.
1-Phenol-2-sulfonic acid, formaldehyde condensate (Phenol-formaldehyde, sulfonated)	No	BAS, RH.
Polyoxyalkylated cyclic amines	No	ML.
All other tanning materials, synthetic	No	BAS, SCP.
<b>Textile chemicals, other than surface active agents:</b>		
N,N-Bis-(2-hydroxyethyl)octadecanamide	No	CCC.
N,N-Dibenzylhydroxylamine	No	CCC.
Dicyanodiamide formaldehyde ammonium chloride polymer	No	CCC, DAN, S, SYT.
Dimethyloldihydroxyethylene urea	No	ACY, CCC, CHP, DAN, SYT.
Formaldehyde polymer with carbamate esters	No	SYT.

See footnotes at end of table.

Table 14-2—Continued

Miscellaneous end-use chemicals and chemical products for which U.S. production and/or sales were reported, identified by manufacturer, 1989

Miscellaneous end-use chemicals and chemical products	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 14-3)
<b>Textile chemicals, other than surface active agents—Continued</b>		
Hydrogenated tallow fatty acid aminoethylethanolamine condensation products	No	CCC.
Lauryl alkyl dimethylamine acetate	No	(2).
Lauryl alkyl dimethylamine phosphate	No	(2).
Melamine formaldehyde methanol polymer	No	ACY, CCC.
Melamine formaldehyde copolymer	No	ENJ.
Melamine stearyl alcohol polymer	No	SYT.
Propoxylated starches	No	SYT.
2,2',4,4'-Tetrahydroxybenzophenone	No	BAS.
Tri(behenoyloxymethyl)trimethoxymethylmelamine	No	SYT.
Urea polymers with formaldehyde and methanol	Yes	ACY, BAS, CCC.
Urea, polymer with tetrakis[hydroxymethyl]phosphonium sulfate	No	CHP.
All other textile chemicals, other than surface active agents	No	BAS, CCC, DUP, ENJ, GAF, PAT, RPC, SCP.
Urea in compounds or mixtures (100% basis):		
Urea in feed compounds (100% basis)	Yes	BNP, CAC, HKY, SOH, TER, TRI, WYC.
Urea in liquid fertilizer (100% basis)	Yes	ARM, BNP, CFI, CHN, CNC, FRI, HKY, MSC, SMP, SOC, SOH, TER, TVA, UOC, WYC, (2).
Urea in plastics (100% basis)	No	OMC, SOH, TRI.
Urea in solid fertilizer (100% basis)	Yes	CAC, CFI, CNC, FRI, GCC, MSC, OMC, SOH, TER, TRI, TVA, UOC, WLC.

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

<sup>3</sup> Data for these companies was adjusted or estimated.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.



Table 14-3

Miscellaneous end-use chemicals and chemical products: Directory of manufacturers, alphabetical by code, 1989

<i>Code</i>	<i>Name of company</i>	<i>Code</i>	<i>Name of company</i>
ACS	Allied Signal, Inc. Engineered Materials Sector	EFH	E. F. Houghton Co.
ACY	American Cyanamid Co.	EK	Eastman Kodak Co.:
AJI	Ajinomoto USA, Inc.	EKT	Tennessee Eastman Co. Div.
ALC	Alco Chemical Corp.	ELC	Elco Corp. Sub. of Detrex Chemical Industries, Inc.
ALD	Aldrich Chemical Co., Inc.	ENJ	Exxon Chemical Americas
ALL	Alliance Chemical, Inc.	FER	Ferro Corp.:
ALW	Albright & Wilson Americas, Inc.		Bedford Chemical Div.
ALX	Alox Corp.		Kell Chemical Div.
AMO	Amoco Corp.	FMT	Fairmount Chemical Co., Inc.
AQU	Aqualon	FRF	Firestone Tire & Rubber Co., Firestone Fibers & Textiles Co.
ARM	LaRoche Industries, Inc.	FRI	Farmland Industries, Inc.
ARN	Arenol Chemical Corp.	GAF	GAF Chemical Corp.
ATR	Atlantic Richfield Co., Arco Chemical Co.	GBF	International Blo-Synthetics, Inc.
BAS	BASF Corp.	GCC	Arcadian Corp.
BCK	Beckman Instruments, Inc., Diagnostics System Group	GFS	GFS Chemicals, Inc.
BFG	B. F. Goodrich Co.	GLC	General Latex and Chemical Corp.
BKM	Buckman Laboratories, Inc.	GNR	Genencor, Inc.
BLZ	Belzak Corp.	GPC	Grain Processing Corp.
BNP	Terra International, Inc.	GRD	W. R. Grace & Co., Organic Chemicals Div.
BRD	Lonza, Inc.		Polymers & Chemical Div.
BRS	Bristol-Myers Co.	GRS	Champlin Refining Co.
CAC	Cominco Fertilizers, Inc.	GTL	Great Lakes Chemical Corp.
CBC	Carbose Corp.	GYR	Goodyear Tire & Rubber Co.
CCA	Akzo Chemicals, Inc.	HCC	Hatco Chemical Corp.
CCC	C. N. C. International, Inc.	HCL	Hoechst Celanese Corp.:
CCL	Catawba-Charlab, Inc.		Fibers Industrial Div.
CCW	Morton International, Inc., Specialty Chemicals Group		Sou-Tex Works.
CED	Cedar Chemical Co.	HKY	Arcadian Corp.
CFI	CF Industries, Inc.	HMP	W. R. Grace & Co., Organic Chemicals Div.
CGO	Citgo Petroleum Corp.		Hampshire Chemical Div.
CGY	Ciba-Gelgy Corp.	HPC	Hercules, Inc.
CHD	Chemdesign, Corp.	JFR	George A. Jeffreys & Co., Inc.
CHH	Chris Hansen's Laboratory, Inc.	LCS	Louisiana Chemical Polymers, Inc.
CHN	Wil-Gro Fertilizer, Inc.	LEM	Napp Chemicals, Inc.
CHP	C. H. Patrick & Co., Inc.	LYP	Lyondell Petrochemical Co.
CHT	Chattem, Inc.	MAK	MAK Chemical Corp.
CNC	Columbia Nitrogen Corp.	MCI	Mooney Chemicals, Inc.
CNP	DSM Chemicals, North America	MCK	MacKenzie Chemical Works, Inc.
CO	Conoco Specialty Products, Inc.	MIL	Milliken & Co., Milliken Chemical Div.
COC	Columbia Organic Chemical Co., Inc.	MLS	Miles Laboratories, Inc., Biotechnology Group.
CPS	CPS Chemical, Co., Inc.	MNA	Monsanto Agricultural Co.
CSP	Coastal Refining & Marketing, Inc.	MOC	Marathon Petroleum Co., Texas Refining Div.
CWN	Upjohn Co., Fine Chemicals	MON	Monsanto Co.
CXI	Chemical Exchange Industries, Inc.	MRK	Merck & Co., Inc.
DA	Diamond Shamrock Refining & Marketing	MSC	Mississippi Chemical Corp.
DAN	Dan River, Inc., Chemical Products Div.	MYO	Mayo Chemical Co.
DCC	Dow Corning Corp.	NBI	Novo Biochemical Industries, Inc.
DGC	Degussa Corp.	NOD	Huls, America, Inc.
DIX	Dixie Chemical Co., Inc.	NSW	NutraSweet Co.
DOW	Dow Chemical Co.	OMC	Olin Corp.
DUP	E. I. duPont de Nemours & Co., Inc. Chemicals and Pigments Dept. ED/IMG Dept. Fibers Dept.	PAH	Parlsh Chemical Co.
		PAR	Pennzoll Co., Penreco Div.

Table 14-3—Continued

Miscellaneous end-use chemicals and chemical products: Directory of manufacturers, alphabetical by code, 1989

<i>Code</i>	<i>Name of company</i>	<i>Code</i>	<i>Name of company</i>
PAS .....	Atochem North America, Inc.	SPR .....	Scientific Protein Laboratories
PAT .....	Pat-Chem, Inc.	SQA .....	Segua Chemicals, Inc.
PFN .....	Pfanstiehl Laboratories, Inc.	SUN .....	Sun Co., Inc.
PFZ .....	Pfizer, Inc.	SWS .....	Wacker Silicones, Corp.
PIC .....	Pierce Chemical Co.	SYT .....	Synthron, Inc.
PLB .....	Pharmacia P-L Blochemicals, Inc.	TER .....	Terra International, Inc.
PMP .....	PMP Fermentation Products, Inc.	TNA .....	Ethyl Corp.
PRA .....	Para-Chem Southern, Inc.	TPC .....	Texas Petrochemicals Corp.
QCP .....	Quaker Chemical Corp.	TRD .....	Bristol Myers Squibb Co.
REG .....	Regis Chemical Co.	TRI .....	Triad Chemical
RH .....	Rohm & Haas Co.	TRO .....	Troy Chemical Corp.
RPC .....	Colloids, Inc., Lyndal Div.	TVA .....	Tennessee Valley Authority, NFDC, TVA, OACD, Div. of Developmental Production
RSA .....	R.S.A. Corp.	TX .....	Texaco, Inc., Texaco Chemical Co.
S .....	Sandoz Chemical Corp., Colors & Chemicals Div.	UCC .....	Union Carbide Corp., Industrial Chemical Div.
SCP .....	Henkel Corp.	UOC .....	Union Oil Co. of California
SHC .....	Shell Chemical Co.	UPJ .....	Upjohn Co.
SHP .....	Shepherd Chemical Co.	UPM .....	UOP Inc.
SHX .....	Sherex Chemical Co., Inc.	USR .....	Uniroyal Chemical Co., Inc.
SM .....	Mobil Oil Corp., Chemical Product Div. Beaumont Refinery Div.	VLR .....	Valero Refining & Marketing Co.
SMP .....	J. R. Simplot Co.	VNC .....	Vanderbilt Chemical Corp.
SOC .....	Chevron Corp., Chevron Chemical Co.	WAY .....	Olin Hunt Specialty Products, Inc.
SOG .....	Hill Petroleum Company	WLC .....	Freeport-McMoran Resource Partners
SOH .....	BP Chemicals America, Inc.	WTC .....	Witco Chemical Corp.
SPD .....	General Electric Co., Silicone Products Div.	WYC .....	Coastal Chem, Inc.

Note.—Complete names, telephone numbers, and addresses of the above reporting companies are listed in table 1 of the appendix.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

## Section 15

### Miscellaneous Cyclic and Acyclic Chemicals

The term "miscellaneous chemicals" as it is used here comprises those synthetic organic products that are not included in the use groups covered by sections I–XIV of this report. They include products that are employed in a great variety of applications. The number of chemicals used extensively for only one purpose is not large. Among the products covered in this section are those used for refrigerants, aerosols, solvents, catalysts, additives in plastics and food products, and, especially, a wide range of acyclic chemical intermediates.

Figure 15-1 shows the trend of production of miscellaneous chemicals during 1985–89, and shows that after a steady rate of increase after 1985, production in 1989 was less than in the previous year.

U.S. production of miscellaneous cyclic and acyclic chemicals in 1989 amounted to 48.9 billion kilograms, an increase of 1.7 percent compared with production in 1988 (Table 15-1). Production of miscellaneous acyclic chemicals comprised 96.7 percent of this section's total production.

Because most of the production of miscellaneous chemicals is used internally by their producers to make more advanced intermediates and other chemical products, their sales are much smaller than their production. In 1989, sales of miscellaneous chemicals were 20.2 billion kilograms, valued at \$16.3 billion, compared with 19.1 billion kilograms, valued at \$15.1 billion, in 1988. The increase in sales quantity in 1989 was 5.3 percent. However, indicating that the surge in prices of the two previous years was almost at an end, the unit value of sales in 1989, 80.7 cents per kilogram, was little changed from the previous year's 78.9 cents per kilogram.

Oxygenated hydrocarbons accounted for about 61 percent of the production of all acyclic miscellaneous chemicals. Production of

oxygenated hydrocarbons, which include organic acids, alcohols (the largest group), ketones, esters, ethers, aldehydes, epoxides, and other chemicals, was 28.8 billion kilograms in 1989, a marginal increase over the 28.3 billion kilograms produced in 1988.

With a 29 percent greater production volume than monohydric and polyhydric alcohols combined, halogenated hydrocarbons is the leading individual group. Production of halogenated hydrocarbons was about 13.3 million kilograms in 1989, about 0.4 million kilograms more than in 1988. Production of chlorinated hydrocarbons, by far the largest segment of this group, was 12.7 billion kilograms in 1989, compared with 12.2 billion kilograms in 1988. The very minor change in production for this entire group in 1988–89 hides increased production of some of its constituent chemicals: chloroform (up 12 percent), vinyl chloride (up 12 percent), and 1,1,1-trichloroethane (up 8 percent). Fluorinated hydrocarbons production, 592 million kilograms in 1989, was 5 percent less than in 1988, following an increase of 18 percent in the earlier year.

Production of the second largest individual group of miscellaneous acyclic chemicals—monohydric alcohols—decreased 11 percent in 1989, to 6.7 billion kilograms, following two years of significant growth. The decrease was spread evenly among most of the major alcohols.

Virtually in a tie for third place among miscellaneous acyclic chemicals, each with production close to 4.2 billion kilograms in 1989, are nitrogenous compounds, acids/anhydrides and aldehydes. Their production was almost the same in 1988.

Table 15-2 lists the products in this section individually identified by manufacturer(s) codes. Table 15-3 lists those codes alphabetically and identifies the manufacturer by name.

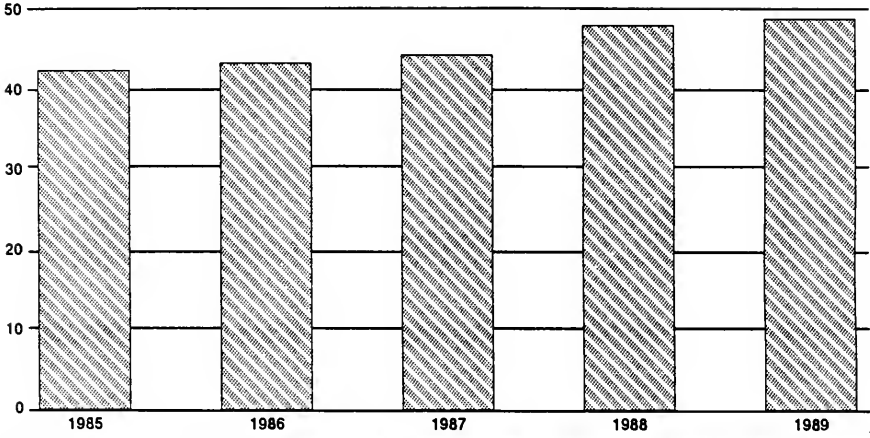
*Aimison Jonnard*

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*(Effective 1/14/91 202-205-3350)*

**Figure 15-1**  
**Miscellaneous cyclic and acyclic chemicals: U.S. production, 1985-89**

*Billions  
of kilograms*



Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 15-1

Miscellaneous cyclic and acyclic chemicals: U.S. production and sales, 1989

Miscellaneous cyclic and acyclic chemicals	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
Grand total	48,871,030	20,166,509	16,269,608	\$0.81
<b>Cyclic</b>				
Total	1,567,895	735,100	1,467,990	2.00
Benzolc acid esters	2,338	1,685	3,342	1.98
Benzolc acid salts	( <sup>2</sup> )	12,930	19,741	1.53
Benzoyl peroxide	4,354	3,161	16,831	5.32
Caprolactam	592,987	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Hexamethylenetetramine, tech	44,396	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Lactones	66,008	6,883	16,697	2.43
Maleic anhydride	215,515	169,856	166,369	.98
Morpholine	11,678	13,746	23,846	1.73
Pinene and derivatives, total	137,340	22,514	27,815	1.24
β-Pinene	16,756	1,674	2,310	1.38
Pine oil, natural, sulfate	2,287	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
All other pinene and derivatives	118,297	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Succinic anhydride derivatives	7,863	7,177	16,043	2.24
Tall oil salts (Linoleic-rosin acid salts)	716	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
All other miscellaneous cyclic chemicals	484,700	497,148	1,177,306	2.37
<b>Acyclic</b>				
Total	47,235,675	19,368,214	14,779,191	.76
<b>Nitrogenous compounds</b>				
Total	4,155,655	1,412,658	1,640,517	1.16
<b>Amides, total</b>				
	143,162	73,878	132,013	1.79
Erucamide	3,783	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
N,N'-Ethylenebis-oleamide	234	256	765	2.99
N,N'-Ethylenebis-stearamide	21,783	16,063	23,709	1.48
Oleamide (Octadecene amide)	1,856	1,569	4,123	2.63
All other amides	115,506	55,990	103,416	1.85
<b>Amines, total<sup>3</sup></b>				
	877,229	278,605	414,299	1.49
<b>Butylamines, total</b>				
	13,855	11,423	22,262	1.95
n-Butylamines	( <sup>2</sup> )	1,254	2,396	1.91
DI-n-Butylamine	( <sup>2</sup> )	2,670	4,539	1.70
All other butylamines	13,855	7,499	15,327	2.04
Diethylamine	( <sup>2</sup> )	2,292	4,070	1.78
Dimethylaminopropylamine	3,076	3,459	7,555	2.18

See footnotes at end of table.

Table 15-1—Continued

Miscellaneous cyclic and acyclic chemicals: U.S. production and sales, 1989

Miscellaneous cyclic and acyclic chemicals	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Acyclic—Continued</b>				
<b>Nitrogenous compounds—Continued</b>				
<b>Amines—Continued</b>				
Ethylenediamine .....	34,241	24,149	45,416	\$1.88
Isopropylamine, mono- .....	( <sup>2</sup> )	28,474	24,465	.86
Dimethylamine .....	46,781	39,518	32,757	.83
Triethylamine .....	( <sup>2</sup> )	7,922	14,544	1.84
Trimethylamine .....	23,421	17,282	12,877	.75
All other amines .....	755,855	144,086	250,353	1.74
<b>Ethanolamines, total .....</b>	<b>302,566</b>	<b>234,808</b>	<b>282,832</b>	<b>1.21</b>
2,2'-Aminodiethanol (Diethanolamine) .....	91,896	79,131	91,626	1.16
2-Aminoethanol (Monoethanolamine) .....	107,339	67,691	74,340	1.10
2,2',2''-Nitrilotriethanol (Triethanolamine) .....	93,066	81,016	95,903	1.18
Methyldiethanolamine .....	10,265	6,970	20,963	3.01
<b>Nitriles, total .....</b>	<b>2,272,076</b>	<b>708,695</b>	<b>550,668</b>	<b>.78</b>
Acetonitrile .....	18,943	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Acrylonitrile .....	1,071,519	606,821	455,180	.75
2-Methylacetonitrile (Acetone cyanohydrin) .....	582,907	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
All other nitriles .....	598,707	101,874	95,488	.93
<b>All other nitrogenous compounds .....</b>	<b>560,622</b>	<b>116,672</b>	<b>260,705</b>	<b>2.23</b>
<b>Acids, acyl halides and anhydrides</b>				
<b>Total .....</b>	<b>4,213,399</b>	<b>1,111,076</b>	<b>1,054,736</b>	<b>.95</b>
Acetic acid, synthetic, 100% .....	1,493,971	358,763	137,830	.38
Acrylic acid <sup>a</sup> .....	472,642	103,642	120,272	1.16
Dimer acid (C <sub>36</sub> dibasic acid) .....	18,407	14,236	15,481	1.09
Fatty acids, hydrogenated <sup>b</sup> .....	156,128	130,614	89,699	.69
Fumaric acid .....	( <sup>2</sup> )	12,936	17,481	1.35
Pivaloyl chloride .....	3,842	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
All other acids, acyl halides and anhydrides .....	2,068,409	490,885	673,973	1.37
<b>Salts of organic acids</b>				
<b>Total .....</b>	<b>189,710</b>	<b>163,545</b>	<b>267,492</b>	<b>1.64</b>
<b>Acetic acid salts, total .....</b>	<b>24,221</b>	<b>10,258</b>	<b>17,409</b>	<b>1.70</b>
Potassium acetate .....	1,843	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Sodium acetate .....	20,036	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Zinc acetate .....	( <sup>2</sup> )	127	435	3.42
All other acetic acid salts .....	2,342	10,131	16,974	1.68
<b>2-Ethylhexanoic acid (α-Ethylcaproic acid) salts, total .....</b>	<b>9,837</b>	<b>8,718</b>	<b>24,389</b>	<b>2.80</b>
Calcium 2-ethylhexanoate .....	1,218	1,139	2,003	1.76
Cobalt 2-ethylhexanoate .....	1,957	1,632	6,421	3.94
Manganese 2-ethylhexanoate .....	644	640	1,358	2.12
Zinc 2-ethylhexanoate .....	581	346	964	2.79
Zirconium 2-ethylhexanoate .....	1,765	1,361	5,404	3.97
All other 2-ethylhexanoic acid salts .....	3,672	3,600	8,239	2.29

See footnotes at end of table.

Table 15-1—Continued

Miscellaneous cyclic and acyclic chemicals: U.S. production and sales, 1989

Miscellaneous cyclic and acyclic chemicals	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Acyclic—Continued</b>				
<b>Salts of organic acids—Continued</b>				
Formic acid salts .....	8,237	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Lauric acid salts .....	( <sup>2</sup> )	657	3,449	\$5.25
Neodecanoic acid, calcium salt .....	22	26	55	2.12
Potassium oxalate .....	15	14	91	2.12
Propionic acid salts, total .....	( <sup>2</sup> )	19,102	16,129	.84
Calcium propionate .....	11,761	11,704	7,853	.67
All other propionic acid salts .....	( <sup>2</sup> )	7,398	8,276	1.12
Stearic acid salts, total .....	72,781	67,206	103,562	1.54
Aluminum stearates, total <sup>6</sup> .....	2,331	2,153	6,084	2.82
Aluminum tristearate .....	827	811	2,652	3.27
All other aluminum stearate salts .....	1,504	1,342	3,412	2.54
Barium stearate .....	1,280	288	625	2.17
Calcium stearate .....	42,594	41,317	51,408	1.24
Magnesium stearate .....	9,441	7,452	13,620	1.83
Zinc stearate .....	15,471	14,708	27,780	1.89
All other stearic acid salts .....	1,664	1,288	4,065	3.16
All other salts of organic acids .....	62,838	57,564	102,408	1.78
<b>Aldehydes</b>				
Total .....	4,062,273	1,472,908	310,058	.21
n-Butyraldehyde .....	763,572	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Formaldehyde (37% by weight) .....	2,873,233	1,305,488	173,426	.16
All other aldehydes .....	625,468	167,420	136,632	.82
<b>Ketones</b>				
Total .....	1,486,984	1,059,680	570,449	.51
Acetone .....	1,145,022	711,140	294,472	.41
Diacetone alcohol (Hydroxymethyl pentanone) .....	( <sup>2</sup> )	9,851	10,535	1.07
Methyl ethyl ketone (2-Butanone) .....	204,157	226,261	138,570	.61
4-Methyl-2-pentanone (Methyl isobutyl ketone) .....	77,494	75,633	64,813	.86
All other ketones .....	60,311	36,795	62,059	1.69
<b>Alcohols, monohydric, unsubstituted</b>				
Total .....	6,681,833	3,961,655	1,502,725	.38
<b>Alcohols, C<sub>11</sub> or lower, unmixed, total</b>				
Butyl alcohols, total .....	( <sup>2</sup> )	318,125	188,828	.59
n-Butyl alcohol (n-Propylcarbinol) .....	794,100	260,716	147,693	.57
Isobutyl alcohol (Isopropylcarbinol)* .....	61,443	49,535	31,101	.63
All other butyl alcohols .....	( <sup>2</sup> )	7,874	10,034	1.27
Ethyl alcohol, synthetic <sup>7</sup> .....	248,906	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
2-Ethyl-1-hexanol .....	277,825	171,118	106,174	.62
Isopropyl alcohol .....	668,518	539,427	235,659	.44

See footnotes at end of table.

Table 15-1—Continued

Miscellaneous cyclic and acyclic chemicals: U.S. production and sales, 1989

Miscellaneous cyclic and acyclic chemicals	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Acyclic—Continued</b>				
<b>Alcohols, monohydric, unsubstituted—Continued</b>				
Methanol, synthetic	3,704,475	2,238,583	326,720	\$.15
Propyl alcohol (Propanol)	82,634	49,373	39,897	.81
All other alcohols, C <sub>11</sub> or lower, unmixed	430,669	391,229	270,743	.69
Alcohols, C <sub>12</sub> and higher, unmixed, total	93,670	43,805	66,154	1.51
1-Octadecanol (Stearyl alcohol)	( <sup>2</sup> )	11,851	20,261	1.71
All other alcohols, C <sub>12</sub> and higher, unmixed	( <sup>2</sup> )	31,954	45,893	1.43
Mixtures of alcohols, total	319,592	209,995	268,550	1.28
Containing C <sub>11</sub> and lower	32,950	43,951	48,527	1.10
Containing C <sub>12</sub> and higher <sup>a</sup>	286,642	166,044	220,023	1.33
<b>Esters of monohydric alcohols</b>				
Total	2,833,482	1,405,324	1,373,753	.98
n-Butyl acetate	101,633	86,374	56,020	.76
Isobutyl acetate	37,303	24,439	16,641	.68
Butyl acrylate	240,256	92,414	115,263	1.25
Dilauryl-3,3'-thiodipropionate	1,073	1,075	4,042	3.76
Distearyl-3,3'-thiodipropionate	2,399	2,405	9,146	3.80
Ethyl acetate (100% base)	132,346	94,673	60,689	.64
2-Ethylhexyl acrylate	45,293	32,783	48,323	1.47
2-Ethylhexyl chloroformate	2,833	2,391	4,713	1.97
Fatty acid esters, not included with plasticizers or surface-active agents, total	9,470	5,179	8,227	1.59
Methyl esters of tallow	825	717	504	.70
Myristyl myristate	( <sup>2</sup> )	106	643	6.06
All other fatty acid esters not included with plasticizers or surface-active agents	8,645	4,358	7,080	1.63
Isopropyl acetate	18,144	16,837	15,594	.93
Methyl methacrylate	526,610	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Phosphorus acid esters, not elsewhere specified	62,638	50,613	120,034	2.37
Propyl acetate	34,399	28,797	28,958	1.01
Stearyl methacrylate	( <sup>2</sup> )	134	546	4.07
Vinyl acetate	1,157,802	589,092	473,259	.74
All other esters of monohydric alcohols	461,283	328,118	412,298	1.26
<b>Polyhydric alcohols<sup>a</sup></b>				
Total	3,655,849	2,923,572	2,722,879	.93
1,4-Butanediol	182,425	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Ethylene glycol	2,477,135	2,257,087	1,983,438	.88
Pentaerythritol	47,968	51,848	70,242	1.35
Propylene glycol	365,300	290,796	251,006	.86
Sorbitol (70%)	150,651	113,496	94,556	.83
All other polyhydric alcohols	432,370	210,345	323,637	1.54
Polyhydric alcohol esters	122,925	131,308	176,314	1.34
2-Butoxyethyl acetate	7,234	6,832	10,470	1.53
All other polyhydric alcohol esters	115,691	124,476	165,844	1.33

See footnotes at end of table.



Table 15-1—Continued

Miscellaneous cyclic and acyclic chemicals: U.S. production and sales, 1989

Miscellaneous cyclic and acyclic chemicals	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Acyclic—Continued</b>				
<b>Polyhydric alcohol ethers</b>				
Total .....	1,087,281	930,105	1,027,465	\$1.10
2-Butoxyethanol (Ethylene glycol monobutyl ether) .	164,198	144,810	137,235	.95
2-(2-Butoxyethoxy)ethanol (Diethylene glycol monobutyl ether) .....	42,471	36,158	42,642	1.18
2-[2-(2-Butoxyethoxy)ethoxy]ethanol (Triethylene glycol monobutyl ether) .....	6,215	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Diethylene glycol .....	197,303	158,024	109,030	.69
2-Ethoxyethanol (Ethylene glycol ethyl ether) .....	46,326	28,622	36,763	1.28
2-(2-Ethoxyethoxy)ethanol (Diethylene glycol monoethyl ether) .....	14,887	16,660	17,978	1.08
2-Methoxyethanol (Ethylene glycol methyl ether) ....	30,934	16,148	16,977	1.05
2-(2-Methoxyethoxy)ethanol (Diethylene glycol monomethyl ether) .....	19,323	29,193	33,387	1.14
2-[2-(2-Methoxyethoxy)ethoxy]ethanol (Triethylene glycol monomethyl ether) .....	14,137	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Polyglycols, ethylene glycol and glycol ether, mixed .	( <sup>2</sup> )	23,755	39,563	1.67
Polytetramethylene glycol ether .....	( <sup>2</sup> )	28,039	90,515	3.23
Triethylene glycol .....	50,697	48,354	64,315	1.33
Glycol ethers derived from propylene oxide, total ...	46,725	35,930	37,456	1.04
Dipropylene glycol .....	( <sup>2</sup> )	28,113	26,745	.95
All other glycol ethers derived from propylene oxide .....	( <sup>2</sup> )	7,817	10,711	1.37
All other polyhydric alcohols ethers .....	454,065	364,412	401,604	1.10
<b>Brominated, chlorinated, and fluorinated hydrocarbons</b>				
Total .....	13,315,582	3,697,361	2,651,813	.71
<b>Brominated (including bromochlorinated) hydrocarbons, total</b> .....				
6,575	4,024	17,304	4.30	
1-Bromobutane .....	( <sup>2</sup> )	241	590	2.45
All other brominated hydrocarbons .....	( <sup>2</sup> )	3,783	16,714	4.42
Chlorinated hydrocarbons, total .....	12,717,079	3,229,848	1,622,423	.50
<b>Chlorinated paraffins (C<sub>10</sub>-C<sub>30</sub>), total</b> .....				
29,136	28,742	33,117	1.15	
35%-64% chlorine .....	23,316	22,695	22,789	1.00
65% or more chlorine .....	5,820	6,047	10,328	1.71
Chloroform .....	266,534	229,311	102,223	.45
Chloromethane (Methyl chloride) <sup>4</sup> .....	208,906	93,761	38,775	.41
Dichloromethane (Methylene chloride) .....	218,468	140,857	66,777	.47
Ethyl chloride (Chloroethane) <sup>4</sup> .....	73,347	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Ethylene dichloride (1,2-Dichloroethane) <sup>4</sup> .....	6,070,377	667,052	157,898	.24
Tetrachloroethylene (Perchloroethylene) .....	218,286	197,147	97,220	.49
1,1,1-Trichloroethane (Methyl chloroform) .....	355,315	303,174	186,522	.62
Vinyl chloride, monomer (Chloroethylene) <sup>4</sup> .....	4,597,104	1,181,140	764,707	.66
All other chlorinated hydrocarbons .....	679,606	388,664	175,184	.45

See footnotes at end of table.

Table 15-1—Continued

Miscellaneous cyclic and acyclic chemicals: U.S. production and sales, 1989

Miscellaneous cyclic and acyclic chemicals	Production	Sales		Average Unit value <sup>1</sup>
		Quantity	Value	
	1,000 kilograms	1,000 kilograms	1,000 dollars	Per kilogram
<b>Acyclic—Continued</b>				
<b>Brominated, chlorinated, and fluorinated hydrocarbons—Continued</b>				
<b>Fluorinated (including other fluorohalogenated) hydrocarbons, total</b>				
Chlorodifluoromethane (F-22)	591,928	463,488	1,012,087	\$2.18
Dichlorodifluoromethane (F-12)	155,366	108,667	265,547	2.44
Trichlorodifluoromethane (F-11)	177,606	179,961	342,282	1.90
All other fluorinated (including other fluorohalogenated) hydrocarbons	87,335	86,233	139,910	1.62
All other miscellaneous acyclic chemicals	171,621	88,627	264,348	2.98
<b>Total</b>	<b>5,430,702</b>	<b>1,099,022</b>	<b>1,480,990</b>	<b>1.35</b>
<b>Acyclic peroxides, total</b>				
2-Butanone peroxide (MEK peroxide)	32,143	30,975	105,401	3.40
tert-Butyl peroxyphthalate	7,428	7,608	22,460	2.95
Di-tert-butyl peroxide (tert-Butyl peroxide)	2,742	2,389	9,805	4.10
All other acyclic peroxides	( <sup>2</sup> )	1,505	5,135	3.41
Expoxides, ethers and acetals, total	21,973	19,473	68,001	3.49
4,664,738	880,373	721,990	.82	
Ethylene oxide <sup>4</sup>	2,281,986	207,835	269,958	1.30
Glycidyl ethers	2,160	2,320	9,089	3.92
All other expoxides, ethers and acetals	2,380,592	670,218	442,943	.66
<b>Fats and oils, chemically modified<sup>10</sup></b>				
Organo-aluminum compounds	12,724	14,197	17,158	1.21
Organo-magnesium compounds	49,801	16,654	74,740	4.49
Hexamethyldisilazane	86	80	2,644	33.13
Organo-tin compounds	424	406	3,869	9.53
Silicone fluids	( <sup>2</sup> )	12,394	76,759	6.19
Phosgene (Carbonyl chloride)	64,055	41,432	172,913	4.17
All other miscellaneous acyclic chemicals, all other	274,633	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
332,098	102,511	305,516	2.98	
<b>Mixtures not specifically itemized</b>				
<b>Total</b>	<b>67,460</b>	<b>63,195</b>	<b>22,427</b>	<b>.35</b>
Fatty acid residues	12,107	11,809	1,974	.17
All other mixtures not specifically itemized <sup>11</sup>	55,353	51,386	20,453	.40

<sup>1</sup> Calculated from unrounded figures.<sup>2</sup> Reported data are accepted in confidence and may not be published, or no data were reported.<sup>3</sup> Statistics limited to compounds of carbon, hydrogen, and nitrogen; and exclude production and sales of fatty amines. Statistics on fatty amines are included in the section on "Surface-Active Agents."<sup>4</sup> The difference between the production reported here and that shown on the *Preliminary Report on U.S. Production of Selected Organic Chemicals (Including Synthetic Plastics and Resin Materials)*, 1989, results from a combination of incorrect reporting by some companies, end-of-year inventory adjustments, and rounding.<sup>5</sup> Excludes minor amounts reported as "fatty acids" and "partially hydrogenated".<sup>6</sup> Statistics exclude production and sales of potassium and sodium stearates. Statistics on these stearates are included in the section on "Surface-Active Agents."<sup>7</sup> Synthetic ethyl alcohol is conventionally defined as that portion made from ethylene. Bureau of Alcohol, Tobacco, and Firearms statistics give the production from "natural" sources, mainly grain.<sup>8</sup> Includes small amount of mixtures of alcohols on both sides of the C<sub>11</sub>-C<sub>12</sub> dividing line.<sup>9</sup> Some polyols which are used as intermediates for urethanes have been included in the section on "Plastics and Resin Materials."<sup>10</sup> Other than esters, salts, alcohols, acids, or acyl halides, which are tabulated in preceding groups.<sup>11</sup> Products included here are predominately acyclic; however, unspecified amounts of mixtures containing some cyclic chemicals may also be included.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 15-2

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Cyclic</b>	<b>Yes</b>	
6-Acetoxy-2,4-dimethyl-1,3-dioxane	No	GIV.
Alkylphenol formaldehyde condensate, alkoxylated	No	(?)
Alkylphenol formaldehyde copolymer	No	(?)
1-(2-Aminoethyl)piperazine	No	DOW.
1-(3-Aminopropyl)morpholine	No	TX.
Amyl ortho- and para-dimethylaminobenzoates	No	VND.
Benzenephosphinic acid	No	FER.
<b>Benzoic acid esters:</b>	<b>Yes</b>	
Benzoic acid, 2-butoxyethanol ester	No	PCI.
Benzoic acid, butyl ester (Butyl benzoate)	No	MRF, PCI, UTC.
Benzoic acid, C <sub>12</sub> -C <sub>16</sub> ester	No	FTX.
Benzoic acid, isodecyl ester	No	VEL.
2-Butoxyethyl benzoate	No	TCC.
2-Ethylhexyl benzoate	No	BRI.
Resorcinol monobenzoate	No	EKT.
Sucrose benzoate	No	VEL.
All other benzoic acid esters	No	CHD.
<b>Benzoic acid salts:</b>	<b>Yes</b>	
Ammonium benzoate	No	WTK.
Barium benzoate	No	FER.
Cadmium benzoate	No	VNC.
Potassium benzoate	No	KLM, PFZ.
Sodium benzoate	No	JRC, KLM, PFZ, RCN.
All other benzoic acid salts	No	VND.
Benzotriazole, polychlorinated	No	EK.
Benzotriazole, potassium & sodium salts	No	(?)
Benzotriazole, substituted	No	CGY.
Benzoyl peroxide	Yes	AZT, CAD, NOC, RCN.
Benzyl alcohol	No	KLM.
Benzyl chloroformate	No	VCM.
Bis[p-chlorobenzoyl]peroxide	No	CAD.
1,2-Bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamoyl)hydrazine	No	ASL, CGY.
Bis(2,4-dichlorobenzoyl) peroxide	No	CAD.
Bis(α,α-dimethylbenzyl)peroxide	No	RCN.
2,2-Bis(ferrocenyl)propane	No	(?)
Bis(hydroxymethyl)oleyl oxazoline	No	ANG.
2,2-Bis(4-hydroxyphenyl)4-methylpentane	No	ASL.
Bis(perfluoroalkyl)bis(alpha-monochlorohydryl)-pyromellitate	No	HCL.
Bis(triphenylsilyl)chromate	No	(?)
Boron fluoride-phenol complex	No	WTC.
β-Bromo-β-nitrostyrene	No	GIV.
2 (and 3)-tert-Butyl-4-methoxyphenol (Butylated hydroxyanisole, or, BHA)	No	EKT, UPM.
Butylmorpholine	No	TX.
tert-Butyl peroxybenzoate	No	AZT, FRE, NOC, RCN.
tert-Butylphenyl glycidyl ether	No	REZ.
Camphene	No	SCM.
Campholenic aldehyde	No	SCM, VIK.
Caprolactam (2-Oxohexamethylenimine)	Yes	ACS, BAS, CNP.
Caprolactam magnesium bromide	No	(?)
Cellulose acetate hexahydrophthalate	No	(?)
Cellulose acetate phthalate	No	EK.
Chlorothalaxanthone	No	PSG.
Cinnamionitrile	No	TNA.
Cresolsulfonic acid, formaldehyde condensate	No	HCL.
Cumene hydroperoxide	No	BTL, FRE.
α-Cumyl peroxyneodecanoate	No	RCN, WTC.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Cyclic—Continued</b>		
Cyanuric acid	No	MON.
Cyclic silizane	No	SCM.
Cyclohexane carbonitrile	No	DUP.
Cyclohexane dimethanol glycidyl ether	No	REZ.
Cyclohexanethiol	No	PAS.
2-Cyclohexene-1-octanoic acid, 5 (and 6)-carboxy-4-hexyl, C <sub>21</sub> H <sub>36</sub> O <sub>4</sub>	No	WVA.
1,4-Cyclohexylenedimethanol	No	EKT.
Cyclohexyl methacrylate	No	CPS.
Decabromodiphenyl ether (DBDP)	No	GTL, TNA.
4,4-Diaminodiphenyl ether	No	MAL.
1,8-Diazabicyclo (5.4.0)undecane	No	AIP.
1,4-Diazobicyclo (2.2.2)octane	No	(?)
2,5-Di(benzoyl peroxy)-2,5-dimethylhexane	No	AZT, RCN.
Dibenzoyl tartaric acid	No	CWN.
2,6-Di-tert-butyl-p-cresol (BHT, or, Butylated hydroxytoluene)	No	UCC, USR.
Di-t-butyl diperoxyphthalate	No	RCN.
2,5-Di-tert-butylhydroquinone	No	EKT.
1,1-Di(t-butyl peroxy) cyclohexane	No	RCN.
1,1-Di(t-butyl peroxy)-3,3,5-trimethyl cyclohexane	No	RCN.
2,4-Di-t-butyl phenyl 3,5-di-t-butyl hydroxybenzoate	No	FER.
1,3-Dichloro-5,5-dimethylhydantoin	No	BRD.
Dicumyl peroxide	No	FRE.
Dicyclopentadienylchromium (Chromocene)	No	(?)
3-Diethylamino-6-methyl-7-(2,4-dimethylanilino) fluoran	No	ESA.
N,N'-Diethyl-N,N'-diphenylurea	No	VCM.
Di(2-ethylhexyl)chloroendate	No	VEL.
o,o-Diethyl-o-phenyl phosphorothioate	No	ICI.
2,5-Dihydrothiophene-1,1-dioxide (Sulfolene)	No	PLC.
2,4-Dihydroxybenzophenone	No	BAS.
2,2'-Dihydroxy-4,4'-dimethoxybenzophenone	No	BAS.
Dihydroxydimethyl benzophenone	No	CWN.
3,5-Dihydroxy-3,5-dimethyl-1,2-peroxycyclopentane	No	RCN.
Diisopropylbenzene hydroperoxide	No	HPC.
p-Dimethoxybenzene (Dimethyl ether of hydroquinone)	No	ASL.
Dimethyl-1,4-cyclohexane dicarboxylate	No	EKT.
4,4-Dimethyl oxazolidone	No	ANG, EFH.
N,N-Dimethylphenyl urea	No	AC.
Dimethyl piperazine	No	TX.
Dimorpholine diethyl ether	No	TX.
Di-tert-octyl hydroquinone	No	EKT.
Dioxane (1,4-Diethylene oxide)	No	FER.
1,3-Dioxolane	No	FER.
Di-para-xylene	No	WCC.
Diphenyl-t-butylhexyl phosphite	No	WTC.
Diphenylisodecyl phosphite	No	WTC.
Diphenylisooctyl phosphite	No	WTC.
Dipropylene glycol salicylate	No	SBC.
4-(Dodecyloxy)-2-hydroxybenzophenone	No	EKT.
Dodecyl pyridinium chloride	No	TLC.
6-Ethoxy-12-dihydro-2,2,4-trimethyl quinoline	No	MON.
5-Ethyl-1-aza-3,7-dioxabicyclo[3.3.0]octane	No	ANG.
Ethyl-2-cyano-3,3-diphenyl acrylate	No	BAS.
Ethyl cyclohexylamine	No	PLC.
2-Ethylhexyl-2-cyano-3,3-diphenyl acrylate	No	BAS.
2-Ethylhexyl-1-p-dimethylaminobenzoate	No	CWN, VND.
2-Ethylhexyl-p-methoxy cinnamate	No	VND.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Cyclic—Continued</b>		
Ethyl hydroxymethyl oleyl oxazoline	No	ANG.
Ethylidene norbornene	No	UCC.
4-Ethylmorpholine	No	TX.
o-Ethylphenol	No	ASL.
N-Ethyl pyrrolidone	No	GAF.
Furan derivatives:		
2-Furaldehyde (Furfural)	No	QKO.
Furfuryl amine	No	QKO.
Furoic acid	No	QKO.
Methyl furan	No	QKO.
Methyl tetrahydrofuran (Methyl THF)	No	QKO.
Tetrahydrofurfuryl alcohol	No	QKO.
All other furan derivatives	No	BRD, QKO.
Glyceryl p-aminobenzoate	No	VND.
Hexabromocyclododecane	No	TNA.
Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine	No	ANG.
Hexamethylenetetramine, tech	Yes	BOR, HMP, PLS, WCL.
Homomenthol salicylate	No	WTC.
Hydrindantin	No	PIC.
Hydroquinone, di(β-hydroxyethyl) ether	No	EKT.
Hydroquinonesulfonic acid, potassium salt	No	EKT.
p-Hydroxybenzoic acid, butyl ester	No	KLM.
p-Hydroxybenzoic acid, ethyl ester	No	KLM.
p-Hydroxybenzoic acid, methyl ester	No	KLM, LEM.
p-Hydroxybenzoic acid, propyl ester	No	KLM, LEM.
N-(Hydroxyethyl)piperazine	No	SCP.
2-Hydroxy-4-methoxybenzophenone	No	BRD, VND.
Hydroxymethyl-5,5-hydantoin	No	BRD.
1-Hydroxy-6-octadecyloxy-2-naphthalene carboxylic acid	No	(?).
2-Hydroxy-4-n-octoxybenzophenone	No	BAS.
α-D-p-Hydroxyphenylglycine methyl ester K	No	BOC.
1,2,3-Indantrione monohydrate (Ninhydrin)	No	PIC.
Lactones:		
Butyrolactone	No	BAS, GAF.
Caprolactone	No	UCC.
Diketene	No	EKT.
Lead/iron resorcyate salicylate	No	SHP.
Maleic anhydride	Yes	AMO, ART, ASH, DKA, MON.
Methoxyethyl morpholine	No	TX.
4-Methoxyphenol	No	ASL, EKT.
Methylaziridine	No	ARS.
Methylbenzene sulfonate	No	EK.
Methyl-p-benzoquinone	No	EK.
2-Methylcyclohexylamine	No	AIP.
3-(N-Methyl-N-cyclohexylamino)-6-methyl-7-anilino fluora	No	GTL.
Methyl-3,5-di-tert-butyl-γ-hydroxyhydrocinnamate	No	CGY.
4-Methylmorpholine	No	TX.
4-Methylphthalic anhydride	No	ICI.
1-Methyl-2-pyrrolidone, monomer	No	BAS, GAF.
Methyltetrahydrophthalic anhydride	No	DIX(E).
Methyl thio pinacolone oxime	No	CED.
Morpholine	Yes	AIP, BAS, DOW, TX.
Morpholine salt of gluconic acid	No	(?).
Morpholine salt of p-toluene sulfonic acid	No	AMB.
1,2-Naphthoquinone-2-diazide-5-sulfonyl chloride (215-sulfonyl chloride)	No	ASL.
4-(2-Nitrobutyl) morpholine	No	ANG.
N-Nitrosophenylhydroxylamine salt	No	MAL.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Cyclic—Continued</b>		
Nonylphenol, alkoxylated/aminated	No	TX.
Nonylphenol glycidyl ether	No	REZ.
Octabromodiphenyl oxide	No	TNA.
Octadecyl-3-(3,5-di-tert-butyl-4-hydroxyphenyl)-proprionate	No	CGY, TNA.
Octylmethoxy cinnamate	No	TMH.
Phenethyl bromide	No	WCC.
Phenol-sulfonated formaldehyde rosin	No	HCL.
2-Phenoxyethanol (Ethylene glycol monophenyl ether)	No	SCP, UCC.
Phenyl acid phosphate	No	ALW.
Phenyldisodocyl phosphite	No	WTC.
$\alpha$ -D-Phenylglycine methyl ester K	No	BOC.
1-Phenyl-2-hydroxy-2-methyl-propanone-1	No	CWN.
Phenylpropanolamine	No	ORT.
Phenyl xylyl ethane	No	HCC.
Phosphonate ester, cyclic	No	ALW.
Phthalic acid, lead salt, (Dibasic)	No	ALI.
Picramic acid, sodium salt	No	SDC.
Pinene and derivatives:	Yes	
Pinane	No	SCM.
Pinane hydroperoxide	No	SCM.
2-Pinanol (cis and trans)	No	SCM.
$\alpha$ -Pinene	No	ARZ, SCM.
$\beta$ -Pinene	Yes	ARZ, NCI, SCM.
$\alpha$ -Pinene oxide	No	SCM, VIK.
Pinene, sulfate	No	ARZ, HPC, NCI.
Pinene, wood	No	HPC.
Pine oil, natural, sulfate	Yes	ARZ, NCI, SCM.
Pine oil, synthetic	No	ARZ, SCM.
Polyglycols-toluene diisocyanate reaction product	No	( <sup>2</sup> ).
Propylene glycol dibenzoate	No	VEL.
Propyl gallate	No	EKT.
2,4(1H,3H)Pyrimidinedione	No	SCM.
2-Pyrrolidone-1-ethyl polymer with 1-icosene	No	GAF.
p-Quinone	No	EKT.
Resorcinol diglycidyl ether	No	REZ.
Rosin acid salts	No	GP.
Salicylic acid, ammonium salt	No	WTK.
Salicylic acid magnesium salt	No	KLM, WTK.
3-Sodiosulfobenzic acid	No	EKT.
Stannous dioctyl phthalate (Dioctyl tin phthalate)	No	( <sup>2</sup> ).
Styrene oxide	No	UCC.
Succinic anhydride	No	BCC, MIL.
Succinic anhydride derivatives:	Yes	
Dodecylsuccinic anhydride	No	BCC, DIX, HMY.
Dodecylsuccinic anhydride	No	MIL.
Iso-Hexadecenyl succinic anhydride	No	DIX.
Iso-octadecenylsuccinic anhydride	No	DIX, HMY.
Nonenylsuccinic anhydride	No	HMY.
Octadecenyl succinic anhydride	No	HMY.
Octenylsuccinic anhydride	No	DIX, HMY, MIL.
All other succinic anhydride derivatives	No	HMY.
Tall oil acyl chloride	No	CCC, WVA.
Tall oil, chemically modified	No	FOC, WVA, ( <sup>2</sup> ), ( <sup>2</sup> ).
Tall oil fatty acids, polymerized	No	SHX, WVA.
Tall oil monomer	No	WTC.
Tall oil, Pentaerythritol tallate	No	EFH.
Tall oil salts (linoleic-rosin acid salts):	Yes	
Calcium manganese tallate	No	MCI, SHP.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Cyclic—Continued</b>		
<b>Tall oil salts (linoleic-rosin acid salts)—Continued</b>		
Cobalt manganese tallate	No	MCI, SHP.
Cobalt tallate	No	MCI, SHP.
Lead tallate	No	MCI.
Manganese tallate	No	MCI, SHP.
Zinc tallate	No	MCI.
All other tall oil salts (Linoleic-rosin acid salts)	No	CCA, (2).
Tannic acid, N.F.	No	MAL.
Terpene hydrocarbons, monocyclic (Solvenol)	No	HPC, NCI, SCM.
Tetrabromobisphenol A	No	GTL, TNA.
2-tetradecylcyclohexyl aniline	No	EKT.
1,2,3,4-Tetrahydronaphthalene (Tetralin)	No	DUP.
Tetrahydrothiophene	No	PAS.
Tetrahydrothiophene-1,1-dioxide (Sulfolane)	No	PLC.
Tetrakis[methylene(3,5-di-tert-butyl-4-hydroxyhydrocinamate)methane]	No	CGY.
4,4'-Thiobis(6-tert-butyl-o-cresol)	No	TNA.
Thiodiethylene bis(3,5-di-tert-butyl-4-hydroxyhydrocinamate)	No	CGY.
Thiophene	No	PAS.
Tolyltriazole, potassium salt	No	(2).
1,3,5-Triazine-(1,3,5(2H,4H,6H))—triethanol	No	(2).
3,4,4'-Trichlorocarbaniilide	No	MON.
Trichloromelamine	No	GFS.
1,3,5-Trichloro-s-triazine-2,4,6-(1H,3H,5H)trione (Trichloroisocyanuric acid)	No	MON, OMC.
Tri(2,4-ditertiarybutylphenyl) phosphite	No	WTC.
1,3,5-Trisopropyl benzene	No	EKT.
Tri(methoxymethyl) tri(stearoxymethyl) melamine	No	WPG.
Trimethyl-1-cyclohexane	No	ENJ.
3,3,5-Trimethylcyclohexanol (m-homomenthol)	No	ARS.
3,5,5-Trimethyl-2-cyclohexene-1-one (Isophorone)	No	ENJ, UCC.
Triphenyl phosphite	No	WTC.
Tris(3,5-di-tert-butyl-y-hydroxybenzyl)isocyanurate	No	CGY.
Urea toluenesulfonate	No	NES.
1-Vinyl-2-pyrrolidone—other copolymers	No	GAF.
1-Vinyl-2-pyrrolidone-methylacrylic acid, dimethylamine ethyl ester, copolymer	No	GAF.
1-Vinyl-2-pyrrolidone, monomer	No	GAF.
1-Vinyl-2-pyrrolidone—vinyl acetate copolymer	No	GAF.
All other cyclic chemicals	No	ALW, ASL, BAS, CGY, CHD, CWN, DPW, EK, EK, EK, HCL, KCH, MIL, MNA, PAC, PIC, RCN, REG, REZ, RH, RQT, RSA, S, SCM, SCP, SHP, TNA, UCC, VIK, WAY, WTC, (2), (2), (2), (2), (2), (2).
<b>Acyclic:</b>	<b>Yes</b>	
<b>Nitrogenous compounds:</b>		
Acetaldehyde dimethylhydrazone	No	DIX.
Acetamidoethanol (N-Acetyl-ethanolamine)	No	SBC.
<b>Amides:</b>		
Acetamide	No	WTK.
Acrylamide monomer	No	ACY, BFG, (2).
Acrylamide polymer with N,N-Diethyl-N-methyl-2-[(1-oxo-2-propenyloxy)ethaniminium sulfate]	No	(2).
Amidoamines	No	PAC.
1,1'-Azobisformamide	No	USR.
Behenamide	No	ASL, WTC.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Nitrogenous compounds—Continued</b>		
<b>Amides—Continued</b>		
Bis[2-(octadecylamido)ethyl]-N-(2-cyanoethyl)-N-ethyl ammonium ethyl sulfate	No	SBC.
Chloromethylene dimethyliminium (Amide chloride)	No	CWN.
Coconut oil amide	No	ARC, CAD, FER.
2,2-Dibromo-3-nitropropioamide	No	DOW.
N,N-Diethyldodecanamide	No	EK.
N,N-Dimethylacetamide	No	DUP, MON.
N,N-Dimethylacetacetamide	No	BRD, EKT.
Dimethylaminopropyl methacrylamide	No	TX.
N,N-Dimethylformamide	No	AIP, DUP.
Erucamide	Yes	ARC, SYP, WTC.
Erucyl stearamide	No	WTC.
N-N-Ethylenebis(cocoamide)	No	WTC.
N,N'-Ethylenebis-oleamide (Oleic acid-ethylene diamine condensate (Amine/acid ratio = 1/2))	Yes	BRD, CCW, WTC.
N,N'-Ethylenebis(stearamide)	Yes	BRD, CCW, WTC.
N-(Hydroxymethyl)-formamide	No	( <sup>2</sup> ).
Methacrylamide	No	BFG, DUP.
N-Methylacetamide	No	ARS.
Monomethylacetacetamide	No	EKT.
Oleamide (Octadecene amide)	Yes	ARC, SYP, WTC.
Oleoylpalmitamide	No	HXL, WTC.
Oxamide	No	HML, ( <sup>2</sup> ).
Stearamide (Octadecane amide)	No	SYP, WTC.
Stearylceramide	No	HXL, WTC.
Stearyl stearamide	No	WTC.
Tallow amide, hydrogenated	No	ARC, CAD.
All other amides	No	ARC, ARS, FER, MIL, REG.
<b>Amines:</b>		
t-Alkylamines, primary, mixed	Yes	RH.
<b>Alkylamines:</b>		
Allylamine	No	HCL.
Diallylamine	No	HCL.
Triallylamine	No	HCL.
N,N'-Bis(2-amino-2-methyl)propyl-1,2-ethane diamine	No	HXL
Bis-hexamethylenetriamine amine	No	DUP, MON.
<b>Butylamines:</b>		
n-Butylamine, mono	Yes	AIP, HCL, PAS.
sec-Butylamine, mono	No	FER, PAS.
tert-Butylamine, mono	No	MON, SC.
Di-n-butylamine	Yes	AIP, HCL, PAS.
Dilsobutylamine	No	AIP, HCL.
Tri-n-butylamine	No	AIP, HCL, PAS.
n-Butylethylamine	No	AIP.
Di-tert-butylethyldiamine	No	DOW, HCL.
Diethylenetriamine	No	TX, UCC.
Di-2-ethylhexylamine	No	HCL.
Dilsopropylamine	No	AIP, PAS, UCC.
2,2-Dimethyl-N-(2-aminoethyl)-1,2-ethane diamine	No	HXL.
Dimethylaminopropylamine	No	AIP, BAS, TX.
3-Dimethylaminopropylamine	No	HCL.
N,N-Dimethylbutylamine	No	HCL.
<b>Ethylamines:</b>		
Diethylamine	Yes	AIP, HCL, PAS, UCC.
Ethylamine, mono-	No	AIP, HCL, PAS, UCC.
Triethylamine	Yes	AIP, HCL, PAS, UCC.

See footnotes at end of table.



Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Nitrogenous compounds—Continued</b>		
<b>Amines—Continued</b>		
Ethylenediamine	Yes	DOW, TX, UCC.
(2-Ethylhexyl) amine, mono-	No	HCL, PAS.
N-Ethyl-2-methylallylamine	No	HCL.
Fatty amines	No	NCL.
1,6-Hexanediamine (Hexamethylenediamine)	No	DUP, MON.
n-Hexylamine	No	CXI, PAS.
<b>Isopropylamines:</b>		
Isopropylamine, mono	Yes	AIP, HCL, PAS, UCC.
<b>Methylamines:</b>		
Dimethylamine	Yes	AIP, BAS, DUP, IMC, QTR, UCC.
Methylamine, mono-	No	AIP, DUP, IMC, QTR.
Trimethyl amine	Yes	AIP, DUP, IMC, QTR.
3-Methylaminopropylamine	No	BAS.
tert-Octylamine	No	RH.
n-Octylamine, mono	No	HCL.
Pentaethylenehexamine	No	DOW, UCC.
<b>Pentylamines (amylamines):</b>		
Dipentylamine	No	HCL, PAS.
Pentylamine, mono-	No	PAS.
Tripentylamine	No	PAS.
<b>Propylamines:</b>		
Dipropylamine	No	AIP, HCL, PAS.
Propylamine, mono-	No	PAS.
Tripropylamine	No	AIP, PAS.
Tetraethylenepentamine	No	DOW, UCC.
N,N,N',N'-Tetramethyl-1,3-butanediamine	No	UCC.
Tetramethylethylenediamine	No	BKM.
Triethylenediamine	No	TX.
Triethylenetetramine	No	DOW, UCC.
All other amines	No	MON, PAC, SCP, TX, UCC.
2-Aminoethanol hydrochloride	No	OMC.
2-Aminoethanol (Monoethanol amine) sulfite	No	EVN.
Aminoethoxyethanol	No	TX.
2-(2-Aminoethylamino)ethanol (Aminoethylethanolamine)	No	DOW, UCC.
2-[(2-Aminoethyl)amino] ethanol, reaction product with octadecanoic acid	No	BRI.
2-Aminoethyl mercaptoacetate (Monoethanolamine thiolglycolate)	No	EVN.
2-Amino-2-ethyl-1,3-propanediol	No	ANG.
2-Amino-2-(hydroxymethyl)-1,3-propanediol [Tris(hydroxymethyl)aminomethane]	No	ANG, WTK.
2-Amino-2-methyl-1,3-propanediol	No	ANG.
2-Amino-2-methyl-1-propanol	No	ANG.
2-Amino-2-methyl-1-propanol hydrochloride	No	CCC.
Bis(dimethylaminoethyl) ether	No	TX.
tert-Butylaminoethyl methacrylate	No	AAC, CPS.
tert-Butyldiethanolamine	No	PAS.
tert-Butyl urea	No	PAS.
Carbohydrazide	No	OMC.
Choline	No	RH.
Diallyldimethyl ammonium chloride	No	CPS. (2).
Di-amine derivatives of dimer acids	No	WTC.
2-Dibutylaminoethanol	No	PAS.
Dibutylaminomethanol	No	(2).
2-Diethylaminoethanol (N,N-Diethylethanolamine)	No	PAS, UCC.
2-(2-Diethylaminoethoxy)ethanol	No	UCC.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Nitrogenous compounds—Continued</b>		
Diethylaminoethylacrylate, dimethyl sulfate, quaternary salt	No	CPS.
2-Diethylaminoethyl methacrylate	No	AAC, CPS, DUP.
Diethylcarbonyl chloride	No	GAF.
Diethylhydroxylamine	No	PAS.
1,3-Diethyl-2-thiourea	No	PAS.
2-Diisopropylaminoethanol (N,N-Diisopropylethanolamine)	No	PAS, UCC.
2-Diisopropylaminoethyl methacrylate	No	DUP.
Dimethylamine epichlorohydrin copolymer	No	CPS.
2-Dimethylaminoethanol (N,N-Dimethylethanolamine)	No	AIP, PAS, TX, UCC.
2-[2-(Dimethylamino)ethoxy]ethanol/dimethylaminopropylene, epoxyated	No	TX.
Dimethylaminoethyl acrylate	No	CPS.
Dimethylaminoethyl acrylate, dimethyl sulfate, quaternary salt	No	CPS.
Dimethylaminoethylacrylate, methyl chloride, quaternary salt	No	AAC, CPS.
Dimethylaminoethyl chloride	No	SK.
Dimethylaminoethyl methacrylate	No	AAC.
Dimethylaminoethylmethacrylate, dimethyl sulfate, quaternary salt	No	AAC, CPS.
Dimethylaminoethylmethacrylate, methyl chloride, quaternary salt	No	AAC, CPS, UCC.
Dimethylaminomethanol	No	(?)
2-Dimethylamino-2-methyl-1-propanol	No	ANG.
2-Dimethylamino-2-methyl-1-propanol hydrochloride	No	WPG.
1-(Dimethylamino)-2-propanol	No	PAS.
Dimethylaminopropyl chloride	No	SK.
<b>Ethanolamines:</b>		
Diethanolamine	Yes	CNE, DOW, OMC, TX, UCC.
Monoethanolamine	Yes	CNE, DOW, OMC, TX, UCC.
Triethanolamine	Yes	CNE, DOW, OMC, TX, UCC.
2-Ethylaminoethanol (Ethylmonoethanolamine)	No	PAS.
1,1-Ethylenedurea	No	EK.
2-Ethylhexyl nitrate ethyl ester	No	BUC.
N-Ethyl-N-hydroxyethyl-1,4-pentanediamine	No	SDW.
2-Ethyl-2-nitro-1,3-propanediol	No	ANG, SDW.
Fatty acid, alkanolamine ester	No	(?)
Guanidine hydrochloride	No	EK.
Hexamethylenediamine adipate (Nylon salt)	No	DUP, MON, (?)
Hexylamine ethoxylate	No	CXI.
N-(2-Hydroxyethyl)-12-hydroxystearamide	No	CAS.
2-(Hydroxymethyl)-2-nitro-1,3-propanediol (Tris-(hydroxymethyl)nitromethane)	No	ANG.
Iminodiacetic acid	No	HMP.
<b>Isopropanolamines:</b>		
Diisopropanolamine	No	DOW.
Dimethyl isopropanolamine	No	PEL.
Monoisopropanolamine	No	DOW.
Trisopropanolamine	No	DOW.
2-Isopropylaminoethanol	No	PAS, UCC.
3-Methoxypropylamine	No	BAS, TX.
Methylaminoacetaldehyde dimethyl acetal (MAADMA)	No	ASL.
2-Methylaminoethanol (N-Methylethanolamine)	No	PAS, UCC.
Methyl ammonium chloride	No	NOD.
Methyl hydrazine, mono	No	OMC.
2,2'-(Methylimino)diethanol (Methyldiethanolamine)	Yes	DOW, PAS, TX, UCC.
Methyl isocyanate	No	RDA.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Nitrogenous compounds—Continued</b>		
2-Methyl-2-nitro-1-propanol	No	ANG.
Mixed higher glycol amine (MHGA)	No	AIP.
Nitrated lard oil	No	SM.
Nitriles:	Yes	
Acetonitrile	Yes	BKC, DUP, SOH, (?).
Acrylonitrile, monomer	Yes	ACY, DUP, MON, SC, SOH.
Adiponitrile	No	DUP, MON.
Aminodimethyl butyronitrile	No	NOD.
2,2-Azobis(dimethyl pentane nitrile)	No	DUP.
2,2-Azobis(2-methyl butane nitrile)	No	DUP.
2,2'-Azobis[2-methylpropionitrile] (Azobisisobutyronitrile)	No	DUP, RCN.
n-Butyronitrile	No	EKX.
Cyanoacetic acid (Malonic nitrile)	No	NOD.
1-(2-Cyanoethyl)ethyl urea	No	GAF.
Decylnitrile	No	ARC.
3-Ethoxypropionitrile	No	DIX.
Ethyl cyanoacetate	No	NOD.
Hexadecylnitrile	No	ARC.
Isobutyronitrile	No	EKX.
Lauroitrile (Dodecyl nitrile)	No	ARC.
3-Methoxypropionitrile	No	(?).
Methyl cyanoacetate	No	NOD.
4-Methyl-5-hydroxymethyl imidazole	No	SK.
2-Methylactonitrile (Acetone cyanohydrin)	Yes	CYR, DUP, RH, SOH.
Octadecenenitrile (Oleonitrile)	No	ARC.
Octadecylnitrile	No	ARC.
Propionitrile	No	MON.
Tallow nitrile	No	ARC, SHX.
3,3'-Thiodipropionitrile	No	EVN.
Trichloroacetoneitrile	No	OMC.
All other nitriles	No	ARC, EKT, HXL, RSA.
Nitroethane	No	ANG, GON.
Nitromethane	No	ANG, GON.
1-Nitropropane	No	ANG, GON.
2-Nitropropane	No	ANG, GON.
N-n-Octyl glucamine	No	(?).
Semicarbazide hydrochloride	No	OMC.
Stearylamidopropyl dimethylamine lactate	No	WM.
Tetraethyl ammonium bromide	No	RSA.
Tetramethylammonium chloride	No	RSA.
Thiosemicarbazide	No	FMT.
Triethanolamine hydrochloride	No	WPG.
Triethanolamine, sulfuric & phosphoric acid salts	No	(?).
Triethylamine, nitric acid salt	No	(?).
Zinc bis(monoethanolamine)dichloride	No	(?).
All other nitrogenous compounds, acyclic	No	ADC, ARC, EK, HXL, OMC, PFZ, REG, RSA, TX, UCC, (?), (?).
Acids, acid anhydrides, and acyl halides:	Yes	
Acetic acid, synthetic (100%)	Yes	AIP, ARC, BCP, DAZ, EKT, HCL, RDA, SC, UCC, USI.
Acetic anhydride, other than recovered	No	EKT, HCL
Acrylic acid	Yes	BAS, HCL, RH, UCC.
Adipic acid	No	BFG, DUP, MON.
Anhydride-acid mixture	No	HCL.
Azelaic acid	No	SCP.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Acids, acid anhydrides, and acyl halides—Continued</b>		
2,2-Bis(hydroxy-methyl)-propionic acid	No	IMC.
Bromoacetic acid	No	WCC.
2-Bromohexanoic acid	No	EKT.
Butyric acid	No	EKT, HCL.
Butyric anhydride	No	EKT.
Butyryl chloride	No	WCC.
Castor oil fatty acids, dehydrated	No	CAS
Chloroacetic acid, mono	No	NCC, PFZ.
Citric acid	No	MLS, PFZ.
Crotonic acid (2-Butenoic acid)	No	EKT.
Decanoyl chloride	No	RCN.
2,2-Dichloroacetyl chloride	No	RDA.
Dimer acid (C <sub>36</sub> aliphatic dibasic acid)	Yes	SCP, SYL, WTC.
Dimethylpropionic acid (Neopentanoic acid)	No	ENJ, QTR.
Dithiodiglycolic acid	No	EVN.
Dithiodipropionic acid	No	EVN.
Dodecanedioic acid	No	DUP.
2-Ethylhexanoic acid ( $\alpha$ -Ethylcaproic acid)	No	EKT, UCC.
2-Ethylhexanoyl chloride	No	PPG, RCN, WTC.
Fatty acids	No	ARC, BRD, CAS, DRL, WTC.
Fatty acids, hydrogenated	Yes	ARC, BRD, CAS, DRL, SHX, SYP, WTC.
Fatty acids, partially hydrogenated	No	SYP, WTC.
Formic acid, 90%	No	HCL.
Fumaric acid	Yes	MLS, MON, PFZ.
Gluconic acid, technical	No	PFZ, PMP.
Glycolic acid (Hydroxyacetic acid)	No	DUP.
Heptanoic acid	No	HCL.
Isoscorbic acid (Erythorbic acid)	No	PFZ.
Isobutyric acid	No	EKX.
Isobutyric anhydride	No	EKT.
Isobutyryl chloride	No	SYL.
Isononoyl chloride	No	HCL.
Itaconic acid (Methylenesuccinic acid)	No	PFZ.
Lactic acid, 100%	No	SC.
Lauroyl chloride	No	RCN.
Malic acid	No	MLS.
Mercaptoacetic acid (Thioglycolic acid)	No	EVN.
3-Mercaptopropionic acid	No	EVN, WTC.
Mercaptosuccinic acid (Thiomalic acid)	No	EVN.
Methacrylic acid	No	DUP, RH.
Methanesulfonyl acid	No	PAS.
Methanesulfonyl chloride	No	PAS.
Neo-C <sub>8</sub> -C <sub>12</sub> acids	No	ENJ.
Neodecanoic acid	No	ENJ.
Neodecanoyl chloride	No	PPG, WTC.
Necheptanoyl chloride	No	WTC.
Nonanoic acid (Pelargonic acid)	No	HCL, SCP.
Octanoyl chloride	No	RCN, WCC.
Oleic acid	No	BRD, DRL, WTC.
Oxidized Fischer-Tropsch wax	No	SQA.
Palmitoyl chloride	No	HCL.
Pivaloyl chloride	Yes	PPG, RCN, WCC, WTC.
Polyacrylic acid	No	BFG, BKM, RH.
Propionic acid	No	EKT, HCL, UCC.
Propionic anhydride	No	EKT.
Propionyl chloride	No	WCC.
Sebacic acid	No	WTH.
Sebacoyl chloride	No	ALD.

See footnotes at end of table.

**Table 15-2—Continued**

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

<i>Miscellaneous cyclic and acyclic chemicals</i>	<i>Separate statistics<sup>1</sup></i>	<i>Manufacturers' identification codes (according to list in table 15-3)</i>
<b>Acyclic—Continued</b>		
<b>Acids, acid anhydrides, and acyl halides—Continued</b>		
Sorbic acid (2,4-Hexadienoic acid) .....	No	MNA.
Stearoyl chloride .....	No	RCN.
3,3'-Thiodipropionic acid .....	No	EVN.
Thiodisuccinic acid .....	No	EVN.
Trifluoroacetic acid .....	No	HOC.
Trifluoroacetic anhydride .....	No	HOC.
Trifluoroacetyl chloride .....	No	HOC.
Trimer dibasic acids .....	No	WTC.
Valeric acid .....	No	UCC.
Valeroyl chloride .....	No	WCC.
All other acids, acid anhydrides, and acyl halides .....	No	ARC, COC, DUP, ENJ, HOC, PG, SCP, UCC, WCC, WTC.
<b>Salts of organic acids:</b>	<b>Yes</b>	
<b>Acetic acid salts:</b>	<b>Yes</b>	
Aluminum acetate .....	No	NCC.
Ammonium acetate .....	No	BKC, WTK.
Barium acetate .....	No	BKC.
Calcium acetate .....	No	HFT, NCC.
Cobalt acetate .....	No	SHP.
Cobalt manganese acetate .....	No	SHP.
Copper acetate .....	No	BKC.
Hydrazine acetate .....	No	FMT.
Lead acetate .....	No	BKC.
Lead subacetate .....	No	BKC.
Magnesium acetate .....	No	BKC, EKT, SHP.
Manganese acetate .....	No	SHP.
Nickel acetate .....	No	SHP.
Potassium acetate .....	Yes	BKC, HCP, NCC, PEL.
Sodium acetate .....	Yes	ATL, BKC, BRI, DAN, HCP, JRC, MAL, NCC, UCC, (?).
Sodium diacetate .....	No	HCP, JRC, NCC.
Zinc acetate .....	Yes	BKC, CCC, SHP, WTK.
Zirconium acetate .....	No	CCC, TZC.
Adipic acid, ammonium salt .....	No	ACS.
Adipic acid, sodium salt .....	No	(?).
Adipic dihydrazide .....	No	FMT.
3-Allyloxy-2-hydroxypropane sulfonic acid, sodium salt .....	No	AAC.
<b>Citric acid salts:</b>		
Ammonium citrate .....	No	PFZ.
Calcium citrate .....	No	PFZ.
Potassium citrate .....	No	HXL, MLS, PFZ, (?).
Sodium citrate .....	No	BRI, HXL, MLS, PFZ, (?).
Diammonium dithiodiglycolate .....	No	EVN.
<b>2-Ethylhexanoic acid (alpha-Ethylcaproic acid) salts</b> .....	<b>Yes</b>	
Aluminum 2-ethylhexanoate .....	No	NOC.
Barium 2-ethylhexanoate .....	No	NOD, WTC.
Bismuth 2-ethylhexanoate .....	No	SHP.
Cadmium 2-ethylhexanoate .....	No	CCA, VNC, WTC.
Calcium 2-ethylhexanoate .....	Yes	CCA, FER, MCI, NOD, WTC.
Cerium 2-ethylhexanoate .....	No	SHP.
Chromium 2-ethylhexanoate .....	No	MCI, SHP.
Cobalt 2-ethylhexanoate .....	Yes	CCA, MCI, NOD, SHP, TRO.
Cobalt-potassium 2-ethylhexanoate .....	No	MCI.
Copper 2-ethylhexanoate .....	No	MCI, NOD.
Iron 2-ethylhexanoate .....	No	CCA, NOD.
Lead 2-ethylhexanoate .....	No	CCA, NOD, SHP.
Manganese 2-ethylhexanoate .....	Yes	CCA, MCI, NOD, SHP, TRO.
Nickel 2-ethylhexanoate .....	No	MCI, SHP.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Salts of organic acids—Continued</b>		
<b>2-Ethylhexanoic acid (alpha-Ethylcaproic acid) salts—Continued</b>		
Potassium 2-ethylhexanoate	No	CCA, MCI, PEL, WTC.
Rare earths 2-ethylhexanoate	No	CCA, MCI.
Stannous 2-ethylhexanoate	No	FER.
Zinc 2-ethylhexanoate	Yes	CCA, FER, MCI, NOD, OMC, SHP, TRO, VNC, WTC.
Zirconium 2-ethylhexanoate	Yes	CCA, FER, MCI, NOD, TRO.
All other 2-ethylhexanoic acid salts	No	NOD.
Fish oil, C <sub>14</sub> -C <sub>22</sub> menhaden, lead salt	No	ELC.
<b>Formic acid salts:</b>		
Aluminum formate	No	RSA.
Ammonium formate	No	WTK.
Calcium formate	No	IMC, QTR.
Sodium formate	No	PST.
<b>Gluconic acid salts:</b>		
Sodium gluconate	No	PFN, PFZ, PMP.
Glycolic acid, potassium salt	No	HCP, JRC.
Glycolic acid, sodium salt	No	HCP, JRC.
Isoascorbic acid, sodium salt (Sodium erythorbate)	No	PFZ.
<b>Tertiary-alpha-alkylcarboxylic acid salts (isocarboxylic acid salts):</b>		
Calcium t-alpha-alkylcarboxylate	No	MCI.
Cobalt t-alpha-alkylcarboxylate	No	MCI.
Copper t-alpha-alkylcarboxylate	No	MCI.
Iron t-alpha-alkylcarboxylate	No	MCI.
Lead t-alpha-alkylcarboxylate	No	MCI.
Manganese t-alpha-alkylcarboxylate	No	MCI.
Mixed t-alpha-alkylcarboxylic acid salts	No	MCI.
Zinc t-alpha-alkylcarboxylate	No	MCI.
Zirconium t-alpha-alkylcarboxylate	No	MCI.
All other t-alpha-alkylcarboxylic acid salts	No	MCI.
<b>Isooctanoic acid salts:</b>		
Isooctanoic acid, calcium salt	No	CCA.
Isooctanoic acid, lead salt	No	CCA.
Isooctanoic acid, manganese salt	No	CCA.
<b>Lactic acid salts:</b>		
Ammonium lactate	No	WM.
Sodium lactate (Nalac)	No	BFP, PFN.
All other lactic acid salts	No	PFN.
<b>Lauric acid salts:</b>		
Barium cadmium laurate	No	FER, WTC.
Barium laurate	No	SYP.
Cadmium laurate	No	SYP.
Lauric acid, zinc salt	No	SYP.
Tin laurate	No	FER.
All other lauric acid salts	No	(?).
<b>Maleic acid salts:</b>		
Dibutyltin maleate	No	WTC.
<b>Mercaptoacetic acid (thioglycolic acid) salts:</b>		
Ammonium mercaptoacetate	No	EVN, WTC.
Sodium mercaptoacetate	No	EVN.
<b>Neodecanoic acid salts:</b>		
Bismuth neodecanoate	No	SHP.
Calcium neodecanoate	Yes	FER, MCI, SHP.
Cobalt neodecanoate	No	MCI, SHP.
Lead-cobalt neodecanoate	No	MCI.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Salts of organic acids—Continued</b>		
<b>Neodecanolic acid salts—Continued</b>		
Lead neodecanoate	No	MCI.
Lithium neodecanoate	No	MCI.
Manganese neodecanoate	No	MCI, SHP.
Rare earths neodecanoate	No	MCI.
Zinc neodecanoate	No	SHP.
Zirconium neodecanoate	No	MCI, SHP.
<b>Octanoic-acid (caprylic acid) salts:</b>		
Aluminum octanoate	No	SYP, WTC.
<b>Oleic acid salts:</b>		
Calcium oleate	No	(?).
Copper oleate	No	MCI.
Sodium oleate	No	WTC.
<b>Oxalic acid salts:</b>		
Ammonium oxalate	No	BKC, HML, WTK.
Potassium oxalate	Yes	BKC, HML, WTK.
Sodium oxalate	No	BKC, HML.
Pelargonic acid, calcium salt (Calcium nonoate)	No	SYP.
<b>Phosphorodithiolic acid salts (dithiophosphates):</b>		
Potassium dihexyl phosphorodithioate	No	ACY.
Sodium di- <i>sec</i> -butyl/diethyl phosphorodithioate	No	ACY.
Sodium di- <i>sec</i> -butyl phosphorodithioate	No	ACY, ELC.
Sodium diethyl phosphorodithioate	No	ACY, ELC.
Sodium dihexyl phosphorodithioate	No	ACY, ELC.
Sodium diisobutyl phosphorodithioate	No	ELC.
Sodium diisopropyl phosphorodithioate	No	ACY, ELC.
<b>Propionic acid salts:</b>		
Ammonium propionate	No	KMI.
Calcium propionate	Yes	HFT, KMI, NCC.
Sodium propionate	No	HFT, NCC.
Ricinoleic acid salts	No	CAS.
Sodium-N-methyl-N-oleyl taurate	No	WPG.
<b>Stearic acid salts:</b>		
Aluminum stearates:	Yes	
Aluminum distearate	No	MAL, NOC, NOD, SYP.
Aluminum monostearate	No	MAL, NOD, SYP.
Aluminum tristearate	Yes	MAL, NOC, NOD, SYP, WTC, (?).
Ammonium stearate	No	WPG.
Barium stearate	Yes	ALI, NOC, NOD, SYP, WTC.
Cadmium stearate	No	SYP, WTC.
Calcium stearate	Yes	FER, MAL, NOC, NOD, SCP, SQA, SYP, WTC.
Cobalt stearate	No	MCI, SHP.
Lead stearate	No	ALI.
Lead stearate, dibasic	No	ALI.
Lithium stearate	No	NOC, WTC.
Magnesium stearate	Yes	ALI, MAL, NOD, SYP, WTC.
Manganese stearate	No	SHP.
Potassium stearate	No	WTC.
Sodium stearate	No	NOC, WTC.
Strontium stearate	No	WTC.
Zinc stearate	Yes	CCC, MAL, NOC, NOD, PLS, SCP, SYP, WTC.
<b>Tartaric acid salts:</b>		
Potassium sodium tartrate	No	PFZ.
Thioacetic acid, potassium salt	No	RSA.
All other salts of organic acids	No	EK, EKX, RSA, SDC, (?).
<b>Aldehydes:</b>		
Acetaldehyde	No	EKX, HCL.
Acrolein (Acrylaldehyde)	No	UCC.

See footnote at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Aldehydes—Continued</b>		
Butyraldehyde	Yes	BAS, EKX, HCL, UCC.
Crotonaldehyde	No	EKT.
2-Ethylhexanal ( $\alpha$ -Ethylcaproaldehyde)	No	EKX, UCC.
Formaldehyde (37% HCHO by weight)	Yes	BCP, BOR, CBD, DUP, GAF, GP, HCL, HPC, IMC, MON, QTR, WCL, UCC.
Glutaraldehyde	No	ACY, BAS.
Glyoxal	No	BAS, EKX, HCL, UCC.
Isobutyraldehyde	No	EKX, HCL, UCC.
Propionaldehyde	No	UCC.
Valeraldehyde (Pentanal)	No	UCC.
All other aldehydes, acyclic	No	
<b>Ketones:</b>		
Acetone	Yes	ACS, ART, ATR, BTL, DOW, ENJ, GE, GGC, SHC, TX, UCC.
5-Chloro-2-pentanone	No	SDW.
1-Chloropinacolone	No	CHG.
Dilisopropyl ketone (2,4-Dimethyl-3-pentanone)	No	EKX.
2-Heptanone (Methyl amyl ketone)	No	EKT.
3-Heptanone (Ethyl butyl ketone)	No	UCC.
4-Hydroxy-4-methyl-2-pentanone (Diacetone alcohol)	Yes	HCL, SHC, UCC.
Isovalerone (Dilsobutyl ketone)	No	EKT, UCC.
Methyl ethyl ketone (2-Butanone)	Yes	ATR, ENJ, HCL, LYP, SHC, UCC.
5-Methyl-2-hexanone (Methyl Isoamyl ketone)	No	EKT.
Methyl isobutyl ketone	Yes	EKT, ENJ, SHC, UCC.
Methylisopropyl ketone	No	EKX.
Methylpropyl ketone	No	EKT, UCC.
Methylpseudolone	No	NCI.
2-Octanone (Hexyl methyl ketone)	No	UPM, WTH.
2,4-Pentanedione (Acetylacetone)	No	UCC.
3-Pentanone (Diethyl ketone)	No	UCC.
Pseudolone	No	NCI, SCM.
2,6,8-Trimethyl-4-nonanone (Isobutyl heptyl ketone)	No	UCC.
All other ketones	No	EKT.
<b>Alcohols, monohydric, unsubstituted:</b>		
Alcohols, C <sub>11</sub> or lower, unmixed (95% or more pure):	Yes	
Allyl alcohol	No	ATR, FMB.
<b>Amyl alcohols:</b>		
2-Methyl-1-butanol	No	UCC.
3-Methyl-1-butanol	No	CPS.
1-Pentanol	No	UCC.
<b>Butyl alcohols:</b>		
n-Butyl alcohol (n-Propylcarbinol)	Yes	BAS, CXI, EKX, GAF, HCL, SHC, UCC, VST.
sec-Butyl alcohol (Methylethylcarbinol)	No	ENJ, SHC.
tert-Butyl alcohol (Trimethylcarbinol)	No	ATR.
Isobutyl alcohol (Isopropylcarbinol)	Yes	BAS, CPS, EKX, HCL, SHC, UCC.
1-Decanol	No	TNA, VST.
2,2-Dimethylbutanol (Isohexyl alcohol)	No	ENJ.
1-Docosanol (Behenyl Alcohol C <sub>22</sub> )	No	SHX.
Ethyl alcohol, synthetic	Yes	DOW, EKX, HCL, SHC, UCC, USI, VST.
2-Ethyl-1-hexanol	Yes	ART, BAS, EKX, SHC, UCC.
n-Heptyl alcohol	No	EKX.
n-Hexyl alcohol	No	TNA, VST.
Isodecyl alcohol	No	ENJ.
Isoheptyl alcohol	No	ENJ.
Isononyl alcohol	No	ENJ.
Iso-octadecyl alcohol	No	SHX.
Iso-octyl alcohol	No	ENJ.

See footnotes at end of table.



Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Alcohols, monohydric, unsubstituted—Continued</b>		
Alcohols, C <sub>11</sub> or lower, unmixed (95% or more pure)—Continued		
Isopropyl alcohol	Yes	ATR, ENJ, LYP, SHC, UCC.
Methanol, synthetic	Yes	AIP, BCP, DUP, EKT, GGC, HCL, LYP, PLC, TOC, UCC.
2-Methyl-1-pentanol	No	ENJ, UCC.
4-Methyl-2-pentanol (1-Methylisobutylcarbinol)	No	TNA, VST.
1-Octanol	No	WTH.
2-Octanol (sec-Capryl alcohol)	No	EKX, HCL, UCC.
Propyl alcohol (Propanol)	Yes	GAF.
2-Propyn-1-ol (Propargyl alcohol)	No	BAS, ENJ.
Undecanol (Linear C <sub>11</sub> alcohol)	No	SHC, UCC.
All other alcohols, unmixed C <sub>11</sub> or lower (95% or more pure)	No	
Alcohols C <sub>12</sub> or higher, unmixed (95% or more pure):	Yes	
Dodecyl alcohol (Lauryl alcohol)	No	PG, TNA, VST.
1-Hexadecanol (Cetyl alcohol)	No	ENJ, PG, VST.
Hexadodecyl alcohol	No	TX.
1-Octadecanol (Stearyl alcohol)	Yes	ENJ, PG, TNA, VST.
cis-9-Octadecan-1-ol (Oleyl alcohol)	No	SHX.
1-Tetradecanol (Myristyl alcohol)	No	PG, VST.
1-Tridecanol	No	ENJ.
All other alcohols, unmixed C <sub>12</sub> or higher (95% or more pure)	No	ENJ.
Mixtures of alcohols:	Yes	
Alcohol mixtures, C- <sub>11</sub> or lower	Yes	BAS, ENJ, PG, SHC, TNA, VST.
Mixtures of alcohols, C <sub>12</sub> and higher	Yes	ENJ, PG, SHC, SHX, TNA, VST.
All other alcohol mixtures	No	VST, WTK.
<b>Esters of monohydric alcohols:</b>		
Acrylic monomers, mixed	No	CPS.
C <sub>12</sub> -C <sub>18</sub> Alcohol esters of lactic acid	No	VND.
Allyl methacrylate	No	BRD, CPS.
<b>Amyl acetates:</b>		
Amyl acetate (n-Pentyl acetate)	No	UCC.
All other amyl acetates	No	RCN.
<b>Butyl acetates:</b>		
n-Butyl acetate	Yes	BAS, EKT, HCL, UCC.
Isobutyl acetate	Yes	BAS, EKT, EKX, HCL, UCC.
Butyl acrylate	Yes	BAS, HCL, RH, UCC.
sec-Butyl chloroformate	No	PPG, VCM.
Butyl lactate	No	CPS.
Butyl maleate	No	SCP.
Butyl mercaptoproprionate	No	EVN.
Butyl methacrylate	No	DUP, RH.
Butyl oleate	No	ELC.
n-Butyl perchlorocrotonate	No	MAL.
Cetylcosyl methacrylate	No	RH.
Cetyl lactate	No	VND.
Chlorohydroxypropyl methacrylate	No	AAC.
Diallyl maleate	No	AAC.
Dibutyl maleate	No	ART, NOD.
Didecyl adipate	No	QCP.
Diethyl carbonate (Ethyl carbonate)	No	PPG.
Di(2-ethyl-1-hexyl) maleate	No	BRI, CHP.
Diethyl maleate	No	ACY.
Diethyl oxalate (Ethyl oxalate)	No	( <sup>2</sup> ).
Dilauryl-3,3'-thiodipropionate	Yes	CCW, EVN, WTC.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Esters of monohydric alcohols—Continued</b>		
Dimethyl carbonate	No	PPG.
Dioctyl maleate	No	ART, NOD.
Distearyl-3,3'-thiodipropionate	Yes	ACY, CCW, EVN, WTC.
Dithiobis(stearyl propionate)	No	EVN.
Ditridecyl maleate	No	EFH.
DI(tridecyl)-3,3'-thiodipropionate	No	EVN, WTC.
Dodecylpentadecyl methacrylate	No	RH.
Dodecyl succinic lactate	No	SM.
2-Ethoxyethyl acetate	No	CNE, UCC.
Ethyl acetate (100% basis)	Yes	EKT, EKX, HCL, MON.
Ethyl acetoacetate	No	EKT.
Ethyl acrylate	No	HCL, RH.
Ethyl chloroformate	No	PPG.
Ethyl chlorothioformate	No	ICI.
2-Ethyl-1-hexyl acetate	No	EKT.
2-Ethyl-1-hexyl acrylate	Yes	BAS, HCL, UCC.
2-Ethylhexyl chloroformate	Yes	HCL, PPG, VCM.
2-Ethyl-1-hexyl methacrylate	No	DUP.
Ethyl maleate, mono	No	AAC.
Ethyl methacrylate	No	DUP.
Ethyl silicate	No	UCC.
Ethyl sulfate (Diethyl sulfate)	No	UCC.
Fatty acid esters, not included with plasticizers or surface active agents:	Yes	
Dilaopropyl dimerate	No	SBC.
Dilaostearyl dimerate	No	SBC.
Dioctyl dimerate	No	WTC.
Docosanyl docosenoate	No	SBC.
2-Ethylhexyl stearate	No	BRI.
Isocetyl stearate	No	VND.
Isopropyl linoleate	No	VND.
Isostearyl isostearate	No	SBC.
Methyl esters of coconut oil	No	PG.
Methyl esters of lard	No	FER.
Methyl esters of tallow	Yes	CHL, FER, WTC.
Methyl 12-hydroxystearate	No	CAS, WTH.
Methyl iso-octadecenoate	No	SYL.
Methyl linoleate	No	HRT.
Methyl pentachlorostearate	No	VCM.
Methyl stearate	No	CHL, WTC.
Myristyl myristate	Yes	AAC, SBC, VND.
Stearyl stearate	No	AAC.
Tridecyl stearate	No	HCL, RPC, WTC.
All other fatty acid esters, not included with plasticizers surface-active agents	No	ALI, SCP.
Hexyl acetate	No	ENJ.
Hexyl acrylate	No	CPS.
Isobutyl acrylate	No	BAS.
Isobutyl chloroformate	No	PPG, VCM.
Isobutyl laubutyrate	No	EKK.
Isobutyl methacrylate	No	RH.
Isodecyl acrylate	No	AAC, CPS.
Isodecyl mercaptoacetate	No	EVN.
Isodecyl methacrylate	No	RH.
Isooctyl acrylate	No	AAC.
Iso-octyl mercaptoacetate	No	EVN.
Iso-octyl-3-mercaptopropionate	No	EVN.
Isopropyl acetate	Yes	EKT, HCL, UCC.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Esters of monohydric alcohols—Continued</b>		
Isopropyl chloroformate	No	PPG, VCM.
Isostearyl neopentanoate	No	SBC, VND.
Lauryl acrylate	No	CPS.
Lauryl lactate	No	VND.
Lauryl methacrylate	No	AAC, CPS, RH.
1-Methoxy-2-ethyl acetate	No	EKX.
2-Methoxyethyl acrylate	No	CPS.
Methyl acetate	No	EKT.
Methyl acetoacetate	No	EKT.
Methyl acrylate, monomer	No	BAS, HCL.
Methyl butyrate	No	PD.
Methyl chloroformate	No	PPG.
Methyl formate	No	HCL.
Methyl methacrylate, monomer	Yes	CYR, DUP, RH.
Methyl pivaloylacetate	No	EKT.
Methyl sulfate (Dimethyl sulfate)	No	DUP.
Myristyl lactate	No	VND.
Phosphorus acid esters:	Yes	
Bis(2-chloroethyl)-2-chloroethylphosphonate	No	ALW.
Bis(2-ethylhexyl)hydrogen phosphite	No	ALW.
Butyl acid phosphate	No	ALW, HK.
Chloroalkyl diphosphate ester, neutral	No	ALW.
Chloroalkyl phosphate ester	No	ALW.
Dibutyl butylphosphonate	No	ALW.
Dibutyl hydrogen phosphite	No	ALW.
Dibutyl pyrophosphate	No	ALW.
Diethylhexyl phosphoric acid	No	ALW.
Diethyl hydrogen phosphite	No	ALW.
Diethyl phosphenothonic dichloride	No	TNA.
Diethyl phosphorochloridodithionate	No	ICI, TNA.
Dimethyl hydrogen phosphite	No	ALW.
Dimethyl methylphosphonate	No	ALW.
Dimethyl phosphoridodithionate	No	ICI.
2-Ethylhexyl hydrogen phosphate	No	ALW.
Iso-octyl hydrogen phosphate	No	ALW.
Methyl dihydrogen phosphate	No	HK.
Stearyl acid phosphate	No	HK.
Tetrakis(2-chloroethyl)ethylene diphosphate	No	OMC.
Tetrakis(2-chloroisopropyl)ethylene diphosphate (T-RDT)	No	OMC.
Trialkyl phosphite	No	GE.
Triethyl phosphite	No	ALW, ICI.
Trisodocylphosphite	No	WTC.
Trisooctyl phosphite	No	ALW, GE.
Trisopropyl phosphite	No	ALW.
Trimethyl phosphite	No	ALW, ICI.
Tris(2-chloroethyl)phosphate	No	PEL.
Tris(2-chloroethyl) phosphite	No	ALW, OMC.
Tris-2-chloropropyl phosphate	No	ALW, PEL.
Tris(2-ethylhexyl)phosphite	No	ALW.
All other phosphorus acid esters	No	ALW, AMV, AZT, COC, (*), BAS, EKT, HCL, RCN, UCC.
Propyl acetate	Yes	
Propyl chlorothioformate	No	ICI.
Stearyl methacrylate	Yes	CPS, RH, TX.
Tetraethyl orthosilicate (Tetraethyl silicate)	No	UCC.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' Identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Acyclic—Continued</b>		
<b>Esters of monohydric alcohols—Continued</b>		
<b>Titanic acid esters:</b>		
Bis[2-(bis[2-hydroxyethyl]amino)ethyl] diisopropyl titanate	No	DUP.
Bis(ethyl-3-oxobutanato)bis(2-propanolato) titanium	No	DUP.
Di(hydroxy)bis(ammoniumlactato)titanium	No	DUP.
Tetrabutyl titanate	No	DUP.
Tetraisopropyl titanate	No	DUP.
Tetrakis(2-ethylhexyl)titanate	No	DUP, NOD.
Triethanolamine titanate	No	NOD.
All other titanic acid esters	No	DUP.
Triethyl orthoacetate	No	NOD.
Triethyl orthoformate	No	NOD.
Triethyl orthopropionate	No	NOD.
Trifluoroethyl methacrylate	No	( <sup>2</sup> ).
Trimethyl orthoacetate	No	NOD.
Trimethyl orthoformate	No	NOD.
Vinyl acetate, monomer	Yes	DUP, HCL, UCC, USI.
All other monohydric alcohol esters	No	BAS, COC, ENJ, MON, MRF, PAH, SDC, VND, ( <sup>2</sup> ), ( <sup>2</sup> ).
<b>Polyhydric alcohols:</b>		
1,2-(and 1,3)-Butanediol	No	HCL.
1,4-Butanediol	Yes	BAS, DUP, GAF.
2-Butene-1,4-diol	No	GAF.
2-Butyne-1,4-diol	No	BAS, GAF.
3-Chloro-1,2-propanediol (Glycerol $\alpha$ -chlorohydrin)	No	DIX, EVN.
Dibromoneopentyl glycol	No	TNA.
2,2-Dimethyl-1,3-propanediol (Neopentyl glycol)	No	BAS, EKK.
Ethylene glycol	Yes	BAS, CNE, CXI, DOW, EKK, HCF, HCL, OMC, PDG, PLC, SHC, TX, UCC, USI, KKO, UCC.
2-Ethyl-1,3-hexanediol	No	
2-Ethyl-2-(hydroxymethyl)-1,3-propanediol (Trimethylolpropane)	No	HCL.
Glycerol, synthetic only	No	DOW, RQT, SYP.
1,6-Hexanediol	No	BAS, CXI.
2-(Hydroxymethyl)-2-methyl-1,3-propanediol (Trimethylolthane)	No	IMC.
Mannitol	No	ICI.
3-Mercapto-1,2-propanediol (Thioglycerol)	No	EVN.
2-Methyl-2,4-pentanediol (Hexylene glycol)	No	SHC, UCC.
Pentaerythritol	Yes	HCL, HPC, PST, QTR.
1,5-Pentanediol	No	BAS.
Propylene glycol (1,2-Propanediol)	Yes	ATR, DOW, OMC, TX, UCC.
Sorbitol (70% by weight)	Yes	BRD, EHC, HOF, ICI, PFZ, RQT.
Trimethylolthane	No	QTR.
2,2,4-Trimethyl-1,3-pentanediol	No	EKK.
All other polyhydric alcohols	No	ATR, ICI, VIK, ( <sup>2</sup> ).
<b>Esters of polyhydric alcohols:</b>		
2-(2-Butoxyethoxy)ethyl acetate	No	CNE, EKT, UCC.
2-Butoxyethyl acetate	Yes	CNE, EKT, UCC.
1,3-Butylene glycol dimethacrylate	No	CPS.
Diethylene glycol adipate	No	CMB, HAL.
Diethylene glycol, borated	No	OMC.
Diethylene glycol chloroformate	No	PPG.
Diethylene glycol dimethacrylate	No	CPS.
2-(2-Ethoxyethoxy)ethyl acetate	No	EKT.
Ethylene carbonate	No	TX.
Ethylene glycol diacetate	No	CPS, EKT.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Esters of polyhydric alcohols—Continued</b>		
Ethylene glycol dimercaptoacetate	No	EVN.
Ethylene glycol dimethacrylate	No	CPS.
Glycerides, mixed C <sub>14</sub> -C <sub>18</sub> and C <sub>18</sub> -C <sub>18</sub> , mono and di	No	
Glyceryl diacetate (Diacetin)	No	HAL.
Glyceryl monoacetate (Monoacetin)	No	HAL.
Glyceryl monothloglycolate	No	EVN, WTC.
Glyceryl triacetate (Triacetin)	No	EKT
Glyceryl tristearate	No	BRD.
Hydroxyethyl acrylate	No	DOW, RH.
Hydroxyethyl methacrylate	No	RH.
Hydroxypropyl acrylate	No	DOW, RH.
Hydroxypropyl methacrylate	No	AAC, RH.
2-Methoxyethyl acetate	No	UCC.
1-Methoxy-2-propyl acetate	No	EKT, HTM.
Nopeopentyl glycol dicaprate	No	SBC.
Pentaerythritol stearate	No	BRD.
Pentaerythritol tetrakis (3-Mercaptoproplonate)	No	EVN.
Pentaerythritol tetrastearate	No	HPC.
Propylene glycol dicaprylatecaprate	No	ATR, TX.
Sucrose octa-acetate	No	HFT.
Trimethylolpropane decanoic acid ester	No	SM.
Trimethylolpropane ethoxylate triacrylate	No	AAC.
Trimethylolpropane triacrylate	No	CPS.
Trimethylolpropane tri(2-mercaptoproplonate)	No	EVN.
Trimethylolpropane trimethacrylate	No	AAC, CPS.
Trimethylolpropane trioleate (TMP trioleate)	No	EFH.
2,2,3-Trimethyl-1,3-pentanediol monoisobutyrate	No	EKX.
Tripropylene glycol diacrylate	No	CPS.
All other polyhydric alcohol esters	No	DUP, EK, GPI, SQA, TX, UCC, WM.
<b>Polyhydric alcohol ethers:</b>	<b>Yes</b>	
Propylene-based polyhydric alcohol ethers	No	(?).
Bis(2-butoxyethyl)ether (Diethylene glycol di-n-butyl ether)	No	FER.
Bis(2-ethoxyethyl)ether (Diethylene glycol diethyl ether)	No	FER.
Bis[2-(2-methoxyethoxy)ethyl] ether (Tetraethylene glycol dimethyl ether)	No	FER.
Bis(2-methoxyethyl)ether (Diethylene glycol dimethyl ether)	No	FER.
2-Butoxyethanol (Ethylene glycol monobutyl ether)	Yes	CNE, DOW, EKX, SHC, UCC.
2-(2-Butoxyethoxy)ethanol (Diethylene glycol monobutyl ether)	Yes	CNE, DOW, EKX, OMC, SHC, UCC.
2-[2-(2-Butoxyethoxy)ethoxy]ethanol (Triethylene glycol monobutyl ether)	Yes	CNE, DOW, UCC.
1-Butyraldehyde trimer	No	HTM.
Diethylene glycol	Yes	BAS, CNE, CXI, EKX, HCL, OMC, PDG, SHC, TX, UCC.
Difunctional epoxy acrylate	No	SQA.
Dimethoxyethane (Ethylene glycol dimethyl ether)	No	FER.
2-Ethoxyethanol (Ethylene glycol monoethyl ether)	Yes	CNE, EKX, OMC, UCC.
2-(2-Ethoxyethoxy)ethanol (Diethylene glycol monoethyl ether)	Yes	CNE, EKX, OMC, UCC.
2-[2-(2-Ethoxyethoxy)ethoxy]ethanol (Triethylene glycol monoethyl ether)	No	OMC, UCC.
Ethylene glycol di-tributyl ether	No	EKX.
Ethylene glycol di-triethyl ether	No	FER.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Esters and ethers of polyhydric alcohols—Continued</b>		
<b>Polyhydric alcohol ethers—Continued</b>		
Ethyl ethers of tetra and higher ethylene glycols (high boiling) . . . . .	No	OMC.
Glycerol monoallyl ether . . . . .	No	AAC.
Glycol ethers derived from propylene oxide: . . . . .	Yes	
Dipropylene glycol . . . . .	Yes	ATR, DOW, OMC, TX.
Dipropylene glycol monomethyl ether (3-(3-methoxypropoxy)propanol) . . . . .	No	OMC, UCC.
Ethylene glycol di-tri-propyl ether . . . . .	No	EKX.
Propylene glycol t-butyl ether . . . . .	No	HTM.
Propylene glycol monomethyl ether (1-Methoxy-2-propanol) . . . . .	No	OMC.
Tripropylene glycol . . . . .	No	ATR, DOW, UCC.
Tripropylene glycol monomethyl ether (3-(3-methoxypropoxy)propanol) . . . . .	No	OMC.
All other propylene glycol ethers (and propylene glycols) . . . . .	No	HTM.
2-[2-(Hexyloxy)ethoxy]ethanol . . . . .	No	UCC.
2-Methoxyethanol (Ethylene glycol monomethyl ether) . . . . .	Yes	CNE, OMC, UCC.
2-(2-Methoxyethoxy)ethanol (Diethylene glycol monomethyl ether) . . . . .	Yes	CNE, DOW, OMC, UCC.
2-[2-(2-Methoxyethoxy)ethoxy]athanol (Triethylene glycol monomethyl ether) . . . . .	Yes	DOW, OMC, UCC.
2-(2-Methoxyethoxy)ethyl-2-methoxyethyl ether (Triethylene glycol dimethyl ether) . . . . .	No	FER, OMC.
Methoxypolyethylene glycol . . . . .	No	AAC, HCL, PPG, UCC.
Paraformaldehyde . . . . .	No	HCL.
Polyethoxy propoxy diethylene glycol ether . . . . .	No	AAC.
Poly(ethylene-butylene) glycol . . . . .	No	( <sup>2</sup> ).
Polyethylene glycol . . . . .	No	AAC, ABB, BAS, DOW, GAF, HCL, OMC, PPG, SCP, UCC, ( <sup>2</sup> ), ( <sup>2</sup> ).
Polyethylene glycol butyl ether, propoxylated . . . . .	No	ICI.
Polyethylene glycol dimethyl ether . . . . .	No	DAN, SHX.
Polyglycols, ethylene glycol and glycol ether, mixed . . . . .	Yes	CXI, HCL, UCC, ( <sup>2</sup> ).
Polymethylvinyl ether monoethylmaleate . . . . .	No	TNI.
Polyoxyalkylene glycol . . . . .	No	OMC.
Polytetramethylene glycol ether . . . . .	Yes	BAS, DUP, QKO.
<b>Polyether polyols based on propylene oxide:</b>		
Polypropylene glycol . . . . .	No	AAC, BAS, DOW, GAF, HCL, OMC, PPG, TX, ( <sup>2</sup> ).
Polypropylene glycol butyl ether (Polypropoxy butyl ether) . . . . .	No	( <sup>2</sup> ).
Polypropylene glycol butyl ether, ethoxylated (Polypropoxy butyl ether, ethoxylated) . . . . .	No	BAS, SCP.
<b>All other polyether polyols based on propylene oxide</b>		
Propoxyethanol (Ethylene glycol monopropyl ether) . . . . .	No	ATR.
Sorbitol, alkoxylated . . . . .	No	EKX.
Sorbitol, ethoxylated . . . . .	No	( <sup>2</sup> ).
Sorbitol, monostearate . . . . .	No	BRD, ICI, ( <sup>2</sup> ).
Sorbitol, propoxylated . . . . .	No	WTC.
Sulfone diglycol . . . . .	No	ICI.
Tetraethylene glycol . . . . .	No	AAC.
Tetra/penta glycols, mixed . . . . .	No	DOW, EKX, UCC.
2,2'-Thiodiethanol (Thiodiglycol) . . . . .	No	CNE, CXI.
Triethylene glycol . . . . .	Yes	AAC, PLC.
		CNE, CXI, DOW, EKX, HCL, OMC, PDG, SHC, TX, UCC.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Esters of polyhydric alcohols—Continued</b>		
<b>Polyhydric alcohol ethers—Continued</b>		
<b>Tri- and tetraethylene glycol monoethyl ethers, borate esters</b> . . . . .		
No	No	OMC.
<b>All other polyhydric alcohol ethers</b> . . . . .		
No	No	BAS, DOW, DUP, EKX, MIL, SCP, TX, UCC, WTC.
<b>Brominated, chlorinated and fluorinated hydrocarbons:</b> . . . . .		
Yes	Yes	
<b>Brominated (Including bromochlorinated) hydrocarbons:</b> . . . . .		
Yes	Yes	
1-Bromobutane (n-Butyl bromide)	Yes	DAZ, DOW, GTL, UCC.
Bromochloromethane	No	TNA.
Bromodecane (Decyl bromide)	No	WCC.
Bromoethane (Ethyl bromide)	No	GTL.
1-Bromohexadecane	No	HMY.
1-Bromohexane (n-Hexyl bromide)	No	HMY.
1-Bromo-3-methyl-2-butene	No	SD.
1-Bromo-octadecane	No	HMY.
1-Bromopentane (n-Amyl bromide)	No	HMY, WCC.
1-Bromopropane (n-Propyl bromide)	No	DAZ.
Ethylene bis tetrabrom	No	TNA.
Myristyl bromide	No	WCC.
Vinyl bromide (Bromoethylene)	No	TNA.
<b>All other brominated (including bromochlorinated) hydrocarbons</b> . . . . .		
No	No	FER, HMY, TNA.
<b>Chlorinated (not otherwise halogenated) hydrocarbons:</b> . . . . .		
Yes	Yes	
Carbon tetrachloride	No	DOW, FRO, HK, LCP.
<b>Chlorinated paraffins (C<sub>10</sub>-C<sub>20</sub>):</b> . . . . .		
Yes	Yes	
Chlorinated paraffins, 35-64% chlorine	Yes	DVC, FER, HK.
Chlorinated paraffins, less than 35% chlorine	No	DVC, FER, SHC.
Chlorinated paraffins, 65% or more chlorine	Yes	DVC, FER, HK.
1-Chlorobutane (n-Butyl chloride)	No	ALW, UCC.
Chloroform	Yes	DOW, FRO, HK, LCP.
Chloromethane (Methyl chloride)	Yes	DCC, DOW, FRO, HK, LCP, SPD, VST.
3-Chloropropene (Allyl chloride)	No	DOW, SHC.
1,2-Dichloroethane (Ethylene dichloride)	Yes	ALW, BCP, BFG, DOW, FOR, FRO, GGC, HK, OMC, PLC, PPG, SHC, VST.
2,3-Dichloropropene	No	SHC.
Ethyl chloride (Chloroethane)	Yes	DOW, DUP, PPG, TNA.
2-Ethylhexyl chloride	No	ALW.
Methylene chloride (Dichloromethane)	Yes	DOW, FRO, HK, LCP.
Neophyl chloride	No	TNA.
Perchloroethylene (Tetrachloroethane)	Yes	DOW, FRO, HK, MIL, PPG.
1,1,1-Trichloroethane (Methyl chloroform)	Yes	DOW, FRO, PPG.
1,1,2-Trichloroethane (Vinyl trichloride)	No	DOW.
Trichloroethylene	No	DOW, PPG.
1,2,3-Trichloropropane	No	DOW.
Vinyl chloride, monomer (Chloroethylene)	Yes	BCP, BFG, DOW, FOR, GGC, HK, PPG, VST.
<b>Vinylidene chloride, monomer (1,1-Dichloroethylene)</b> . . . . .		
No	No	DOW, PPG.
<b>All other chlorinated (not otherwise halogenated) hydrocarbons</b> . . . . .		
No	No	( <sup>2</sup> ).
<b>Fluorinated (Including other fluorohalogenated) hydrocarbons:</b> . . . . .		
Yes	Yes	
Bromochlorodifluoromethane	No	GTL.
2-Bromo-1-chloro-1,2,2-trifluoroethane	No	HOC.
2-Bromo-2-chloro-1,1,1-trifluoroethane (Halothane)	No	HOC.
Bromotrifluoromethane	No	DUP, GTL.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Brominated, chlorinated and fluorinated hydrocarbons—Continued</b>		
Fluorinated (including other fluorohalogenated) . . . . .	Yes	
hydrocarbons—Continued		
1-Chloro-1,1-difluoroethane (F-142b) . . . . .	No	PAS.
Chlorodifluoromethane (F-22) . . . . .	Yes	ACS, DUP, LRO, PAS, RCN.
Chloropentafluoroethane . . . . .	No	GTL.
2-Chloro-1,1,1,2-tetrafluoroethane . . . . .	No	SCM.
Chlorotrifluoroethylene (Trifluorovinyl chloride) . . . . .	No	ACS.
2-Chloro-1,1,2-trifluoroethyl methyl ether . . . . .	No	OH.
Chlorotrifluoromethane (F-13) . . . . .	No	DUP.
Dibromodifluoromethane . . . . .	No	GTL.
Dichlorodifluoromethane (F-12) . . . . .	Yes	ACS, DUP, LRO, PAS, RCN.
Dichlorotetrafluoroethane (F-114) . . . . .	No	ACS, DUP.
Dichloro-trifluoroethane (F-123) . . . . .	No	DIX, HOC.
1,1-Difluoroethane . . . . .	No	DUP.
Hexafluoropropylene, monomer . . . . .	No	DUP.
1-Iodoperfluorohexane . . . . .	No	DUP.
Polytetrafluoroethylene ethyl iodide . . . . .	No	(?).
1,2,2,2-Tetrafluoroethane . . . . .	No	HOC.
Tetrafluoroethylene (F-1114) . . . . .	No	DUP.
Tetrafluoromethane (F-14) . . . . .	No	DUP.
Trichlorofluoromethane (F-11) . . . . .	Yes	ACS, DUP, LRO, PAS, RCN.
Trichlorotrifluoroethane (F-113) . . . . .	No	ACS, DIX, DUP, PAS.
Trifluoropropene . . . . .	No	HOC.
Vinyl fluoride, monomer . . . . .	No	DUP.
Vinylidene fluoride, monomer . . . . .	No	PAS.
All other fluorinated (including other fluorohalogenated) hydrocarbons . . . . .	No	DUP, HOC, REG.
<b>Other miscellaneous acyclic chemicals:</b>		
Iodinated (not otherwise halogenated) hydrocarbons:	Yes	
Diodomethane (Methylene iodide) . . . . .	No	DPW.
Ethylhexyl iodide (Iodoethyl hexane) . . . . .	No	RSA.
Iodobutane . . . . .	No	RSA.
Iodoethane (Ethyl iodide), non-medical . . . . .	No	DPW, RSA.
Iodomethane (Methyl iodide) . . . . .	No	RSA.
All other iodinated (Not otherwise halogenated) hydrocarbons . . . . .	No	DPW, RSA.
2-(Acetoacetoxy)ethyl methacrylate . . . . .	No	EKT.
<b>Acetylacetonates:</b>		
Aluminum acetylacetonate . . . . .	No	MCK.
Titanium acetylacetonate . . . . .	No	NOD.
All other acetylacetonates . . . . .	No	MCK.
<b>Acyclic peroxides:</b>		
Acetylacetone peroxide . . . . .	No	CAD.
tert-Amyl hydroperoxide . . . . .	No	WTC.
2-Butanone peroxide (MEK peroxide) . . . . .	Yes	CAD, FRE, NOC, RCN, WTC.
n-Butyl-4,4-bis[t-butylperoxy]valerate . . . . .	No	RCN.
tert-Butyl hydroperoxide . . . . .	No	ATR, AZT, FRE, RCN.
tert-Butyl peroxide (Di-tert-butyl peroxide) . . . . .	Yes	AZT, RCN, WTC.
tert-Butyl peroxyacetate . . . . .	No	AZT, RCN.
tert-Butyl peroxy-2-ethylhexanoate . . . . .	No	RCN, WTC.
tert-Butyl peroxyisobutyrate . . . . .	No	RCN.
tert-Butyl peroxyisopropylcarbonate . . . . .	No	RCN.
tert-Butylperoxy maleic acid . . . . .	No	PAS.
tert-Butyl peroxyneodecanoate . . . . .	No	RCN, WTC.
tert-Butyl peroxyplvalate . . . . .	Yes	AZT, RCN, WTC.

See footnotes at end of table.



Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Other miscellaneous acyclic chemicals—Continued</b>		
<b>Acyclic peroxides—Continued</b>		
Decanoyl peroxide	No	RCN.
Di(sec-butyl)peroxydicarbonate	No	RCN.
Di-(2-ethylhexyl) peroxydicarbonate	No	RCN, WTC.
Dilisononoyl peroxide	No	RCN.
2,5-Dimethyl-2,5-di(tert-butylperoxy)hexane	No	RCN.
2,5-Dimethyl-2,5-di(tert-butylperoxy)hexyne-3	No	RCN.
2,5-Dimethyl-2,5-di(2-ethylhexanoyl peroxy)hexane	No	RCN, WTC.
Ethyl 3,3-di(t-butyl peroxy) butyrate	No	RCN.
Lauroyl peroxide	No	RCN.
Peroxyacetic acid (Peracetic acid)	No	FMB.
Succinyl peroxide	No	RCN.
Tertiary amyl per-2-ethylhexanoate	No	WTC.
Carbon disulfide	No	PAS.
Chromium octanoate, activated, catalyst	No	(?)
Cobalt borocyclate	No	AAC.
1,3-Dichloro-2-propanol	No	ARS.
Epoxides, ethers, and acetals:	Yes	
Bis[2-chloroethyl]ether (Dichlorodethyl ether)	No	BKM.
Butylene oxide	No	DOW.
Butyl vinyl ether	No	GAF.
1-Chloro-2-methoxyethane	No	HIL.
Chloromethyl methyl ether	No	RH.
2,2-Dichloro-1,1-difluoroethyl methyl ether	No	OH.
Dioxyethane	No	WPG.
Dimethyl sulfone	No	CRZ.
Epichlorohydrin	No	DOW, SHC.
Ethylene oxide	Yes	BAS, CNE, DOW, EKX, HCL, OMC, PLC, SHC, SUN, TX, UCC, USI, VST.
Ethyl ether	No	EKX, USI.
Ethyl vinyl ether	No	GAF.
Glycidol (2,3-Epoxy-1-propanol)	No	DIX.
Glycidyl ethers:	Yes	
Alkyl glycidyl ether, C <sub>12</sub> -C <sub>14</sub> and C <sub>12</sub> -C <sub>18</sub>	No	REZ.
Alkyl glycidyl ethers, C <sub>8</sub> -C <sub>10</sub>	No	REZ.
1-(Allyloxy)-2,3-epoxypropane (Allyl glycidyl ether)	No	AAC, CPS.
1,4-Butanediol diglycidyl ether	No	REZ.
1-Butoxy-2,3-epoxypropane (Butyl glycidyl ether)	No	CPS, REZ.
tert-Butyl glycidyl ether	No	CPS.
Dibromoneopentyl glycidyl ether	No	REZ.
Glycidyl decanoate	No	ENJ.
Neopentyl glycol diglycidyl ether	No	REZ.
Polyol glycidyl ether	No	REZ.
Hexadecylsulfenyl chloride	No	EKT.
Isopropyl ether	No	ENJ, SHC.
Methylal (Dimethoxymethane)	No	HCL.
Methyl ether (Dimethyl ether)	No	AIP.
Methyl vinyl ether	No	GAF, UCC.
Propylene oxide	No	ATR, DOW.
1,1,3,3-Tetramethoxypropane	No	GAF, NOD.
All other epoxides, ethers, acetals	No	UCC, VIK, (?).
Ethyl succinyl chloride	No	CWN.
Fats and oils, chemically modified:	Yes	
Brominated vegetable oil	No	DOM.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production end/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Other miscellaneous acyclic chemicals—Continued</b>		
<b>Fats and oils, chemically modified—Continued</b>		
Castor oil, hydrogenated	No	CAS.
Castor oil, polymerized	No	CAS.
Chlorinated fatty materials	No	FER.
Hydrogenated menhaden fish oil	No	CHL, WTC.
Hydrogenated tallow glycerides	No	CHL, WTC.
Sulfurized corn oil	No	SM.
Vegetable glycerides, hydrogenated	No	BRD, WTC.
All other fats and oils, chemically modified	No	ARC, CAS, CHL, CJO.
<b>Hydrocarbons:</b>		
n-Decane	No	HMV, PLC.
Dilsubutylene isomers	No	HTM, NCI.
n-Dodecane	No	HMV, PLC.
Hexadecane	No	HMV.
Myrcene	No	SCM, (?).
n-Nonane	No	HMV.
n-Octadecane	No	HMV.
n-Octane	No	HMV, PLC.
All other hydrocarbons	No	DUP, HMV, WTK.
2-Mercaptoethanol	No	AAC, MRT, PLC.
Methyl sulfoxide (Dimethyl sulfoxide)	No	GAY.
Octadecanoic acid, 2-(1-carboxyethoxy)-1-methyl-2-oxoethyl ester, sodium salt	No	WTC.
<b>Organo-aluminum compounds:</b>		
Aluminum di-sec-butoxide acetoacetic ester chelate	No	CHT.
Aluminum diisopropoxide acetoacetic ester chelate	No	CHT, KCH.
Aluminum [1,3-butanediolato(2)-O,O'] (ethyl-3-oxobutanoato-0', 0'-dihydroxy T-4	No	CHT.
Aluminum ethyl-3-oxobutanoato-0', 0'-dihydroxy T-4	No	KCH.
Aluminum isoctoxide, diisopropoxide	No	KCH.
Aluminum isopropoxide (Aluminum isopropylate)	No	CHT, KCH.
Aluminum tri-sec-butoxide	No	CHT.
Diethylaluminum chloride	No	TNA, TSA.
Diethyl aluminum ethoxide	No	TSA.
Diethylaluminum iodide	No	TNA, TSA.
Diisobutylaluminum chloride	No	TNA, TSA.
Diisobutylaluminum hydride	No	TNA, TSA.
Di-n-propylaluminum chloride	No	TSA.
Ethylaluminum dichloride	No	TNA, TSA.
Ethylaluminum sesquichloride	No	TNA, TSA.
Isobutylaluminum chloride	No	TNA, TSA.
Isopropenylaluminum	No	TSA.
Methylaluminum sesquichloride	No	CHT.
Oxoaluminum isopropoxide	No	KCH.
Oxoaluminum stearate	No	CHT, KCH.
Oxy-aluminum octanoate	No	KCH.
Polyol aluminum chelate	No	SQA.
Tri-n-butylaluminum	No	TNA, TSA.
Triethylaluminum	No	TNA, TSA.
Tri-n-hexyl aluminum	No	TNA, TSA.
Trisobutylaluminum	No	TNA, TSA.
Trimethylaluminum	No	TNA, TSA.
Tri-n-octylaluminum	No	TNA, TSA.
Tri-oxyaluminum tri-isopropoxide	No	CHT.
All other organo-aluminum compounds	No	KCH.

See footnotes at end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Other miscellaneous acyclic chemicals—Continued</b>		
<b>Organo-boron compounds:</b>		
Boric acid-amine adducts	No	FER.
Boron trichloride-amine complex (DY 9577)	No	ASL.
Diethanolamine-borate	No	EFH.
N-Methyl-methanamine with borane (1:1)	No	(2).
2-Methyl-2-propanamine with borane(1:1)	No	(2).
Mixed alcohol borates	No	(2).
Triethylborane	No	(2).
Triethyl borate	No	ADC.
Trimethoxyboroxine	No	(2).
Trimethyl borate	No	MHI.
N,N,N-Trimethyl methanaminium octahydrotriborate	No	(2).
All other organo-boron compounds	No	ASL, HCL, TSA, USB, (2).
<b>Organo-lithium compounds:</b>		
n-Butyllithium	No	FTE.
sec-Butyllithium	No	FTE.
Lithium hydroxystearate	No	WTC.
<b>Organo-magnesium compounds:</b>		
Butyl ethyl magnesium	No	TSA.
n-Butyl magnesium chloride	No	(2).
Di-n-butylmagnesium	No	TSA.
Di-n-hexyl magnesium	No	TSA.
Magnesium methylate	No	SOI.
<b>Organo-silicon compounds:</b>		
N-Aminoethylaminopropyl trimethoxysilane	No	DCC, NOD.
α-Chloropropyltrichlorosilane	No	DCC.
Chloropropyltrimethoxysilane	No	DCC, NOD.
Chlorotrimethylsilane	No	DCC.
Dichlorodimethylsilane	No	DCC.
Dichloromethylsilane	No	DCC.
Dichloromethylvinylsilane	No	DCC, SCM.
Diisobutyl dimethoxychloro silane	No	NOD.
Divinyl tetramethyldisiloxane	No	NOD.
α-Glycidoxypropyltrimethoxysilane	No	DCC, NOD, UCC.
Hexamethyldisilazane	Yes	DCC, NOD, SCM.
Hexyltrichlorosilane	No	SCM.
Isobutyltrimethoxysilane	No	NOD.
Mercaptopropyltrimethoxysilane	No	NOD, UCC.
α-Methacryloxypropyltrimethoxysilane	No	UCC.
Methyltrimethoxysilane and polymethyltrisiloxane	No	DCC, UCC.
N-Octyltriethoxy silane	No	SCM.
Polyoxyalkene silicones	No	UCC.
Silicone fluids	Yes	DCC, SPD, SWS, UCC.
Trichloromethylsilane	No	DCC.
Trichloropropylsilane	No	DCC.
Trichlorovinylsilane	No	DCC, SCM, UCC.
Tris(2-methoxyethoxy)vinyl silane	No	NOD.
Tris(pentamethyldisiloxanyl)-3-methacrylatopropylsilane	No	(2).
Vinyltriethoxysilane	No	NOD, UCC.
Vinyl trimethoxy silane	No	NOD.
All other organo-silicone compounds	No	ARO, NOD, SCM, UCC, (2).
<b>Organo-tin compounds:</b>		
Dibutyltin bis(butylmaleate)	No	CCA.
Dibutyltin bis(isooctylmercaptoacetate)	No	WTC, (2).
Dibutyltin bis(mercaptolaurate)	No	(2).
Dibutyltin dichloride	No	WTC, (2).
Dibutyltin oxide	No	(2).
Dimethyltin dichloride	No	WTC.

See footnotes at the end of table.

Table 15-2—Continued

Miscellaneous chemicals for which U.S. production and/or sales were either reported or estimated, identified by manufacturer, 1989

Miscellaneous cyclic and acyclic chemicals	Separate statistics <sup>1</sup>	Manufacturers' identification codes (according to list in table 15-3)
<b>Acyclic—Continued</b>		
<b>Other miscellaneous acyclic chemicals—Continued</b>		
Organo-tin compounds—Continued		
Dimethyltin-IOTG .....	No	WTC.
Ester tin mercaptoesters .....	No	CCA.
Monomethyl tin .....	No	WTC.
Organotin mercaptides .....	No	CCA, CCW.
Tin carboxylate .....	No	FER.
All other organo-tin compounds .....	No	SCM, (2), (2).
Perchloromethanethiol (Perchloromethyl mercaptan) ..	No	ICI.
Perfluoroalkyl polyether .....	No	DUP.
Perfluoroethiols, C <sub>4</sub> -C <sub>20</sub> , gamma-omega .....	No	CGY.
Phosgene (Carbonyl chloride) .....	Yes	DUP, ICI, OMC, PPG, VDM.
Pine oil, synthetic .....	No	NCI.
Polyalphaolefins .....	No	USI.
Polyhexafluoropropylene oxide .....	No	DUP.
Polymethacrylic acid esters .....	No	DUP.
Potassium 2-methyl-2-butanol .....	No	(2).
Potassium 2-methyl-2-propanol .....	No	(2).
Sodium methoxide (Sodium methylate) .....	No	HK, OMC.
Tetrahydroalocimene hydrochloride .....	No	NCI.
Thioethanol, sodium salt .....	No	BAS.
Trifluoroethanol .....	No	HOC.
Zirconium compounds .....	No	KCH.
All other miscellaneous acyclic chemicals .....	Yes	ABB, ASL, CGY, EK, EKT, GPI, HMP, NOD, PAH, PIC, RCN, RSA, SCP, SHX, TCC, TNA, TSA, USR, (2), (2), (2), (2).
Mixtures not specifically itemized: .....	Yes	
Alcohols, monohydric, and their esters, C <sub>6</sub> and higher .....	No	EKX.
Butyl formcel .....	No	HCL.
Celtone .....	No	HCL.
Fatty acid residues .....	Yes	DRL, SHX, SYP, WTC.
Gluconic acid and salts, mixed .....	No	PMP.
Glycol residues .....	No	OMC.
Methyl formcel .....	No	HCL, NOD.
Oxidate light ends .....	No	HCF.
Oxo process bottoms .....	No	HCL.
Propionic blends .....	No	HCL.
All other mixtures not specifically itemized .....	Yes	BAS, CGY, DUP, HCL, MON, NES, WAY.

<sup>1</sup> Chemicals for which separate statistics are reported in this section are indicated by 'yes.' Chemicals for which data are accepted in confidence and may not be published are indicated by 'no.'

<sup>2</sup> The manufacturer did not consent to his identification with the designated products.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.

Table 15-3

Miscellaneous cyclic and acyclic chemicals: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
AAC	Alcolac, Inc.	CNE	Oxy Petrochemicals, Inc.
ABB	Abbott Laboratories	CNP	DSM Chemicals, North America
AC	AC & S, Inc.	COC	Columbia Organic Chemicals Co., Inc.
ACS	Allied Signal Inc., Engineered Material Sector	CPS	CPS Chemical Co., Inc.
ACY	American Cyanamid Co.	CRZ	James River II Corp.
ADC	Anderson Development Co.	CWN	Upjohn Co., Fine Chemicals
AIP	Air Products & Chemicals, Inc.	CXI	Chemical Exchange Industries, Inc.
ALD	Aldrich Chemical Co., Inc.	CYR	CYRO Industries
ALI	Anzon, Inc.	DAN	Dan River Inc., Chemical Products Div.
ALW	Albright & Wilson, Inc.	DAZ	Diaz Chemical Corp.
AMB	American Bio-Synthetics Corp.	DCC	Dow Corning Corp.
AMO	Amoco Corp.	DIX	Dixie Chemical Co., Inc.
AMV	Amvac Chemical Corp.	DKA	Mobay Synthetics Corporation
ANG	Angus Chemical Co.	DOM	Dominion Products, Inc.
ARC	Akzo Chemicals, Inc.	DOW	Dow Chemical Co.
ARO	Arco	DPW	Deepwater, Inc.
ARS	Arsynco, Inc., Sub. Div of Aceto Corp.	DRL	Unichema North America
ART	Aristech Chemical Corp.	DUP	E. I. duPont de Nemours & Co., Inc. Automotive Products Dept. Chemicals & Pigments Dept. Petrochemicals Dept. Polymer Products Dept.
ARZ	Arizona Chemical Co.	DVC	Dover Chemical Corp. Sub. of ICC Industries, Inc.
ASH	Ashland Oil, Inc.	EFH	E. F. Houghton & Co.
ASL	Specialtychem Products Corp.	EHC	Ethichem Corp.
ATL	Atlantic Industries, Inc.	EK	Eastman Kodak Co.:
ATR	Atlantic Richfield Co., Arco Chemical Co.	EKT	Tennessee Eastman Co. Div.
AZT	Catalyst Resources, Inc.	EKX	Texas Eastman Co. Div.
BAS	BASF Corp.	ELC	Elco Corp. Sub. of Detrex Chemical Industries, Inc.
BCC	Buffalo Color Corp.	ENJ	Exxon Chemical Americas
BFG	B. F. Goodrich Co.	ESA	East Shore Chemical Co.
BFP	American Ingredients Company	EVN	W. R. Grace & Co., Organic Chemicals Div. Evans Chemetics
BKC	J. T. Baker Chemical Co.	FER	Ferro Corp.:
BKM	Buckman Laboratories, Inc.		Bedford Chemical Div.
BOC	Blocraft Laboratories, Inc.		Grant Chemical Div.
BOR	Borden, Inc., Packaging & Indus. Prod. Div.		Kell Chemical Div.
BRD	Lonza, Inc.	FMB	FMC Corp., Chemical Products Group
BRI	Sedgelyed Specialties	FMT	Fairmount Chemical Co., Inc.
BTL	BTL Specialty Resin Corp.	FOC	Handschy Industries, Inc., Ink and Chemical Div.
BUC	Synalloy Corp., Blackman Uhler Chemical Div.	FOR	Formosa Plastics Corporation Louisiana
CAD	Akzo Chemicals, Inc.	FRE	Freeman Chemical Corp.
CAS	Caschem, Inc.	FRO	Vulcan Materials Co., Chemicals Div.
CBD	Chembond Corp.	FTE	Cyprus Foote Mineral Company
CCA	Akzo Chemicals, Inc.	FTX	Finetex, Inc.
CCC	C. N. C. International, Inc.	GAF	GAF Corp., Chemical Group
CCW	Morton International, Inc., Specialty Chemicals Group	GAY	Gaylord Chemical Corp.
CED	Cedar Chemical Co.	GE	General Electric Co., Specialty Chemical Group
CGY	Ciba-Geigy Corp.	GFS	GFS Chemical, Inc.
CHD	Chemdesign Corp.	GGC	Georgia-Gulf Corp.:
CHG	Mobay Chemical Corp., Agricultural Chemicals Div.		Plaquemine Div.
CHL	Chemol, Inc.	GIV	Givaudan Corp.
CHP	C. H. Patrick & Co., Inc.		
CHT	Chattem, Inc.		
CJO	C. J. Osborn Chemical, Inc.		
CMB	Cambridge Industries Co.		

See footnotes at the end of table.

Table 15-3—Continued

Miscellaneous cyclic and acyclic chemicals: Directory of manufacturers, alphabetical by code, 1989

Code	Name of company	Code	Name of company
GON	W. R. Grace & Co., Organic Chemicals Div., Nitroparaffins	MRT	Morton International, Inc., Specialty Chemical
GP	Georgia-Pacific Corp., Resins Operations	NCC	Niacet Corp.
GPI	Grindsted Products, Inc.	NCI	Unlon Camp Corp., BBA Div.
GTL	Great Lakes Chemical Corp.	NCI	Unlon Camp Corp.
HAL	C. P. Hall Co.	NES	Ruetgers-Nease Chemical Co.
HCC	Hatco Chemical Corp.	NOC	Norac Co., Inc. Mathe Div.
HCF	Cape Industries	NOD	Huls America, Inc.
HCL	Hoechst Celanese Corp: Chemical Group Inc. Fibers Industrial Division Fine Chemicals Division Sou-Tex Works	OH	Anaquest
HCP	Honig Chemical & Processing Corp.	OMC	Olin Corp.
HFT	Syntex Agribusines, Inc.	ORT	Roehr Chemicals, Inc., Div. of Aceto Corp.
HIL	Hilton Davis Company	PAC	Pacific Anchor Chemical Corp.
HK	Occidental Chemical Corp., ED & S Div.	PAH	Parish Chemical Co.
HML	Hummel Crofton, Inc.	PAS	Atocem North America, Inc.
HMP	W. R. Grace & Co., Hampshire Chemicals Div. & Organic Chemicals Div.	PCI	Piedmont Chemical Industries, Inc.
HMV	Humphrey Chemical Co.	PD	Parke-Davis, Div. of Warner-Lambert Co.
HOC	Halocarbon Products Corp.	PDG	P. D. Glycol
HOF	Hoffman-LaRoche, Inc.	PEL	Peiron Corp.
HPC	Hercules, Inc.	PFN	Pfanstiehl Laboratories, Inc.
HRT	Hart Products Corp.	PFZ	Pfizer Pharmaceuticals, Inc.
HTM	Haltermann Ltd. Co.	PG	Procter & Gamble Co., Procter & Gamble Mfg. Co.
HXL	Hexcel Corp., Hexcel Chemical Products	PIC	Pierce Chemical Co.
ICI	ICI Americas, Inc.: Agricultural Chemical Div. Rubicon, Inc. Specialty Chem Div.	PLC	Phillips 66 Co.
IMC	IMC Pitman-Moore Industrial Chemicals Div.	PLS	Plastics Engineering Co.
JRC	Jarchem Industries, Inc.	PMP	PMP Fermentation Products, Inc.
KCH	Manchem, Inc.	PPG	PPG Industries, Inc.
KLM	Kalama Chemical, Inc.	PSG	PMC, Inc., PMC Specialties Group, Inc.
KMI	Kemin Industries, Inc.	PST	Peretorp Polyols, Inc.
LCP	LCP Chemicals - West Virginia, Inc.	QCP	Quaker Chemical Corp.
LEM	Napp Chemicals, Inc.	QKO	QO Chemicals, Inc.
LRO	Laroche Chemicals, Inc.	QTR	Questa Chemical, Corp.
LYP	Lyondell Petrochemical Co.	RCN	Racon, Inc.
MAL	Mallinckrodt, Inc.	RDA	Rhone-Poulenc, Inc.
MCI	Mooney Chemicals, Inc.	REG	Regis Chemical Co.
MCK	Mackenzie Chemical Works, Inc.	REZ	Hi-Tek Polymers, Inc.
MHI	Morton International, Inc., Ventron Division	RH	Rohm & Haas Co.
MIL	Milliken & Co., Milliken Chemical Div.	RPC	Colloids, Inc., Lyndal Division
MLS	Miles, Inc., Biotechnology Group	RQT	Roquette Corporation
MNA	Monsanto Agricultural Co.	RSA	R.S.A. Corp.
MON	Monsanto Co.	S	Sandoz Chemical Corp.
MRF	Morflex Chemical Company, Inc.	SBC	Scher Chemicals, Inc.
		SC	Sterling Chemicals, Inc.
		SCM	SCM Corp., PCR, Inc., & Gilco Organics
		SCN	Schenectady Chemicals, Inc.
		SCP	Henkel Corp.
		SD	Sterling Drug, Inc.: Sterling Pharmaceuticals, Inc.
		SDC	Sandoz Chemicals Corp.
		SDW	Sterling Drug, Inc. Sterling Organics Div.
		SHC	Shell Chemical Co. Div.
		SHP	Shepherd Chemical Co.

See footnotes at the end of table.

Table 15-3—Continued

Miscellaneous cyclic and acyclic chemicals: Directory of manufacturers, alphabetical by code, 1989

<i>Code</i>	<i>Name of company</i>	<i>Code</i>	<i>Name of company</i>
SHX .....	Sherex Chemical Co., Inc.	UCC .....	Union Carbide Corp.
SK .....	Smithkline Beecham Chemicals	UPM .....	UOP, Inc.
SM .....	Mobil Oil Corp.: Chemical Products Div.	USB .....	U. S. Borax & Chemical Corp.
SOH .....	BP Chemicals, Inc.	USI .....	Quantum Chemical Corp., USI Div.
SOI .....	Specialty Organics, Inc.	USR .....	Uniroyal, Inc., Uniroyal Chemical Div.
SPD .....	General Electric Co., Silicone Products Div.	UTC .....	Unltex Chemical Corp.
SQA .....	Sequa Chemicals, Inc.	VCM .....	Vanchem, Inc.
SUN .....	Sun Co., Inc.	VDM .....	Van De Mark Chemical Co., Inc.
SWS .....	Wacker Silicones	VEL .....	Velsicol Chemical Corp.
SYL .....	Arizona Chemical Co.	VIK .....	M & T Chemical
SYP .....	Synthetic Products Co.	VNC .....	Vanderbilt Chemical Corp.
TCC .....	Sybron Chemicals, Inc.	VND .....	Van Dyk, Div. of Mallinckrodt, Inc.
TLC .....	Twin Lake Chemical, Inc.	VST .....	Vista Chemical Co.
TMH .....	Hacros Chemicals, Inc.	WAY .....	Olin Hunt Specialty Products, Inc.
TNA .....	Ethyl Corp.	WCC .....	White Chemical Corp.
TNI .....	Gillette Chemical Co.	WCL .....	Wright Chemical Corp.
TOC .....	Tenneco Oil Co.	WM .....	Inolex Chemical Co.
TRO .....	Troy Chemical Corp.	WPG .....	West Point—Pepperell, Inc., Grifftex Chemical Co. Sub.
TSA .....	Texas Alkyls, Inc.	WTC .....	Witco Chemical Corp.
TX .....	Texaco Chemical Co.	WTH .....	Union Carbide Corp., Chemical Division
TZC .....	Magnesium Elektron, Inc.	WTK .....	Helco Chemicals, Inc.
		WVA .....	Westvaco Corp.

Note.—Complete names, telephone number, and addresses of the above reporting companies are listed in app. A.

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.





**APPENDIX A**  
**DIRECTORY OF MANUFACTURERS**

Table A-1

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identification code	Name of company	Telephone number	Office address
AEP	A & E Plastic Inc	818-968-3801	14505 Proctor Ave. Industry, CA 91749.
AC	AC & S, Inc.	304-755-9275	P.O. Box 335, Nitro, WV 25143.
ABB	Abbott Laboratories	312-937-3452	1401 Sheridan Rd., N. Chicago, IL 60064.
ILI	Acme Steel Co	708-849-2500	13500 S. Perry Ave., Riverdale, IL 60627.
ACO	Adco Chemical Co	201-589-0880	49 Rutherford St., Newark, NJ 07105.
AIP	Air Products & Chemicals, Inc	215-481-4911	7201 Hamilton Blvd, Allentown, PA 18195-1501
AJY	Ajay Chemicals, Inc	404-943-8202	1400 Industry Rd., Powder Springs, GA 30073.
AJI	Ajinomoto USA, Inc	201-488-1212	4020 Ajinomoto Dr., Raleigh, NC 27610.
ARC	Akzo Chemicals, Inc.	312-906-7500	300 S. Riverside, Plaza Chicago, IL 60606.
CCA	Akzo Chemicals, Inc	312-906-7500	500 Jersey Ave, New Brunswick, NJ 08903.
CAD	Akzo Chemicals, Inc	312-906-7500	2153 Lockport-Olcott Rd., Burt, NY 14028.
FRP	Akzo Coatings, Inc	912-367-3616	P.O. Box 349, Baxley, GA 31513.
REL	Akzo Coatings, Inc	502-459-9110	4730 Crittenden Dr., Louisville, KY 40233.
AKZ	Akzo Coatings, Inc	502-459-9110	1313 Windsor Ave., Columbus, OH 43218.
HAN	Akzo Coatings, Inc	814-294-3381	1313 Windsor Ave., Columbus, OH 43216.
IOV	Akzo/lovite, Inc	708-481-8900	21625 Oak St., Matteson, IL 60443.
ALW	Albright & Wilson, Americas, Inc	804-550-4300	P.O. Box 26229, Richmond, VA 26229.
ALC	Alco Chemical Corp	615-629-1405	909 Mueller Dr., Chattanooga, TN 37406.
AAC	Alcolac, Inc	301-859-4900	1099 Winterson Rd., Linthicum, MD 21044.
ALD	Aldrich Chemical Co., Inc	414-273-3850	1001 W. St. Paul Ave., Milwaukee, WI 53233.
ALE	Alex Chemical Co	717-462-3500	119 N. Union St., Shenandoah, PA 17976.
ACH	Alco Chemical Corp	214-733-6841	17304 N. Preston Dr., Dallas, TX 75252.
ALG	Allegheny Chemical Corp	814-772-3965	Gillis Ave., Rldgway, PA 15853.
ALL	Alliance Chemical, Inc	201-945-5400	Linden Ave., Ridgefield, NJ 07657.
BME	Allied Signal-Bendix, Corp., Friction Materials Div.	518-270-0200	P.O. Box 230, Troy, NY 12180.
ACS	Allied Signal Inc:		
	Engineered Materials Sector	201-455-4911	P.O. Box 1051 R, Morristown, NJ 07054.
	Engineered Plastic Div	201-455-3100	Columbia Rd. & Park Ave., Morristown, NY 07962.
	High Density Polyethylene Business	504-775-4330	12875 Scenic Hwy, Baton Rouge, LA 70892.
ALX	Alox Corp	716-282-1295	3943 Buffalo Ave., Niagara Falls, NY 14303.
APH	Alpha Corporation of Tennessee	901-853-2450	423 Highway 57 East, Collerville, TN 38017.
ALP	Alpha Laboratories, Inc	303-756-1338	P.O. Box 22223, Denver, CO 80222.
HES	Amerada Hess Corp. (Hess Oil Virgin Island Corp.)	201-750-6000	1 Hess Plaza, Woodbridge, NJ 07095.
AMB	American Bio-Synthetics Corp	414-384-7017	710 W. National Ave., Milwaukee, WI 53204.
ACY	American Cyanamid Co	201-831-2768	One Cyanamid Plaza, Wayne, NJ 07470.
BFP	American Ingredients, Co	816-561-9050	3947 Broadway, Kansas City, MO 64111.
API	American Polymers, Inc	508-987-0144	Old Webster Rd., Oxford, MA 01801.
ASY	American Synthetic Rubber Corp	502-449-8300	P.O. Box 32960, Louisville, KY 40232.
SPO	Ameripol Synpol Co., Div. of Uniroyal Goodrich Tire Co.	216-762-4442	146 South High St. Akron, OH 44308-1493.
HVG	Ametek, Inc., Havg Div	302-995-0400	900 Greenbank Rd., Wilmington, DE 19808.

Table A-1--Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identifi- cation code	Name of company	Telephone number	Office address
AMO	Amoco Corp	312-856-6111	200 E. Randolph Dr., Chicago, IL 60680-0703.
AMV	Amvac Chemical Corp	213-264-3910	4100 E. Washington Blvd., Los Angeles, CA 90023.
OH	Anaquest	608-273-0019	2005 W. Beltline Hwy., Madison, WI 53713.
ADC	Anderson Development Co	517-263-2121	1415 E. Michigan St., Adrian, MI 49221.
ANG	Angus Chemical Co	312-498-6700	2211 Sanders Rd., Northbrook, IL 60062.
ALI	Anzon, Inc	215-427-3000	2545 Aramingo Ave., Philadelphia, PA 19125.
APX	Apex Chemical Co	201-354-5420	200 S. First St., Elizabeth, NJ 07206.
APC	Apollo Chemical Corp	919-226-1161	1105 Southerland St., Graham, NC 27253.
APO	Apollo Colors, Inc	708-564-9190	3000 W. Dundee Rd., Suite 415, Northbrook, IL 60062.
AQU	Aqualon Co	302-996-2000	2711 Centerville Rd., Wilmington, DE 19850.
HKY	Arcadian Corp	901-758-5200	6750 Poplar Ave., Suite 600, Memphis, TN 38138-7419.
GCC	Arcadian Corp	901-758-5200	P.O. Box 27147, Memphis, TN 38127.
ARD	Ardmore, Inc	201-481-2406	29 Riverside Ave., Newark, NJ 07104.
ARN	Arenol Chemical Corp	201-526-5900	189 Meister Ave., Somerville, NJ 08876.
ART	Aristech Chemical Corp	412-433-2747	600 Grant St., Pittsburgh, PA 15230-0250.
ARZ	Arizona Chemical Co	904-785-6700	1001 E. Business Hwy. 98, Panama City, FL 32401.
SYL	Arizona Chemical Co	904-785-6700	P.O. Box 947, Port St. Joe, FL 32456.
ALS	Armco, Inc.	513-425-2744	703 Curtis St., Middletown, OH 45043.
ARP	Armour Pharmaceutical Co	815-932-6771	P.O. Box 511, Kankakee, IL 60901.
ARK	Armstrong World Industries, Inc	717-397-0611	333 Liberty Street, Lancaster, PA 17604.
ARO	ARNCO	714-739-7900	One Centerpointe Dr., LaPalma, CA 90623-1094.
ARL	Arol Chemical Products Co	201-344-1510	649 Ferry St., Newark, NJ 07105.
ARS	Arsynco, Inc., Sub Div. of Aceto Corp.	718-898-2300	126-02 Northern Blvd., Flushing, NY 11368.
ASH	Ashland Oil, Inc	614-889-3333	P.O. Box 2219, Columbus, OH 43216.
	Ashland Petroleum Co	606-329-3333	P.O. Box 391, Ashland, KY 41114.
BLA	Astor Products, Inc., Blue Arrow Div	904-783-5352	5244 Edgewood Ct., Jacksonville, FL 32205.
ATL	Atlantic Industries, Inc	201-235-1800	10 Kingsland Rd., Nutley, NJ 07110.
ATR	Atlantic Richfield Co., Arco Chemical Co.	215-359-2000	3801 West Chester Pike, Newtown Square, PA 19073.
ARI	Atlas Refinery, Inc	201-589-2002	142 Lockwood St., Newark, NJ 07105.
RSN	Atochem North America, Inc	201-447-3300	266 Harristown Rd., Glen Rock, N.J. 07452.
PAS	Atochem North America, Inc	215-587-7452	Three Parkway, Philadelphia, PA 19102.
WTL	Atochem North America, Inc., Lucidol Div.	716-877-1740	1740 Military Rd., Buffalo, NY 14240.
AUX	Auralux Corp	203-886-2616	29 Scott Ave., Norwich, CT 06360.
AUS	Ausimont N.V	201-292-6250	128 Technology Drive, Waltham, MA 02254
BAS	BASF Corp. Chemicals Div	201-316-2937	100 Cherry Hill Rd., Parsippany, NJ 07054.
ICF	Coating & Colorants	201-365-3400	1255 Broad St., Clifton, NJ 07015.
SOH	BP Chemicals, Inc	216-586-4141	200 Public Square 31-4105-N, Cleveland, OH 44114 - 2375.
SIF	Filon Div	213-757-5141	12333 South Van Ness Ave., Hawthorne, CA 90250.

**Table A-1—Continued**  
**Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989**

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identifi- cation code	Name of company	Telephone number	Office address
SIC	BP Chemicals, Inc.—Continued Silmur Div .....	213-757-1801	12333 South Van Ness Ave., Hawthorne, CA 90250.
SIO	BP Oil Company .....	419-226-2300	1150 South Metcalf St., Lima, OH 45804.
BTL	BTL Speciality Resin Corp .....	419-244-5856	2112 Sylvan Ave., Toledo, OH 43606.
BKC	J. T. Baker Chemical Co .....	201-859-2151	222 Red School Lane, Phillipsburg, NJ 08865.
BIB	Beckman Instruments, Inc .....	714-871-4848	1050 Page Mill Rd., Palo Alto, CA 94304.
BCK	Spincro Div. Diagnostic Systems Group .....	619-993-8740	2470 Faraday Ave., Carlsbad, CA 92008.
BEE	Beecham, Inc.: Beecham Laboratories Div .....	201-469-5200	101 Possumtown Rd., Piscataway, NJ 08854.
BEW	Pharmaceuticals Div .....	201-881-3000	3 Garret Mountain Plaza, West Paterson, NJ 07424.
BCM	Beiding Chemical Industries .....	212-544-6040	P.O. Box 130, Hendersonville, NC 28715.
BLZ	Belzak Corp .....	201-773-0602	850 Bloomfield Ave., Clifton, NJ 07012.
BTS	Bethlehem Steel Corp .....	215-694-4522	866 Martin Tower - 8th Fl., Bethlehem, PA 18016.
BNS	Binney & Smith, Inc .....	215-253-6271	1100 Church Lane, Easton, PA 18044-0431.
BOC	Blocraft Laboratories, Inc .....	201-796-3434	12 Industrial Park, Waldwick, NJ 07463.
NUT	Bloproducts, Inc .....	502-968-3321	4820 Jennings Lane, Louisville, KY 40218.
BOE	Boehme Filatex, Inc .....	919-342-6631	Rt. 11 Box 5, Reidsville, NC 27320.
BOT	Boots Co. (USA), Inc .....	708-405-7400	300 Tristate Int'l Ctr. Suite 200, Lincolnshire, IL 60015
BOR	Borden, Inc.: Packaging & Industrial Products Div. ....	614-225-4000	180 E. Broad St., Columbus, OH 43209.
BCP	Borden Chemical & Plastics Delaware Limited Partnership .....	504-387-5101	Route 73, Gelsmar, LA 70734.
BMC	Brlin-Mont Chemicals, Inc .....	919-292-0566	3921 Spring Garden St., Greensboro, NC 27407.
BRS	Bristol-Myers Co .....	212-546-4000	345 Park Ave., New York, NY 10154.
TRD	Bristol Myers Squibb Co .....	212-546-4000	P.O. Box 609, Humacao, PR 00661.
BRU	M. A. Bruder & Sons, Inc .....	215-353-5100	52nd & Grays Ave., Philadelphia, PA 19143.
BKM	Buckman Laboratories, Inc .....	901-278-0330	1256 N. McLean Blvd., Memphis, TN 38108.
BCC	Buffalo Color Corp .....	716-827-4500	P.O. Box 7027., Buffalo, NY 14240.
BRR	Burris Chemical, Inc., Color Div .....	803-554-7511	175 Eschelon Rd., Greenville, SC 29605.
BUR	Burroughs Wellcome Co .....	919-248-3000	3030 Cornwallis Rd., Research Triangle Park, NC 27709.
CFI	CF Industries, Inc .....	312-438-9500	Salem Lake Dr., Long Grove, IL 60047.
CLU	CL Industries, Inc .....	217-662-2136	P.O. Box 218, Georgetown, IL 61846.
CCC	C.N.C. International, Inc .....	401-769-6100	20 Privledge St., Woonsocket, RI 02895.
PS	CPS Corp .....	716-366-6010	3257 Middle Rd., Dunkirk, NY 14048.
CPS	CPS Chemical Co., Inc .....	201-727-3100	Old Bridge Rd., Old Bridge, NJ 08857.
CYR	CYRO Industries .....	201-770-3000	100 Valley Rd., Mr. Arlington, NJ 07856.
GRL	Calgon Corp., Calgon Veetal Laboratories Div. ....	314-862-2000	5035 Manchester Ave., St. Louis, MO 63110.
CMB	Cambridge Industries Co .....	201-465-4565	7-33 Amsterdam St., Newark, NJ 07105.
HCF	Capo Industries .....	919-341-5500	P.O. Box 327, Wilmington, NC 28402.
SVC	Capital City Products Co .....	614-299-3131	1530 S. Jackson St., Janesville, WI 53545.
CBC	Carbose Corp .....	814-443-1611	100 Maple St., Somerset, PA 15501.

**Table A-1—Continued**  
**Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989**

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identifi- cation code	Name of company	Telephone number	Office address
CGL	Cargill, Inc . . . . .	612-475-7634	P.O. Box 5630, Minneapolis, MN 55428.
CHC	Carpenter Chemical Co . . . . .	804-359-0800	P.O. Box 27205, Richmond, VA 23261.
BSC	Cascade Resins, Inc . . . . .	503-343-2111	P.O. Box 1989, Eugene, OR 97440.
CAS	Caschem, Inc . . . . .	201-858-7900	40 Avenue A, Bayonne, NJ 07002.
AZT	Catalyst Resources, Inc . . . . .	713-957-6818	2190 North Loop West, Suite 400, Houston, TX 77018.
CCL	Catawba-Charlab, Inc . . . . .	704-523-4242	5046 Old Pineville Rd., Charlotte, NC 28217.
CED	Cedar Chemical Corp . . . . .	501-572-3701	Highway 242 South, West Helena, AR 72390.
CNT	Certaineed Corp . . . . .	901-685-5348	P.O. Box 3, Vicksburg, MS 39181.
CPR	Certified Processing Corp . . . . .	215-341-7000	P.O. Box 860, Valley Forge, PA 19482.
GRS	Champlin Refining Co . . . . .	201-923-5200	U.S. Highway #22, Hillside, NJ 07205.
CHT	Chattem, Inc . . . . .	512-882-8871	P.O. Box 9176, Corpus Christi, TX 78469.
CHD	Chemdesign Corp . . . . .	615-821-4571	1715 W. 38th St., Chattanooga, TN 37409.
CBF	Chembond Corp . . . . .	503-687-8840	1600 Valley River Dr., Suite 390, Eugene, OR 97401.
CHD	Chemdesign Corp . . . . .	508-345-9999	99 Development Rd., Fitchburg, MA 01420.
CFX	Chemfax, Inc . . . . .	601-863-6511	10045 Three River Rd., Gulfport, MS 39503.
CXI	Chemical Exchange Industries, Inc . . . . .	713-526-8291	3813 Buffalo Speedway, Houston, TX 77098.
CMT	Chemithon Corp . . . . .	206-937-9954	5430 Marginal Way, SW., Seattle, WA 98106.
CHL	Chemol Co . . . . .	919-272-3050	2410 Randolph Ave., Greensboro, NC 27406.
SOC	Chevron Corp., Chevron Chemical . . . . .	415-842-5500	6001 Bollinger Canyon Rd., San Ramon, CA 94583.
CHH	Chris Hansen's Laboratory, Inc . . . . .	414-476-3630	9015 W. Maple St., West Allis, WI 53214.
CMC	Chromatic Color Corp . . . . .	502-737-1700	305 Ring Rd., Elizabethtown KY, 42701.
CGY	Ciba-Geigy Corp . . . . .	914-478-3131	444 Saw Mill River Rd., Ardsley, NY 10502.
FJI	Cincinnati Varnish Co . . . . .	513-631-4270	1776 Mentor Ave., Cincinnati, OH 45212.
CGO	Citgo Petroleum Corp . . . . .	918-495-4000	P.O. Box 1562, Lake Charles, LA 70602.
CGU	Citizens Gas & Coke Utility . . . . .	317-264-8802	3133 Southeastern Ave., Indianapolis, IN 46203.
ACT	Climax Performance Materials Corp . . . . .	708-458-8450	7666 W. 63rd St., Summit, IL 60501.
WYC	Coastal Chem, Inc . . . . .	307-637-2700	P.O. Box 1287, Cheyenne, WY 82003.
CSP	Coastal Refining & Marketing Inc . . . . .	713-877-1400	Nine Greenway Plaza, Houston, TX 77046.
CP	Colgate-Palmolive Co . . . . .	212-310-2000	300 Park Ave., New York, NY 10022.
CLD	Colloids, Inc . . . . .	201-926-6100	P.O. Box 769, Marietta, GA 30061.
RPC	Lyndal Div . . . . .	404-259-4831	1338 Coronet Drive, Dalton, Ga. 30720
CIC	Color Chem International Corp . . . . .	201-444-8563	7 Plymouth Rd., Glen Rock, NJ 07452.
CCS	Colorado Chemical Specialties, Inc . . . . .	303-245-8148	569 24-1/4 Rd., Grand Junction, CO 81505.
CRS	Colorado Resins, Inc . . . . .	303-245-8148	569 24-1/4 Rd., Grand Junction, CO 81505.
CNC	Columbia Nitrogen Corp . . . . .	404-823-4300	P.O. Box 1483, Augusta, GA 30903.
COC	Columbia Organic Chemical Co., Inc . . . . .	803-425-1786	1424 Mt. Zion Road, Cassatt SC 29032.
CAC	Cominco Fertilizers Inc . . . . .	509-747-6111	W. 818 Riverside Ave., Spokane, WA 99201.
CMP	Commercial Products Co., Inc . . . . .	201-427-6887	117 Ethel Ave., Hawthorne, NJ 07506.
CNI	Conap, Inc . . . . .	716-372-9650	1405 Buffalo St., Olean, NY 14760.
CON	Concord Chemical Co., Inc . . . . .	609-966-1526	17th & Federal Sts., Camden, NJ 08105.
CO	Conoco Specialty Products, Inc . . . . .	713-293-1000	600 N. Dairy Ashford Rd., Houston, TX 77079.
CTL	Continental Chemical Co . . . . .	201-472-5000	270 Clifton Blvd., Clifton, NJ 07011-3686.

Table A-1—Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Ident- fication code	Name of company	Telephone number	Office address
CTP	Continental Polymers, Inc	213-637-2103	2225 E. Del Amo Blvd., Compton, CA 90220.
CPV	Cook Paint & Varnish Co	816-391-6000	P.O. Box 419389, Kansas City, MO 64141.
HEU	Cookson Pigments, Inc	201-242-1800	256 Vanderpool St., Newark, NJ 07114.
COP	Coopers Creek Chemical Corp	215-828-0375	River Rd., West Conshohocken, PA 19428.
CPY	Copolymer Rubber & Chemical Corp	504-355-5655	P.O. Box 2591, Baton Rouge, LA 70821.
CMS	Cosmic Plastics, Inc	818-365-3249	12314 Gladstone Ave., San Fernando, CA 91342.
CRD	Croda, Inc	212-683-3089	183 Madison Ave., New York, NY 10016.
CK	Crompton & Knowles Corp	215-775-8000	P.O. Box 341, Reading, PA 19603.
CCP	Crown Central Petroleum Corp	301-539-7400	1 N. Charles St., Baltimore, MD 21203.
USM	Crown Metro, Inc	803-299-1331	Echelon Road, Donaldson Centre, Greenville, SC 29606.
CYT	Cumberland International Corp	713-682-1221	1523 N. Post Oak Rd., Houston, TX 77055.
CTR	Customs Resins Div. of Bemis Co., Inc.	502-826-7641	Highway 136 West, Henderson, KY 42420.
AMD	Cyclo Products, Inc	213-582-6411	1922 E. 64th St., Los Angeles, CA 90001.
FTE	Cyprus Foote Mineral Co	215-889-9605	301 Lindenwood Dr., Suite 301, Malvern, PA 19355.
CNP	DSM Chemicals North America, Inc	404-823-4240	P.O. Box 2451, Augusta, GA 30903.
POP	Dalcolor Pope, Inc	201-279-2702	33 Sixth Ave., Paterson, NJ 07524.
MAR	Dalhousie Chemical, Inc	203-625-0701	81 Holly Hill Lane Greenwich, CT 06830.
DAN	Dan River, Inc., Chemical Products Div	804-799-7000	State Route 360 East, Danville, VA 24543.
DPI	Dart Polymers, Inc., Sub. of Dart Container Corp.	517-676-3800	432 Hogsback Rd., Mason, MI 48854.
DGO	Day-Glo Color Corp	216-391-7070	4515 St. Clair Ave., Cleveland, OH 44103.
DPW	Deepwater, Inc	714-751-3522	P.O. Box 17599, Irvine, CA 92713.
DGC	Degussa Corp	201-641-8100	65 Challenger Rd., Ridgefield Park, NJ 07880.
DRR	Delta Resins & Refractories, Inc	414-462-1200	8263 N. Teutonia Ave., Milwaukee, WI 53209.
DNS	Dennis Chemical Co	314-771-1800	2700 Papin St., St. Louis, MO 63103.
DSO	DeSoto, Inc	312-391-9000 708-757-5100 708-391-9000	1608 4th St., Berkeley, CA 94710, and 300 State St., Chicago Heights, IL 60411 and P.O. Box 481268, Garland, TX 75046.
UDI	DeSoto, Inc	708-391-9000	3950 Fossil Creek Blvd., Fort Worth, TX 76137.
PLX	Union City	312-391-9000	1700 So. Mt. Prospect Rd., Des Plaines, IL 60018
DTR	Detroit Coke Corp	313-842-6222	7819 West Jefferson Ave., Detroit, MI 48209.
	Dexter Corp:		
HYA	Dexter Adhesive & Structural Material Div.	415-687-4201	2850 Willow Pass Road, Pittsburgh, CA 94565.
HYC	Dexter Electronic Material Div	818-968-6511	15051 E. Don Julian Rd., Industry, CA 91749.
MID	Dexter Specialty Coatings	708-623-4200	E. Water St., Waukegan, IL 60085.
DEX	Dexter Chemical Corp	212-542-7700	845 Edgewater Rd., Bronx, NY 10474.
AGP	Dial Corp	602-248-2800	2000 Aucutt Rd., Montgomery, AL 36038.
DA	Diamond Shamrock Refining & Marketing	512-641-6800	P.O. Box 696000, San Antonio, TX 78269-6000.
DAZ	Diaz Chemical Corp	716-638-6321	40 Jackson St., Holley, NY 14470.

Table A-1—Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identification code	Name of company	Telephone number	Office address
PLN	Disografin Industries Corp . . . . .	603-669-4050	Granier Industrial Airpark, Manchester, NH 03103.
DIX	Dixie Chemical Co., Inc . . . . .	713-863-1947	3635 W. Dallas Ave., Houston, TX 77019.
DRC	Dock Resins Corp . . . . .	201-862-2351	1512 W. Elizabeth Ave., Linden, NJ 07036.
DOM	Dominion Products, Inc . . . . .	718-499-3050	882 - 3rd Ave., Brooklyn, NY 11232.
DVC	Dover Chemical Corp. Sub. of ICC . . . . .	216-343-7711	W. 15th & Davis Sts., Dover, OH 44622.
DOW	Dow Chemical Co . . . . .	517-636-6125	2020 Willard H. Dow Center, Midland, MI 48674.
DCC	Dow Corning Corp . . . . .	517-496-4000	P.O. Box 994, Midland, MI 48686-0994.
DRX	Drexel Chemical Corp . . . . .	901-774-4370	2487 Pennsylvania St., Memphis, TN 38109.
ABP	Drummond Co., Inc . . . . .	205-945-6301	P.O. Box 10246, Birmingham, AL 35202.
WBG	Dryden Oil Co., White & Bagley Div . . . . .	508-791-3201	688-692-Millbury St., Worcester, MA 01607.
CHO	Ducon . . . . .	618-654-2070	180 Woodcrest Dr., Highland, IL 62249.
DUP	E. I. duPont de Nemours & Co., Inc . . . . .	302-774-1000	1007 Market St., Wilmington, DE 19898.
DSC	Dye Specialties, Inc . . . . .	201-866-9504	100 Plaza Center, Secaucus, NJ 07096.
AGI	EMS-American Grilon, Inc . . . . .	803-481-9173	P.O. Box 1717, Sumter, SC 29151.
EPC	EPC Partners, Ltd . . . . .	713-880-6500	P.O. Box 4324, Houston, TX 77210.
EPI	Eagle Pitcher Industries Inc., Orthane Div. . . . .	817-387-0585	P.O. Box 1389, Denton, TX 76202.
ECC	Eastern Color & Chemical Co . . . . .	401-331-9000	35 Livingston St., Providence, RI 02904.
EK	Eastman Kodak Co . . . . .	718-724-4000	343 State St., Rochester, NY 14650.
EKT	Tennessee Eastman Co. Div . . . . .	615-229-2000	P.O. Box 1974, Kingsport, TN 37662.
EKX	Texas Eastman Co. Div . . . . .	214-236-5012	P.O. Box 7444, Longview, TX 75607.
ESA	East Shore Chemical Co. . . . .	616-726-3106	1221 E. Barney Ave., Muskegon, MI 49443.
ELI	Ecolab Inc . . . . .	612-293-2233	Ecolab Center, St. Paul, MN 55102.
ELN	Elan Chemical Co . . . . .	201-344-8014	268 Doramus Ave., Newark, NJ 07105.
ELC	Elco Corp. Sub. of Detrex Chemical Industries, Inc. . . . .	216-749-2605	1000 Beltline Rd., Cleveland OH 44109.
USM	Emhart Corp., Bostik Div . . . . .	508-777-0100	Boston St., Middleton, MA 01949.
EMK	Emkay Chemical Co . . . . .	201-352-7053	319-325 Second St., Elizabeth, NJ 07206.
EKO	Empire Coke Co . . . . .	205-323-2400	1927 1st Ave., N., Suite 900, Birmingham, AL 35203.
ENO	Enoco, Inc . . . . .	901-328-5800	755 Crossover Lane, Suite 216, Memphis, TN 38117.
HSH	Engelhard Corp . . . . .	201-632-6000	3400 Band Street, Louisville, KY 40212.
SAR	Esschem, Inc . . . . .	215-521-3800	Governor Printz Blvd., Essington, PA 19029.
ESS	Essential Industries, Inc . . . . .	414-538-1122	28391 Essential Rd., Merton, WI 53056.
EHC	Ethichem Corp . . . . .	201-933-7880	150 Grand St., Carlstadt, NJ 07072.
ETC	Ethox Chemicals, Inc . . . . .	803-277-1620	P.O. Box 5094, Station B, Greenville, SC 29606.
TNA	Ethyl Corp . . . . .	804-788-5000	330 S. 4th St., Richmond, VA 23217.
EVL	Eval Company of America . . . . .	708-719-4610	1001 Warrenville Rd., Suite 201, Lisle, IL 60532.
ENJ	Exxon Chemical Americas . . . . .	713-870-6000	P.O. Box 3272, Houston, TX 77253-3272.
	FMC Corp:		
FMN	Agricultural Chemical Group . . . . .	215-299-6000	2000 Market St., Philadelphia, PA 19103.
FMB	Chemical Products Group . . . . .	215-299-6000	2000 Market St., Philadelphia, PA 19103.
FMC	Nitro Div . . . . .	215-299-6000	2000 Market St., Philadelphia, PA 19103.
FAB	Fabricolor Manufacturing Corp . . . . .	201-742-3900	24-1/2 Van Houten St., Paterson, NJ 07509.
FMT	Fairmount Chemical Co., Inc . . . . .	201-344-5790	117 Blanchard St., Newark, NJ 07105.

Table A-1—Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identification code	Name of company	Telephone number	Office address
FRI	Farmland Industries, Inc	816-459-6000 816-238-8111	P.O. Box 308, Lawrence, KS 66044. 1417 Lower Lake Rd., St. Joseph, MO 64502.
FEL	Felton Worldwide, Inc	718-497-4664	599 Johnson Ave., Brooklyn, NY 11237.
SDS	Fermenta ASC Corp	216-357-4100	5966 Helsey Rd., Mentor, OH 44060.
FER	Ferro Corp.:		
	Bedford Chemical Div	216-641-8580	7050 Krick Rd., Bedford, OH 44146.
	Grant Chemical Div	504-654-6801	P.O. Box 263, Baton Rouge, LA 70770.
	Kell Chemical Div	219-931-2630	3000 Sheffield Ave., Hammond, IN 46320.
FBI	Fiber Industries, Inc	704-357-2000	5146 Parkway Plaza Blvd., Charlotte, NC 28217.
CSD	Fina Oil & Chemical Co., Cosden Chemical Div.	214-750-2400	8350 N. Central Expressway, Dallas, TX 75206.
FTX	Finetex, Inc	201-797-4686	418 Falmouth Ave., Elmwood Park, NJ 07407.
	Firestone Tire & Rubber Co.:		
FRF	Firestone Fibers & Textile Co	216-379-7000	P.O. Box 450, Hopewell, VA 23860.
FRS	Firestone Synthetic Rubber & Latex Co. Div.	216-379-7495	P.O. Box 26611, Akron, OH 44319-0006.
CI	Firmenich, Inc	609-452-1000	P.O. Box 5880, Princeton, NJ 08543.
FST	Firat Chemical Corp	601-762-0870	P.O. Box 1427, Pascagoula, MS 39567.
FPC	Flambeau Paper Corp	715-762-5235	200 N. First Ave., Park Falls, WI 54552.
FLM	Fleming Laboratories, Inc	704-372-5613	2215 Thrift Rd., Charlotte, NC 28234.
CIK	Flint Ink Corp., Cal/Ink Div	415-525-1188	1404 - 4th St., Berkeley, CA 94710.
FMX	Foamex Products, Inc., Div. of Knoll Int'l Holdings, Inc.	803-576-1210	P.O. Box 188, Cornelius, NC 28031.
FOR	Formosa Plastics Corp-Louisiana Formosa Plastics Corp-USA	504-356-3341 201-966-6980	P.O. Box 271, Baton Rouge, LA 70821. 66 Hanover Rd., Florham Park, NJ 07932.
BDS	Fragrance Resources, Inc	201-264-6767	275 Clark St., Keyport, NJ 07735.
FLN	Franklin International, Inc	614-443-0241	2020 Bruck St., Columbus, OH 43207.
FRE	Freeman Chemical Corp	414-284-5541	217 Freeman Dr., Port Washington, WI 53074.
WLC	Freeport McMoran Resource Partners.	504-582-4000	1615 Poydras St., New Orleans, LA 70112.
FB	Fritzsche Dodge & Olcott, Inc	201-929-4100	76 - 9th Ave., New York, NY 10011.
COO	H.B. Fuller Co	508-658-3351	820 Woburn St., Wilmington, MA 01887.
FLH	H.B. Fuller Co	612-645-3401	4450 Malsbary Rd., Blue Ash, OH 45242.
EEP	Furon Co	714-831-5350	Maln & Orchard Sts., Mantua, OH 44255.
GAF	GAF Chemical Corp	201-628-3000	1361 Alps Rd., Linden, NJ 07036.
GFS	GFS Chemicals, Inc	614-881-5501	P.O. Box 245, Columbus, OH 43065.
GLX	Galaxie Chemical Corp	201-279-0558	26 Piercy St., Paterson, NJ 07524.
GAN	Ganes Chemicals, Inc	201-507-4300	630 Broad St., Carlstadt, NJ 07072
GAY	Gaylord Chemical Corp	504-649-5464	P.O. Box 1209, Slidell, LA 70459-1209
GNT	Gencorp Polymers Products	216-869-4200	165 S. Cleveland Ave., Mogadore, OH 44260.
GNR	Genencor, Inc	415-742-7500	180 Kimball Way, S. San Francisco, CA 94080.
	General Electric Co.:		
GE	Electromaterials Div	614-622-5310	1350 S. Second St., Coshocton, OH 43812.
GEP	Plastics Div	413-448-7110	1 Plastics Ave., Pittsfield, MA 01201.
SPD	Silicone Products Div	518-237-3330	Waterford-Mechanicville Rd., Waterford, NY 12188.



**Table A-1—Continued**  
**Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989**

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identifi- cation code	Name of company	Telephone number	Office address
GE	General Electric Co—Continued Specialty Chemicals Group .....	413-448-6394	Parkersburg Center, 5th & Avery, Parkersburg, WV 26102.
GLC	General Latex and Chemical Corp .....	617-576-8000	P.O. Box 498, Ashland, OH 44805.
GRG	P.D. George Co .....	314-621-5700	5200 N. Second St., St. Louis, MO 63147.
GGC	Georgia Gulf Corp: Houston Div .....	713-473-4453	3503 Pasadena Freeway, Pasadena, TX 77503.
	Plaquemine Div .....	404-395-4500	400 Perimeter Center Terrace, Suite 595, Atlanta, GA 30348.
	PVC Compound Div .....	404-395-4500	P.O. Box 629, Plaquemine, LA 70765-0629.
	Georgia-Pacific Corp.:		
PSP	Bellingham Div .....	206-733-4410	P.O. Box 1236, Bellingham, WA 98227.
GP	Resins, Inc .....	404-521-4600	133 Peachtree St. NE., Atlanta, GA 30303.
TNI	Gillette Chemical Co .....	617-421-7000	3500 W. 16th St., N. Chicago, IL 60064.
GIV	Givaudan Corp .....	201-365-8000	100 Delawanna Ave., Clifton, NJ 07014.
GLD	Gildden Company .....	216-344-8000	925 Euclid Ave., Cleveland OH 44115.
BLF	B. F. Goodrich Co .....	216-447-7802	6100 Oak Tree Blvd., Cleveland, OH 44131.
HGC	Goodson Polymers, Inc .....	801-272-9000	3760 S. Highland Dr., Suite 500, Salt Lake City, UT 84106.
GYR	Goodyear Tire & Rubber Co W. R. Grace & Co.:	216-796-2121	1144 E. Market St., Akron, OH 44316.
EVN	Organic Chemicals Div., Evans Chemetics	617-861-6600	55 Hayden Ave., Lexington, MA 02173.
GRD	Organic Chemicals Div., Chemicals & Polymers Div.	617-861-6600	55 Hayden Ave., Lexington, MA 02173.
HMP	Organic Chemicals Div., Hampshire Chemicals Div.	617-861-6600	55 Hayden Ave., Lexington, MA 02173.
CON	Organic Chemicals Div., Nitroparaffins.	617-861-6600	55 Hayden Ave., Lexington, MA 02173.
GPC	Grain Processing Corp .....	319-264-4211	1600 Oregon Street, Muscatine, IA 52761-0349.
CPC	Grant Industries, Inc .....	201-791-6700	P.O. Box 360, Elmwood Park, NJ 07407.
GTL	Great Lakes Chemical Corp .....	317-497-6100	U.S. Hwy. 52 NW., Lafayette, IN 47906.
GNW	Greenwood Chemical Co .....	703-456-6832	State Hwy. #690, Greenwood, VA 22943.
GDC	Greco, Mfg. Inc .....	919-475-8101	216 E. Holly Hill Rd., Thomasville, NC 27360.
GPI	Grinstead Products, Inc .....	913-764-8100	200 Industrial Parkway Industrial Airport, KS 66031.
GGI	Grow Group, Inc .....	301-939-1234	1354 Old Post Rd., Havre De Grace, MD 21078.
GRV	Guardsman Products, Inc .....	616-452-5181	1350 Steele Ave. SW., Grand Rapids, MI 49507.
GSS	Gulf States Steel, Inc .....	205-543-6201	174 South 26th St., Gadsden AL 35904-1935.
GTH	Guth Corp .....	414-644-6461	P.O. Box 347, Slinger, WI 53086.
HAR	Haarmann & Reimer Corp .....	201-467-5600	70 Diamond Rd., Springfield, NJ 07081.
HAL	C. P. Hall Co .....	312-767-4600	7300 S. Central Ave., Chicago, IL 60638.
HOC	Halocarbon Products Corp .....	201-343-8703	82 Burielwts Ct., Hackensack, NJ 07601.
HTM	Haitermann Ltd .....	713-452-5951	16717 Jacintoport Blvd., Houston, TX 77015.
FOC	Handschy Industries, Inc Ink and Chemical Div .....	708-597-7990	13601 S. Ashland Ave., Riverdale, IL 60627-1099.

**Table A-1—Continued**  
**Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989**

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identifi- cation code	Name of company	Telephone number	Office address
TMH	Harcros Chemicals, Inc	913-321-3131	5200 Speaker Rd., Kansas City, KS 66110.
HRT	Hart Products Corp	201-433-6665	173 Sussex St., Jersey City, NJ 07302.
HCC	Hatco Chemical Co	201-738-1000	King George Post Rd., Fords, NJ 08863.
WTK	Helco Chemicals, Inc	717-476-0353	Route 611, Delaware Water Gap, PA 18327.
HAP	Helmerich & Payne, Inc., Natural Gas Odorizing Div.	713-424-5568	3601 Decker Dr., Baytown, TX 77520.
SCP	Henkel Corp	215-270-8100	2200 Renaissance Blvd., Gulph Mills, PA 19406.
HPC	Hercules, Inc	302-594-5000	Hercules Plaza, Wilmington, DE 19894.
HER	Heresite Protective Coating, Inc	414-684-6646	822 S. 14th St., Manitowoc, WI 54220.
HTN	Heterene Chemical Corp	201-278-2000	790 - 21st Ave., Paterson, NJ 07513.
HEC	Hewchem	601-863-8600	P.O. Box 188, Gulfport, MS 39502.
HEW	Hewitt Soap Co., Inc	513-253-1151	333 Linden Ave., Dayton, OH 45403.
HXL	Hexcel Corp: Chemical Products Div	805-498-1399	3547 Old Conejo Rd., Newbury Park, CA 91320.
	Chemical Products Div	616-772-2193	215 N. Centennial St., Zeeland, MI 49464.
HIP	High Point Chemical Corp	919-884-2214	243 Woodbine St., High Point, NC 27261.
SOG	Hill Petroleum Company	203-661-4770	P.O. Box 5038, Houston, TX 77262-5038.
HIL	Hilton Davis Chemical Co	513-841-4000	2335 Langdon Farm Rd., Cincinnati, OH 45237.
HIM	Himont, USA, Inc	302-996-6000	P.O. Box 15439, Wilmington, DE 19894.
BEZ	Hi-Tek Polymers	502-499-4011	9808 Bluegrass Parkway, Louisville, KY 40299.
HDG	Hodag Chemical Corp	312-675-3950	7247 N. Central Park Ave., Skokie, IL 60076.
HCL	Hoechst Celanese Corp: Bayport Works, SP & W Div	713-474-6737	P.O. Box 58160, Houston, TX 77258.
	Chemical Group Div	214-689-4000	1250 W. Mockingbird Lane, Dallas, TX 75247.
	Engineering Plastics Div	201-635-2600	26 Main St., Chatham, NJ 07928.
	Fibers Industrial Div	803-579-5505	P.O. Box 5887, Spartanburg, SC 29304-5887.
	Fine Chemical Div	804-393-3100	801 Water St., Portsmouth, VA 23704.
	SpecialtyChem Group Coventry Plant.	201-231-2000	500 Washington St., Coventry, RI 02816.
	Sou-Tex	201-231-2000	P.O. Box 866, Mt. Holly, NC 28120.
HOF	Hoffmann-LaRoche, Inc	201-235-5000	340 Kingsland St., Nutley, NJ 07110.
HCP	Honig Chemical & Processing Corp	201-344-0881	414 Wilson Ave., Newark, NJ 07105.
EFH	E. F. Houghton & Co	215-666-4000	P.O. Box 930, Valley Forge, PA 19482.
NOD	Huls America, Inc	201-981-5000	80 Centennial Ave., Piscataway, NJ 08855-0456.
HML	Hummel Croton, Inc	201-754-1800	10 Harmich Rd., S. Plainfield, NJ 07080.
HMV	Humphrey Chemical Co	203-281-0012	45 Divine St., N. Haven, CT 06473-0325.
HNT	Huntington Laboratories, Inc	219-356-8100	970 E. Tipton St., Huntington, IN 46750.
HMN	Huntman Chemical Corp	801-532-5200	2000 Eagle Gate Tower, Salt City, UT 84111.
ICI	ICI Americas, Inc: Agricultural Products Div	302-886-8000	Delaware Corp. Center, Wilmington, DE 19897.
	Films Group Div	302-886-3793	Concord Pike & Murphy Rd., Wilmington, DE 19897.
	Polyurethanes Group	609-423-8300	Mantua Grove Rd., W. Deptford, NJ 08066.

Table A-1—Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report.)

Ident- fication code	Name of company	Telephone number	Office address
	<i>ICI Americas, Inc.—Continued</i>		
	Resin Div . . . . .	508-658-6600	730 Main St., Wilmington, MA 01887.
	Specialty Chemicals Div . . . . .	302-886-3000	Concord Pike & Murphy Rd., Wilmington, DE 19897.
IMC	IMC Pittman-Moore, Inc . . . . .	812-232-0121	P.O. Box 207, Terre Haute, IN 47808.
	Industrial Chemical Div. . . . .	708-615-3700	421 E. Hawley St., Mundelein, IL 60060.
ISP	INSPEC Chemical Corp . . . . .	412-765-1200	411 Seventh Ave., Pittsburgh, PA 15219
IND	Indol Color Co., Inc . . . . .	201-242-1300	1029 Newark Ave., Elizabeth, NJ 07201.
IDC	Industrial Color, Inc . . . . .	815-722-7402	50 Industry Ave., Joliet, IL 60435.
INL	Inland Steel Co . . . . .	312-346-0300	3210 Watling, St., E. Chicago, IL 46312.
WM	Inolex Chemical Co . . . . .	215-271-0800	Jackson & Swanson Sts., Philadelphia, PA 19148.
SPC	Inslco Corp., Sinclair Paint Co. Div . . . . .	213-888-8888	6100 South Garfield Ave., Los Angeles, CA 90040.
IMI	Insulating Materials, Inc . . . . .	518-395-3300	1 Campbell Rd., Schenectady, NY 12306.
GBF	International Bio-Synthetics Inc . . . . .	704-527-9000	P.O. Box 241068, Charlotte, NC 28224-1068.
IFF	International Flavor & Fragrances Inc . . . . .	201-264-4500	1515 Highway #36, Union Beach, NJ 07735.
IPC	Interplastic Corp . . . . .	612-331-6850	2015 NE Broadway, Minneapolis, MN 55413.
CRZ	James River II, Inc . . . . .	804-844-5411	4th & Adams Sts., Camas, WA 98607.
JRC	Jarchem Industries, Inc . . . . .	201-344-0600	40 Ball St., Newark, NJ 07105.
JFR	George A. Jeffreys & Co., Inc . . . . .	703-389-8220	P.O. Box 909, Salem, VA 24153.
JRG	Andrew Jergens Co . . . . .	513-421-1400	2535 Spring Grove Ave., Cincinnati, OH 45214.
JTO	Jetco Chemicals, Inc . . . . .	214-872-3011	P.O. Box 1898, Corsicana, TX 75110.
MRX	Johnson Matthey, Inc . . . . .	215-648-8000	2001 Nolte Dr., W. Deptford, NJ 08066.
JNS	S. C. Johnson & Son, Inc . . . . .	414-631-2000	1525 Howe St., Racine, WI 53403.
JOB	Jones-Blair Co . . . . .	214-353-1600	2728 Empire Central, Dallas, TX 75045.
KLM	Kalama Chemical, Inc . . . . .	206-682-7890	Bank of California Center, Suite 1110, Seattle, WA 98164.
KTP	Kama Corp . . . . .	717-455-2022	666 Dietrich Ave., Hazelton, PA 18201.
KAN	Kanasco, Ltd . . . . .	301-789-7800	6118 Robinwood Road, Baltimore, MD 21125.
KMP	Kelly-Moore Paint Co., Inc . . . . .	415-592-8337	987 Commercial St., San Carlos, CA 94070.
KMI	Kemin Industries, Inc . . . . .	515-266-2111	2100 Maury St., Des Moines, IA 50301.
KPI	Kenrich Petrochemicals, Inc . . . . .	201-823-9000	140 E. 22nd St., Bayonne, NJ 07002-0032.
KYS	Keysor Century Corp . . . . .	805-259-2360	P.O. Box 308, Saugus, CA 91350.
KCW	Keystone Color Works, Inc . . . . .	717-854-9541	151 W. Gay Ave., York, PA 17403.
CHF	Kincaid Enterprises, Inc . . . . .	304-755-3377	P.O. Box 549, Nitro, WV 25143.
KHI	Koch Refining Co . . . . .	316-832-5500	P.O. Box 2302, Wichita, KS 67201.
KPT	Koppers Industries, Inc . . . . .	412-227-2001	436 Seventh Ave., Pittsburgh, PA 15219-1800.
LCP	LCP Chemicals:		
	Maine Div. of Hanlin Group, Inc . . . . .	201-225-4840	P.O. Box 149, Orrington, ME 04474.
	West Virginia, Inc . . . . .	304-843-1310	P.O. Box Box J, Moundsville, WV 26041.
LTV	LTV Steel Co., Inc . . . . .	216-822-5000	LTV Steel Bldg., 25 W. Prospect Ave., Cleveland, OH 44115.

Table A-1—Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identification code	Name of company	Telephone number	Office address
LKY	Lake States Div. of Rhinelander Paper Co.	715-369-4217	515 W. Davenport St., Rhinelander, WI 54501.
LRO	LaRoche Chemical, Inc.	504-356-8406	P.O. Box 1031, Baton Rouge, LA 70821.
ARM	LaRoche Industries Inc.	404-851-0475	1100 Johnson Ferry Rd., Atlanta GA 30342.
LII	Lawter International, Inc.	708-498-4700	990 Skokie Blvd., Northbrook, IL 60062.
LEA	Leatex Chemical Co.	215-739-6324	2722 N. Hancock St., Philadelphia, PA 19133.
LLI	Lee Laboratories, Inc.	804-862-2534	2820 N. Normandy Dr., Petersburg, VA 23805.
LVR	C. Lever Co., Inc.	215-639-8640	736 Dunks Ferry Rd., Bensalem, PA 19020.
LEV	Lever Brothers Co.	212-688-6000	390 Park Ave., New York, NY 10022.
LIL	ElI Lilly & Co.	317-276-2000	Lilly Corporate Center, Indianapolis, IN 46285.
	ElI Lilly Industries, Inc.	809-757-4000	Call Box 1198 - Pueblo Station, Carolina, PR 00630-1198.
LIC	Lilly Industrial Coatings, Inc.	317-634-8512	P.O. Box 946, Indianapolis, IN 46206.
LMC	Lomac, Inc.	616-788-2341	5025 Evanston Ave., Muskegon, MI 49443.
BRD	Lonza, Inc.	201-794-2400	17-17 Route 208, Fair Lawn, NJ 07410.
LC	Lord Corp., Chemical Products Group	814-868-3611	2000 W. Grandview Blvd., Erle, PA 16514-0038.
LCS	Louisiana Chemical Polymers, Inc.	504-775-1801	12537 Scenic Hwy., Baton Rouge, LA 70807.
LYP	Lyondell Petrochemical Co.	713-652-7200	1221 McKinney, Suite 1600, Houston, TX 77253-3646.
STG	McCormick & Co., Inc., McCormick-Stange, Flavor Div.	301-771-7401	230 Schilling Circle S., Hunt Valley, MD 21031.
MGK	McLaughlin Gormley King Co.	612-544-0341	8810 - 10th Ave. N., Minneapolis, MN 55427-4372.
MNP	McWhorter, Inc.	312-428-2657	400 E. Cottage Place, Carpentersville, IL 60110.
MAK	MAK Chemical Corp.	317-288-4464	1200 Rochester Ave., Muncie, IN 47307-0423.
SOR	MW Manufacturers, Inc., Southern Resin Div.	919-475-1348	P.O. Box 68, Thomasville, NC 27360.
VIK	M & T Chemicals, Inc.	201-499-2110	P.O. Box 1104, Rahway, NJ 07065-0970.
MCK	MacKenzie Chemical Works, Inc.	504-886-2173	78015 Chemical Rd., Bush, LA 70431.
TZC	Magnesium Elektron, Inc.	201-782-5800	500 Point Breeze Road, Flemington, NJ 08822.
MGR	Magruder Color Co., Inc.	201-242-1300	1029 Newark Ave., Elizabeth, NJ 07208.
MAL	Mallinckrodt, Inc.	314-895-2000	675 McDonnell Blvd., St. Louis MO 63042.
KCH	Manchem, Inc.	215-837-1808	275 Keystone Dr., Bethlehem, PA 18017.
MOC	Marathon Petroleum Co., Texas Refining Div.	419-422-2121	539 S. Main St., Findlay, OH 45840.
MRV	Mariow- Van Loan Corp.	919-886-7126	1511 Joshua Circle, High Point, NC 27260.
MCA	Masonite Corp., Alpine Resin Div.	601-649-6000	P.O. Box 1048, Laurel, MS 39440.
MAX	Max Marx Color Corp.	201-373-7801	1200 Grove St., Irvington, NJ 07111.
MYO	Mayo Chemical Co.	404-696-6711	554 Oakdale Rd., Smyrna, GA 30082.
MLC	Melamine Chemicals, Inc.	504-473-3121	P.O. Box 748, Donaldsonville, LA 70346.
MRK	Merck & Co., Inc.	201-574-4000	P.O. Box 2000, Rahway, NJ 07065.
MER	Merichem Co.	713-455-1311	1914 Haden Rd., Houston, TX 77015.
MLS	Miles Inc., Biotechnology Products Div.	219-262-6916	1127 Myrtle St., Elkhart, IN 46515.
MIL	Milliken & Co., Milliken Chemical Div.	803-472-9041	P.O. Box 817, Inman, SC 29349.

Table A-1—Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Ident- fication code	Name of company	Telephone number	Office address
MMM	Minnesota Mining & Manufacturing Co. ....	612-733-3847	3M Center 224-6S, St. Paul, MN 55144.
MIR	Miranol Chemical Co., Inc. ....	201-329-3900	P.O. Box 436, 68 Culver Rd., Dayton, NJ 08810.
MSC	Mississippi Chemical Corp. .... Mobay Chemical Corp.:	601-746-4131	P.O. Box 388, Yazoo City, MS 39194.
CHG	Agricultural Chemicals Div. ....	816-242-2345	Hawthorne Rd., Kansas City, MO 64120.
VPC	Dyes & Pigments Div. ....	412-777-2000	Mobay Road, Pittsburgh, PA 15205-9741.
MOB	Pittsburgh Div. ....	412-777-2000	Mobay Road, Pittsburgh, PA 15205-9741.
DKA	Mobay Synthetics Corp. ....	713-477-8821	8701 Park Place Blvd., Houston TX 77017.
SM	Mobil Oil Corp.:		
	Beaumont Refinery Div. ....	703-846-3000	3225 Gallows Rd., Fairfax, VA 22037.
	Gas Liquids Dept. ....	703-849-3000	P.O. Box 900, Dallas, TX 75221.
	Chemical Products Div. ....	201-321-6000	P.O. Box 250, Edleon, NJ 08818.
	Petrochemicals Div. ....	713-590-7700	World Towers One, 15600 Kennedy Blvd., Houston, TX 77032.
	Polystyrene Business Group. ....	201-321-6000	P.O. Box 3029, Edison, NJ 08818.
MOA	Mona Industries, Inc. ....	201-345-8220	76 E. 24th St., Paterson, NJ 07544.
MON	Monsanto Co. ....	314-694-1000	800 N. Lindbergh Blvd., St. Louis, MO 63167.
MNA	Monsanto Agricultural Co. ....	314-694-1000	800 N. Lindbergh Blvd., St. Louis, MO 63167.
MCI	Mooney Chemicals, Inc. ....	216-781-8383	2301 Scranton Rd., Cleveland, OH 44113.
MCP	Moretex Chemical Products, Inc. ....	803-583-8441	314 W. Henry St., Spartanburg, SC 29301.
MRF	Morflex, Inc. ....	919-292-1781	2110 High Point Road, Greensboro, NC 27403.
	Morton International Inc.:		
PYI	Morton Chemical Div. ....	312-807-2000	Mountain Creek Church Rd., Greenville, SC 29602.
MRT	Specialty Chemicals Group. ....	312-807-2000	333 W. Wacker Dr. Chicago, IL 60606.
CCW	Specialty Chemicals Group. ....	513-733-2100	2000 West St., Reading, OH 45215.
MHI	Ventron Div. ....	508-774-3100	150 Andover St., Danvers, MA 01923.
MOT	Motomco, Ltd. ....	608-244-2904	3699 Kinsman Blvd., Madison, WI 53704.
RTC	Mount Vernon Mills, Inc. ....	803-233-4151	P.O. Box 2478, Greenville, SC 29602.
PNX	The Murphy-Phoenix Co. ....	216-831-0404	25800 Science Park Dr., Suite 200, Beechwood, OH 44122.
NTL	NL Chemicals, Inc. ....	609-443-2000	P.O. Box 700, Hightstown, NJ 08520.
NMC	NAMICO, Inc. ....	215-482-6600	4601 Flat Rock Rd., Philadelphia, PA 19127.
LEM	Napp Chemicals, Inc. ....	201-773-3900	199 Main St., Lodl, NJ 07644.
NTC	National Caseln Co. ....	312-846-7300	601 W. 80th St., Chicago, IL 60620.
NCJ	National Caseln of New Jersey. ....	312-846-7300	601 W. 80th St., Chicago, IL 60620.
NSC	National Starch & Chemical Corp. ....	201-685-5000	10 FINDERNE AVE., BRIDGEWATER, NJ 08807.
NTS	National Steel Corp., Great Lakes Div. ....	313-297-2100	1 Quality Dr., Ecorse, MI 48229.
NEP	Nepera, Inc. ....	914-782-1200	Route #17, Harriman, NY 10926.
NEV	Neville Chemical Co. ....	412-331-4200	2800 Neville Rd., Pittsburgh, PA 15225.
NBC	New Boston Coke Corp. ....	614-456-4154	600 River Ave., New Boston, OH 45662.
NCC	Niacet Corp. ....	716-285-1474	400 - 47th St., Niagara Falls, NY 14304.
NLO	Niklor Chemical Co., Inc. ....	213-830-2253	2060 E. 220th St., Long Beach, CA 90810.
NCP	Niles Chemical Paint Co. ....	616-683-3377	P.O. Box 307, Niles, MI 49120.
NOC	The Norac Co., Inc. ....	818-334-2908	405 S. Motor Ave., Azusa, CA 91702.
	Mathe Div. ....	201-779-4981	169 Kennedy Dr., Lodl, NJ 07644-0230.

Table A-1—Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identification code	Name of company	Telephone number	Office address
FSN	NOR-AM Chemical Co	302-575-2000	3509 Silverside Road, Wilmington, DE 19810.
NW	Northwestern Chemical Co	312-231-6111	120 N. Aurora St., W. Chicago, IL 60185.
NOR	Norwich Eaton Pharmaceutical, Inc	607-335-2049	17 Eaton Ave., Norwich, NY 13815.
NBI	Novo Biochemical Industries, Inc	919-494-2014	State Road 1003, Franklinton, NC 27525.
NSW	The Nutrasweet Co	312-940-9800	1751 Lake Cook Rd., Deerfield, IL 60015.
OBC	The O'Brien Corp	415-871-2300	450 E. Grand Ave., S. San Francisco, CA 94080.
	Occidental Chemical Corp.:		
HKD	Durez Div	716-696-6000	Walck Rd., N. Tonawanda, NY 14120.
HK	ED & S Div	214-404-3300	5005 LBJ Freeway, Dallas, TX 75244.
HXP	Polymer & Plastics Div	215-251-1000	P.O. Box 1772, Berwyn, PA 19312.
OMC	Olin Corp	203-356-2000	120 Long Ridge Rd., Stamford, CT 06904.
WAY	Olin Hunt Speciality Products, Inc	201-977-6000	One Wellington Rd., Lincoln, RI 02865.
OC	Omega Chemicals, Inc	803-582-5346	P.O. Box 1723, Spartanburg, SC 29304
ORG	Organics/LaGrange, Inc	312-764-6700	7125 N. Clark St., Chicago, IL 60626.
OCC	Orient Chemical Corp	201-465-0714	121 Tyler St., Port Newark, NJ 07114.
BSW	Original Bradford Soap Works, Inc	401-821-2141	200 Providence St., W. Warwick, RI 02893.
CJO	C. J. Osborn Chemicals, Inc	609-662-0128	820 Sherman Ave., Pennsauken, NJ 08110.
OCF	Owens-Corning Fiberglas Corp	419-248-8000	Fiberglas Tower, Toledo, OH 43659.
CNE	Oxy Petrochemicals, Inc	713-623-2246	5 Greenway Plaza, Suite 2500, Houston, TX 77046.
PBI	PBI-Gordon Corp	816-421-4070	1217 W. 12th St., Kansas City, MO 64101-1407.
PDG	PD Glycol	409-838-4521	P.O. Box 3785, Beaumont, TX 77704.
PSG	PMC Inc., PMC Specialties Group, Inc.	216-356-0700	20525 Centennial Ridge Rd, Rocky River, OH 44116.
PMP	PMP Fermentation Products, Inc	414-352-3001	7670 N. Port Washington Rd., Milwaukee, WI 53217.
PPG	PPG Industries, Inc	412-434-3131	One PPG Place, Pittsburgh, PA 15272.
PAC	Pacific Anchor Chemical Corp	213-725-1800	5701 S. Eastern Ave. Suite 530, Los Angeles, CA 90040.
PRA	Para-Chem. Southern Inc	803-967-7691	P.O. Box 127, Simpsonville, SC 29681.
PAH	Parish Chemical Co	801-226-2018	145 N. Geneva Rd., Orem, UT 84057.
PD	Parke-Davis Div., of Warner Lambert, Inc.	616-392-2375	188 Howard Ave., Holland, MI 49424.
PSC	Passaic Color & Chemical Co	201-279-0400	28-36 Paterson St., Paterson, NJ 07501.
PAT	Pat-Chem, Inc	803-233-3941	11 Worley Rd., Greenville SC 29602.
CHP	C. H. Patrick & Co., Inc	803-244-4831	P.O. Box 2528, Greenville, SC 29602.
PEL	Peirson Corp	708-442-9100	7847 W. 47th St., Lyons, IL 60534.
PEN	Penick Corp	201-621-2804	158 Mount Olive Ave., Newark NJ 07714
PAR	Penzoil Products Co., Penreco Div	713-337-1534	4401 Park Ave., Dickinson, TX 77539.
BPT	Permuthane Coatings, Inc	508-531-1880	13 Corwin St., Peabody, MA 01960.
PST	Perstorp Compounds, Inc	413-584-2472	238 Nonotuck St., Florence, MA 01060.
PST	Perstorp Polyole, Inc	419-729-5448	600 Matzinger Rd., Toledo, OH 43612.
PFN	Pfanstiehl Laboratories, Inc	708-623-0370	1219 Glen Rock Ave., Waukegan, IL 60085.
PCW	Pfister Chemical, Inc	201-945-5400	Linden Ave., Ridgefield, NJ 07657.
PFZ	Pfizer, Inc	212-573-2323	235 E. 42nd St., New York, NY 10017.
PHR	Pfizer Pharmaceuticals, Inc	809-846-4300	P.O. Box 628, Barceloneta, PR 00617.
PHR	Pharmachem Corp	215-867-4654	719 Stefko Blvd., Bethlehem, PA 18016.
PLB	Pharmacia P-L Blochemicals, Inc	414-227-3600	2202 N. Bartlett Ave., Milwaukee, WI 53202.

Table A-1—Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Ident- fication code	Name of company	Telephone number	Office address
PDI	Pheips Dodge Industries, Inc . . . . . Pheips Dodge Magnet Wire Co.	219-456-4444	4300 New Haven Ave., Fort Wayne, IN 46803.
PLC	Phillips 66 Co . . . . .	918-661-6600	Phillips Bldg., Bartlesville, OK 74004.
PPX	Phillips Paraxylene, Inc . . . . .	809-864-1515	P.O. Box 1162, Guayama, PR 00655.
PPR	Phillips Puerto Rico Core, Inc . . . . .	809-864-1515	P.O. Box 1166, Guayama, PR 00655.
PHC	Phthalchem, Inc . . . . .	513-681-0099	266 W. Mitchell Ave., Cincinnati, OH 45232.
PCI	Piedmont Chemical Industries, Inc . . . . .	919-885-5131	331 Burton Ave., High Point, NC 27261.
PIC	Pierce Chemical Co . . . . .	815-968-0747	3747 N. Meridan Rd., Rockford, IL 61103.
PIL	Pilot Chemical Co . . . . .	213-723-0036	11756 Burke St., Santa Fe Springs, CA 90670.
PPL	Pioneer Plastics Corp . . . . .	207-784-9111	1 Plonite Rd., Auburn, ME 04210.
PKL	Plaskolite, Inc . . . . .	614-294-3281	P.O. Box 1497, Columbus, OH 43216.
PSL	Plaslok Corp . . . . .	716-681-7755	3155 Broadway, Buffalo, NY 14227.
PLS	Plastics Engineering Co . . . . .	414-458-2121	3518 Lakeshore Rd., Sheboygan, WI 53081.
PMC	Plastics Manufacturing Co . . . . .	214-330-8671	2700 S. Westmoreland, Dallas, TX 75233.
RCD	Polysear, Inc . . . . .	203-934-6315	17 Woodland, Rd., Madison, CT 06443.
PRT	Pratt & Lambert, Inc . . . . .	716-873-6000	P.O. Box 22, Buffalo, NY 14240.
JLP	J. L. Prescott Co . . . . .	201-777-4200	27 - 8th St., Passaic, NJ 07055.
PCH	Prochem, Inc . . . . .	215-436-4812	890 Fern Hill Rd., West Chester, PA 19380.
PG	Procter & Gamble Co., Procter & . . . . . Gamble Mfg. Co.	513-627-6386	Spring Grove & June St., St. Bernard, OH 45217.
PRC	Products Research & Chemical Corp. . . . .	818-240-2060	5430 San Fernando Rd., Glendale, CA 91209.
QKO	QO Chemicals, Inc . . . . .	317-497-6110	2801 Kent Ave., W. Lafayette, IN 47906.
QCP	Quaker Chemical Corp . . . . .	215-828-4250	Elm & Lee Sta., Conshohocken, PA 19428-0809.
USI	Quantum Chemical Corp., USI Div. . . . .	513-530-6580	11500 Northlake Dr., Cincinnati, OH 45249.
QTR	Queetra Chemicals Corp . . . . .	404-434-1333	2859 Paces Ferry Rd., Atlanta, GA 30339.
QUN	K. J. Quinn & Co., Inc . . . . .	817-474-7177	135 Folly Mill Rd., Seabrook, NH 03874.
AMU	RPM American Emulsioms Co., Inc . . . . .	404-226-7028	1202 Dozier St., Dalton, GA 30721.
RSA	R.S.A. Corp . . . . .	914-693-1818	690 Saw Mill River Rd., Ardsley, NY 10502.
RCN	Racon, Inc . . . . .	316-524-3245	6040 S. Ridge Rd., Wichita, KS 67201.
BLC	Ranbar Technology, Inc . . . . .	412-486-1111	1114 William Flinn Highway, Glenshaw, PA 15116.
RAY	Rayonier Chemical Products, Inc . . . . .	203-348-7000	P.O. Box 68967, Seattle, WA 98188.
RAB	Raytech Corp . . . . .	203-371-0101	1204 Darlington Ave., Crawfordsville, IN 47933.
RBI	Reeves Brothers, Inc . . . . .	803-576-1210	P.O. Box 3127, Spartanburg, SC 29304.
REG	Regie Chemical Co . . . . .	708-967-6000	8210 Austin Ave., Morton Grove, IL 60053.
RCI	Reichhold Chemicals, Inc . . . . .	914-682-5700	800 Calltola Dr., Research Triangle Park, Durham, NC 27713.
RIL	Reilly Industries, Inc . . . . .	317-247-8141	1510 Market Square Center, Indianapolis, IN 46204.
CRT	Reilly-Whiteman, Inc . . . . .	215-423-5300	801 Washington St., Conshohocken, PA 19428.
LUR	Reilly-Whiteman, Inc . . . . .	215-423-5300	2600 E. Tioga St., Philadelphia, PA 19134.
ELP	Rexene Products Co . . . . .	214-450-9000	5005 LBJ Freeway, Occidental Tower, Dallas, TX 75244.
RDA	Rhone-Poulenc, Inc . . . . .	201-821-1000	CN 5266, Princeton, NJ 08543-5266.

Table A-1—Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identification code	Name of company	Telephone number	Office address
AMS	Ridgway Color Co . . . . .	513-771-1900	410 Glendale-Milford Rd., Cincinnati, OH 45215.
RIK	Riker Laboratories, Inc., Sub. of 3M Co . . . . .	818-341-1300	19901 Nordhoff St., Northridge, CA 91324.
RIV	Riverdale Chemical Co . . . . .	708-754-3330	220 E. 17th St., Chicago Heights, IL 60411-3699.
ROB	Robeco Chemicals, Inc . . . . .	212-986-6410	99 Park Ave., New York, NY 10016.
ORT	Roehr Chemicals, Inc. Div. of Aceto Corp . . . . .	718-784-8473	52-20 37th St., Long Island City, NY 11101.
RH	Rohm & Haas Co . . . . .	215-592-3000	Independence Mall West., Philadelphia, PA 19105.
DRB	Rohm Tech, Inc . . . . .	508-342-5831	119 Authority Dr., Fitchburg, MA 01420.
ROM	Roma Color, Inc . . . . .	617-676-3481	749 Quequechan St., Fall River, MA 02723.
RQT	Roquette Corp . . . . .	708-249-5950	1550 Northwestern Ave., Gurnee, IL 60031-2392.
RUC	Rubicon, Inc . . . . .	504-673-6141	P.O. Box 517, Geismar, LA 70734.
RUO	Ruco Polymer Corp . . . . .	516-931-8104	New South Rd., Hicksville, NY 11802.
NES	Ruetgers-Nease Chemical Co . . . . .	814-238-2424	201 Struble Rd., State College, PA 16801.
SBP	SBS Products Inc . . . . .	517-799-4941	302 Waller St., Saginaw, MI 48602.
SCM	SCM Corp.: Gildco Organica . . . . . PCR, Inc . . . . .	904-768-5800 904-376-8246	P.O. Box 389, Jacksonville, FL 32201. P.O. Box 1466, Gainesville, FL 32609.
SOS	SSC Industries, Inc . . . . .	404-762-9651	1550 E. Taylor Ave., East Point, GA 30344.
NPR	Safeway, Inc . . . . .	415-944-4329	2800 Ygnacio Valley Rd., Walnut Creek, CA 94598.
STX	St. Croix Petrochemical Corp . . . . .	809-778-6450	P.O. Box 6801, Sunny Isle, St. Croix, U.S. VI 00823-6801.
SLM	Salem Oil & Grease Co . . . . . Sandoz Chemical Corp.: Sandoz Chemical Corp . . . . .	508-745-0585 704-331-7016 704-331-7016	60 Grove St., Salem, MA 01970. 4000 Monroe Rd., Charlotte, NC 28205. 4000 Monroe Rd., Charlotte, NC 28205.
S	Sandoz Chemical Corp . . . . .	704-331-7016	4000 Monroe Rd., Charlotte, NC 28205.
SDC	Sandoz Chemical Corp . . . . .	704-331-7016	4000 Monroe Rd., Charlotte, NC 28205.
ZOC	Sandoz Corp. Protection . . . . .	312-699-1616	1300 E. Touhy Ave., Des Plaines, IL 60018.
SCN	Schenectady Chemicals, Inc . . . . .	518-370-4200	Congress & 9th Sts., Schenectady, NY 12306.
SBC	Scher Chemicals, Inc . . . . .	201-471-1300	Industrial West, Clifton, NJ 07012.
SCH	Schering Corp . . . . .	201-298-4000	1011 Morrie Ave., Union, NJ 07081.
SCO	Scholler, Inc . . . . .	215-739-0900	P.O. Box 26968, Philadelphia, PA 19134.
SPR	Scientific Protein Laboratories . . . . .	608-849-5944	700 E. Main St., Waunakee, WI 53597.
SPA	Scott Paper Co . . . . .	215-521-5000	P.O. Box 925, Everett, WA 98206.
TXS	Scott Polymers, Inc . . . . .	817-831-3541	3607 N. Sylvanla Ave., Fort Worth, TX 76111.
SRL	G. D. Searle & Co . . . . .	708-982-7000	5200 Old Orchard Rd., Skokie, IL 60077.
BRI	Sedgfield Specialities . . . . .	919-379-2000	3330 W. Friendly Ave., Greensboro, NC 27406.
SQA	Sequa Chemicals, Inc . . . . .	803-385-5181	P.O. Box 70, Chester, SC 29706.
SKP	Shakespeare Monofilament Div . . . . .	803-754-7011	6111 Shakespeare Rd., Columbia, SC 29240.
SHO	Shell Oil Co . . . . .	713-241-9548	P.O. Box 3105, Houston, TX 77253.
SHC	Shell Chemical Co . . . . .	713-241-9548	P.O. Box 3105, Houston, TX 77253.
SGO	Shenango, Inc . . . . .	412-771-4400	200 Neville Rd., Pittsburgh, PA 15225-1690.
SHP	Shepherd Chemical Co . . . . .	513-731-1110	4900 Beech St., Cincinnati, OH 45212.
SHX	Sherex Chemical Co., Inc . . . . .	614-764-6500	5777 Frantz Rd., Dublin, OH 43017.



Table A-1—Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identifi- cation code	Name of company	Telephone number	Office address
	The Sherwin-Williams Co.:		
SW	Sherwin-Williams Co	216-566-2000	11541 S. Champlain, Chicago, IL 60628.
SW	Sherwin-Williams Co	216-566-2000	Boggs Lane South, Richmond, KY 40475.
SW	Sherwin-Williams Co	216-566-2000	2802 W. Miller Rd., Garland TX 75041.
BAL	Consumer Div	301-625-8284	2325 Hollins Ferry Rd., Baltimore, MD 21230.
SHT	Shlntech, Inc	713-965-0713	24 Greenway Plaza, Suite 811, Houston, TX 77046.
SMP	J. R. Simplot Co	208-336-2110	P.O. Box 912 Pocatello, ID 83204.
UPF	Sloss Industries Inc	205-254-7801	3500 - 35th Ave., Birmingham, AL 35207.
SK	SmithKline Beechman Chemicals	215-751-4000	One Franklin Plaza, Philadelphia, PA 19101.
SMO	Smooth-On, Inc	201-647-5800	1000 Valley Rd., Gillette, NJ 07933.
SLT	Soltex Polymer Corp	713-522-1781	P.O. Box 1000, Deer Park, TX 77536.
SLC	Soluol Chemical Co., Inc	401-821-8100	Green Hill & Market Sts., W. Warwick, 2000 Rockford Rd., Charles City, IA 50616.
SAL	Solvay Animal Health, Inc	515-257-2422	815-D Virginia St., SW., Lenoir, NC 28645.
SAC	Southeastern Adhesives	704-754-3493	P.O. Box 9217, Corpus Christi, TX 78469.
SWR	Southwestern Refining Co., Inc	512-884-8863	310 Wheeler St., Tonawanda, NY 14150.
SPL	Spaulding Composites Co	716-692-2000	715-735-9033
ASL	SpecialtyChem Products Corp	818-962-2008	5623 N. 4th St., Irwindale, CA 91706.
SOI	Specialty Organics, Inc	201-595-8181	200 Sheridan Ave., Paterson, NJ 07512.
IPP	Spectrachem Corp	201-997-1700	1035 Belleville Turnpike, Kearny, NJ 07032.
SCC	Standard Chlorine of Delaware, Inc	815-727-4944	22500 Millsdale Rd., Elwood, IL 60421 and 100 W. Henter Ave., Maywood, NJ 07607.
STP	Stepan Co	409-942-3360	201 Bay St. South, Texas City, TX 77592-1311.
SC	Sterling Chemicals, Inc	212-907-2000	2144 E. State St., Trenton, NJ 08619.
SD	Sterling Drug, Inc	212-907-2000	P.O. Box 11247, Barcelonita, PR 00617.
SDW	Sterling Organics Div	212-907-2000	90 Park Ave., New York, NY 10016.
CIN	Stockhausen, Inc	919-333-3500	2408 Doyle St., Greensboro, NC 27406.
IRI	Stuart-Ironslides, Inc	708-655-4595	7575 Plaza Court, Willowbrook, IL 60521
SUN	Sun Company, Inc	215-977-6358	1801 Market St., Philadelphia, PA 19103.
SNA	Sun Chemical Corp., Pigments Div	212-986-5500	411 Sun Ave., Cincinnati, OH 45232.
RAS	Surface Coatings, Inc	617-933-4200	100 Eames St., Wilmington, MA 01887.
TCC	Sybron Chemical, Inc	609-893-1100	P.O. Box 66, Birmingham Rd., Birmingham, NJ 08011.
INP	Synair Corp	615-698-8801	2003 Arnicoia Hwy., Chattanooga, TN 37406.
BUC	Synalloy Corp., Blackman Uhler Chemical Div.	803-585-3661	Croft Industrial Park, Spartanburg, SC 29304.
SRY	Synray Corp	201-245-2600	209 N. Michigan Ave., Kenilworth, NJ 07033.
HFT	Syntex Agribusiness, Inc	417-866-7291	P.O. Box 1246, Springfield, MO 65810.
SYF	Synthetic Products Co	216-531-6010	1000 Wayside Rd., Cleveland, OH 44110.
SYT	Synthron, Inc	704-437-8611	P.O. Box 1111, Morganton, NC 28655.
TKD	Takeda Chemical Products USA, Inc	919-762-8666	P.O. Box 2577, Wilmington, NC 28402.
TEK	Teknor Apex Co	401-725-8000	505 Central Ave., Pawtucket, RI 02861.
TLI	Teledyne Industries, Inc., Teledyne	408-637-3731	3601 Union Rd., Hollister, CA 95024-0006.
TOC	McCormick Selph. Tenneco Methanol Co	713-757-2131	1010 Milan St., Houston, TX 77252.
TEN	Tennessee Chemical Co	615-496-3331	1 Cocee St., Copperhill, TN 37317.

Table A-1—Continued  
 Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Identifi- cation code	Name of company	Telephone number	Office address
TVA	Tennessee Valley Authority, NFDC, . . . . . TVA, OACD, Div. of Developmental Production.	205-386-3521	Muscle Shoals, AL 35660.
TER	Terra International, Inc . . . . .	712-277-1340	Terra Centre, 600 - 4th St., Sloux City, IA 51101.
TER	Terra International, Inc . . . . .	712-277-1340	1000 Terra Dr., Woodward, OK 73801.
TX	Texaco Chemical Co . . . . .	713-432-3734	3040 Post Oak Rd., Houston, TX 77056.
TSA	Texas Alkyls, Inc . . . . .	713-479-8411	P.O. Box 600, Deer Park, TX 77536.
TPC	Texas Petrochemicals Corp . . . . .	713-477-9211	8600 Park Place Blvd., Houston, TX 77017.
TWD	Tonawanda Coke Corp . . . . .	716-876-6222	P.O. Box 5007, Tonawanda, NY 14151-5007.
TRI	Triad Chemical . . . . .	504-473-9231	P.O. Box 310, Donaldsonville, LA 70346.
TRO	Troy Chemical Corp . . . . .	201-589-2500	One Avenue L, Newark, NJ 07105.
TUL	Tull Chemical Co., Inc . . . . .	205-831-1154	P.O. Box 3246, Oxford, AL 36203.
TLC	Twin Lake Chemical, Inc . . . . .	716-433-3824	520 Mill St., Lockport, NY 14095.
UPM	UOP, Inc . . . . .	312-391-2000	25 E. Algonquin Road, Des Plaines, IL 60017-5017.
UHL	Paul Uhlich & Co., Inc . . . . .	914-478-2000	1 Railroad Ave., Hastings-on-Hudson, NY 10706.
DRL	Unichema North America . . . . .	312-376-9000	4650 S. Racine Ave., Chicago, IL 60609.
NCI	Union Carbide Corp . . . . .	201-628-2000	1600 Valley Rd., Wayne, NJ 07470.
NCI	BBA Div . . . . .	201-628-2000	2051 N. Lane Ave., Jacksonville, FL 32236.
WTH	Chemical Div . . . . .	201-628-9000	875 Harger St., Dover, OH 44622.
UCC	Union Carbide Corp., Industrial Chemical Div.	304-747-3825	P.O. Box 8361, Charleston, WV 25303.
UOC	Union Oil Co. of California . . . . .	213-977-5131	1201 W. Fifth St., Los Angeles, CA 90017.
UTP	Union Texas Products Corp . . . . .	713-623-6544	1330 Post Oak Blvd. Houston TX 77252-2120.
USR	Unroyal Chemical Co., Inc . . . . .	203-573-3886	World Headquarters, Middlebury, CT 06749
UNN	United Aniline Co . . . . .	617-762-4057	Endicot St., Norwood, MA 02062.
UNO	United Erie, Inc . . . . .	814-456-7561	438 Huron St., Erie, PA 16502.
USB	U.S. Borax & Chemical Corp . . . . .	213-251-5400	3075 Wilshire Blvd., Los Angeles, CA 90010.
USX	U.S. Steel, Div. OF USX: Clariton Plant . . . . .	412-433-4980	600 Grant St., Pittsburgh, PA 15219.
	Gary Works . . . . .	412-433-4980	600 Grant St., Pittsburgh, PA 15219.
UTC	Unifex Chemical Corp . . . . .	919-378-0965	520 Broome Rd., Greensboro, NC 27406.
UPJ	The Upjohn Co . . . . .	616-323-4000	7000 Portage Rd., Kalamazoo, MI 49001.
CWN	Fine Chemicals . . . . .	203-281-2700	410 Sackett Point Rd., North Haven, CT 06473.
VSV	Valentine Sugars, Inc . . . . .	504-532-2541	Rt 2, Box 625, Lockport, LA 70374.
VLR	Valero Refining & Marketing Co . . . . .	512-246-2000	530 McCullough, San Antonio, TX 78292.
VCM	Vanchem, Inc . . . . .	716-434-2624	1 N. Transit Rd., Lockport, NY 14094.
VDM	Van De Mark Chemical Co., Inc . . . . .	716-433-6764	1 N. Transit Rd., Lockport, NY 14094.
VNC	Vanderbilt Chemical Corp . . . . .	203-744-3900	31 Taylor Ave., Bethel, CT 06801.
		203-853-1400	and Rt. #2, Box 54, Murray, KY 42071.
VND	Van Dyk, Div. of Mallinckrodt, Inc . . . . .	201-450-3206	Main & William Ste., Belleville, NJ 07109.
VEL	Vesicol Chemical Corp . . . . .	708-898-9700	5600 N. River Rd., Rosemont, IL 60018.
VIN	Vineland Chemical Co., Inc . . . . .	609-691-3535	1611 Wheat Rd., Vineland, NJ 08360.
VCC	Vinings Industries, Inc . . . . .	404-436-1542	3950 Cumberland Pkwy., Atlanta, GA 30101.
VKR	Virkler Co . . . . .	704-527-2350	1022 Pressley Rd., Charlotte, NC 28210.

Table A-1—Continued

## Synthetic organic chemicals alphabetical directory of manufacturers, by company, 1989

(Names of synthetic organic chemicals manufacturers that reported production and/or sales to the U.S. International Trade Commission for 1989 are listed below alphabetically, together with their identification codes as used in the 15 individual sections of this report)

Ident- fication code	Name of company	Telephone number	Office address
VST	Vieta Chemical Co . . . . .	713-531-3200	15990 N. Barker's Landing Rd., Houston, TX 77224.
VTM	Vitamins, Inc . . . . .	312-861-0700	200 E. Randolph Dr., Chicago, IL 60601.
FRO	Vulcan Materials Co., Chemicals Div . . . . .	205-877-3000	P.O. Box 7689, Birmingham, AL 35233.
VYN	Vygen Corporation . . . . .	216-998-1120	Middle Road, Ashtabula, OH 44004.
SWS	Wacker Silicones Corp . . . . .	517-264-8500	3301 Sutton Rd., Adrian, MI 49221.
WJ	Warner-Jenkinson Co . . . . .	314-658-7342	2526 Baldwin St., St. Louis, MO 63106.
WCA	West Coast Adhesives Co . . . . .	503-286-3515	11104 NW Front Ave., Portland, OR 97231.
EW	Westinghouse Electric Corp., Insulating Materials Div. . . . .	412-864-7960	Route 993, Manor, PA 15665.
WPG	WestPoint Pepperell, Inc . . . . .	404-645-4753	1900 Cunningham Dr., Opelika, AL 36801.
WVA	Westvaco Corp . . . . .	212-688-5000	P.O. Box 70848, Charleston Heights, SC 29415.
WRD	Weyerhaeuser Co . . . . .	715-384-2141	118 S. Palmetto Ave., Marshfield, WI 54449.
WPS	Wheeling-Pittsburgh Steel Corp . . . . .	304-234-2439	1134 Market St., Wheeling, WV 26003.
WCC	White Chemical Corp . . . . .	201-621-4100	660 Frelinghuysen Ave., Newark, NJ 07114.
WHW	Whittemore-Wright Co., Inc . . . . .	617-242-1180	62 Alford St., Boston, MA 02129.
CHN	Wil-Gro Fertilizer, Inc . . . . .	918-825-3383	P.O. Box 429, Pryor, OK 74362.
WTC	Witco Corp . . . . .	201-573-2800	155 Tice Blvd., Woodcliff Lake, NJ 07675.
WCL	Wright Corp . . . . .	919-251-0234	102 Orange St., Wilmington, NC 28403.
WYK	Wyckoff Chemical Co., Inc . . . . .	616-637-8474	1421 Kalamazoo St., S. Haven, MI 49090.
WYT	Wyeth Laboratories, Inc., Wyeth Laboratories Div. of American Home Products Corp. . . . .	215-341-3867	P.O. Box 13745, Philadelphia,

Source: Compiled from data received in response to questionnaires of the U.S. International Trade Commission.



**APPENDIX B**  
**CYCLIC INTERMEDIATES;**  
**GLOSSARY OF SYNONYMOUS NAMES**

Table B-1

## Cyclic Intermediates: Glossary of synonymous names

Common name	Standard (chemical abstracts) name
A acid	3,5-Dihydroxy-2,7-naphthalenedisulfonic acid.
Acetyl-p-phenylenediamine	4'-Aminoacetanilide.
1,2,4-acid	4-Amino-3-hydroxy-1-naphthalenesulfonic acid (1-Amino-2-naphthol-4-sulfonic acid).
Acid yellow 9	6-Amino-3,4'-azodibenzenesulfonic acid.
p-Aminobenzenesulfonic acid	Sulfanilic acid and salt.
m-Aminobenzoyl J acid	4-Hydroxy-7-(m-aminobenzamido)- 2-naphthalenesulfonic acid.
Aminoepsilon acid	8-Amino-1,6-naphthalenedisulfonic acid.
Amino G acid	7-Amino-1,3-naphthalenedisulfonic acid.
Amino J acid	6-Amino-1,3-naphthalenedisulfonic acid.
Amino R salt	3-Amino-2,7-naphthalenedisulfonic acid.
Aniline oil	Aniline.
Anthraflavic acid	2,6-Dihydroxyanthraquinone.
Anthrarufin	1,5-Dihydroxyanthraquinone.
Armstrong & Wynne's acid	4-Hydroxy-2-naphthalenesulfonic acid.
B acid	5-Amino-4-hydroxy-1,7-naphthalenedisulfonic acid.
2B acid	8-Amino-4-chloro-m-toluenesulfonic acid.
4B acid	6-Amino-m-toluenesulfonic acid.
Benzal chloride	$\alpha, \alpha$ -Dichlorotoluene.
Benzanthrone	7H-Benz[de]anthracen-7-one.
Benzotrichloride	$\alpha, \alpha, \alpha$ -Trichlorotoluene.
Bisphenol A	4,4'-Isopropylidenediphenol.
B.O.N.	3-Hydroxy-2-naphthol acid.
Broenner's acid	6-Amino-2-naphthalenesulfonic acid.
Bromamine acid	1-Amino-4-bromo-2-anthraquinonesulfonic acid.
Bromobenzanthrone	3-Bromo-7H-benz[de]anthracen-7-one.
C acid	3-Amino-1,5-naphthalenedisulfonic acid.
C.A. acid	3-Amino-8-chloro-4-auriferous acid.
C-Amine (Lake Red C acid)	6-Amino-5-chloro-p-toluenesulfonic acid.
Cassella acid	5-Hydroxy-1-naphthalenesulfonic acid.
Chicago Acid (SS acid)	4-Amino-5-hydroxy-1,3-naphthalenedisulfonic acid.
Chlorobenzanthrone	Chloro-7H-benz[de]anthracen-7-one.
Chromotropic acid	4,5-Dihydroxy-2,7-naphthalenedisulfonic acid.
Chrysozin	1,8-Dihydroxyanthraquinone.
1,6-Cleve's acid	5-Amino-2-naphthalenesulfonic acid.
1,7-Cleve's acid	8-Amino-2-naphthalenesulfonic acid.
Crocein acid	7-Hydroxy-1-naphthalenesulfonic acid.
2-Cyanopyridine	Picolinonitrile.
3-Cyanopyridine	Nicotinonitrile.
Cyanuric chloride	2,4,6-Trichloro-s-triazine.
D acid	6-Amino-1-naphthalenesulfonic acid.
DADI	Dianilidine diisocyanate.
DDB	p-Dibutoxybenzene.
Decacyclene	Diacenaphtho[1,2-];1',2'-]fluoranthene.
Dehydrothio-p-tolidine	2-(p-Aminophenyl)-6-methylbenzothiazole.
Developer Z	3-Methyl-1-phenyl-2-pyrazolin-5-one.
o-Dianilidine	3,3'-Dimethoxybenzidine.
1,1'-Dianthrimide	1,1'-Iminodianthraquinone.
Dibenzanthrone	Violanthrone.
Dichlone	2,3-Dichloro-1,4-naphthoquinone.
4,4'-Dihydrocydiphenylsulfone	4,4'-Sulfonyldiphenol.
Dimethyl POPOP	1,4-Bis[2-(4-methyl-5-phenyloxazoyl)]benzene.
4,5-Dinitrochrysozin	1,8-Dihydroxy-4,5-dinitroanthraquinone.
Dioxy S acid	4,5-Dihydroxy-1-naphthalenesulfonic acid.
Diphenyl epsilon acid	8,8-Dianilino-1-naphthalenesulfonic acid.
Durene	1,2,4,5-Tetramethylbenzene.
Epsilon acid (Andresen's acid)	8-Hydroxy-1,6-naphthalenedisulfonic acid.

Table B-1—Continued

## Cyclic Intermediates: Glossary of synonymous names

Common name	Standard (chemical abstracts) name
F acid	7-Hydroxy-2-naphthalenesulfonic acid.
Fast Red G base	2-Nitro-p-toluidine [N <sub>2</sub> =1].
Fast Scarlet R base	5-Nitro-o-anisidine [NH <sub>2</sub> =1].
Fischer's aldehyde	1,3,3-Trimethyl- $\omega^2$ , $\alpha$ -indolineacetaldehyde.
Fischer's base	1,3,3-Trimethyl-2-methyleneindoline.
Freund's acid	4-Amino-2,7-naphthalenedisulfonic acid.
G salt	7-Hydroxy-1,3-naphthalenesulfonic acid, sodium salt.
Gamma acid	6-Amino-4-hydroxy-2-naphthalenesulfonic acid, sodium salt.
Gold salt	9,10-Dihydro-9,10-dioxo-1-anthracenesulfonic acid and salt.
H acid	4-Amino-5-hydroxy-2,7-naphthalenedisulfonic acid, (8-Amino-1-naphthol-3,6-disulfonic acid).
Hellmellitene	1,2,3-Trimethylbenzene.
Indoxyl	3(2H)-Indolone.
Isodurene	1,2,3,5-Tetramethylbenzene.
J acid	7-Amino-4-hydroxy-2-naphthalenesulfonic acid, sodium salt.
J acid urea	7,7'-Ureylenebis[4-hydroxy-2-naphthalenesulfonic acid]
K acid	4-Amino-5-hydroxy-1,7-naphthalenedisulfonic acid.
Koch's acid	8-Amino-1,3,6-naphthalenetrisulfonic acid.
L acid	5-Hydroxy-1-naphthalenesulfonic acid.
Lake Red C amine	2-Amino-5-chloro-p-toluenesulfonic acid.
Laurent's acid	5-Amino-1-naphthalenesulfonic acid.
M acid	8-Amino-4-hydroxy-2-naphthalenesulfonic acid.
MEP	5-Ethyl-2-picoline (2-Methyl-5-ethylpyridine).
Mesitylene	1,3,5-Trimethylbenzene.
Methane base	4,4'-Methylenebis[N,N-dimethylaniline].
Milcher's hydrol	4,4'-Bis[dimethylamino]benzhydrol.
Milcher's ketone	4,4'-Bis[dimethylamino]benzophenone.
MOCA	3,3'-Dichloro-4,4'-diaminodiphenylmethane.
MVP	5-Vinyl-2-picoline.
Naphthlonic acid	4-Amino-1-naphthalenesulfonic acid.
o-Naphthlonic acid	1-Amino-2-naphthalenesulfonic acid.
$\beta$ -Naphthol	2-Naphthol, tech
Naphthol AS	3-Hydroxy-2-naphthallidide.
$\alpha$ -Naphthylamine	1-Naphthylamine.
Neville & Winther's acid	4-Hydroxy-1-naphthalenesulfonic acid.
m-Nitrobenzoyl J acid	4-Hydroxy-7-(m-nitrobenzamido)-2-naphthalenesulfonic acid.
Oxy Koch's acid	1-Naphthol-3,6,8-trisulfonic acid.
Pentaanthrimide	1,4,5,8-Tetrakis(1-antraquinonylamino) anthraquinone.
Peri acid	8-Amino-1-naphthalenesulfonic acid.
Phenylbiphenyl	Terphenyl.
N-Phenyldiethanolamine	2,2'-[(Phenyl)imino]diethanol.
Phenyl gamma acid	6-Anilino-4-hydroxy-2-naphthalenesulfonic acid.
Phenyl J acid	7-Anilino-4-hydroxy-2-naphthalenesulfonic acid.
Phenyl peri acid	8-Anilino-1-naphthalenesulfonic acid.
Picric acid	2,4,6-Trinitrophenol.
POPOP	1,4-Bis[2-(5-phenyloxazolyl)]benzene.
Pseudocumene	1,2,4-Trimethylbenzene.
Pyrazoleanthrone	Anthra[1,9-cd]pyrazol-6(2H)-one.

Table B-1—Continued

## Cyclic Intermediates: Glossary of synonymous names

Common name	Standard (chemical abstracts) name
Pyrazoleanthrone yellow	[3,3'-Blanthral[1,9-cd]-pyrazole]-6,6'-(2H,2'H)dione
Pyrazolone T	5-Oxo-1-(p-sulphophenyl)-2-pyrazolone-3-carboxylic acid.
Quinizarin	1,4-Dihydroxyanthraquinone.
2-Quinizarinsulfonic acid	9,10-Dihydro-1,4-dihydroxy-9,10-dioxo-2-anthracenesulfonic acid.
Quinoline yellow base	Quinophthalone.
R salt	3-Hydroxy-2,7-naphthalenedisulfonic acid, disodium salt.
RG acid (Violet acid)	4-Hydroxy-2,7-naphthalenedisulfonic acid.
Rhodulline acid (J Acid Imide)	7,7'-Iminobis[4-hydroxy-2-naphthalenesulfonic acid].
RR acid	3-Amino-5-hydroxy-2,7-naphthalenedisulfonic acid.
S acid	4-Amino-5-hydroxy-1-naphthalenesulfonic acid.
Schaffer's acid	6-Hydroxy-2-naphthalenesulfonic acid.
Silver salt	9,10-Dihydro-9,10-dioxo-2-anthracenesulfonic acid and salt.
Solvent Yellow 1	p-Phenylazoaniline and hydrochloride.
Solvent Yellow 3	4-(o-Tolylazo)-o-toluidine.
SS acid (Chicago acid)	4-Amino-5-hydroxy-1,3-naphthalenedisulfonic acid.
Sulfanilic acid	p-Aminobenzenesulfonic acid.
o-Sulfobenzaldehyde	o-Formylbenzenesulfonic acid.
Tetralin	1,2,3,4-Tetrahydronaphthalene.
Thiolindoxyl	3(2H)-Thlanaphthenone.
Thiosalicylic acid	o-Mercaptobenzoic acid.
Tobias acid	2-Amino-1-naphthalenesulfonic acid.
TODI	Bitolylene diisocyanate.
o-Toldine	3,3'-Dimethylbenzidine.
$\alpha$ -Toluic acid	Phenylacetic acid.
$\alpha$ -Tolunitrile	Phenylacetoneitrile.
4-m-Tolylenediamine	Toluene-2,4-diamine.
Trimellitic anhydride	1,2,4-Benzenetricarboxylic acid, 1,2-anhydride.
Trimethyl base	1,3,3-Trimethyl-2-methyleindoline.
Trinitrophenol	Picric acid.
Urea J acid (J acid urea)	7,7'-Ureylenebis[4-hydroxy-2-naphthalenesulfonic acid].
Veratraldehyde	3,4-Dimethoxybenzaldehyde.
Veratrole	o-Dimethoxybenzene.
Vinytoluene	ar-Methylstyrene.
Violet acid (RG acid)	4-Hydroxy-2,7-naphthalenedisulfonic acid.



**APPENDIX C**  
**SYNTHETIC ORGANIC CHEMICALS,**  
**U.S. PRODUCTION AND SALES, 1989,**  
**HARMONIZED SYSTEM BASIS**

## Synthetic Organic Chemicals, U.S. Production and Sales, 1989, Harmonized System Basis

The following table contains 1989 U.S. production and sales data for synthetic organic chemicals in the 6-digit Harmonized System (HS) format. The Commission decided to compile such data in this format in response to the decision by the U.S. Bureau of the Census to publish Standard Industrial Classification (SIC) data which will be convertible to the HS beginning with the 1987 *Census of Manufactures*. The U.S. Bureau of the Census has historically referred to the *Synthetic Organic Chemicals, United States Production and Sales (SOC)* report in the chemicals section of the Census of Manufactures, which permits them to omit collecting synthetic organic chemicals production and shipments data from its respondents. Because of this situation, the SOC data will now also be compiled on an HS basis to provide comparability with the new SIC format.

The table provides production and sales data on a 6-digit HS basis only where publication would not violate the statutory provisions relating to unlawful disclosure of information accepted in confidence by the Commission. It includes only the 6-digit item numbers with publishable data from a number of HS chapters in which these chemicals are classified, but does not provide totals by chapter or overall total figures.

Table C-1

Synthetic organic chemicals: U.S. production and sales, 1989, harmonized system basis

HS/ number	Description	Production	Sales	
		Quantity Kilograms	Quantity Kilograms	Value Dollars
271113	Butane, liquefied	383,306,643	319,572,334	55,765,838
290121	Ethylene	15,870,502,405	7,622,373,816	3,991,875,940
290122	Propene (Propylene)	9,331,186,249	5,269,184,835	2,109,565,279
290124	Buta-1,3-diene and isoprene	1,573,778,426	1,467,717,690	633,080,216
290211	Cyclohexane	1,031,210,603	1,048,405,116	489,447,663
290220	Benzene	5,414,072,000	3,504,956,323	1,360,244,906
290230	Toluene	2,634,809,000	1,764,066,854	548,598,556
290244	Mixed xylene isomers	2,947,573,624	1,421,630,540	506,041,875
290250	Styrene	3,781,561,000	1,965,840,000	1,411,501,000
290260	Ethylbenzene	4,189,377,000	145,353,000	80,532,885
290270	Cumene	2,007,702,325	1,271,899,046	601,429,107
290311	Chloromethane (Methyl chloride) and chloroethane (Ethyl chloride)	282,253,781	( <sup>1</sup> )	( <sup>1</sup> )
290312	Dichloromethane (Methylene chloride)	218,468,084	140,857,000	66,777,169
290313	Chloroform (Trichloromethane)	266,534,101	229,311,000	102,223,000
290321	Vinyl chloride (Chloroethylene)	4,597,104,069	1,181,140,330	764,707,466
290340	Halogenated deriva of acyclic hydrocarbons containing two or more different halogens	591,928,000	463,488,000	1,012,087,000
290511	Methanol (Methyl alcohol)	3,704,475,000	2,238,583,000	326,720,000
290512	Propan-1-ol (Propyl alcohol) and propan-2-ol (Isopropyl alcohol)	751,152,177	588,799,816	275,555,201
290513	Butan-1-ol (n-Butyl alcohol)	794,099,727	260,716,254	147,693,286
290514	Other butanols nsp	( <sup>1</sup> )	57,409,000	41,135,000
290531	Ethylene glycol (Ethandiol)	2,477,135,000	2,257,087,000	1,983,438,000
290532	Propylene glycol (Propane-1,2-diol)	265,300,160	290,795,854	251,006,259
290542	Pentaerythritol	47,967,523	51,848,369	70,241,884
290544	D-glucitol (Sorbitol)	150,651,000	113,495,956	94,556,384
290711	Phenol (Hydroxybenzene) and its salts	1,726,417,000	654,045,000	619,665,000
290713	Octylphenol, nonylphenol and their isomers; salts thereof	88,949,769	( <sup>1</sup> )	( <sup>1</sup> )
290723	4,4'-Isopropylidenediphenol (Bisphenol A, Diphenylpropane) and its salts	563,073,906	180,964,875	221,658,210
290941	2,2'-Oxydiethanol (Diethylene glycol, Digol)	197,302,558	158,023,863	109,030,248
290942	Monomethyl ethers of ethylene glycol or of diethylene glycol	50,256,964	45,340,617	50,364,173
290943	Monobutyl ethers of ethylene glycol or of diethylene glycol	206,668,425	180,968,624	179,877,363
291010	Oxirane (Ethylene oxide)	2,281,986,000	207,834,629	269,957,878
291211	Methanal (Formaldehyde)	2,673,233,000	1,305,488,000	173,426,000
291213	Butanal (Butyraldehyde, normal isomer)	763,571,756	( <sup>1</sup> )	( <sup>1</sup> )
291411	Acetone	1,145,022,000	711,140,045	294,471,819
291412	Butanone (Methyl ethyl ketone)	204,157,432	226,261,480	138,569,661
291413	4-Methylpentan-2-one (Methyl isobutyl ketone)	77,494,000	75,633,000	64,813,000
291422	Cyclohexanone and methylcyclohexanones	483,276,918	56,672,973	64,322,449
291441	4-Hydroxy-4-methylpentan-2-one (Diacetone alcohol)	( <sup>1</sup> )	9,851,413	10,535,384
291521	Acetic acid	1,493,971,000	358,763,000	137,830,000
291522	Sodium acetate	20,036,000	( <sup>1</sup> )	( <sup>1</sup> )
291531	Ethyl acetate	132,346,197	94,672,902	60,689,412
291532	Vinyl acetate	1,157,802,383	589,091,527	473,258,716
291533	n-Butyl acetate	101,632,953	86,374,150	56,020,051
291534	Isobutyl acetate	37,302,881	24,438,841	16,641,309
291731	Dibutyl orthophthalates	9,725,036	8,107,763	9,187,703
291732	Diocetyl orthophthalates	138,827,841	139,588,078	121,916,833
291735	Phthalic anhydride	416,125,000	195,880,041	130,785,913
291822	O-Acetylsalicylic acid (Aspirin), its salts and esters	10,200,745	( <sup>1</sup> )	( <sup>1</sup> )
292141	Aniline and its salts	460,998,000	316,383,316	215,866,614
293211	Tetrahydrofuran	78,275,423	33,751,110	64,063,618
310210	Urea, whether or not in aqueous solution	5,368,457,000	5,074,040,000	696,343,000
320411	Disperse dyes and preparations based thereon	12,184,000	10,595,000	117,706,000

**Table C-1—Continued**  
**Synthetic organic chemicals: U.S. production and sales, 1989, harmonized system basis**

HS/number	Description	Production	Sales	
		Quantity Kilograms	Quantity Kilograms	Value Dollars
320412	Acid dyes, premetallized or not, mordant dyes and preparations based thereon . . . . .	5,764,000	6,339,000	73,370,000
320413	Basic dyes and preparations based thereon . . . . .	5,476,000	5,235,000	70,523,000
320414	Direct dyes and preparations based thereon . . . . .	28,823,000	20,949,000	118,619,000
320415	Vat dyes (including those usable in that state as pigments) and preparations based thereon . . . . .	16,713,689	16,698,613	78,861,434
320416	Reactive dyes and preparations based thereon . . . . .	13,832,000	9,830,000	118,972,000
320417	Pigments and preparations based thereon . . . . .	50,053,000	42,980,000	697,145,000
320420	Fluorescent brightening agents . . . . .	60,711,000	57,181,000	119,787,000
390110	Polyethylene having a specific gravity of less than 0.94 . . . . .	4,121,039,260	3,864,414,532	3,891,068,344
390120	Polyethylene having a specific gravity of 0.94 or more . . . . .	3,197,750,000	3,064,941,000	3,486,406,000
390210	Polypropylene . . . . .	3,039,309,000	2,973,767,593	2,473,615,661
390311	Polystyrene, expandable . . . . .	315,828,422	259,183,240	403,757,149
390319	Polystyrene, other than expandable . . . . .	2,084,435,597	1,696,290,515	2,060,471,710
390330	Acrylonitrile-butadiene-styrene (ABS) copolymers . . . . .	547,436,000	500,304,000	1,021,475,000
390461	Polytetrafluoroethylene (PTFE) . . . . .	( <sup>1</sup> )	12,482,036	174,664,627
390511	Polymers of vinyl acetate in aqueous dispersion . . . . .	296,642,158	215,565,554	347,713,899
390610	Polymethyl methacrylate . . . . .	291,416,014	189,328,819	450,151,867
390730	Epoxide resins . . . . .	386,383,675	251,587,153	660,328,778
390750	Alkyd resins . . . . .	322,475,327	218,430,232	382,070,122
390810	Polyamide-6, -11, -12, -6,6, -6,9, -6,10 or -6,12 (nylon type) . . . . .	1,448,708,000	967,860,000	3,454,463,000
390910	Urea resins; thiourea resins . . . . .	933,877,000	851,717,000	255,815,000
390920	Melamine resins . . . . .	81,613,071	69,167,585	135,114,736
390940	Phenolic resins . . . . .	833,553,509	517,046,991	972,065,501
390950	Polyurethanes . . . . .	216,759,374	101,481,582	364,023,274

**APPENDIX D**  
**ALPHABETICAL CHEMICAL INDEX**

## Alphabetical Chemical Index

The alphabetical index of chemicals contained in this appendix table is an outgrowth of the processing of data by the U.S. International Trade Commission for its annual report, *Synthetic Organic Chemicals, United States Production and Sales*. This index will aid those who have an interest in the report, either as users of the published data or as suppliers of individual company data to the Commission, principally by showing the section number and line item number of specific chemicals. This information can be used to assist in locating a chemical in the report and to provide respondents to the Commission's questionnaire with information on where to list their production and sales data. The index shows only those chemicals for which production or sales were reported to the Commission for this edition of the report.

The index, initially designed for Commission use in computer processing of data for the annual report, has certain characteristics that should be noted to increase its usefulness. For example, superior headings for individual entries are not shown in the index. Thus, understanding the contents of the first item in the index, "accelerators, activators, and vulcanizing agents, acyclic, *other*," necessitates that the index user turn to the individual section (in the report) and item number (in the questionnaire) to find those acyclic accelerators, activators, and vulcanizing agents already specified. Similarly, the index entry "specific gravity 0.940 and below" does not by itself identify the chemical product. The index user will need to turn to the indicated section number and item number to determine the chemical referred to—in this case, polyethylene.

The chemical names used in this report and in the questionnaires sent to U.S. producers to obtain the data aggregated in the report are listed alphabetically in the first column of each listing in the index. The second column refers to the section in the report and questionnaire containing the chemical, and the third column shows the appropriate item number in that section in the questionnaire.

Table D-1  
Alphabetical chemical index

Chemical name	Sect. Item No.	No.	Chemical name	Sect. Item No.	No.
Accelerators, activators, and vulcanizing agents, acyclic, other	09	163,000	Acid Blue 15	04	133,000
Accelerators, activators, and vulcanizing agents, cyclic, other	09	49,000	Acid Blue 25	04	136,000
Acetaldehyde dimethylhydrazone	15	782,000	Acid Blue 40	04	140,000
Acetaldehyde ethyl phenethyl acetal	07	307,200	Acid Blue 41	04	141,000
Acetaldehyde phenethyl propyl acetal	07	1,300	Acid Blue 62	04	145,000
Acetal resins	08	1,400	Acid Blue 67	04	145,067
Acetamide	08	19,000	Acid Blue 92	04	153,000
Acetamidethanol (N-Acetyl-ethanolamine)	15	227,000	Acid Blue 113	04	157,000
Acetaminophen	06	220,000	Acid Blue 118	04	158,000
Acetazolamide	06	392,000	Acid Blue 145	04	161,000
Acetic acid, amides with polyalkylene polyamines, salt	12	796,000	Acid Blue 231	04	168,000
Acetic acid, synthetic (100%)	15	357,900	Acid Blue 281	04	168,281
Acetoacetanilide	03	486,000	Acid Blue 283	04	168,298
o-Acetoacetanilide	03	9,000	Acid Blue 298	04	168,321
Acetoacetylaldehyde	03	10,000	Acid Blue 324	04	168,330
Acetoacetylaldehyde yellows, all others	05	17,000	Acid blue dyes, all other	04	169,000
o-Acetoacetotoluidide	03	11,000	Acid Brown 14	04	185,000
2-(Acetoacetoxy)ethyl methacrylate	03	1281,400	Acid Brown 19	04	190,000
2,4'-Acetoacetoxydipide	03	11,500	Acid Brown 50	04	194,050
Acetoacet-m-xylalide	03	1,500	Acid Brown 59	04	195,000
Acetoguanamine	03	115,200	Acid Brown 97	04	197,147
2'-Acetonaphthone ( $\beta$ -Methyl naphthyl ketone)	07	1,500	Acid Brown 147	04	199,159
Acetone	15	806,000	Acid Brown 159	04	199,160
Acetone-formaldehyde resins	08	1,000	Acid Brown 160	04	199,161
Acetonitrile	15	432,000	Acid Brown 161	04	199,165
3-( $\alpha$ -Acetonylbenzyl)-4-hydroxycoumarin (Warfarin)	13	169,000	Acid Brown 166	04	199,186
Acetophenone, tech.	03	14,000	Acid Brown 185	04	200,229
p-Acetotoluidide	03	15,000	Acid Brown 209	04	200,237
1-Acetoxy-2-sec-butyl-1-ethenylcyclohexane	07	93,500	Acid Brown 239	04	200,264
6-Acetoxy-2,4-dimethyl-1,3-dioxane	15	1,000	Acid Brown 264	04	200,269
Acetylacetates, all other	15	1281,700	Acid Brown 439	04	209,439
Acetylacetone peroxide	15	1281,990	Acid Brown dyes, all other	04	209,000
N-[(Acetylamino)methyl]-2-chloro-N-(2,6-diethylphenyl) acetamide	13	168,995	(Acid Green 3)	05	230,003
Acetyl-n-butyl (2,3-Hexanedione)	07	126,000	Acid Green 5	04	170,000
Acetyl cedrene (Vertoflex)	07	33,550	Acid Green 6	04	172,000
Acetylene (For chemical use only)	02	38,500	Acid Green 16	04	175,000
N-Acetyl isovaleryl [5-Methyl-2,3-hexanedione]	07	126,600	Acid Green 20	04	177,000
N-Acetyl methyl anthranilate	07	63,555	Acid Green 25	04	179,000
2-Acetylpropionyl (2,3-Pentanedione)	07	126,600	Acid Green 70	04	184,000
Acid Black 1	03	19,450	Acid green dyes, all other	04	186,000
Acid Black 2	04	203,000	Acid Orange 7	04	43,000
Acid Black 52	04	204,000	Acid Orange 8	04	44,000
Acid Black 60	04	211,000	Acid Orange 10	04	45,000
Acid Black 63	04	214,000	Acid Orange 24	04	47,000
Acid Black 63	04	214,063	Acid Orange 60	04	54,000
Acid Black 92	04	215,000	Acid Orange 64	04	57,000
Acid Black 107	04	216,000	Acid Orange 89	04	61,089
Acid Black 172	04	218,172	Acid Orange 116	04	62,000
Acid Black 194	04	218,194	Acid Orange 128	04	64,000
Acid Black 210	04	218,210	Acid Orange 152	04	65,152
Acid Black dyes, all other	04	219,000	Acid Orange 156	04	65,161
Acid Blue 9	04	132,000	Acid Orange 161	04	65,161
			(Acid Red 26)	05	214,000

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. No.	Item No.	Chemical name	Sect. No.	Item No.
Acid Red 1	04	67 000	Acid Yellow 226	04	24 096
Acid Red 4	04	58 000	Acid Yellow 239	04	37 239
Acid Red 14	04	69 000	Acid yellow dyes, all other	04	38 000
Acid Red 33	04	75 000	Acrolein (acrylaldehyde)	06	648 100
Acid Red 57	04	79 000	Acrolein (acrylaldehyde)-2-methylpropanesulfonic acid, sodium salt polymer	15	783 000
Acid Red 73	04	81 000	Acrylamide-acrylic acid copolymer	14	395 000
Acid Red 87	04	84 000	Acrylamide-acrylic acid copolymer, sodium salt	14	396 000
Acid Red 97	04	87 000	Acrylamide monomer	14	397 000
Acid Red 119	04	94 000	Acrylamide polymer with N,N-Dialkyl-N-methyl-2[[1-oxo-2-propenyl)oxy]ethaniminium sulfate	15	228 000
Acid Red 137	04	97 000	Acrylamide-trimethylaminoethyl acrylate chloride polymer	15	399 500
Acid Red 151	04	99 000	Acrylamide-trimethylaminoethyl methacrylate chloride	14	400 000
Acid Red 174	04	100 174	Acrylate-alkyd copolymer resins	08	1 900
Acid Red 182	04	103 000	Acrylic acid	15	491 000
Acid Red 186	04	105 000	Acrylic monomers, mixed	15	884 000
Acid Red 226	04	110 226	Acrylonitrile-butadiene-styrene (ABS) terpolymer resins	08	42 000
Acid Red 266	04	111 000	Acrylonitrile monomer	15	433 000
Acid Red 278	04	111 278	Acyclic amphoteric surface-active agents, all other	12	19 000
Acid Red 296	04	111 296	Acyclic herbicides	13	212 000
Acid Red 299	04	112 000	Acyclic insecticides, all other	13	231 000
Acid Red 337	04	114 000	Acyclic plasticizers, all other	11	130 000
Acid Red 364	04	115 364	Acyclic elastomers, all other	06	186 800
Acid Red 384	04	115 384	Adipic acid	15	22 000
Acid Red 388	04	115 388	Adipic acid, ammonium salt	15	492 000
Acid Red 396	04	115 396	Adipic acid-crosslinked polyacrylamide	15	613 000
Acid Red 410	04	115 410	Adipic acid-diethylenetriamine-epichlorohydrin polymer	14	405 000
Acid Red 418	04	115 418	Adipic acid esters, all other	14	153 000
Acid Red 419	04	115 419	Adipic acid, sodium salt	11	68 000
Acid red dyes, all other	04	115 419	Adipic acid type complex linear polyesters and polymeric plasticizers	15	613 400
Acids, acid anhydrides, and acyl halides, all other	15	566 000	Adipic dihydrazide	11	131 100
Acid Violet 3	04	118 000	Adiponitrile	15	613 300
Acid Violet 7	04	119 000	Adiponitrile	15	434 000
Acid Violet 12	04	120 000	β-Alanine-N-(2-hydroxyethyl)-N-2-oxococoyl amino ethyl, sodium salt	12	447 800
Acid Violet 17	04	121 000	Albumin	06	574 800
Acid Violet 49	04	126 000	Albuterol sulfate	06	323 000
[Acid Yellow 1]	05	204 001	Alcohol esters, monohydric, all other	15	1070 000
[Acid Yellow 23]	05	204 023	C <sub>12</sub> -C <sub>18</sub> Alcohol esters of lactic acid	15	684 800
Acid Yellow 3	04	3 000	C <sub>12</sub> -Alcohol, ethoxylated, propoxylated and phosphated	15	76 150
Acid Yellow 17	04	9 000	Alcohol mixtures, other	12	850 000
Acid Yellow 19	04	6 000	Alcohol mixtures, C <sub>11</sub> or lower only	15	883 400
Acid Yellow 23	04	1 000	Alcohol mixtures, C <sub>11</sub> through C-18 only	15	883 100
Acid Yellow 26	04	1 000	Alcohols, monohydric, and their esters, C <sub>2</sub> and higher	15	883 200
Acid Yellow 36	04	12 000	Alcohols and phenols, alkoxylated and phosphated or polyphosphated, all other	15	1425 000
Acid Yellow 39	04	17 000	Alcohols, unmixed C <sub>2</sub> or higher, all other	12	91 000
Acid Yellow 59	04	19 000	Alcohols, unmixed C <sub>2</sub> or lower, all other	15	882 000
Acid Yellow 65	04	21 000	Aldane	03	21 400
Acid Yellow 73	04	22 000	Aldaldehyde and acetone-amine reaction products, cyclic, other	09	55 000
Acid Yellow 99	04	25 000	Aldaldehyde-amine reaction products, cyclic, other	09	8 000
Acid Yellow 129	04	31 000			
Acid Yellow 135	04	32 000			
Acid Yellow 137	04	32 137			
Acid Yellow 151	04	33 000			
Acid Yellow 159	04	34 000			
Acid Yellow 174	04	35 000			
Acid Yellow 198	04	37 000			
Acid Yellow 200	04	37 200			
Acid Yellow 219	04	37 219			



Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Aldehydes, acyclic, all other	15	4-Allyl-1,2-dimethoxybenzene (4-Allylveratrole)	07
Aliphatic hydrocarbon sulfides	14	Allyl disulfide	07
Alkanolamine condensates, all other	12	Allyl heptanoate	07
Alkene thiophosphonate	14	Allyl hexanoate	07
Alkenyl succinimide	14	Allyl methacrylate	15
3-Alkoxy-2-hydroxypropyl trimethyl ammonium chloride	13	4-Allyl-2-methoxyphenol (Eugenol)	07
Alkoxy trifluorotitanate	12	1-(Allyloxy)-2,3-epoxypropane (Allyl glycidyl ether)	15
Alkoxy phenol	08	3-Allyloxy-2-hydroxypropane sulfonic acid, sodium salt	15
Alkyd copolymers, all other	08	Allyl resins	08
Alkylalcohol ethoxylated and carbonated, sodium salt	12	Allyl sulfonate, sodium salt	08
2-(C <sub>3-17</sub> Alkyl)-1-(C <sub>1-18</sub> aminoethyl)	12	Alpha olefins, C <sub>6</sub> -C <sub>10</sub>	02
N-alkylamine bis(methylene)phosphonic acid	14	Alpha olefins, C <sub>11</sub> and higher	02
1-Alkylamines, primary, mixed	15	Alprazolam	06
Alkyl aromatics, all other	02	Alprostadil	06
Alkylary-p-phenylenediamines	09	Aluminum acetate	15
Alkylaryl phosphites, mixed	09	Aluminum acetylacetonate	15
Alkylbenzene straight-chain (Except dodecyl and tridecyl)	03	Aluminum chlorohydroxyphenalocyanine blue	03
1- $\alpha$ -Alkylcarboxylic acid salts (Isocarboxylic acid salts), all other	15	Aluminum di-sec-butoxide acetoacetic ester chelate	15
Alkyl dimethyl amine oxide	12	Aluminum diisopropoxide	15
Alkyl glycidyl ether, C <sub>12</sub> -C <sub>18</sub> and C <sub>12</sub> -C <sub>18</sub>	15	Aluminum distearate	15
Alkyl glycidyl ethers, C <sub>8</sub> -C <sub>10</sub>	15	Aluminum ethyl-3-oxobutanoate-0', 0'-dihydroxy T-4	15
Alkyl imidazole	14	Aluminum formate	15
3-(C <sub>2-18</sub> alkoxy)-1-propanamine	12	Aluminum formate	15
N-(C <sub>2-18</sub> alkoxy)-1-propanamine	12	Aluminum isocitoxide, diisopropoxide	15
Alkylphenol, calcium salt	14	Aluminum isopropoxide (Aluminum isopropylate)	15
Alkylphenol formaldehyde condensate, alkoxylated	15	Aluminum monostearate	15
Alkylphenol-formaldehyde condensates, alkoxylated, all other	15	Aluminum octanoate	15
Alkylphenol formaldehyde copolymer	15	Aluminum octanoate	15
Alkylphenols, mixed	14	Aluminum tri-sec-butoxide	15
Alkylpyridines, mixed	03	Aluminum tristearate	15
Alkyl succinic anhydride	14	Amides, all other	15
All other specific	14	Aminoamines	06
All other specific flavor and perfume materials	07	Aminoaldehyde hydrochloride	06
All other benzoid or naphthalenoid chemicals	07	Amino oxides and oxygen-containing amines (Except those with amide linkages), acyclic, all other	12
All other dyes	04	Amino oxides and oxygen-containing amines (Except those having amine linkages), cyclic, all other	12
Allo-octene	04	Amines, all other containing oxygen, all other	12
Alloprinolol	06	Amine salts of fatty, aliphatic, and tall oil acids, all other	12
All other polybutadiene (BR) type elastomers	10	4-Aminoacetamide (Acetyl-p-phenylenediamine)	03
All other products from petroleum and natural gas, cyclic	02	3-Amino- <i>o</i> -acetamide, cyclic, all other	03
All other succinic anhydride derivatives	15	Amino acids and salts, cyclic, all other	14
All other terpenoid heterocyclic, or alicyclic flavor and perfume chemicals	07	1-Aminobenzamide and salt	03
Allyl alcohol	15	6-Aminobenzamide	03
Allylamine	07	p-Aminobenzoic acid, tech	03
p-Allylanisole	15	2-Amino-6-chloro-3-thiazolonesulfonic acid	03
Allyl n-butyl trithiocarbonate	14	1-Amino-4-bromo-9,10-dihydro-9,10-dithio-2-anthracenesulfonic acid and sodium salt	03
Allyl cyclohexyl propionate	07	7-Aminoethylsopropionic acid [SO <sub>2</sub> H=1]	03
		6-Amino-5-chloro-p-toluenesulfonic acid [SO <sub>2</sub> H=1] (2B Acid)	03
			83,000

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. No.	Item No.	Chemical name	Sect. No.	Item No.
3-Amino-2,5-dichlorobenzoic acid, ammonium salt (2,5-Dichloro-3-aminobenzoic acid, ammonium salt)	13	40,500	Ammonium acetate	15	588,000
4-Amino-N,N-di-(hydroxyethyl)aniline sulfate	03	91,503	Ammonium benzoate	15	621,100
Ammonium butyronitrile	15	434,400	Ammonium citrate	15	627,400
4-Amino-6-(1,1-dimethyl-ethyl)-3-(methylthio)-1,2,4-triazin-5-(4H)-one	13	40,600	Ammonium formate	06	623,000
2-Aminoethanol hydrochloride	15	309,900	Ammonium lactate	15	672,900
2-Aminoethanol (Monoethanol amine) sulfate	15	310,000	Ammonium mercaptoacetate	15	691,000
Aminoxyethanol	15	311,000	Ammonium oxalate	15	722,000
2-(2-Aminoethylamino)ethanol (Aminoethylthanolamine)	15	312,000	Ammonium oxydiethylenedis (alkyl* dimethyl chloride)	13	245,022
(2-Aminoethyl)amino ethanol, reaction product with octadecanoic acid	15	312,500	Ammonium phenolsulfonate	06	553,000
N-Aminoethylaminopropyl trimethoxysilane	15	1378,480	Ammonium polyacrylate	14	426,000
(2-Aminoethyl)ethyl(dryodogenated talow alkyl)(2-hydroxyethyl)ammonium ethyl sulfate	12	448,000	Ammonium propionate	15	749,000
2-Aminoethyl mercaptoacetate (Monoethanolamine thioglycolate)	15	313,000	Ammonium stearate	06	443,000
1-(2-Aminoethyl)-2-naphtirnyl-2-imidazole	12	404,450	Amobarbital, sodium	06	444,000
1-(2-Aminoethyl)-2-nor(tall oil alkyl)-2-imidazole	12	406,000	Amoxsalin	06	525,300
2-Amino-2-ethyl-1,3-propanediol	15	314,000	Amoxicillin (trihydrate)	06	9,600
N-2-(4-Amino-N-ethyl-m-toluidino)ethyl methanesulfonamide	14	318,000	Amoxicillin (anhydrous)	06	9,500
Amorphous acid	06	574,900	Amphetamine sulfate	06	512,000
2-Amino-2-(hydroxymethyl)-1,3-propanediol	15	316,000	Amphotericin B	06	1,000
(1-tris(hydroxymethyl)amino)ethane	03	116,803	Ampicillin (trihydrate)	06	10,100
methyl-9-methoxybutanoic acid	03	118,000	Ampicillin, sodium	06	166,000
m-(1-(4-amino-3-methoxyphenyl)azo)benzenesulfonic acid (5-amino-2-methyl-1-propanediol)	15	317,000	Amprullium	06	886,000
2-Amino-2-methyl-1-propanediol	15	319,000	Amyl acetate (n-Pentyl acetate)	15	888,000
2-Amino-2-methyl-1-propanol hydrochloride	15	320,000	Amyl acetates, all other	15	886,000
2-Amino-2-methylpropyl 8-bromothephylinate	03	130,100	Amylases, all other	17	98,000
2-Amino-5-methylpyridine	03	133,600	$\alpha$ -Amyl climamic aldehyde	04	5,550
2-Amino-6-methylpyridine	03	134,000	Amyl cinnamic aldehyde dimethyl acetal	07	5,650
2-Amino-2,7-naphthalenedisulfonic acid	03	145,000	Amyl cinnamyl alcohol	07	5,650
2-Amino-5-nitrothazole	03	178,000	Amyl cyclohexyl acetate	07	93,900
2-Amino-4-nitrotoluene hydrochloride	03	178,400	tert-Amyl hydroperoxide	06	367,000
5-Amino-2-[[2-oxo-5-benzimidazolyl)amino]benzenesulfonic acid	03	182,000	Amyl nitrite	06	3,002
6-Aminopentaclic acid	03	182,100	Amyl ortho- and para- dimethylaminobenzoates	15	721,500
p-Aminophenol	03	186,000	Amyphenol-formaldehyde, alkoxylated	12	124,000
p-[[p-Aminophenyl)azo]benzenesulfonic acid	03	188,000	p-tert-Amyphenol sulfide (Tackifier)	09	93,650
7-[[4-Aminophenyl)azo]-1,3-naphthalenedisulfonic acid	03	189,000	Anabolic agents and androgens, all other	06	644,000
3-Aminophenylphosphonic acid	03	193,802	Anhydride-acid mixture	15	492,500
1-(3-Aminopropyl)morpholine	15	6,000	Anhydrosorbital dioleate	12	589,000
2-Aminopyridine	03	194,000	Anhydrosorbital esters, all other	12	603,000
4-Aminopyridine	03	195,000	Anhydrosorbital monoester of tall oil acids	12	590,000
Aminosalicic acid	06	142,000	Anhydrosorbital monolaurate	12	591,000
5-Aminosalicylic acid	03	197,000	Anhydrosorbital mono-oleate	12	592,000
2-Aminothiazole nitrate	03	202,050	Anhydrosorbital monopalmitate	12	593,000
4-Amino-m-toluenesulfonic acid (SO <sub>3</sub> H=1)	03	203,000	Anhydrosorbital sesquioleate	12	594,000
4-Amino-3,5-trichloropicolinic acid (Picloram)	13	41,000	Anhydrosorbital triester of tall oil acids	12	596,000
Amtriptiline hydrochloride	06	525,000	Anhydrosorbital trioleate	12	600,000
			Anhydrosorbital tristearate	12	602,000
			Aniline (Aniline oil)	03	212,000
			Aniline, ethoxylated	12	342,200
			2-Anilinoethanol	03	215,000
			Anilinoethanesulfonic acid and salt	03	219,000



Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	No.	Sect. Item No.	Chemical name	Sect. Item No.	No.
Basic brown dyes, all other	04	358,000		Benzalkonium heparin	06	624,500
Basic brown dyes, all types, modified	04	418,999		Benzanilide	03	259,000
Basic Green 4	04	354,000		Benzene-, cumene-, toluene-, and xylenesulfonates, all other	12	151,000
Basic green dyes, all other	04	354,100		Benzene High purity (98-100%)	02	5,500
(Basic Green 1, PMA)	05	230,101		Benzene Other	02	6,500
Basic Orange 1	04	327,000		Benzene phosphonic acid	15	9,250
Basic Orange 2	04	372,000		Benzene phosphorus chloride	03	281,500
Basic Orange 21	04	372,000		Benzene sulfonic acid	03	284,000
Basic Orange 26	04	376,000		Benzene sulfonic acid, 2-formyl-, sodium salt	12	137,710
Basic orange dyes, all other	04	329,000		Benzenesulfonyl chloride	03	284,200
(Basic Red 1)	05	215,001		Benzenesulfonyl chloride	03	286,000
Basic Red 1	04	333,000		Benzene, toluene, xylene, mixtures	03	287,000
Basic Red 12	04	383,000		1,2,4-Benzenetricarboxylic acid	03	287,000
Basic Red 14	04	384,000		1,2,4-Benzenetricarboxylic acid, 1,2-dianhydride (Trimellitic anhydride)	02	33,000
Basic Red 15	04	384,000		Benzhydrol (Diphenylmethanol)	03	288,100
Basic Red 17	04	386,000		Benzimidazole	03	289,000
Basic Red 22	04	390,000		Benzocaine	03	273,100
Basic Red 29	04	391,046		Benzocaine	06	704,000
Basic Red 46	04	392,000		Benzocaine	06	134,000
Basic Red 49	04	392,054		Benzocic acid, 2-butoxyethanol ester	09	9,015
Basic Red 54	04	392,054		Benzocic acid, butyl ester (Butyl benzoate)	15	3,020
Basic Red 73	04	392,073		Benzocic acid, 2-[4-(dimethylamino)-benzoyl]-	15	21,830
Basic Red 104	04	392,104		Benzocic acid, C <sub>12</sub> -C <sub>18</sub> ester	15	9,058
Basic Red 111	04	392,111		Benzocic acid esters, all other	15	9,058
Basic red dyes, all other	04	334,000		Benzocic acid, isodecyl ester	15	9,058
(Basic Red 81, PMA)	05	210,050		Benzocic acid, methyl ester	15	13,000
Basic Violet 1	05	221,001		Benzocic acid, methyl ester	03	275,000
(Basic Violet 4)	05	221,004		Benzocic acid salts, all other	06	425,000
(Basic Violet 10)	05	221,010		Benzocic acid, tech.	03	278,000
Basic Violet 1	04	335,000		Benzonitrile	03	278,000
Basic Violet 3	04	337,000		Benzophenone	07	8,000
Basic Violet 4	04	338,000		Benzophenone	03	278,100
Basic Violet 10	04	339,011		2-Benzothiazolethiol, sodium salt	03	278,200
Basic Violet 11	04	395,000		1H-Benzotriazole	03	281,000
Basic Violet 16	04	398,035		Benzotriazole, polychlorinated	15	15,300
Basic Violet 35	04	342,000		Benzotriazole, potassium and sodium salts	15	15,400
Basic violet dyes, all other	04	342,000		Benzotriazole, substituted	15	15,500
(Basic Violet 3, PMA)	05	221,003		2-Benzoxazolethiol	03	283,200
Basic Yellow 11	04	360,000		Benzoyl chloride	03	286,000
Basic Yellow 13	04	361,000		Benzoyl chloride	15	16,000
Basic Yellow 15	04	362,000		Benzophenone	15	16,000
Basic Yellow 28	04	367,000		Benzophenone	06	535,000
Basic Yellow 29	04	368,000		Benzophenone hydrochloride	15	17,000
Basic Yellow 53	04	370,053		Benzyl alcohol	12	508,190
Basic Yellow 58	04	370,058		Benzyl (alkylpyridinium)chloride	03	289,000
Basic Yellow 59	04	370,065		Benzylamine	03	290,000
Basic Yellow 72	04	370,078		2-(Benzylamino)ethanol	07	11,000
Basic Yellow 75	04	370,079		Benzyl benzoate	07	12,000
Basic Yellow 83	04	370,083		Benzyl butyrate	15	17,115
Basic Yellow 84	04	370,094		Benzyl chloroformate	07	13,000
Basic Yellow 86	04	370,098		Benzyl chloride	12	508,800
Basic Yellow 98	04	370,098		Benzyl (cocoonut oil alkyl)bis(2-hydroxyethyl)ammonium chloride	12	449,000
Basic yellow dyes, all other	04	325,000		Benzyl (cocoonut oil alkyl)dimethylammonium chloride	12	509,000
Basic yellow dyes, all other	15	229,200		Benzyl (cocoonut oil alkyl)dimethylammonium chloride	12	509,000
Basic yellow dyes, all other	03	7,500		Benzyl (cocoonut oil alkyl)dimethylammonium chloride	12	509,900
Benzaldehyde, glyceryl acetal	07	7,500		Benzyl (cocoonut oil alkyl)dimethylammonium chloride	12	509,900
Benzaldehyde, tech	03	247,000				

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Benzylidimethyl(mixed alkyl)ammonium chloride	12 510,000	Bis(2-butoxyethyl) ether (Diethylene glycol di-n-butyl ether)	15 1142,000
Benzylidimethyloctadecylammonium chloride	12 511,000	1,1-Bis(carboxymethyl)-2-undecyl-2-imidazolium chloride, disodium salt	12 20,000
Benzyl dimethyl oleyl ammonium chloride	12 512,000	Bis(p-chlorobenzoyl)peroxide	15 17,900
Benzylidimethyl(tallow alkyl)ammonium chloride	12 513,000	Bis(2-chloroethyl) ether (Dichlorodiethyl ether)	15 1300,000
6-benzylidenelene (bap)	13 231,251	Bis(2-Chloroethyl)-2-chloroethylphosphonate	15 1017,000
Benzyl formate	07 15,000	Bis(coconut oil alkyl)amine	12 431,000
1-Benzyl-2-heptadecyl-1-(2-hydroxyethyl)-2-imidazolium chloride	12 451,000	Bis(coconut oil alkyl)dimethylammonium chloride	12 480,000
Benzylhexadecyldimethylammonium chloride	12 515,000	Bis-cumylphenyl-oxoethyl titanate	12 775,800
Benzyl(hydrogenated tallow alkyl)dimethylammonium chloride	12 516,000	1,2-Bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamoyl)hydrazine	15 17,980
2-Benzyl-2-hydroxy-5,9-dimethyl-6,7-benzomorphanhydrobromide	03 294,950	Bis(dibutylthiocarbamoyl) disulfide	09 144,950
1-Benzyl-1-(2-hydroxyethyl)-2-nor(tall oil alkyl)-2-imidazolium	12 453,000	Bis(2,4-dichlorobenzoyl) peroxide	15 18,000
Benzyl isobutyrate	07 15,400	Bis(dimethylaminoethyl) ether	15 322,900
Benzyl isopentyl ether	07 15,900	Bis( $\alpha,\alpha$ -dimethylbenzyl)peroxide	15 19,000
Benzyl isovalerate	07 15,700	Bis(1,3-dimethylbutyl)phosphorodithioleyleyl amine salt	14 232,000
Benzyl-methyl-bis(hydrogenated tallow)ammonium chloride	12 518,500	N,N'-Bis(1,4-dimethylpiperyl)-p-phenylenediamine	09 55,551
Benzyl(mixed alkyl)pyridinium chloride	12 516,670	S-11,2-Bis(ethoxycarbonyl)ethyl(O,-dimethyl)phosphorothioate (Malathion)	13 215,000
1-Benzoyloxy-2-methoxy-4-propenylbenzene (Benzyl isoeugenyl ether)	07 16,000	Bis(2-ethoxyethyl) ether (Diethylene glycol diethyl ether)	15 1143,000
Benzyl phenylacetate	07 17,000	Bis(2-ethylhexyl)hydrogen phosphate	15 1019,000
1-Benzyl-4-phenylisonicotinitrile	03 208,200	Bis(2-ethylhexyl)triphosphate	11 16,550
Benzyl picolinium chloride	12 517,100	N,N'-Bis(1-ethyl-3-methylpiperyl)-p-phenylenediamine	09 56,000
Benzyl propionate	07 18,000	Bis(ethyl-3-oxobutanato)bis(2-propanoate) titanium	15 1058,800
1-Benzopyridinium chloride	12 518,000	Bis(N,N1-ethyl(stearic/arachidic/berisole)amide)	12 470,400
1-Benzyl quinolinium chloride	12 518,200	Cyanoethyl ethylammonium ethosulfate	15 19,200
Benzyl salicylate	07 19,000	2,2-Bis(ferrocenyl)propane amine	15 260,000
Benzyl(tallow alkyl)bis(2-hydroxyethyl)ammonium chloride	12 453,500	Bis(hydrogenated tallow alkyl)amine	12 432,000
S-Benzyl thiocarbamate	13 118,071	Bis(hydrogenated tallow alkyl)dimethylammonium chloride	12 481,000
Benzyl(trimethylammonium) chloride	12 519,000	Bis(hydrogenated tallow alkyl)dimethylammoniummethyl sulfate	12 482,000
Benzyl(trimethylammonium) hydroxide	03 300,000	N,N-Bis(2-hydroxyethyl)(coconut oil alkyl)amine	12 321,100
Beta-carotene (provitamin A)	06 789,000	N,N-Bis(2-hydroxyethyl)(coconut oil alkyl)amine oxide	12 321,110
Betaine hydrochloride	08 649,000	Bis(2-hydroxyethyl, ethoxylated)methyl(9-octadecyl)ammonium chloride	12 454,000
Betamethasone dipropionate	06 649,500	Bis(2-hydroxyethyl, ethoxylated)methyloctadecylammonium chloride	12 455,500
Betamethasone sodium phosphate	06 650,000	Bis-2-hydroxyethyl-hydrogenated tallow-ethyl sulfate	12 455,500
Betamethasone valerate	06 651,000	Bis-(2-hydroxyethyl)isododecylpropylamine oxide	12 321,700
Beta methyl ionone coar	07 104,100	Bis(2-hydroxyethyl)methyl(tallow alkyl)ammonium chloride	12 455,540
Bethanechol chloride	06 314,500	N,N-bis-(2-hydroxyethyl)octadecanamide	14 489,000
Bethanechol staine	14 24,000	N,N-Bis(2-hydroxyethyl)octadecylamine	12 322,000
Biotin	06 794,000	Bis-2-hydroxyethyl-octyl-methyl-p-toluene sulfonate	12 455,600
4,4'-Biphenol	03 307,000	N,N'-Bis(2-hydroxyethyl)(tallow alkyl)amine	12 324,000
Biphenyl	03 307,000	Bis(2-hydroxyethyl)tallowammonium ethanoate	12 0,500
N,N-Bis(2-acetamidido)glycine	14 3,000	N,N'-Bis(2-hydroxyethyl)-p-toluidine	03 958,500
N,N-Bis(2-amino-2-methylpropyl)-N-ethylammonium ethyl sulfate, dimer acid	12 457,500	Bis(hydroxy-methyl)oleyl oxazoline	15 20,500
N,N'-Bis(2-azido-benzylidene)-4-methylcyclohexanone	15 259,000	2,2-bis(4-hydroxyphenyl)-propanoic acid	15 494,500
Bis(2-bis(2-hydroxyethyl)amino)ethyl diisopropyl titanate	03 311,400	2,2-Bis(4-hydroxyphenyl)1,4-methylpentane	15 20,550
Bis-1,4-bromoacetoxyl-2-butene	15 1058,600		
	13 176,000		



Table D-1—Continued  
Alphabetical Chemical Index

Chemical name	Sect. Item No.	Sect. Item No.
Butyl acrylate	15	893,000
Butyl acrylate-ethyl acrylate copolymer resins	06	19,950
n-Butyl alcohol (n-Propylcarbinol)	15	843,000
sec-Butyl alcohol (Methylcyclohexanol)	13	847,000
tert-Butyl alcohol (Trimethylcarbinol)	15	847,000
Butyl alcohol, ethoxylated and phosphated	12	76,000
n-Butylamine, mono	15	267,000
sec-Butylamine, mono	15	264,000
tert-Butylamine, mono	15	265,000
Butyl p-aminobenzoate	13	365,000
2-(sec-Butylamino)-4-ethylamino-6-methoxy-s-triazine	03	118,041
2-(tert-Butylamino)-4-ethylamino-6-(methylthio)-s-triazine	03	118,017
tert-Butylaminoethyl methacrylate	15	327,455
p-Butylamine	03	366,000
n-Butylbenzaldehyde	03	370,000
p-Butylbenzene	03	371,000
N-n-Butyl benzensulfonamide	09	0,500
N-tert-Butyl-2-benzothiazoleulfenamide	09	25,000
Butyl benzyl phthalate	15	17,000
n-Butyl-4,4-bis[1-butylperoxy]valerate	15	1284,200
Butyl butyl lactate	07	127,500
sec-Butyl chloroformate	15	898,000
3-tert-Butyl-5-chloro-6-methyluracil	13	118,018
2-tert-Butyl-p-cresol	03	377,000
6-tert-Butyl-o-cresol	03	93,710
2-tert-Butyl cyclohexanol	07	93,700
2-sec-Butylcyclohexanone	07	93,800
o-tert-Butylcyclohexyl acetate	07	93,800
p-tert-Butylcyclohexyl acetate (Verbenax)	07	94,000
tert-Butyldiethanolamine	15	327,500
Butylene glycol adipate	11	56,750
1,3-Butylene glycol dimethacrylate	15	1100,200
1,3-Butylene glycol, ethoxylated	12	758,940
Butylene oxide	15	1303,000
n-Butylethylamine	15	267,000
Butyl 2-ethylhexyl phthalate	11	21,000
Butyl ethyl magnesium	15	1374,800
N-Butyl-N- $\alpha,\alpha$ -trifluoro-2,6-dinitro-p-toluidine (Benefin)	13	43,000
Butyl formal	15	1430,000
tert-Butyl glycidyl ether	15	1317,470
tert-Butyl hydroperoxide	15	1285,000
4,4'-Butyldienebis(6-tert-butyl-m-cresol)	09	86,200
Butyl(isobutylene-isoprene) type	10	9,000
Butyl lactate	15	900,000
n-Butyllithium	15	1372,000
sec-Butyllithium	15	1373,000
n-Butyl magnesium chloride	15	1374,900
Butyl maleate	15	901,000
n-Butyl mercaptan (1-Butanethiol)	02	90,310
sec-Butyl mercaptan (2-Butanethiol)	02	90,315
tert-Butyl mercaptan (2-Methyl-2-propanethiol)	02	91,000
Butyl mercaptopropionate	15	901,800
Butyl methacrylate	15	902,000
Butyl methacrylate-ethyl methacrylate copolymer resins	08	19,960
2-(and 3)-tert-Butyl-4-methoxyphenol (Butylated hydroxyanisole, or, BHA)	15	25,000
p-tert-Butyl- $\alpha$ -methylcrotonaldehyde	07	21,900
2-[(1-Butyl-2-methylindol-3-yl)carbonyl]benzoic acid	03	382,200
Butyl methyl pyrophosphate Isopropoxy titanium salt octyl phosphite adduct	12	92,300
Butylmorpholine	15	25,500
Butylnaphthalenesulfonic acid, sodium salt	15	162,000
Butyl octyl phthalates	11	23,000
Butyl oleate	15	909,000
Butyl oleate, sulfated, sodium salt	15	257,000
n-Butyl perchloroformate	12	202,500
tert-Butyl peroxide [(9)-tert-butyl peroxide]	15	1268,900
tert-Butyl peroxyacetate	15	1268,600
tert-Butyl peroxyisobutyrate	15	1268,250
tert-Butyl peroxyisobutylate	15	1268,280
tert-Butyl peroxyisopropylcarbonate	15	1268,300
tert-Butylperoxy maleic acid	15	1268,320
tert-Butyl peroxyneodecanoate	15	1267,350
tert-Butyl peroxyvalerate	15	1267,000
o-sec-Butylphenol	03	383,000
p-sec-Butylphenol	03	384,000
p-tert-Butylphenol	03	386,000
p-tert-Butylphenol-formaldehyde, alkoxylated	12	721,600
Butylphenols, mixed	02	367,000
2-(p-tert-Butylphenoxy)cyclohexyl-2-propynyl sulfite	13	166,017
tert-Butylphenyl glycidyl ether	15	26,550
N-(3-(p-tert-butylphenyl)-2-methylpropylidene)-anthranilic acid, methyl ester	07	21,920
Butyl phosphate	12	92,400
Butyl phosphate, potassium salt	12	92,500
Butyl phthalyl butyl glycolate	11	41,400
Butyl picolinium bromide	12	519,500
Butyl picoleate	11	107,000
n-Butyl stearate	11	117,000
p-tert-Butyltoluene	03	388,000
Butyl 2-[4-[[5-(trifluoromethyl)-2-pyridinyl]oxy]phenoxy]propanoate	13	43,050
tert-Butyl urea	15	329,500
Butyl vinyl ether	15	1305,000
6-tert-Butyl-2,4-xyleneol	03	391,000
2-Butyne-1,4-diol	15	1075,000
Butyraldehyde	15	784,000
l-Butyraldehyde trimer	15	1151,700
Butyric acid	15	499,000
Butyric anhydride	15	500,000
Butyrolactone	15	104,500
n-Butyrontitile	15	436,000
Butyl chloride	15	501,000
Cadmium benzoate	15	10,000
Cadmium 2-ethylhexanoate	15	631,000

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Cadmium laurate	15 677-300	(1-Carboxyheptadecyl)trimethylammonium hydroxide, inner salt	12 1,000
Cadmium naphthenate	14 297,000	5 (or 6)-Carboxy-4-hexyl-2-cyclohexene-1-octanoic acid, potassium/sodium salts	12 52,500
Cadmium stearate	15 751,000	5 (or 6)-Carboxy-4-hexyl-2-cyclohexene-1-octanoic acid, reaction products with castor oil	12 38,500
Caffeine, natural	06 537,000	Carboxylic acid - alkanolamine condensates, all other	12 582,000
Caffeine, synthetic	06 591,000	Carboxylic acid-amines and polyamine condensate, all other	12 587,000
Calcitonin	06 691,500	Carboxylic acid-diamine and polyamine condensates, all other	12 374,000
Calcium acetate	15 591,000	Carboxylic acid-diamine and polyamine condensates, alkoxylated, all other	12 784,000
Calcium 1- $\alpha$ -alkylcarboxylate	15 668,000	Carboxylic acid esters, all other	12 721,000
Calcium ascorbate	06 808,000	Carboxylic acids, all other	12 75,000
Calcium citrate	15 622,000	Carboxylic acids with amide, ester or ether linkage, other	12 51,000
Calcium 2-ethylhexanoate	15 632,000	N-Carboxy-N-methylanthranilic anhydride	03 351,400
Calcium formate	15 738,000	Carboxymethyl-3-coccamidopropyl dimethyl ammonium chloride, sodium salt	12 3,980
Calcium gluceptate	06 739,000	(Carboxymethyl)[3-(coconut oil amide) propyl]dimethylammonium hydroxide, inner salt	12 4,000
Calcium manganese tetracetate	15 170,000	1-Carboxymethyl-2-heptadecyl-1-(2-hydroxyethyl)-2-imidazolium hydroxide, sodium derivative, sodium salt	12 22,000
Calcium naphthenate	14 298,000	1-Carboxymethyl-1-(2-hydroxyethyl)-2-heptyl-2-imidazoliumhydroxide, sodium derivative, sodium salt	12 22,600
Calcium nonadecanoate	15 703,000	1-Carboxymethyl-1-(2-hydroxyethyl)-2-imidazolium hydroxide, sodium derivative, sodium salt	12 23,200
Calcium oleate	15 718,500	1-Carboxymethyl-1-(2-hydroxyethyl)-2-nonyl-2-hydroxide sodium derivative, sodium salt	12 24,000
Calcium polycarboxiphil	06 591,500	1-Carboxymethyl-1-(2-hydroxyethyl)-2-undecyl-2-imidazolium hydroxide, sodium derivative, sodium salt	12 25,000
Calcium propionate	15 737,000	1-Carboxymethyl-1-(2-hydroxyethyl)-2-undecyl-2-imidazoliumhydroxide, sodium derivative, sodium salt	12 21,300
Calcium stearate	15 752,000	(Carboxymethyl)-3-(lauryl amido propyl dimethyl ammonium hydroxide inner salt	12 21,400
Calcium undecylenate	06 135,000	Carvacrol	07 94,300
Camphene	15 29,000	l-Carvone	07 94,300
Campholenic aldehyde	15 29,100	$\beta$ -Caryophyllene	12 53,000
Canrenoate, potassium	06 736,700	Castor oil acids (Ratio = 2/1)	12 52,000
Canrenoate, potassium	06 736,700	Castor oil acids, potassium salt	12 53,000
Capramidopropyl betaine	07 111,500	Castor oil ethoxylated	12 669,000
Capreomycin	06 39,150	Castor oil fatty acids, dehydrated	15 502,000
Capric acid (Ratio = 2/1)	12 530,000	Castor oil hydrogenated	15 1327,610
Capric acid (Ratio = 1/1)	12 546,010	Castor oil polymerized	15 305,000
Caprolactam (2-Oxohexamethylenimine)	15 29,500	Castor oil, sulfated, sodium salt	12 529,000
Caprolactam magnesium bromide	15 29,505	Cationic surfactant-active agents, all other	07 94,700
Caproactone	15 104,600	$\alpha$ -Cedrene epoxide (Andrane)	07 94,760
3-(Caprylamidoethylene-(2-hydroxyethyl)amino)propionic acid	12 0,700	Cedrol	07 94,760
Caprylamphopropionate	12 9,800	Cedryl acetate	07 94,800
Caprylic acid tetraethylene-pentamine condensate	12 358,700		
Captropril	06 355,400		
Caramphen	06 425,800		
Carbencillin, disodium	06 12,000		
Carbidopa	06 830,500		
1-(Carboethoxy)ethyl 5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-nitrobenzoate	13 118,068		
Carbonyldiazide	15 330,500		
2-Carbomethoxy-1-propen-2-yl dimethyl phosphate	13 216,000		
Carbon black feedstock	02 36,050		
Carbon Black oil	01 21,010		
Carbon disulfide	15 1296,600		
Carbon tetrachloride	15 1217,000		
4,4'-Carbonylbis(phthalic anhydride)	03 400,100		
Carboplatin	06 278,100		
1-Carboxyethyl-1-(2-hydroxyethyl)-2-heptyl-2-imidazolium hydroxide, sodium derivative, sodium salt	12 21,200		
1-Carboxyethyl-1-(2-hydroxyethyl)-2-nonyl-2-imidazolium hydroxide, sodium derivative, sodium salt	12 21,250		



Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Cadyl formate	07	2-Chloro-1,4-diethoxybenzene	03
Cafacolor	06	2-Chloro-2,5-diethoxy-4-nitrobenzene	03
Cafamandole	06	2-Chloro-2',6'-diethy-1-N-(n-butoxymethyl)acetanilide (Butachlor)	13
Cafazolin, sodium	06	2-Chloro-2',6'-diethy-1-N-(methoxymethyl)acetanilide (Atachlor)	13
Cafonidol	06	1-Chloro-1,1-difluoroethane (F-142b)	13
Cafoxitin	06	Chlorodifluoromethane (F-22)	15
Ceftazidime	06	4-Chloro-2',5'-dimethoxyacetacetanilide	03
Celastrol	06	4-Chloro-1,4-dimethoxybenzene	03
Cellulase	14	1-Chloro-2,4-dinitrobenzene (Dinitrochlorobenzene)	03
Cellulose acetate	08	2-Chloro-3,5-dinitrobenzenesulfonic acid	03
Cellulose acetate butyrate	08	2-Chloro-N-(2,6-dinitro-4-(trifluoromethyl)phenyl)-N-ethyl-6-fluorobenzene methanamine	13
Cellulose acetate hexahydrophthalate	15	3-Chlorodiphenylamine	03
Cellulose acetate phthalate	15	2-Chloro-N-ethoxymethyl-N-(2-ethyl-6-methylphenyl)acetamide (Acetochlor)	13
Cellulose acetate propionate	08	2-Chloro-1-(3-ethoxy-4-nitrophenoxy)-4-(trifluoromethyl)benzene (Oxyfluoren)	13
Cellulose ethers, all other	16	2-Chloro-4-(ethylamino)-6-(isopropylamino)-s-triazine (Atrazine)	13
Cellulose, oxidized	15	2-(4-Chloro-6-(ethylamino)-s-triazin-2-ylamino)-2-methylpropanitrile (Cyanazine)	13
Cephalexin	06	p-1-(2-Chloroethyl)methylamino)benzaldehyde	03
Cephalothin, sodium	06	Chloroform	15
Cephadrine	06	Chloroethoxypropyl methacrylate	15
Cerium 2-ethylhexanoate	15	2-Chloro-N-isopropylacetanilide (Propachlor)	13
Cetylalcolyl methacrylate	15	1-Chloro-2-methoxyethane	15
Cetyl lactate	06	2-Chloro-N-(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino carbonyl benzene sulfonamide	13
Chemical indicators	14	Chloromethyl dimethyliminium (Amide chloride)	15
Chemically defined linear alcohol, alkoxylated, all other	15	Chloromethyl methyl ether	15
Chemical reagents and fine chemicals	12	4-Chloro-2-methylphenoxyacetic acid, dimethylamine salt	13
Chlorinated fatty materials	15	4-Chloro-2-methylphenoxyacetic acid, iso-octyl ester	13
Chlorinated (Not otherwise halogenated) hydrocarbons, all other	15	2-(4-Chloro-2-methylphenoxy)propionic acid, dimethylamine salt	13
Chlorinated insecticides, cyclic, all other	15	1-Chloro-2-nitrobenzene (Chloro-o-nitrobenzene)	03
Chlorinated paraffins, 55-64% chlorine	15	2-Chloro-4-nitrobenzene (Chloro-p-nitrobenzene)	03
Chlorinated paraffins, less than 35% chlorine	15	2-Chloro-4-nitrobenzoic acid	03
Chlorinated paraffins, 65% or more chlorine	15	4-Chloro-3-nitrobenzoic acid potassium salt	03
Chlorinated rubber, natural and synthetic	10	2-Chloro-4-nitrotoluene	03
Chloroacetic acid, mono	15	Chloropentafluoroethane	15
2-Chloroacetophenone	03	5-Chlorophenothiazine	15
Chloroallyl diposphate ester, neutral	15	2-Chlorophenothiazine	03
Chloroallyl phosphate ester	15	1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1,2,4-triazol-1-yl)butan-2-one	13
2-Chloroallyl diethylthiocarbamate (CDEC)	13	$\alpha$ -(2-Chlorophenyl)- $\alpha$ -(4-chlorophenyl)-5-pyrimidinemethanol	13
1-(3-Chloro-allyl)-D-3,5,7-triaza-1-azoniaadamantane chlori	03	N-(4-Chlorophenyl)-N-(3,4-dichlorophenyl)urea	03
2-Chloro-4-aminotoluene	03	4-Chloro-o-phenylenediamine	03
o-Chloroaniline	03		
p-Chloroaniline	03		
p-Chlorobenzaldehyde	03		
p-Chlorobenzamide	03		
Chlorobenzene, mono	03		
p-Chlorobenzene sulfonic acid	03		
5-Chlorobenzotriazole	13		
2-Chloro-4,6-bis(ethylamino)-8-triazine (Simazine)	13		
2-Chloro-4,6-bis(isopropylamino)-8-triazine (Propazine)	13		
1-Chlorobutane (n-Butyl chloride)	15		
2-Chloro-1,4-dibutoxybenzene	03		
1-Chloro-2,5-albutoxy-4-nitrobenzene	03		
94,810			
39,300			
39,500			
40,000			
40,100			
40,200			
40,500			
40,700			
99,500			
384,000			
20,980			
21,000			
29,900			
30,000			
21,010			
413,000			
635,000			
1430,250			
41,000			
43,600			
632,200			
911,700			
912,000			
236,000			
80,000			
71,000			
62,000			
1327,700			
1252,000			
147,000			
1219,000			
1218,000			
1220,000			
9,050			
503,000			
411,100			
1021,700			
1021,702			
198,000			
413,300			
412,500			
414,000			
415,000			
425,000			
427,000			
430,000			
329,000			
44,050			
44,000			
1221,000			
440,780			
440,800			
440,009			
40,020			
523,100			
523,000			

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	No.	Chemical name	Sect. Item No.	No.
$\alpha$ -[2-(4-chlorophenyl)ethyl]- $\alpha$ -[1,1-dimethyl(ethyl)-1h-1,	13	40, 028	Choline salicylate	06	399, 300
2-riazole-1-ethanol	13	40, 019	Chromium 2-ethylhexanoate	15	632, 500
$\alpha$ -(2-chlorophenyl)- $\alpha$ -(4-fluorophenyl)-5-	13	168, 994	Chromium naphthenate	14	299, 000
pyrimidinmethanol	13	118, 067	Chromium octanoate, activated, catalyst	15	1371, 150
$\beta$ -(4-chlorophenyl)methyl-%-(1,1-dimethyl(ethyl)-1,2,4-	13	812, 320	Chromidine	06	619, 600
triazole-1-ethanol)	13	1076, 000	Cimetidine hydrochloride	08	619, 600
2-(2-chlorophenyl)methyl-4,4-dimethyl-3-isoxazolone	13	1229, 000	Cineole (eucalyptol)	07	23, 700
4-chlorophthalic acid	03	528, 000	Cinnamaldehyde	07	24, 000
1-chlorophthalone	15	812, 320	Cinnamitrifluoride	15	34, 780
3-chloro-1,2-propanediol (Glycerol $\alpha$ -chlorohydrin)	15	1076, 000	Cinnamyl acetate	07	25, 000
3-chloropropene (Allyl chloride)	15	1229, 000	Cinnamyl alcohol	07	26, 000
$\alpha$ -Chloropropylchlorosilane	15	1379, 000	Cinnamyl butyrate	07	27, 100
Chloropropyltrimethoxysilane	15	1380, 000	Cinnamyl cinamate	07	27, 200
3-chloropropyl-2,5-xylol ether	03	530, 070	Cinnamyl nitrile	07	27, 500
2-chloropyridine	03	532, 000	Cinnamyl propionate	07	28, 000
4-chlororesorcinol	03	537, 000	Cinoxacin	06	276, 002
Chlorosulfonated polyethylene (CSM) type	10	9, 100	Cis-1-(3-chloro-allyl)-3,5,7-triaza-1-azoniaadamante	03	413, 500
2-(4-chlorosulfonylphenyl)ethylchlorosilane	14	197, 000	chlor	06	278, 200
Chlorosulfurized sperm oil	14	1257, 500	Citral dimethyl acetal	07	127, 700
2-chloro-1,1,1,2-tetrafluoroethane	15	34, 600	Citric and acetylcitric acid esters, all other	11	71, 000
Chlorothiazanthone	06	719, 000	Citric acid	15	505, 000
Chlorothiazide	06	719, 000	Citric acid, sodium salts (50% ) in sodium phosphates	12	53, 500
$\alpha$ -Chlorotoluene	03	543, 000	[20% ]	07	128, 000
$\alpha$ -Chlorotoluene (Benzyl chloride)	03	545, 000	Citronellyl acetate	12	130, 000
3-Chloro-p-toluidine [NH <sub>2</sub> =1]	03	547, 000	Citronellyl formate	07	131, 000
2-Chloro-6-(trichloromethyl)pyridine	13	168, 991	Citronellyl isobutyrate	07	131, 500
Chlorotrifluoroethylene (Trifluorovinyl chloride)	15	1258, 000	Citronellyl propionate	06	45, 000
2-Chloro-1,1,2-trifluoroethyl methyl ether	15	1259, 200	Clindamycin	06	45, 000
Chlorotrifluoromethane [F-13]	15	1259, 000	Cloxacillin	06	116, 500
2-Chloro-N-[[14-(trifluoromethoxy)	13	133, 200	Cloxacillin, sodium	06	13, 000
phenyl]amino]carbonyl]benzamide	13	556, 050	Cobalt acetate	15	593, 000
3-(2-Chloro-4-trifluoromethylphenoxy)toluene	15	1381, 000	Cobalt t- $\alpha$ -alkylcarboxylate	15	669, 000
Chlorotrifluoromethylsilane	15	1381, 000	Cobalt borate neodecanoate complexes	09	180, 300
4-Chloro-3,5-xyleneol	06	88, 500	Cobalt borosylate	15	1371, 600
Chlorpheniramine	06	89, 000	Cobalt 2-ethylhexanoate	15	633, 000
Chlorpheniramine maleate	06	89, 000	Cobalt manganese acetate	15	593, 010
Chlorpheniramine tannate	08	483, 800	Cobalt manganese tellate	15	172, 010
Chlorpromazine	06	484, 000	Cobalt naphthenate	14	301, 000
Chlorpromazine hydrochloride	06	687, 000	Cobalt neodecanoate	15	705, 000
Chlorpropamide	06	61, 000	Cobalt-potassium 2-ethylhexanoate	15	633, 010
Chlorotetracycline (medicinal grade)	06	34, 000	Cobalt stearate	15	172, 000
Chlorotetracycline (animal feed grade)	06	64, 000	Cobalt tellate	15	172, 000
Cholesterols and hydrocholesterols, all other	14	110, 000	Cocaine	06	701, 500
Cholesterol esterase	06	612, 001	N-Cocaoalkyl-1,3-propylenediamine acetate	13	245, 011
Cholesterol oxidase	06	612, 001	N-Cocamidopropylchlorate	08	9, 250
Choline	15	342, 000	N-(Cocamidopropyl;N'-acetic acid) ammonium salt	12	462, 600
Choline bicarbonate	06	605, 000	Cocamidopropyl betaine	12	9, 255
Choline bitartrate	06	605, 000	Cocamidopropyl dimethyl amine	12	328, 300
Choline chloride (animal feed grade)	06	607, 000	Cocamidopropyl dimethyl amine oxide	12	385, 280
Choline chloride (medicinal grade)	06	608, 000	N-Cocamidopropyl-N,N-dimethylamine oxide	12	9, 580
Choline citrate	06	610, 000	3-[3-[[Cocamidopropyl]dimethylammonio]-2-	12	9, 600
Choline dihydrogen citrate	06	611, 000	hydroxypropane sulfonate	12	9, 700
Choline magnesium salicylate	06	385, 300	3-Cocamidopropyl-2-hydroxy-3-sulfopropylidimethyl	12	9, 700
			ammonium hydroxide, inner salt		

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Coccamphocarboxylglicinate	12 9,260	Copper 1- $\alpha$ -alkylcarboxylate	15 669,050
Coccamphocarboxypropionate	12 9,265	Copper 2-ethylhexanoate	15 634,000
Coccamphopropionate	12 9,280	Copper gluconate	06 762,000
Cocodimethyl ethyl ammonium ethyl sulfate	12 482,750	Copper naphthenate	14 302,000
Coconut fatty acid-ethoxylated nonylphenol ester	12 758,970	Copper oleate	15 718,000
Coconut oil acids	12 569,000	Copper [2,2',2'',2''',1-znH,31H-phthalacynanine]pentakis (methylene)]pentakis (1H-isolindole-1,3(2H)-donato]]	03 568,603
Coconut oil acids (Ratio = 1/1)	12 564,000	Corr oil acids, potassium salt	12 56,000
Coconut oil acids (Ratio = 2/1)	12 542,000	Corr oil acids, sodium salt	06 670,000
Coconut oil acids (Ratio = 1/1)	12 546,000	Corticosteroids, all other	06 692,000
Coconut oil acids (Ratio = 2/1)	12 556,000	Corticotropin	06 653,000
Coconut oil acids	12 554,000	Coumarone acetate	07 29,000
Coconut oil acids, diethanolamine salt	12 29,100	Coumarin	08 22,000
Coconut oil acids-dimethylaminopropylamine condensate (amine/acid ratio = 1/1)	12 586,480	Coumarone-indene resins	01 21,000
Coconut oil acids-N,N-dimethyltrimethylenediamine condensate	12 360,000	Creosote oil (Dead oil): creosote content in solution (100 Percent basis)	01 20,000
Coconut oil acids-ethanolamine condensate, ethoxylated	12 576,000	Creosote oil (Dead oil): creosote in coal tar solution (100 Percent solution basis)	01 19,000
Coconut oil acids-ethanolamine salt, sulfated, potassium salt	12 29,200	Creosote oil (Dead oil): distillate as such (100 Percent creosote basis)	01 569,000
Coconut oil acids and oleic acid, potassium salt	12 248,000	m-Cresol	03 572,000
Coconut oil acids, potassium salt	12 55,700	p-Cresol, from petroleum	03 571,000
Coconut oil acids, potassium salt	12 54,000	(m,p)-Cresol, from petroleum	03 574,000
Coconut oil acids, 2-sulfoethyl ester, sodium salt	12 55,000	Creosulfonic acid, formaldehyde condensate	15 34,830
Coconut oil acids, triethanolamine salt	12 198,000	m-Cresyl acetate	06 258,500
Coconut oil acids, triethanolamine salt	12 29,000	Crésylic acid [Less than 75 percent distilling over 215° C]	02 12,000
N-[(Coconut oil acyl)-N-methylaurine, sodium salt	12 183,000	Crésylic acid, refined: from petroleum	03 580,000
N-[(Coconut oil acyl)sarcosine, sodium salt	12 40,000	Cratonaldehyde	15 786,000
Coconut oil alcohol, ethoxylated	12 735,000	Cratonic acid [2-Butenonic acid]	15 506,000
3-[[Coconut oil alkyl]amidoethylene-(2-hydroxyethyl)amino]propionic acid	12 10,130	Crude acetate mixture (Linahyl, neryl, geranyl acetates, main components)	07 162,100
(Coconut oil alkyl)amine	12 418,000	Crude coal tar	01 0,300
(Coconut oil alkyl)amine acetate	12 329,000	Crude coal tar solvent	01 22,030
(Coconut oil alkyl)amine, ethoxylated	12 326,000	Crude light oil	01 1,000
(Coconut oil alkyl)amine, ethoxylated, acetate	12 327,100	Crude tar, acid oils having a tar acid content of: 5 Percent or less than 24 percent	01 15,000
(Coconut oil alkyl)amine, ethoxylated and phosphated	12 327,000	Curme (Isocurme benzene)	03 581,100
Coconut oil alkylamine, propoxylated	12 327,550	Curme hydroperoxide	03 581,100
N-[(Coconut oil alkyl)amino]butyric acid, sodium salt	12 483,000	Curme hydroperoxide	13 58,500
(Coconut oil alkyl)bis(2-hydroxyethyl, ethoxylated)-methylammonium chloride	12 456,000	Cumenesulfonic acid, ammonium salt	12 144,100
(Coconut oil alkyl)-bis-(hydroxyethyl)methyl ethoxylated mono-(2-carboxyethyl)ether methyl sulfate, potassium salt	12 456,000	Cumenesulfonic acid, sodium salt	12 144,100
N-[(Coconut oil alkyl)trimethylenediamine	12 456,025	Cumyl acetate	07 29,200
Coconut oil amide	12 407,000	q-Cumyl peroxydecanoate	15 35,400
Coconut oil, ethoxylated	15 232,000	Cumyl phenolate isopropoxy (titanium salt)	12 736,500
Coconut oil, sulfated, sodium salt	12 669,200	4-Cyanoacetic acid (Malonic nitride)	15 438,500
Coconut oil and tallow acids (Ratio = 2/1)	12 306,000	Cyanoacetyl morpholine	03 592,000
Codine	12 333,000	1-(2-Cyanoethyl)ethylene diurea	06 798,000
Cod oil, sulfated, sodium salt	06 269,950	Cyano(4-fluoro-3,3-dimethylcyclopropyl)ethyl-3-(2,2-dichloroethyl)-2,2-dimethylcyclopropanecarboxylate	13 166,050
Cod oil, sulfated, sodium salt	12 298,600		
Complex hydrocarbons, all other	02 614,500		
Complex hydrocarbons, all other	12 651,000		
Complex hydrocarbons, all other	11 132,000		
Complex hydrocarbons, all other	12 386,000		
Complex hydrocarbons, all other	14 594,000		
Copolyurethane urea	15 594,000		
Copper acetate	15 594,000		

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Sect. Item No.
N-Cyano-s-methyl-N-2(4-methyl-5-imidazolyl)methylthioethylsulfourea	03	584, 213
Cyano-3-phenoxycybenzyl-cis, trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylate	13	166, 049
Cyano(3-phenoxycybenzyl)methyl-4-chloro- $\alpha$ -(1-methylethyl)benzeneacetate	13	166, 024
Cyanuric acid	15	36, 000
Cyclic amphoteric surface-active agents, all other	12	28, 000
Cyclic chemicals, all other	10	6, 000
Cyclic elastomers, all other	13	40, 000
Cyclic fungicides, all other	13	118, 000
Cyclic herbicides, all other	13	166, 000
Cyclic insecticides, all other	03	154, 000
Cyclic intermediates, all other	11	38, 250
Cyclic plasticizers, all other	15	37, 500
Cyclic silazane	03	476, 500
Cyclohexazine hydrochloride	03	586, 000
Cyclohexane	13	36, 280
Cyclohexane carbonitrile	13	588, 100
1,4-Cyclohexanedicarboxylic acid	03	588, 000
1,2-Cyclohexanedicarboxylic acid anhydride	03	588, 100
Cyclohexane dimethanoid glycidyl ether	15	36, 301
Cyclohexanesulfuric acid (Cyclamic acid)	07	84, 000
Cyclohexanesulfuric acid, sodium salt (sodium cyclamate)	07	84, 000
Cyclohexanetriol	15	36, 800
Cyclohexanol	03	589, 000
Cyclohexanone	03	591, 000
Cyclohexanone oxime	03	591, 000
Cyclohexene	03	592, 000
4-Cyclohexene-1,2-dicarboxylic anhydride	03	594, 000
2-Cyclohexene-1-octanoic acid, 5 (and 6)-carboxy-4-hexyl C <sub>8</sub> H <sub>16</sub> O <sub>2</sub>	15	39, 500
Cyclohexene oxide	03	594, 100
$\beta$ -(1-Cyclohexenyl)ethylamine	03	594, 296
Cycloheximide	06	65, 000
Cyclohexylamine	03	595, 000
N-Cyclohexyl-2-benzothiazolesulfenamide	09	26, 000
3-Cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-1,2,4-triazine-1,3,5-triazine-	13	118, 019
1,2-(H <sub>2</sub> H)-dione	15	41, 000
4-Cyclohexylmethanethanol	15	41, 200
Cyclohexylmethacrylate	03	597, 300
Cyclohexylmethylmethoxysilane	03	597, 300
N-Cyclohexyl-N-phenyl-p-phenylenediamine	09	58, 000
N-(Cyclohexylthio)phthalimide	09	124, 250
Cyclooctadiene	03	597, 800
Cyclopentane	02	11, 000
Cyclopropane carboxylic acid, 3-(2-chloro-3,3-trifluoro-1-propenyl)-2,2-dimethyl-(2-methyl[1,1-phenyl]-3-yl) methyl ester	03	601, 500
$\alpha$ -Cyclopropyl- $\alpha$ -(p-methoxyphenyl)-5-pyrimidine methanol (Anycitol)	13	168, 140
2-(Cyclopropylmethylamino)-5-chlorobenzophenone	03	601, 780
2-(N-Cyclopropylmethyl-N-phthalimidocetyl)-amino-5-chlorobenzophenone	03	601, 800
Chemical name	Sect. Item No.	Sect. Item No.
N-cyclopropyl-1,3,5-triazine-2,4,6-triamine	13	166, 048
Cycloserine	06	5, 000
Cyclosoils	02	4, 010
p-Cymene	03	602, 000
Cypermethrin	13	166, 029
Cyproheptadine hydrochloride	06	91, 000
Cytarabine	06	278, 300
Danicol	15	602, 500
Decabromodiphenyl ether (DBDP)	05	43, 005
trans-Decahydro- $\beta$ -naphthol	07	29, 700
trans-Decahydro- $\beta$ -naphthyl acetate	07	29, 710
Decalin (Capraldehyde)	07	132, 000
Decane	12	432, 850
1-Decanamine, N,N-didodecyl	15	1337, 000
n-Decane	15	850, 500
1-Decanol	15	507, 000
Decanoyl chloride	15	1291, 000
Decanoyl peroxide	07	132, 500
Decyl acetate	12	727, 000
Decyl alcohol, ethoxylated	12	76, 200
Decyl alcohol, ethoxylated and phosphated	12	727, 010
Decyl alcohol, ethoxylated and propoxylated	03	603, 000
Decyldiphenyl oxide	02	92, 500
Decyl mercaptans	15	438, 300
Decylnitrile	15	438, 300
Decyl and octyl alcohols, ethoxylated	12	736, 000
Decyl and octyl alcohols, ethoxylated and propoxylated	12	736, 100
Decyl and octyl phosphate	12	92, 000
Decyl and octyl sulfate, sodium salt	12	217, 000
Decyl oleate	11	90, 300
Decyloxy poly(ethyleneoxy)ethyl chloride	12	728, 000
Decyl polyphosphate, sodium salt	12	95, 000
Decyl sulfate, sodium salt	12	218, 000
Demeclocycline	06	32, 000
Dexamethasone	06	854, 000
Dexamethasone sodium phosphate	06	855, 000
Dexbrompheniramine maleate	06	92, 000
Dexpanthenol	06	789, 000
Dextran	06	637, 000
Dextroamphetamine	06	514, 000
Dextroamphetamine sulfate	06	517, 000
Dextromethorphan hydrobromide	06	430, 000
3-Diacetoxyethylaminobenzenide	03	605, 800
Di-N- $\beta$ -acetoxyethyl-m-toluidine	03	605, 900
Diagnostic agents, other than roentgenographic contrast media, all other	06	582, 000
Dialkylbenzene	03	608, 200
Dialkylthiocarbamic acid derivative	09	127, 950
DI(C <sub>5</sub> -C <sub>6</sub> alkyl)naphthalenesulfonic acid	12	162, 500
Diallylamine	15	258, 100
N,N-diallyl-2-dichloroacetamide	13	175, 013
Diallyldimethyl ammonium chloride	15	349, 200
Diallyl isophthalate	08	4, 030
Diallyl maleate	15	913, 000
Di-amine derivatives of dimer acids	15	349, 300

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Diamines and polyamines, all other	12	Dibutylthiocarbamic acid, diphenylguanidine salt	09
1,3-Diaminocyclohexane	03	Dibutylthiocarbamic acid, nickel salt	09
4,4-Diaminodiphenyl ether	15	Dibutylthiocarbamic acid, nickel salt	09
4,4'-Diaminodiphenyl sulfone	03	Dibutylthiocarbamic acid, zinc salt	09
2,6-Diaminopyridine	03	Di-tert-butylethyldiamine	15
Diammonium dithiodiglycolate	03	Dibutyl hydrogen phosphite	15
Di-tert-aryl-phenyl acid phosphate	14	2,5-Di-tert-butylhydroquinone	15
2,5-Diaminoterphthalic acid	03	D-n-butylmagnesium	15
Diallylenediamines, mixed	09	Dibutyl maleate	15
Diazotate, sodium	06	Dibutylnaphthalenesulfonic acid	15
1,8-Diazabicyclo (5.4.0) undecane	06	1,1-Bi(tert-butyl peroxy) cyclohexane	15
Diazepam	05	Di(sec-butyl)peroxydicarbonate	15
1,4-Diazobicyclo(2.2.2)octane	06	1,1-Bi(tert-butyl peroxy)-3,3,5-trimethyl cyclohexane	15
4-Diazo-2,5-diethoxymorpholinobenzene	15	2,4-Di-tert-butylphenol	03
2,5-Di(benzoyl peroxy)-2,5-dimethylhexane	06	2,6-Di-tert-butylphenol	03
Diazoxide	16	2,6-Di-tert-butylphenol	03
Dibenzoyl tartaric acid	15	2,6-Di-tert-butylphenol	03
Dibenzylamine	09	2,4-Di-tert-butyl phenyl 3,5-di-tert-butyl hydroxybenzoate	14
Dibenzylammonosuccinic acid	09	N,N-Di-sec-butyl-p-phenylenediamine	15
Dibenzylthiocarbamic acid, sodium salt	09	Dibutyl phthalate (including disubutyl phthalate)	11
Dibenzylthiocarbamic acid, zinc salt	09	Dibutyl sebacate	11
m-Dibromobenzene	14	Dibutyltin bis(butylmaleate)	11
p-Dibromobenzene	03	Dibutyltin bis(isoocetylmercaptoacetate)	15
1-Dibromomethane	13	Dibutyltin bis(mercaptolaurate)	15
1,2-Dibromo-2,4-dicyanobutane	13	Dibutyltin dichloride	15
Dibromofluoromethane	13	Dibutyltin oxide	15
1,2-Dibromo-4-ethoxybenzene	13	Dibutyltin selenide	15
3,5-Dibromo-4-ethoxybenzene (Bromoxynil)	13	N,N-Di-sec-butyl-N-octadecylsulfosuccinamic acid, tetracosyl salt	09
Dibromooxepentyl glycol ether	15	Dicacetyl borate	12
Dibromoneopentyl glycol	15	Dichlorophthalazine	08
2,2-Dibromo-3-nitropropionamide	03	2,2-Dichloroacetyl chloride	08
2,6-Dibromo-4-nitroaniline	03	3,4-Dichloroaniline	06
2,4-Dibromo-6-nitro-m-cresyl methyl ether	07	3,6-Dichloro-2-anisic acid (Dicamba)	13
Dibucaine	06	o-Dichlorobenzene	03
Dibucaine hydrochloride	06	p-Dichlorobenzene	03
p-Dibutoxybenzene (DBB)	03	m-Dichlorobenzene	03
Di(2-(2-butoxyethoxy)ethyl) adipate	11	3,3'-Dichlorobenzidine base and salts	03
Dibutoxyethyl adipate	11	2,6-Dichlorobenzonitrile	13
Di(2-butoxyethyl) phthalate	11	2,4-Dichlorobenzotrifluoride	03
Dibutoxyethyl sebacate	11	2,4-Dichlorobenzylidimethyl(mixed alkyl)ammonium chloride	12
2,5-Dibutoxy-4-morpholinobenzene	03	2,4-Dichloro-6-(o-chloroanilino)-s-triazine	13
(DBB Sulfate)	03	2,2-Dichloro-1,1-difluoroethyl methyl ether	15
2,5-Dibutoxy-4-morpholinonitrobenzene	03	Dichlorodifluoromethane (F-12)	15
Di-n-butylamine	15	1,4-Dichloro-2,5-dimethoxybenzene (Chloroneb)	13
4,4'-Di-sec-butylaminodiphenylmethane	14	1,4-Dichloro-5,5-dimethylantoin	15
2-Dibutylaminoethanol	15	Dichlorodimethylsilane	03
Dibutylaminoethanol	15	Dichlorodiphenylsilane	03
Dibutylaminoethanol	15	1,2-Dichloroethane [Ethylene dichloride]	05
Dibutyl butylphosphonate	15	2,6-Dichloro-3-methylamine	13
Dibutyl-p-cresol	03	Dichloromethylphenylsilane	03
2,6-Di-tert-butyl-p-cresol (BHT, or Butylated hydroxytoluene)	15	Dichloromethylsilane	15
2,5-Di-sec-butylidicylhydroquinone	09		
Di-tert-butyl diperoxyphthalate	02		
Di-tert-butyl disulfide	02		

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Dichloromethylstyliane	15	2,5-Di-(1,1-dimethylpropyl)hydroquinone	09
2,6-Dichloro-4-nitroaniline	03	Diadoxybenzenesulfonic acid, sodium salt	137,000
1,2-Dichloro-4-nitrobenzene	03	Diesel fuel additives, acyclic, all other	14
2,4-Dichloro-4-(2-nitro-4-trifluoromethylphenyl)ethane	03	Diesel fuel additives, cyclic, all other	15
2,4-Dichlorophenoxyacetic acid (2,4-D)	13	Diethanolamine	15
2,4-Dichlorophenoxyacetic acid, 2-butoxyethyl ester	13	Diethanolamine-borate	15
2,4-Dichlorophenoxyacetic acid, n-butyl ester	13	Diethanolamine condensate, all other	15
2,4-Dichlorophenoxyacetic acid, sec-butyl ester	13	Diethanolamine condensates (Amine/acid = 2/1), all other	545,000
2,4-Dichlorophenoxyacetic acid, dimethylamine salt	13	Diethanolamine condensates, amine/acid ratio=1/1, all other	553,000
Isopropanolamine salts	13	$\alpha$ , $\alpha$ -Diethoxyacetophenone	12
2,4-Dichlorophenoxyacetic acid, iso-octyl ester	13	Diethoxybenzene	03
2,4-Dichlorophenoxyacetic acid, isopropyl ester	13	Diethoxyethane	03
2-(2,4-Dichlorophenoxy)propionic acid, dimethylamine salt	13	2,5-Diethoxy-4-morpholinobenzediazonium chloride	15
2-(2,4-Dichlorophenoxy)propionic acid, isoctyl ester	13	2,5-Diethoxy-4-morpholinotrobenzene	14
3-(3,4-Dichlorophenyl)-1,1-dimethylurea (Duron)	13	Diethyl acetal	03
O-(2,4-Dichlorophenyl) O-ethyl S-propyl phosphordithiolate	13	Diethyl aluminum chloride	07
3-(3,4-Dichlorophenyl)-1-methoxy-1-methylurea (Lunuron)	13	Diethyl aluminum ethoxide	15
3-(3,4-Dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3-one (Methazole)	13	Diethylaluminum iodide	15
1-(1-(2,4-Dichlorophenyl)-4-propyl-1,3-dioxolan-2-ylmethyl)-1H-1,2,4-triazole	13	Diethylamine	15
2-(3,5-Dichlorophenyl)-2-(2,2-trichloroethyl)oxirane (tri)	13	p-(Diethylamino)benzaldehyde, 1,1-diphenylhydrazine	03
3,6-Dichloropicolinic acid	13	p-(Diethylamino)benzalddehyde, 1,1-diphenylhydrazine zinc chloride	03
1,3-Dichloro-2-propanol	15	2-Diethylaminoethanol (N,N-Diethylthanolamine)	14
1,3-Dichloropropene	13	2-(2-Diethylaminoethoxy)ethanol	15
2,3-Dichloropropene	13	Diethylaminoethylacrylate, dimethyl sulfate, quaternary salt	15
3,4-Dichloropropionanilide (Propanil)	13	2-Diethylaminoethyl methacrylate	15
2,6-Dichloropyridine	03	2-[4-(Diethylamino)-2-hydroxybenzoic acid]	03
3,7-Dichloro-8-quinolic Acid	13	4-(Diethylamino)-2-methylbenzaldehyde	03
Dichlorotrifluoroethane (F-114)	15	3-Diethylamino-6-methyl-7-(2,4-dimethylamino) fluoran o-(2-(Diethylamino)-6-methyl (4-pyrimidinyl) o,o-dimethyl phosphorothioate	15
Dichlorotrifluoroethane (F-123)	15	m-(Diethylamino)phenol (N,N-Diethyl-3-aminophenol)	13
p, $\alpha$ -Dichlorotoluene	03	3-(Diethylamino)propophenone	03
Dichloro-trifluoroethane	15	N,N-Diethylaniline	03
Dichlorvos	06	2,6-Diethylaniline	03
Dicloxacillin, sodium	06	Diethylbenzene	03
Dicresylphosphordithioic acid	14	Diethylcarbamazoyl citrate	06
Dicresylphosphordithioic acid, ammonium salt	14	Diethylcarbamoyl chloride	15
Dicresylphosphordithioic acid, sodium salt	06	Diethyl carbonate (Ethyl carbonate)	15
Dicumaryl	15	N,N-Diethylcyclohexylamine	03
Dicumyl peroxide	15	O,O-Diethyl O-(2-diethylamino-6-methyl-4-pyrimidinyl) phosphorothioate	03
2,4-Dicumylphenol	03	3,5-Diethyl-1,2-dihydro-1-phenyl-2-propylpyridine	13
Dicyanamide resins	06	N,N'-Diethyl-N,N'-diphenylurea	15
Dicyanodiamide formaldehyde ammonium chloride polymer	14	Diethylthiocarbamic acid, cadmium salt and bis(diethylthiocarbamoyl) diazide, mixture	09
Dicyclohexylamine	03	Diethylthiocarbamic acid, sodium salt	09
Dicyclohexyl phthalate	03	Diethylthiocarbamic acid, thallium salt	09
Dicyclopentadiene (includes Cyclopentadiene)	03	N,N-Diethylthiocarbamic acid, zinc salt	09
Dicyclopentadienylchromium (Chromocene)	15	Diethylene diamine	15
Didecyl adipate	15	Diethylene glycol	15
Didecyl dimethylammonium chloride	12	Diethylene glycol adipate	15



Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	No.
Dibutyl- <i>o</i> -cresol	03	777,200
Dichloromethane (Methylene iodide)	15	1277,000
Diisobutyl adipate	11	61,000
Diisobutyl aluminum chloride	15	1358,000
Diisobutyl aluminum hydride	15	1359,000
Diisobutylamine	15	263,000
Diisobutyl dimethylchloro silane	15	1385,200
Diisobutylens (DI-Isobutene)	02	74,000
Diisobutylene isomers	15	1337,200
Diisobutylene maleate	12	707,000
Diisobutylphenol, ethoxylated	12	742,900
Diisocetyl phthalate	11	62,000
Diisocetyl phthalate	11	30,000
Diisocetyl phthalate	11	30,050
Disononyl peroxide	15	1293,570
Disononyl adipate	11	62,500
Disononyl phthalate	11	30,100
Diso-octyl adipate	11	63,000
Diso-octyl phthalate	11	35,000
Disopropylamine	15	408,000
m-Disopropylbenzene	03	777,500
Diisopropyl adipate	11	63,200
Diisopropylamine	15	286,000
2-Disopropylaminoethanol (N,N- Diisopropylethanolamine)	15	362,000
2-Disopropylaminoethyl methacrylate	15	363,000
Diisopropylamine	03	778,000
Diisopropylbenzene	03	778,100
Diisopropylbenzene hydroperoxide	15	64,000
Diisopropylmerate	15	968,980
Diisopropyl hydrogen phosphate	14	272,000
Diisopropyl ketone (2,4-Dimethyl-3-pentanone)	15	617,000
Diisopropylmaleinesulfonic acid, sodium salt	12	166,000
Diisopropyl-4-phenoxylaniline	03	778,200
N,N-Diisopropyl-p-phenylenediamine	14	181,000
S-(O,O-Disopropyl phosphorodithioate) ester of N-( $\alpha$ - mercaptoethyl)benzenesulfonamide (Bensulfide)	13	58,000
Diisopropyl sebacate	11	114,100
Diisopropyl succinate	15	968,985
Diketene	15	104,620
Diketene	15	940,000
Dilauryl-3,3'-thiodipropionate	06	355,650
Dilauryl hydrochloride	06	60,000
Dimethylurate	15	509,000
Dimer acid (C <sub>36</sub> aliphatic dibasic acid)	12	419,300
Dimeracidalyl amine	12	407,700
N-(Dimercaptoalkyl)trimethylenediamine	06	94,000
Dimethindene maleate	12	342,250
2,5-Dimethoxyaniline, ethoxylated	03	783,000
m-Dimethoxybenzene	03	784,000
p-Dimethoxybenzene	03	784,000
p-Dimethoxybenzene [Dimethyl ether of hydroquinone]	15	67,000
Dimethoxyethane [Ethylene glycol dimethyl ether]	15	1185,000
1,1-Dimethoxy octane	07	129,690

Chemical name	Sect. Item No.	No.
3-(Dimethoxyphosphoryloxy)-N,N-dimethyl-cis- crotonamide	13	222,000
1,2-Dimethoxy-4-propenylbenzene (4-Propenylacetrole)	07	30,000
N,N-Dimethylacetamide	15	236,000
N,N-Dimethylacetacetamide	15	236,500
O,S-Dimethylacetylphosphoramidothioate (Acephate)	13	222,500
Dimethyl adipate	11	63,225
N,N-Dimethyl-N-alkylamine phosphate	12	393,200
Dimethyl-alpha-lonone	07	102,100
Dimethylamine	15	288,000
Dimethylamine epichlorohydrin copolymer	15	364,750
Dimethylamine epichlorohydrin ethylenediamine copolymer	14	417,000
p-(Dimethylamino)benzaldehyde	03	795,250
p-Dimethylaminobenzenediazonium chloride (p-Diazo-N,N- dimethylaniline zinc chloride)	14	346,000
m-(Dimethylamino)benzoic acid	03	796,000
2-(4-(Dimethylamino)benzoyl)benzoic acid	03	796,500
2-Dimethylaminoethanol (N,N-Dimethylethanolamine)	15	366,000
2,12-(Dimethylamino)	15	366,200
2-ethoxyethanol/dimethylaminopropylene, opoxylated	15	366,500
Dimethylaminoethyl acrylate	15	367,000
Dimethylaminoethyl methacrylate, dimethyl sulfate, quaternary salt	15	367,800
Dimethylaminoethylacrylate, methyl chloride, quaternary salt	15	367,900
Dimethylaminoethyl chloride	15	357,350
2,2-Dimethyl-N(2-aminooethyl)-1,2-ethane diamine	13	272,500
Dimethylaminoethyl methacrylate	15	368,000
Dimethylaminoethylmethacrylate, dimethyl sulfate, quaternary salt	15	368,200
Dimethylaminoethylmethacrylate, methyl chloride, quaternary salt	15	369,000
Dimethylaminoethanol	15	369,500
2-Dimethylamino-2-methyl-1-propanol	13	369,580
2-Dimethylamino-2-methyl-1-propanol hydrochloride	15	369,600
m-Dimethylaminopropionol	03	802,000
1-(Dimethylamino)-2-propanol	15	274,000
3-Dimethylaminopropylamine	15	359,700
3-Dimethylaminopropylamine	15	379,000
Dimethylaminoethyl chloride	15	289,500
11-[3(Dimethylamino)propyl]-6H-hydroxydibenz(b,e) oxepin	03	803,000
Dimethylaminoethyl methacrylate	15	236,780
Dimethylammonium hydrogen isophthalate	09	41,725
N,N-Dimethylamine	03	805,000
2,6-Dimethylamine	03	805,500
N,N-Dimethylbenzylamine	12	432,970
N,N-Dimethylbenzylamine	03	809,000
2,1-Dimethyl-4,4'-bipyridinium dichloride	13	118,049
2,2-Dimethylbutanol (isoneyl alcohol)	15	651,700
N,N-Dimethylbutylamine	15	274,995
N-(1,3-Dimethylbutyl)-N-phenyl-p-phenylenediamine	09	59,310



Table D-1—Continued  
Alphabetical chemical index

Chemical name	Secr. Item No.	Chemical name	Secr. Item No.
N,N-Dimethyl capramide	12	N,N-Dimethyl(9-octadecenyl-alkyl)amine	437-500
Dimethyl carbonate	15	N,N-Dimethyloctadecylamine	12
N,N-Dimethyl(coconut oil alkyl)amine	12	N,N-Dimethyl(9-octadecenyl-alkyl)amine	437-500
N,N-Dimethyl(coconut oil alkyl)amine oxide	12	N,N-Dimethyl(9-octadecenyl-alkyl)amine	437-500
N,N-Dimethyl(9-octadecenyl-alkyl)amine	12	N,N-Dimethyl(9-octadecenyl-alkyl)amine	437-500
Dimethyl-1,4-cyclohexane dicarboxylate	13	3,7-Dimethyl-2,6-octadienyl (Citral A, geraniol)	134-850
Dimethyl-1,4-cyclohexanedicarboxylate	13	3,7-Dimethyl-2,6-octadienyl (Citral A&B)	134-850
Dimethyl cyclohexane methanol	03	3,7-Dimethyl-2,6-octadienenitrile	140-350
β,4-Dimethyl-3-cyclohexene-1-propanal	07	3,7-Dimethyl-2,6-octadienyl-ol (Nerol)	135-000
β,4-Dimethyl-3-cyclohexene-1-propanol	07	3,7-Dimethyl-1,6-octadienyl-ol (Geraniol)	138-000
N,N-Dimethylcyclohexylamine	03	3,7-Dimethyl-1,6-octadienyl-ol (Linalool)	138-000
N,N-Dimethylcyclohexylamine oxide	07	3,7-Dimethyl-2,6-octadienyl acetate (Neryl acetate)	136-000
Dimethyl(C12-18)ammonium chloride (mixed straight and branched chains)	12	3,7-Dimethyl-1,6-octadienyl acetate (Linalyl acetate)	135-100
2,5-Dimethyl-2,5-di(tert-butylperoxy)hexane	12	3,7-Dimethyl-1,6-octadienyl acetate (Linalyl acetate)	135-100
2,5-Dimethyl-2,5-di(tert-butylperoxy)hexane-3	15	3,7-Dimethyl-1,6-octadienyl acetate (Linalyl acetate)	135-100
O,O-Dimethyl-O-2,2-dichlorovinyl phosphate (DDVP)	13	3,7-Dimethyl-1,6-octadienyl acetate (Linalyl acetate)	135-100
5,6-Dimethyl-2-dimethylamino-4-pyrimidinyl dimethyl carbamate	13	3,7-Dimethyl-2,6-octadienyl phenylacetate (Geranyl phenylacetate)	139-000
Dimethyl(dioctadecyl)ammonium chloride	12	3,7-Dimethyl-1,6-octadienyl propionate (Linalyl propionate)	31-000
4,4'-Dimethyldiphenyl ether	03	3,7-Dimethyl-1,6-octadienyl propionate (Linalyl propionate)	31-000
Dimethyldithiocarbamic acid, bismuth salt	09	Dimethyloctanal	140-000
Dimethyldithiocarbamic acid, copper salt	09	3,7-Dimethyloctanal-1 (Tetrahydrogeraniol)	140-100
Dimethyldithiocarbamic acid, lead salt	09	3,7-Dimethyl-3-octanol	140-450
Dimethyldithiocarbamic acid, potassium salt	09	3,7-Dimethyloctyl acetate	140-500
Dimethyldithiocarbamic acid, potassium salt	09	3,7-Dimethyl-8-octenyl-1-ol (Citronellal)	140-500
Dimethyldithiocarbamic acid, selenium salt	09	3,7-Dimethyl-8-octenyl-1-ol (Citronellal)	141-000
Dimethyldithiocarbamic acid, sodium salt	09	3,7-Dimethyl-8-octenyl-1-ol (Citronellal)	141-000
Dimethyldithiocarbamic acid, zinc salt	09	3,7-Dimethyl-7-octenyl 70%, 6-octenyl isomer 30%	142-000
N,N-Dimethyldodecylamine	12	Dimethyldihydroxyethylene urea	142-100
N,N-Dimethyldodecylamine oxide	12	4,4-Dimethyl ozalidene	479-000
N,N-Dimethyloctylamine	12	O,O-Dimethyl S-(4-oxo-1,2,3-benzotriazin-3(3H)-yl) methyl phosphorodithioate (Acinphos-methyl)	159-000
4-(1,1-Dimethyl-2,5-di(2-ethylhexanoyl peroxy) hexane S-(((1,1-Dimethylthio)lthio)lthio)lthio) O,O-diethyl phosphorodithioate (Turbufoes)	15	N,N-Dimethyl-3,4,9,10-perylene-tetracarboxylic acid 3,4,9,10-dimide	03
N,N-Dimethylformamide	13	α,α-Dimethylphenethyl acetate	821-500
N,N-Dimethylglycine	14	N,N-Dimethylphenethyl urea	32-000
2,6-Dimethylheptan-2-ol	14	Dimethyl phosphate of 3-hydroxy-N-methyl-cis-crotonamide	68-220
N,N-Dimethylhexadecylamine	12	O,S-Dimethyl phosphorodithioate	225-000
N,N-Dimethylhexadecylamine oxide	12	Dimethyl phosphorodithioate	229-012
Dimethyl hexanediol	07	Dimethyl phthalate	1030-000
2,5-Dimethyl-3-hexene-2,5-diol	07	Dimethyl piperazine	32-000
N,N-Dimethylhydantoin	12	3,5-Dimethylpiperidine	62-700
Dimethyl hydrogen phosphate	12	1,1-Dimethylpiperidinium chloride	825-500
Dimethyl isophthalate	11	N,N-Dimethyl-1,3-propanediamine polymer with epichlorohydrin, sulfate	168-350
Dimethyl isopropanolamine	11	2,2-Dimethyl-1,3-propanediol (Neopentyl glycol)	160-000
Dimethyl methoxyphosphonate	15	Dimethylpropionic acid (Neopentanoic acid)	1080-000
O,O-Dimethyl O-(4-(methylthio)-m-tolyl)phosphorothioate (Fenthion)	15	Dimethyl sebacate	510-000
N,N-Dimethyl(mixed alkyl)amine	13	N,N-Dimethyl(iso)bean oil alkylamine	114-900
N,N-Dimethyl(mixed alkyl)amine oxide	12	Dimethyl sulfide	439-000
2,6-Dimethylnaphthalene	03	Dimethyl sulfone	92-820
Dimethyl-2,6-naphthalenedicarboxylate	03	Dimethyl-2,3,5,6-tetrachloroterephthalate (DCPA)	1309-150
		N,N-Dimethyltetradecylamine	62-000
			440-000



Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. No.	Item No.	Chemical name	Sect. No.	Item No.
Direct blue dyes, all other	04	571,000	Direct Yellow 137	04	454,137
Direct Brown 44	04	597,000	Direct Yellow 147	04	454,147
Direct Brown 154	04	605,000	Direct Yellow 148	04	454,148
Direct Brown 230	04	606,230	Direct Yellow 154	04	454,154
Direct Brown 231	04	606,231	Direct Yellow 166	04	454,166
Direct Brown 232	04	606,232	Direct yellow dyes, all other	04	455,000
Direct Brown 238	04	606,238	N,N'-Disalicylidene-1,2-propanediamine	14	161,000
Direct brown dyes, all other	04	607,000	Sodium cyanodithiolimidocarbonate	13	179,000
Direct Green 92	04	586,092	Disopyramide phosphate	08	378,500
Direct green dyes, all other	04	587,000	Disperse Black 1	04	749,000
Direct Orange 15	04	461,000	Disperse Black 9	04	751,000
Direct Orange 26	04	462,000	Disperse Black 33	04	752,000
Direct Orange 39	04	466,000	Disperse black dyes, all other	04	753,000
Direct Orange 72	04	470,000	Disperse Blue 3	04	716,000
Direct Orange 80	04	475,000	Disperse Blue 7	04	717,000
Direct Orange 112	04	479,018	Disperse Blue 14	04	718,014
Direct Orange 118	04	483,000	Disperse Blue 20	04	719,000
Direct orange dyes, all other	04	483,009	Disperse Blue 62	04	723,000
Direct Red 3	04	519,195	Disperse Blue 64	04	727,000
Direct Red 16	04	488,000	Disperse Blue 73	04	729,000
Direct Red 2	04	491,000	Disperse Blue 77	04	730,000
Direct Red 26	04	492,000	Disperse Blue 79	04	731,000
Direct Red 72	04	499,000	Disperse Blue 81	04	732,000
Direct Red 75	04	500,000	Disperse Blue 95	04	734,000
Direct Red 80	04	504,000	Disperse Blue 102	04	735,000
Direct Red 81	04	505,000	Disperse Blue 106	04	735,106
Direct Red 83	04	506,000	Disperse Blue 118	04	739,000
Direct Red 224	04	521,224	Disperse Blue 122	04	739,122
Direct Red 236	04	521,236	Disperse Blue 148	04	742,148
Direct Red 238	04	521,238	Disperse Blue 165	04	743,165
Direct Red 239	04	521,239	Disperse Blue 183	04	743,183
Direct Red 254	04	521,254	Disperse Blue 200	04	743,200
Direct red dyes, all other	04	522,000	Disperse Blue 281	04	743,281
Direct Violet 9	04	525,000	Disperse Blue 284	04	743,284
Direct Violet 66	04	531,000	Disperse Blue 291	04	743,291
Direct Violet 99	04	532,099	Disperse Blue 317	04	743,317
Direct Violet 195	04	532,104	Disperse Blue 353	04	743,353
Direct violet dyes, all other	04	533,000	Disperse Blue 357	04	743,357
Direct Yellow 4	04	421,000	Disperse Blue 359	04	743,359
Direct Yellow 5	04	422,000	Disperse blue dyes, all other	04	744,000
Direct Yellow 6	04	427,000	Disperse Brown 16	04	747,016
Direct Yellow 11	04	435,000	Disperse Brown 22	04	747,022
Direct Yellow 34	04	438,000	Disperse Brown 26	04	747,026
Direct Yellow 44	04	439,000	Disperse Brown 27	04	747,027
Direct Yellow 50	04	439,051	Disperse Green 9	04	745,009
Direct Yellow 51	04	443,000	Disperse Orange 3	04	653,000
Direct Yellow 105	04	445,000	Disperse Orange 5	04	654,000
Direct Yellow 106	04	446,000	Disperse Orange 25 and 25.1	04	654,000
Direct Yellow 107	04	447,000	Disperse Orange 29	04	658,000
Direct Yellow 118	04	450,000	Disperse Orange 30	04	659,000
Direct Yellow 119	04	451,000	Disperse Orange 37	04	661,000
Direct Yellow 127	04	453,000	Disperse Orange 41	04	662,000
Direct Yellow 131	04	454,000	Disperse Orange 44 and 44.1	04	663,000
Direct Yellow 132	04	454,132	Disperse Orange 73	04	667,073
Direct Yellow 133	04	454,133			

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Sect. Item No.	Chemical name	Sect. Item No.
Disperse Orange 89	04	668.089	Disperse Yellow 64	04
Disperse Orange 94	04	668.094	Disperse Yellow 77	04
Disperse Orange 138	04	668.138	Disperse Yellow 86	04
Disperse orange dyes, all other	04	669.000	Disperse Yellow 88	04
Disperse Orange 153	04	668.153	Disperse Yellow 108	04
Disperse Red 5	04	670.000	Disperse Yellow 114	04
Disperse Red 13	04	672.000	Disperse Yellow 126	04
Disperse Red 17	04	678.000	Disperse Yellow 198	04
Disperse Red 30	04	680.000	Disperse Yellow 219	04
Disperse Red 50	04	683.000	Disperse Yellow 238	04
Disperse Red 55	04	684.000	Disperse Yellow 239	04
Disperse Red 60	04	685.000	Disperse yellow dyes, all other	04
Disperse Red 65	04	687.000	Diethylmethyl ammonium methosulfate	12
Disperse Red 73	04	688.000	Diethyl-3, 3'-thiodipropionate	15
Disperse Red 74	04	688.074	Distinnaxane, hexakis(2-methyl-2-phenylpropyl)	13
Disperse Red 88	04	691.000	Disulfuram	06
Disperse Red 91	04	692.000	N,N'-(Di-tall oil acid)amidoethylamine	06
Disperse Red 117	04	694.000	Dilawamidammonium sulfate	12
Disperse Red 135	04	695.000	Di-tertiary nonylpolysulfide	14
Disperse Red 136	04	695.136	Di-tertiary nonylpolysulfide	14
Disperse Red 137	04	697.000	2, 2'-Dithiobis(benzothiazole)	09
Disperse Red 145	04	697.145	2, 2'-Dithiobis(benzothiazole)	09
Disperse Red 153	04	699.153	Dihydrostearic acid derivatives, acyclic, other	05
Disperse Red 159	04	700.000	Dihydrostearic acid	05
Disperse Red 167 and 167-1	04	700.167	4, 4'-Dihydroxyephedrine	03
Disperse Red 177	04	701.000	Dihydropropionic acid	15
Disperse Red 179	04	702.000	2, 5-Di-p-toluidinoterephthalic acid	03
Disperse Red 263	04	703.263	Di-tridecyl adipate	11
Disperse Red 273	04	703.273	Di-tridecyl maleate	15
Disperse Red 274	04	703.274	Di-tridecyl phthalate	11
Disperse Red 276	04	703.276	Dl(tridecyl)-3, 3'-thiodipropionate	15
Disperse Red 313	04	703.311	Dlundecyl phthalate	11
Disperse Red 316	04	703.316	1, 5-Diureidonaphthalene	03
Disperse Red 325	04	703.325	Divinylbenzene	08
Disperse Red 333	04	703.333	Divinyl tetramethylsiloxane	15
Disperse Red 338	04	703.338	Dobutamine	06
Disperse Red 339	04	703.339	1-Docosanol (Behenyl alcohol, C <sub>22</sub> )	15
Disperse Red 340	04	703.340	Docosanyl docosenoate	15
Disperse Red 345	04	703.345	Docusate, calcium	06
Disperse Red 358	04	703.358	Docusate, potassium	06
Disperse red dyes, all other	04	704.000	Docusate, sodium	06
Disperse Violet 1	04	705.000	n-Dodecane	15
Disperse Violet 17	04	707.017	Dodecanedioic acid	15
Disperse Violet 28	04	710.000	Dodecene	02
Disperse Violet 33	04	710.033	Dodecyl-acetic succinimide	14
Disperse Violet 36	04	710.036	Dodecyl succinic acid, benzothiazole salt	24
Disperse Violet 48	04	713.048	Dodecylsuccinic anhydride	14
Disperse Violet 60	04	713.060	Dodecyl alcohol (Lauryl alcohol)	15
Disperse Violet 91	04	713.091	Dodecyl alcohol, ethoxylated	15
Disperse Violet dyes, all other	04	713.000	Dodecyl alcohol, ethoxylated and phosphated	12
Disperse Yellow 3	04	631.000	Dodecyl alcohol, ethoxylated and phosphated, ammonium salt	12
Disperse Yellow 23	04	636.000	Dodecyl alcohol, ethoxylated and sulfated, ammonium salt	12
Disperse Yellow 42	04	636.000	Dodecylamine	03
Disperse Yellow 54	04	638.000	Dodecylbenzene, other	15
			Dodecylbenzene, straight-chain	03
				869.000

Table D-1—Continued  
Alphabetical Chemical Index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Dodecylbenzenesulfonates, all other	12	Dodecyltrimethylammonium bromide	12
Dodecylbenzenesulfonic acid	124,000	Dodecyltrimethylammonium chloride	488,000
Dodecylbenzenesulfonic acid, (Mixed alkyl)amine salt	118,000	Doxapram hydrochloride	06
Dodecylbenzenesulfonic acid, ammonium salt	122,000	Doxazosin mesylate	06
Dodecylbenzenesulfonic acid, calcium salt	115,000	Doxepin	06
Dodecylbenzenesulfonic acid, diethanolamine salt	117,000	Doxepin hydrochloride	06
Dodecylbenzenesulfonic acid, diethanolamine salt	118,000	Doxyamine succinate	06
Dodecylbenzenesulfonic acid, DMAP salt	118,500	Drug and Cosmetic Green 5	04
Dodecylbenzenesulfonic acid, ethylenediamine salt	119,000	Drug and Cosmetic Green 8	04
Dodecylbenzenesulfonic acid, isopropanolamine salt	120,000	Drug and Cosmetic Orange 5	04
Dodecylbenzenesulfonic acid, isopropanolamine salt	121,000	Drug and Cosmetic Red 5	04
Dodecylbenzenesulfonic acid, monoethanolamine salt	122,500	Drug and Cosmetic Red 6	04
Dodecylbenzenesulfonic acid, oleyl amine, ethoxyethylated salt	122,700	Drug and Cosmetic Red 7	04
Dodecylbenzenesulfonic acid, potassium salt	123,000	Drug and Cosmetic Red 17	04
Dodecylbenzenesulfonic acid, sodium salt	125,000	Drug and Cosmetic Red 21	04
Dodecylbenzenesulfonic acid, triethanolamine salt	127,000	Drug and Cosmetic Red 27	04
N-Dodecylthietylenetriamine	12	Drug and Cosmetic Red 30	04
N-Dodecylthietylenetriamine	12	Drug and Cosmetic Red 33	04
Dodecylphenyl oxide	03	Drug and Cosmetic Red 34	04
Dodecylphenyloxidedisulfonic acid	12	Drug and Cosmetic Yellow 5	04
Dodecylphenyloxidedisulfonic acid, disodium salt	12	Drug and Cosmetic Yellow 10	04
Dodecyl disodium benzaine, N-(2-carboxylethyl), sodium salt	12	Etoproprionum chloride	06
n-Dodecylamine acetate (Dodine)	10,420	Etytromycin	06
n-Dodecyl-3-aminopropionic acid	198,000	Enalapril maleate	06
n-Dodecyl-3-iminopropionic acid, disodium salt	10,500	Enlurane	06
N-Dodecyl-3-imino-dipropionic acid, monosodium salt	11,020	Epichlorohydrin	15
tert-Dodecyl mercaptan, ethoxyethylated	12	Epichlorohydrin bisphenol A, ethoxyethylated	15
n-Dodecyl mercaptane	09	Epichlorohydrin elastomers (CO <sub>2</sub> ECO) type	12
Dodecylnitrobenzene	03	Epoxydes, ethers, acetate, all other	10
4-(Dodecylloxy)-2-hydroxybenzophenone	15	Epoxydized esters, all other	11
Dodecylpentadecyl methacrylate	03	Epoxydized linseed oils	11
p-Dodecylphenol	12	Epoxydized pentaerythritol tetraphtalate	11
Dodecylphenol, ethoxyethylated	12	Epoxydized soybean oil	11
Dodecylphenol, ethoxyethylated and phosphorylated	12	Epoxy resin admixed	08
Dodecylphenol, sulfurized, calcium salt	12	Epoxy resin admixed	08
Dodecylphenyl- $\alpha$ -naphthylamine	14	Epoxyresin admixed	08
Dodecylphenyl- $\alpha$ -naphthylamine, dioctyl diphenylamine copolymer	14	Epracalciferol (vitamin D <sub>2</sub> )	08
Dodecylpyridinium chloride	15	Erasamide	15
1-Dodecylpyridinium chloride	278,000	Eruclal alkylamine	15
Dodecylsuccinic anhydride	14	Eruclal stearamide	15
Dodecylsuccinic anhydride	15	Erythromycin	06
Dodecyl succinic lactate	15	Erythromycin estolate	06
Dodecyl sulfate, ammonium salt	12	Erythromycin stearate	06
Dodecyl sulfate, diethanolamine salt	12	Erythromycin succinate	06
Dodecyl sulfate, N,N-diethylcyclohexylamine salt	12	Erythromycin thioacetate	06
Dodecyl sulfate, isopropanolamine salt	12	Esters of sulfated oleic acid, all other	15
Dodecyl sulfate, magnesium salt	12	Estradiol cypionate	12
Dodecyl sulfate, sodium salt	12	Ester in mercaptoesters	15
Dodecyl sulfate, sodium salt	12	Ethanolamine condensates, amine/acid ratio = 1/1, all other	12
Dodecyl sulfate, triethanolamine salt	12	Ethanolidiglycine, disodium salt	14
Dodecyl sulfacetate, sodium salt	12	4-Ethanolpiperidine	03
Dodecyl and tetradecyl alcohols, ethoxyethylated and sulfated, ammonium salt	12	2-Ethanolpyridine	03
	273,000		

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. No.	Item No.	Chemical name	Sect. No.	Item No.
5-Ethoxy-3-trichloromethyl-1,2,4-thiadiazole	03	873.700	1-Ethoxy-3-methylbenzene	03	877.700
Ethchlorval	06	468.000	4-Ethoxy-2-methyl-N-phenylaniline	07	877.900
Ethers and thioethers, all other	12	775.000	3-Ethoxypropionitrile	15	440.000
Ethisterone	03	873.800	Ethyl acetate	07	143.950
Ethipabate	06	172.000	Ethyl acetate (100% basis)	15	954.001
Ethosuximide	06	419.000	Ethyl acetate	15	955.000
Ethothol	08	420.000	Ethyl acrylate	15	956.000
N-(p-ethoxycarbonylphenyl)-n-ethyl-n-phenylformamide	07	34.200	Ethyl acrylate methacrylic acid copolymer	14	419.000
6-Ethoxy-12-dihydro-2,4-trimethyl quinoline	15	76.500	Ethyl alcohol, phosphated, amine salt	12	96.700
2-Ethoxyethanol (Ethylene glycol monoethyl ether)	15	1159.000	Ethyl alcohol, synthetic	12	853.000
2-(2-Ethoxyethoxy)ethanol (Diethylene glycol monoethyl ether)	15	1160.000	Ethylaluminum dichloride	15	1360.000
2-[2-(2-Ethoxyethoxy)ethoxy]ethanol (Triethylene glycol monoethyl ether)	15	1161.000	Ethylaluminum sesquichloride	15	1361.000
2-(2-Ethoxyethoxy)ethyl acetate	15	1105.000	Ethylamine, mono-	15	278.000
Ethoxyethyl acetate	15	993.000	2-Ethylaminoethanol (Ethylmonoethanolamine)	15	385.000
Ethoxylated acetic acid, sodium salt	12	318.100	2-(Ethylamino)-4-(isopropylamino)-6-(methylthio)-s-triazine (Armetryne)	13	69.000
Ethoxylated anhydrosorbitol esters, all other	12	624.000	o-Ethylaniline	03	882.500
Ethoxylated anhydrosorbitol monolaurate	12	616.000	N-Ethylaniline, refined	03	883.000
Ethoxylated anhydrosorbitol mono-oleate	12	617.000	2-(N-Ethylanilino)ethanol	03	884.000
Ethoxylated anhydrosorbitol monopalmitate	12	618.000	3-(N-Ethylanilino)propionitrile	03	886.000
Ethoxylated anhydrosorbitol monostearate	12	619.000	o-(N-Ethylanilino)-m-toluenesulfonic acid	07	887.000
Ethoxylated anhydrosorbitol triester of tall oil acids	12	620.000	Ethyl anthranilate	07	85.800
Ethoxylated anhydrosorbitol triborate	12	621.000	5-Ethyl-1-aza-3,7-dioxabicyclo[3.3.0]octane	15	76.900
Ethoxylated anhydrosorbitol tristearate	12	622.000	Ethylbenzene	03	892.000
Ethoxylated anhydrosorbitol tristearate condensed with oil fatty acid	12	707.820	(Ethylbenzyl)dimethyl(mixed alkyl)ammonium chloride sulfate	12	527.000
Ethoxylated anhydrosorbitol glycol stearate	12	707.900	N-Ethyl-N-bis(polyoxyethylene)tallow ammonium ethyl sulfate	12	458.850
Ethoxylated glycerol mono- and diesters of hydrogenated tallow acids	12	708.800	Ethyl butyrate	07	144.000
Ethoxylated glycerol and propylene glycol esters of coco fatty acids	12	708.780	Ethyl caprate	07	144.100
Ethoxylated hydantoin glycol dicocotate	14	162.000	Ethyl celidose	08	21.030
Ethoxylated (hydrogenated tallow amine), methyl ammonium chloride	12	458.100	Ethyl chloroformate	15	1223.000
Ethoxylated 1,2-propanediol monostearate	12	711.000	Ethyl 2-(4-chloro-6-methoxy-pyrimidin-2-yl) amino carbonyl amino sulfonyl benzoate (Chlorimuron ethyl)	13	69.025
Ethoxylated and propoxylated glycerol mono- and diesters of tallow acids	12	708.700	Ethyl chloroethanolformate	15	959.600
Ethoxylated, quaternized(C <sub>12-18</sub> alkyl) oxypropyl trimethylene diamine	12	458.200	Ethyl cinnamate	07	36.000
Ethoxylated, quaternized reaction product of formaldehyde and tallow diamine	12	458.250	Ethyl cyanoacetate	15	440.100
Ethoxylated sorbitol beeswax ester	12	625.000	Ethyl 2-cyano-3,3-diphenyl acrylate	15	77.800
Ethoxylated sorbitol hexaester of tall oil acids	12	627.000	2-(N-Ethyl-N,β-cyanoethyl)-4-acetaminoisole	03	895.100
Ethoxylated sorbitol hexaester of tall oil acids	12	628.000	Ethyl cyclohexylamine	13	78.100
Ethoxylated sorbitol lanolin ester	12	629.000	Ethyl 3-(4-tert-butylphenyl) thiocarbamate	15	69.100
Ethoxylated sorbitol mono-oleate	12	630.000	O-ethyl S, 8-di-tert-butyl phosphorothioate	13	1296.320
Ethoxylated sorbitol mono-stearate	12	631.000	S-Ethyl disobutylthiocarbamate (Butylate)	13	166.053
Ethoxylated sorbitol oleate, acetylated	12	631.500	Ethyl(dimethyl(mixed alkyl)ammonium ethyl sulfate	12	400.000
Ethoxylated sorbitol pentaurester	12	631.500	O-Ethyl S, S'-dipropyl phosphorodithioate	13	243.010
Ethoxylated sorbitol tetraester of lauric and oleic acids	12	633.000	S-Ethyl dipropylthiocarbamate (EPTC)	13	202.000
Ethoxylated sorbitol tetraester of tall oil acids	12	635.000	Ethylene-acrylic acid resins (EAA)	08	40.000
Ethoxylated sorbitol tetraoleate	12	636.000	N-N-Ethylenebisococamide	02	31.900
Ethoxylated sorbitol tetraoleate	12	636.400	Ethylene bis (dithiocarbamic acid), disodium salt (Nabam)	15	239.900
Ethoxylated sorbitol tetraoleate	12	636.500		13	183.000



Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
2,2'-Ethyldiene-bis[4,6-di-tert-butylphenol] (Isonox 129)	15 76,550	Fatty acid residues	15 1434,300
Ethylidene norbornene	15 80,000	Fatty acids	15 522,000
Ethyl isobutyrate	07 146,450	Fatty acids, hydrogenated	13 523,000
(+)-5-Ethyl-2-(1,4-isopropyl-4-methyl-5-oxo-2-imidazolyl)-2-cyctic acid	13 118,076	Fatty acids, partially hydrogenated	15 282,000
Ethyl isovalerate	07 146,500	Fatty amines	07 95,790
Ethyl laurate	07 947,300	Fenchol	06 401,200
Ethyl maleate, mono	13 898,500	Enopropylate	06 401,250
N-Ethylmaleimide	03 898,500	Ferriallyl C <sub>12</sub> methacrylate	06 646,700
Ethyl mercaptan (Ethanethiol)	15 963,400	Fibrosate hydrochloride	06 1745,500
Ethyl methacrylate	05 963,400	Fierfencol	06 742,500
N-Ethyl-2-methylallylamine	15 281,500	Flotation reagents, all other	14 147,000
6-Ethyl-2-methylamine	03 897,000	Fluocanazole	06 135,600
Ethyl-2-methyl butyrate	07 147,700	Fluocytosine	06 856,000
Ethyl-2-methyl pentanoate	03 897,200	Fluorocortisone acetate	06 401,280
2-[Ethyl(2-methylphenyl)amino]ethanol		Fluorocortisone acetate	10 11,000
N-[3-(1-Ethyl-1-methylpropyl)-5-isoxazolyl]-2,6-O-methoxybenzamide (Fidol) S-propyl	13 118,062	Fluorocortisone acetate	04 755,006
7-Ethyl-2-methyl-4-undecyl sulfate, sodium salt	12 165,012	Fluorocortisone acetate	04 758,000
4-Ethymorpholine	15 81,000	Fluorescent Brightener 22	04 761,000
Ethyl myristate	07 148,000	Fluorescent Brightener 28	04 765,000
2-Ethyl-2-nitro-1,3-propanediol	15 392,250	Fluorescent Brightener 46	04 766,000
Ethyl 2(2-nitro-4-trifluoromethylphenyl)-3-oxobutanoate	03 899,800	Fluorescent Brightener 49	04 767,000
Ethyl octanoate	07 150,000	Fluorescent Brightener 52	04 770,000
o-Ethylphenol	15 81,200	Fluorescent Brightener 61	04 771,000
Ethyl phenylacetate	07 37,800	Fluorescent Brightener 71	04 773,000
N-Ethyl-N-phenylbenzylamine	03 901,000	Fluorescent Brightener 102	04 778,000
Ethyl (polyoxyethylene, cocoamine) ethylsulfate	12 458,830	Fluorescent Brightener 128	04 779,000
Ethyl propionate	07 150,200	Fluorescent Brightener 134	04 780,000
N-(1-Ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzamine	13 118,030	Fluorescent Brightener 205	04 780,205
5-Ethyl-2,3-pyridinedicarboxylic acid	03 907,500	Fluorescent Brightener 220	04 780,225
N-Ethyl pyrrolidone	15 81,300	Fluorescent Brightener 235	04 780,235
Ethyl salicylate	07 39,000	Fluorinated (including other fluorhalogenated) hydrocarbons, all other	15 1276,000
Ethyl silicate	15 985,000	p-Fluorocarbonyl chloride	03 913,200
N-Ethyl-N-(isobornyl alkyl)morpholinium ethyl sulfate	12 493,000	Fluorocarbonyl chlorides, all other	03 913,700
Ethyl succinyl chloride	15 956,000	Fluorocarbonyl chlorides, all other	08 38,200
Ethyl sulfate (Diethyl sulfate)	02 89,100	5-Fluoro-2-methyl-1-[[4-(methylsulfonyl)phenyl]methyl]meth-Indene	06 657,000
Ethylthioethanol	11 5,000	p-Fluorotoluene	03 913,300
N-Ethyl-p-toluenesulfonamide	03 908,000	Fluoxymesterone	03 913,550
3-(N-Ethyl-m-toluidino)propionitrile	07 150,250	Fluoxymesterone	06 640,000
Ethyl trimethyl cyclopentyl butanol	13 231,015	Fluoxymesterone	06 485,000
Ethyl 3,7,11-trimethyltrideca-2,4-dienoate	07 150,300	Fluoxymesterone	06 692,700
Ethyl valerate	15 1316,000	Flutamide	04 782,000
Ethyl vinyl ether	06 837,001	Food, Drug, and Cosmetic Blue 1	04 783,000
Etidronate, disodium	08 44,010	Food, Drug, and Cosmetic Blue 2	04 784,000
Expandable polystyrene beads	04 827,000	Food, Drug, and Cosmetic Green 3	04 786,000
External Drug and Cosmetic Orange 3	06 620,400	Food, Drug, and Cosmetic Red 3	04 787,000
Annoline	15 1331,000	Food, Drug, and Cosmetic Red 4	04 787,040
Fats and oils: chemically modified, all other	15 392,500	Food, Drug, and Cosmetic Yellow 5	04 789,005
Fatty acid alkylamine ester		Food, Drug, and Cosmetic Yellow 6	04 790,000
Fatty acid esters, not included with plasticizers		Formaldehyde (37% HCHO by weight)	15 791,000
Surface-active agents, all other		Formaldehyde, dicyandiamide, ethylene sulfate polymers	12 780,500
Fatty acid polyamine condensate	15 981,000		



Table D-1--Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Sect. Item No.
Formaldehyde polymer with carbamate esters	14	487,000
Formaldehyde polymer with ethylenediamine and nonyl phenol derivatives	14	163,000
Formic acid, 90%	15	524,000
1-Formylpiperidine	03	919,153
Fuel additives, acyclic, all other	14	177,000
Fumaric acid	15	525,000
2-Furaldehyde (Furfural)	15	82,000
Furan	03	920,000
Furan derivatives, all other	15	84,000
Furfuryl alcohol	03	921,000
Furfuryl alcohol, ethoxylated	12	749,900
Furfuryl amine	13	87,000
Furfuryl type resins	08	82,400
Furoic acid	03	920,200
1-[2-Furyl]piperazine	03	920,200
D-Galactose	14	456,000
Galactolide (1,3,4,6,7,8-Hexahydro-4,6,6,7,8,8-Hexamethyl-cyclopenta-1'-2-benzopyran)	07	98,000
Gallium nitrate	08	278,400
Gasoline additives, acyclic, all other	14	169,000
Gasoline additives, cyclic, all other	14	190,000
Gentamicin	06	620,500
Geranyl acetate	07	48,000
Geranyl butyrate	07	151,000
Geranyl crotonate	07	153,001
Geranyl ethyl ether	07	153,007
Geranyl formate	07	153,010
Geranyl isobutyrate	07	153,020
Geranyl isovalerate	07	153,560
Geranyl nitrile (Citralva)	07	153,600
Geranyl propionate	07	153,800
Geranyl tiglate	13	168,450
Gibberellin acid	06	688,000
Glipizide	06	693,000
Glucagon	14	36,000
Glucosaminylase	14	65,000
Glucosheptonic acid, $\beta$ -isomer, sodium salt	14	66,000
Glucosheptonic acid, sodium salt	14	66,000
$\alpha$ -Glucosamidopropyl dimethyl-2-hydroxyethyl ammonium chloride	12	471,500
Gluconic acid, potassium and sodium salts W/20% mix of sodium bisulfite-formaldehyde	12	57,530
Gluconic acid and salts, mixed	15	1494,800
Glucosic acid, technical	14	526,000
Glucose oxidase	14	523,000
Glucose-6-phosphate dehydrogenase	14	12,000
Glutamic acid hydrochloride	08	578,500
Glutaryl-p-nitroaniline (liver function test)	14	792,000
Glutaraldehyde	11	85,950
Glutaric acid esters, all other	11	85,950
Gluteronimide	08	471,000
Glucosides, mixed C <sub>14</sub> and C <sub>16</sub> 's, mono-	15	1110,400
Glycerine, alkoxyethylated	12	761,700
Glycerol, alkoxyethylated, toluene diisocyanate copolymer	12	761,800
Glycerol diacetyltartrate monostearate	12	644,000
Glycerol dilaurate	12	651,500
Glycerol esters of chemically defined acids, all other	12	659,000
Glycerol esters of mixed acids, all other	12	629,700
Glycerol, ethoxylated	12	768,000
Glycerol, ethoxylated and phosphated	12	111,900
Glycerol monoallyl ether	15	1187,210
Glycerol mono- and diesters of mixed fatty acids	12	548,800
Glycerol monoester of C <sub>2</sub> -C <sub>16</sub> acids	12	667,000
Glycerol monoester of coconut oil acids	12	660,900
Glycerol monoester of coconut oil acids, sulfated,	12	661,000
sodium salt	12	662,000
Glycerol monoester of cottonseed oil acids	12	662,000
Glycerol monoester of hydrogenated cottonseed oil acids	12	663,000
Glycerol monoester of hydrogenated lard acids	12	663,500
Glycerol monoester of hydrogenated soybean oil acids	12	664,000
Glycerol monoester of lard acids	12	665,000
Glycerol monoester of mixed fatty acids, acetylated	12	649,000
Glycerol monoester of mixed fatty acids, phosphated	12	112,000
Glycerol monoester of mixed fatty acids, succinylated	12	649,100
Glycerol monoester of palm oil acids	12	665,800
Glycerol monoester of safflower oil acids	12	666,200
Glycerol monoester of tall oil acids	12	666,300
Glycerol monoester of tallow acids	12	665,400
Glycerol monolaurate	12	655,000
Glycerol mono-oleate	12	657,000
Glycerol monoricinoleate	12	657,000
Glycerol monostearate	12	658,000
Glycerol sequester of hydrogenated tallow acids	12	667,400
Glycerol, synthetic only	15	1084,000
Glycerol triester of mixed fatty acids	12	667,900
Glycerol triacetate/decanoate	12	658,400
Glycerol p-aminobenzoate	15	86,000
Glycerol diacetate (Diacetin)	15	111,000
Glycerol monoacetate (Monocetin)	15	112,000
Glycerol monoricinoleate	15	108,000
Glycerol monostearate	15	109,000
Glycerol trifacetate (Triacetin)	15	113,000
Glycerol trifacetate/palmitate	15	109,000
Glycerol trifacetate/oleate	11	120,000
Glycerol trileolate (Trileolin)	11	81,000
Glycerol tripropionate	11	83,000
Glycerol triacetate	15	115,500
Glycidol (2,3-Epoxy-1-propanol)	15	1317,000
$\alpha$ -Glycidoxypropyltrimethoxysilane	15	1387,000
$\alpha$ -Glycidyl decanoate	15	1317,200
Glycine (Aminoacetic acid), non-medical	14	10,000
Glycolic acid (Hydroxyacetic acid)	15	528,000
Glycolic acid, potassium salt	15	663,750
Glycolic acid, sodium salt	15	664,000
Glycol palargonate	15	84,000
Glycol phthalate esters, all others	11	41,700

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. No.	Item No.	Chemical name	Sect. No.	Item No.
Glycol residues	15	1435-000	Hexadecyltrimethylammonium chloride	12	495,000
Glycopyrrolate	06	288-500	Hexadodecyl alcohol	15	874,000
Glyoxal	15	793,000	Hexafluoropropylene, monomer	15	12,000
Glyoxal-formaldehyde resins	08	7,500	Hexaglycerol	07	691,947
Gonadorelin, acetate	06	682,900	Hexahydro-5-methoxy-4,7-methano-1H-indene	12	40,300
Grease, other than wool, sulfated, sodium salt	12	282,000	Hexahydro-1,3,5-triethyl-s-triazine	13	40,012
Guacalwood acetate	07	96,100	Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine	13	40,022
Gualene	07	96,200	Hexamethylsilazane	15	137,500
Guaifenesin	06	584,000	Hexamethylenediamine adipate (nylon salt)	15	397,000
Guanidine hydrochloride	13	398,000	Hexamethylenediaminetetra(methylene phosphonic acid), potassium salt	14	68,000
Guanidines, cyclic, other	09	52,000	Hexamethylenimine	03	92,870
Halazepam	08	500,500	Hexamethylenetetramine, tech.	05	86,910
Halichonide	06	639,500	N-Hexanal	07	153,300
Half-phthalic acid ester of tallow	12	318,300	Hexane	02	63,000
alkanolamide/monoglyceride	06	500,800	Hexanediol	02	283,000
Haloerolipid	06	80,500	1,6-Hexanediol	15	1083,000
Helloropy acetate	07	80,520	2-Hexenal	02	155,300
Helloropy acetone	07	80,520	2-Hexenol	02	67,015
Heptachloro-tetrahydro-endo-methanindene	13	136,000	n-Hexene	02	67,020
(Heptachlor)	13	343,000	n-Hexenes, mixed	07	155,400
2-(8-Heptadecyl)-4,4-bis(hydroxymethyl)-2-oxazoline	12	345,950	2-Hexyl	07	155,650
2-(8-Heptadecyl)-4-hydroxymethyl-4-ethyl-2-oxazoline	12	410,000	Cis-3-Hexenyl acetate	07	155,653
2-Hexadecyl-2-imidazole	12	410,000	Cis-3-Hexenyl butyrate	07	155,654
Hexadecylmethylbenzimidazolesulfonic acid, sodium salt	12	26,000	Cis-3-Hexenyl methyl carbonate	07	40,500
Hexaldehyde-aniline condensate	09	6,000	Cis-3-Hexenyl tiglate	07	155,656
n-Heptane	02	71,000	Cis-3-Hexenyl valerate	07	155,656
Heptanoic acid	15	528,500	Cis-3-Hexenyl valerate	07	155,656
Heptanoic acid, potassium salt	12	57,550	Hexoxyacetalddehyde dimethyl acetal	07	155,700
2-Heptanone (Methyl amyl ketone)	15	819,000	Hexyl acrylate	15	984,000
3-Heptanone (Ethyl butyl ketone)	15	820,000	Hexyl acetate	15	985,000
Heptenes, mixed	02	72,000	n-Hexyl alcohol	15	857,000
n-Heptyl alcohol	15	856,000	n-Hexylamine	15	284,000
2-Heptylcyclopentanone	07	96,500	Hexylamine ethoxylate	15	398,000
Heptyl formate	07	188,010	Hexyl (isononyl anide) carboxylic acid, mono-triethanolamine salts	12	57,560
Herring oil, sulfated	12	286,490	2-Hexyl-2-cyclopentan-1-one	07	41,000
Herring oil, sulfated, sodium salt	12	299,000	Hexyl n-decyl phthalate	07	96,800
Hetacillin, potassium	06	87,820	Hexyl (isononyl anide) carboxylic acid, triethanol-diethanolamine, mixed salts	11	44,000
Hexabromocyclohexane	09	87,820	Hexyl nitrate	07	57,565
Hexachlorocyclopentadiene	03	94,000	2-[2-(Hexyloxy)ethoxy]ethanol	12	155,715
1,4,5,6,7-Hexachloro-5-norbornene-2,3-dicarboxylic anhydride (Chlorenchro anhydride)	03	995,100	Hexyloxypyrrolamine	14	149,000
Hexadecane	15	1342,000	Hexyl phosphate, potassium salt	15	128,600
1-Hexadecanol (Cetyl alcohol)	15	873,000	Hexyl sulfate, potassium salt	12	99,900
Hexadecanobisole	07	96,600	Hexyl sulfate, potassium salt	12	99,910
Hexadecyl acetate	07	155,020	Hexyl sulfite, potassium salt	12	231,000
Hexadecyl alcohol, ethoxylated	12	730,000	Hexyl trichlorosilane	15	1387,530
Hexadecylamine	12	421,000	Homomenthol salicylate	15	88,999
Hexadecyl dipropylate	12	39,500	Humatrope	06	693,500
Hexadecyl dimorphosphate	12	347,000	Hydralazine hydrochloride	06	357,000
Hexadecyl dimorphosphate	12	347,000	Hydratropaldehyde dimethyl acetal	07	43,000
Hexadecyl nitrate	15	441,750	Hydrate acetate	15	594,500
Hexadecyl stearate	11	121,310	Hydrindantin	15	91,000
Hexadecyl sulfite, sodium salt	12	230,000	Hydrocarbon carboxylic acid derivatives (specify)	14	205,000
Hexadecyl sulfonate	15	1317,950			
Hexadecyltrimethylammonium bromide	12	494,000			

Table D-1.—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Sect. Item No.
Hydrocarbon derivatives: all other hydrocarbon derivatives	02	156,000
Hydrocarbon phosphorus acid, barium salt	14	206,000
Hydrocarbon phosphoryl derivatives	14	207,000
Hydrocarbons, all other	15	1349,000
Hydrocarbons, C <sub>8</sub> , all other	02	52,000
Hydrocarbons, C <sub>9</sub> , all other	02	59,000
Hydrocarbons, C <sub>10</sub> , all other	02	68,000
Hydrocarbons, C <sub>11</sub> , all other	02	73,000
Hydrocarbons, C <sub>12</sub> , and above, all other, including mixtures	02	89,000
Hydrocarbons, C <sub>2</sub> fraction	02	31,200
Hydrocarbons, C <sub>2</sub> -C <sub>3</sub> mixtures	02	43,000
Hydrocarbons, C <sub>3</sub> mixtures	02	48,000
Hydrocarbons, C <sub>4</sub> mixtures	02	54,000
Hydrocarbons, C <sub>5</sub> -C <sub>6</sub> mixtures	02	67,000
Hydrochloric acid	06	722,000
Hydrochloric acid, concentrated	07	43,500
Hydrocodone bitartrate	06	433,000
Hydrocodone	06	660,000
Hydrocodone acetate	06	661,000
Hydrocumarin	07	44,000
Hydrogenated castor oil, ethoxylated	12	670,000
Hydrogenated menhaden fish oil	15	1329,050
Hydrogenated tallow acids, aminoethanolamide, acetate salt	12	575,280
(Hydrogenated tallow alkyl)amine	12	422,000
(Hydrogenated tallow alkyl)amine acetate	12	394,000
(Hydrogenated tallow alkyl)amine, ethoxylated	12	329,000
(Hydrogenated tallow alkyl)trimethylammonium chloride	12	498,000
1-(2-Hydrogenated tallow amidoethyl)-2-nor(hydrogenated tallow)-2-imidazoline	12	386,500
Hydrogenated tallow fatty acid aminoethanolamine condensate	14	488,000
Hydrogenated tallow glycerides	15	1329,000
Hydrogenated tallow glycerides diethylenediamine condensate	12	587,943
Hydrogenated tallow glycerides diethylenetriamine	12	587,943
Hydroquinone mixtures	14	113,000
Hydroquinone hydrochloride	06	401,400
Hydroquinone (Hydroquinol)	14	357,000
Hydroquinone, di(β-hydroxyethyl) ether	15	91,250
Hydroquinone sulfonic acid, potassium salt	03	91,300
Hydroxybenzoic acid	03	934,000
p-Hydroxybenzoic acid	03	944,000
p-Hydroxybenzoic acid, butyl ester	15	92,000
p-Hydroxybenzoic acid, ethyl ester	15	93,000
p-Hydroxybenzoic acid, propyl ester	15	94,000
p-Hydroxybenzoic acid, methyl ester	15	95,000
4-Hydroxybenzylbenzene	03	948,000
Hydroxychloroquine sulfate	06	175,000
Hydroxycitronellal methyl anthranilate	07	44,050
Hydroxycitronellol	07	156,500
2-Hydroxy-5,9-dimethyl-6,7-benzomorphan	03	953,550
7-Hydroxy-3,7-dimethyl-1-octanal (Hydroxycitronellal)	07	156,000
7-Hydroxy-3,7-dimethyl octanal, dimethyl acetal (Hydroxycitronellal, dimethyl acetal)	07	157,000
Hydroxyethane-1-diphosphonic acid	14	69,000
4-Hydroxy-3-ethoxybenzaldehyde (Ethylvanillin)	07	44,100
Hydroxyethyl acrylate	15	1119,000
3-[N-(2-Hydroxyethyl)amino]propanitrile	03	956,000
Hydroxyethylcellulose	14	409,000
N-β-Hydroxyethyl-2,4-dihydroxybenzamide (2-Hydroxyethyl)dimethyl(3-stearamidopropyl)ammonium	03	958,000
(2-Hydroxyethyl)dimethyl(3-stearamidopropyl)ammonium phosphate	12	472,000
(2-Hydroxyethyl)dimethyl(3-stearamidopropyl)ammonium nitrate	12	474,000
N-(2-Hydroxyethyl)-1,2-diphenylethylenediamine	12	351,000
(N-Hydroxyethyl)ethylenedinitrilo)triacetic acid, iron salt	14	72,000
(N-Hydroxyethyl)ethylenedinitrilo)triacetic acid, magnesium salt	14	73,000
(N-Hydroxyethyl)ethylenedinitrilo)triacetic acid, trisodium salt	14	74,000
Hydroxyethyl hydroxypropyl cellulose	14	409,500
1-Hydroxyethyl-1-(2-hydroxy-3-sodiumsulfonatopropyl)-2-caryyl-2-imidazolinium hydroxide	12	26,600
1-Hydroxyethyl-1-(2-hydroxy-3-sodiumsulfonatopropyl)-2-nor-coconut oil fatty acids-2-imidazolinium hydroxide	12	26,700
N-(2-Hydroxyethyl)-12-hydroxystearamide	15	395,200
Hydroxyethylidene diphosphonic acid, potassium salt	14	75,000
Hydroxyethylidene diphosphonic acid, sodium salt	14	76,000
Hydroxyethyl methacrylate	15	1119,200
1-(2-Hydroxyethyl)-2-nonyl-2-imidazoline	12	348,000
1-(2-Hydroxyethyl)-2-nor(coconut oil alkyl)-2-imidazoline	12	349,000
1-(2-Hydroxyethyl)-2-nor(soya oil alkyl)-2-imidazoline	12	351,600
1-(2-Hydroxyethyl)-2-nor(tall oil alkyl)-2-imidazoline	12	350,000
2-Hydroxyethyl n-octyl sulfide	13	233,010
N-(Hydroxyethyl)pyberazine	15	96,000
3-Hydroxy-2-ethyl-4-pyrone (Ethylmatol)	07	97,000
1-(2-Hydroxyethyl)-1(sodium carboxymethyl)enoxyethylene)-2-nor-coconut oil fatty acids-2-imidazolinium hydroxide	12	26,900
1-(2-Hydroxyethyl)-2-(tall oil alkyl)imidazoline, fatty acid salt	12	351,700
N-(2-Hydroxyethyl)-N,N',N'-tris(2-hydroxypropyl)thylenediamine	12	330,000
Hydroxyethyl-2-undecyl-2,3-imidazoline	12	464,000
5-Hydroxyisophthalic acid	03	962,500
2-Hydroxy, 3-(lauryl-myristyl)oxy-1 propane sulfonic acid, sodium salt	12	207,050
3-Hydroxy-4-methoxybenzaldehyde (Iso-vanillin)	07	44,200
4-Hydroxy-3-methoxybenzaldehyde [Vanillin]	07	44,300
2-Hydroxy-4-methoxybenzophenone	15	97,000
4(4-Hydroxy-3-methoxyphenyl)-2-butanone (Vanillylacetone)	07	44,800
2-[(1-Hydroxyethyl)amino]-2-methylpropanol	13	245,014





Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Sect. Item No.
Isostearyl isostearate	15	756,000
Isosteryl neopentanoate	15	995,000
Isothiocyanic acid, phenyl ester	03	1043,102
Isothiocyanic acid, phenyl ester	03	1043,102
Isothiocyanic acid, phenyl ester	03	1043,102
Isotridecyloxypropylamine	12	330,300
N-Isotridecyloxypropyl trimethylene diamine	12	330,320
Isovalerone (Disobutyl ketone)	15	824,000
2-Isovaleryl-1,3-indandione	13	169,900
Itaconic acid (Methylenesuccinic acid)	15	539,000
Ivermectin	06	133,001
Kanamycin	06	50,000
Ketamine hydrochloride	06	437,000
Ketones, all other	15	839,000
Ketoprofen	06	402,400
Lactic acid, 100%	15	542,000
Lactic acid salts, all other	15	675,000
Lanolin, ethoxylated	12	671,000
Lard oil acids (ratio=1/1)	12	546,600
Lard, sulfated, sodium salt	12	293,000
Lasalocid, sodium	08	66,600
Lax type polyvinylidene chloride resins	08	50,010
3-Lauramido-N,N-dimethylpropylamine oxide	12	397,000
(3-Lauramidopropyl)trimethylammonium methyl sulfate	12	475,000
Lauric acid	12	570,000
Lauric acid (Ratio = 1/1)	12	547,000
Lauric acid (Ratio = 1/1)	12	564,300
Lauric acid (Ratio = 2/1)	12	534,000
Lauric acid esters, all other	11	87,000
Lauric acid, potassium salt	12	38,000
Lauric acid salts, all other	15	679,000
Lauric acid, zinc salt	15	575,900
Lauric and myristic acid (Ratio = 1/1)	12	571,200
Lauric and myristic acids	12	535,000
Lauric and myristic acids (Ratio = 2/1)	12	584,400
Lauric and myristic acids (Ratio = 1/1)	15	446,000
Lauronitrile (Dodecyl nitrile)	15	543,000
Lauryl chloride	12	1296,400
Lauryl peroxide	15	1244,000
N-Lauroylsarcosine, sodium salt	12	985,270
Lauryl acrylate	12	100,700
Lauryl alcohol, phosphated, potassium salt	14	489,250
Lauryl alkyl dimethylamine acetate	14	489,260
Lauryl alkyl dimethylamine phosphate	14	13,400
Laurylamidopropyl betaine	12	13,500
Laurylglycolate	12	936,000
Lauryl methacrylate	15	997,000
Lauryl methacrylate-stearyl methacrylate copolymer resins	08	19,980
Lauryl pyridinium chloride	12	498,500
Lead acetate	15	595,000
Lead t- $\alpha$ -alkylcarboxylate	15	670,500
Lead-cobalt neodecanoate	15	706,000
Lead 2-ethylhexanoate	15	637,000
Lead iron sebacoylate salticylate	15	104,776
Lead naphthenate	14	306,000
Lead neodecanoate	15	707,000
Lead stearate	15	756,000
Lead stearate, dibasic	15	995,000
Lead subacetate	15	597,000
Lead tellurate	15	1176,000
Leuco Sulfur Black 1	04	1107,000
Leuco Sulfur Black 2	04	1115,000
Leuco Sulfur Black 11, 11:1	04	1115,000
Leuco Sulfur Black 18	04	1115,018
Leuco Sulfur Blue 7	04	1075,000
Leuco Sulfur Blue 11	04	1089,000
Leuco Sulfur Brown 1, 1:1	04	1091,000
Leuco Sulfur Brown 3	04	1091,000
Leuco Sulfur Brown 37	04	1101,000
Leuco Sulfur Brown 52	04	1101,052
Leuco Sulfur Brown 96	04	1104,996
Leuco Sulfur Green 2	04	1084,000
Leuco Sulfur Green 16	04	1087,000
Leuco Sulfur Green 34	04	1087,034
Leuco Sulfur Green 35	04	1087,035
Leuco Sulfur Green 36	04	1087,036
Leuco Sulfur Red 14	04	1070,014
Leuco Sulfur Yellow 22	04	1064,022
Leuprolide acetate	06	278,800
Lidocaine	06	535,000
Lidocaine hydrochloride	06	706,100
Light-oil distillates, all other	06	9,000
Lignin amine	12	357,010
Lignin, ethoxylated	12	161,900
Lignin, sodium salt	12	518,400
Lignosulfonic acid, ammonium salt	12	153,000
Lignosulfonic acid, calcium salt	12	153,000
Lignosulfonic acid, chromium salt	12	153,000
Lignosulfonic acid, iron salt	12	153,000
Lignosulfonic acid, manganese salt	12	157,100
Lignosulfonic acid, mixed chromium and iron salts	12	157,200
Lignosulfonic acid, potassium salt	12	157,700
Lignosulfonic acid, sodium salt	12	158,500
Lignosulfonic acid, zinc salt	12	158,500
Limonene	07	50,200
Limonene anthranilate	07	49,500
Limonene (animal feed grade)	06	67,000
Limonene (medicinal grade)	06	51,000
Limonene alcohols, sulfated, all other	12	240,000
Linoleic acid (Ratio = 1/1)	12	547,800
Linoleic acid (Ratio = 2/1)	12	536,000
Linoleic acid dimers, alkoxylated	12	111,200
Lipase	14	714,000
Lisinoapril	06	327,300
Lithium heparin	06	627,000
Lithium hydroxystearate	15	1373,500
Lithium neodecanoate	15	708,000
Lithium stearate	15	758,000
Lovastatin	06	379,000
Loxapine succinate	06	503,700
Lubricating oil and grease additives, acyclic, all other	14	293,000

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. No.	Item No.	Chemical name	Sect. No.	Item No.
Lubricating oil and grease additives, cyclic, all other	14	294,000	Meperidine hydrochloride	06	404,000
2,6-Lutidine	03	1047,000	Meprednisone	06	1088,000
3,4-Lutidine	03	1048,000	Mercaptoacetic acid (Thioglycolic acid)	15	549,000
Matene	06	202,900	2-Mercaptobenzothiazole	09	30,000
Matene acetate	05	598,000	2-Mercaptobenzothiazole, copper salt	09	30,000
Magnesium bis(4-nitrobenzylmalonate) dihydrate	13	1048,700	2-Mercaptobenzothiazole, sodium salt	13	40,024
Magnesium gluconate	06	764,000	2-Mercaptoethanol	09	32,000
Magnesium methacrylate	06	1352,000	N-(Mercaptoethyl)phthalimide S-(O,O-dimethylphosphorodithioate)	15	1353,000
Magnesium stearate	08	262,500	3-Mercapto-1,2-propanediol (Thioglycerol)	13	165,024
Magnesium stearate	15	759,000	3-Mercaptopropionic acid	15	550,000
Maleic anhydride	12	44,500	Mercaptopropyltrimethoxysilane	15	1388,000
Maleic anhydride, polypropylene glycol copolymer	12	711,700	Mercaptosuccinic acid (Thiomalic acid)	15	51,000
Maleic acid	15	547,000	2-Mercaptotoluidimide, zinc salt	09	41,475
Malonaldehyde	03	1048,930	Metaxalone	06	478,000
D-Maltose	14	459,000	Methacrylamide	15	247,000
Manganese acetate	15	599,000	Methacrylic acid	15	552,000
Manganese t- $\alpha$ -alkylcarboxylate	15	671,000	$\alpha$ -Methacryloxypropyltrimethoxysilane	15	1389,000
Manganese 2-ethylhexanoate	15	639,000	Methadone hydrochloride	06	405,000
Manganese gluconate	06	765,000	Methamphetamine hydrochloride	06	520,000
Manganese naphthenate	14	309,000	Methane	02	37,000
Manganese naphthoate	15	709,000	Methanesulfonic acid, disodium salt (DSMA)	13	204,000
Manganese stearate	15	760,000	Methanesulfonic acid, dodecyl- and octyl- ammonium salts	13	205,900
Manganese tartrate	15	177,000	Methanesulfonic acid, monosodium salt (MSMA)	13	205,900
Mannitol	15	1087,000	Methanesulfonic acid	15	553,000
Maprotiline hydrochloride	06	529,000	Methanesulfonyl chloride	15	584,000
Meclozine hydrochloride	06	81,000	Methanol, synthetic	06	861,000
Meclofenamate, sodium	06	402,500	Methanamine	06	239,000
Meclofenamic acid	06	802,600	Methanamine mandelate	06	241,000
Medicinal chemicals, all other	06	580,000	Methionine	06	645,000
Medroxyprogesterone acetate	06	663,000	Methionine, hydroxy analogue, calcium salt	14	15,000
Mefenamic acid	06	403,000	Methocarbamol	06	478,000
Mefenamic acid	06	680,500	o-Methoxybenzaldehyde	07	51,950
Megestrol acetate	03	1050,000	o-Methoxyphenyl alcohol	07	52,000
Melamine	03	1050,000	2-Methoxyethyl acetate	03	1037,300
Melamine formaldehyde methanol polymer	14	483,000	2-(2-Methoxyethoxy)ethanol (Diethylene glycol monomethyl ether)	15	1168,000
Melamine formaldehyde resins	08	8,000	2-(2-(2-Methoxyethoxy)ethoxy)ethanol (Triethylene glycol monomethyl ether)	15	1169,000
Melamine formaldehyde copolymer	14	489,500	2-(2-Methoxyethoxy)ethyl-2-methoxyethyl ether	15	1170,000
Melamine stearyl alcohol polymer	14	490,000	1-Triethylene glycol dimethyl ether	15	1171,000
Melengestrol acetate	06	681,000	2-Methoxy-2-ethyl acetate	15	1000,800
p-Mentha-1,3-diene ( $\alpha$ -Terpinene)	07	107,600	2-Methoxyethyl acrylate	15	1124,000
p-Mentha-1,4-diene ( <i>r</i> -Terpinene)	07	107,700	Methoxyethyl morpholine	15	108,450
p-Mentha-1,8-diene (Limonene)	07	108,000	2-Methoxyethylpiperidine	03	1057,503
p-Mentha-6,8-dien-2-ol (Carveol)	07	107,000	2-Methoxynaphthalene	07	53,000
p-Mentha-6,8-dien-2-one (Carvone, Carvol)	07	108,300	N-(4-Methoxy-3-nitrophenyl)acetamide	06	1060,100
p-Menth-3-en-3-ol (Isopulegone)	07	107,100	4-Methoxyphenol	15	109,000
p-Menth-4-(8)-ene-3-one (Pulegone)	07	108,400	1-p-Methoxyphenyl pentan-1-one-3 (Methyl-anisylacetone)	07	53,400
1-p-Mentha-8-yl-1-propanone	07	108,600	3-(2-Methoxyphenyl)-2-propenal	07	76,700
dl-Menthol synthetic	07	110,100			
Menthyl acetate	07	110,200			
l-Menthyl acetate	07	111,100			

Table D-1—Continued  
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Chemical name	Sect. No.	Item No.	Chemical name	Sect. No.	Item No.
Methoxypolyethylene glycol	15	1172 000	2-Methyl-1-butanol	15	841 000
2-Methoxy-propylphenol	07	54 000	3-Methyl-1-butanol	15	841 001
3-Methoxy-4-propylphenol, acetate	07	54 100	3-Methyl-2-butenyl acetate	07	162 012
3-Methoxypropionitrile	15	448 200	3-Methyl butyl acetate	07	162 450
1-Methoxy-2-propyl acetate	15	125 300	3-Methyl butyl butyrate	07	162 453
3-Methoxypropylamine	15	417 000	Methyl-1-(butylcarbamoyl)-2-benzimidazolecarbamate (Genomyl)	13	24 900
2-Methoxy-4-propylphenol	07	54 150	Methyl-1-butyl ether	14	184 000
Methoxypolyamine bromide	06	620 700	Methylbutyl pyrophosphate, ethylenedioxy titanium salt	12	100 200
Methoxypolyamine bromide	06	421 000	Methyl butanol	07	162 020
Methyl-3-	13	118 072	Methyl butyrate	15	1006 300
N-Methylacetamide	15	248 000	Methylcellulose	14	411 000
Methyl acetate	15	1002 000	Methyl chloroformate	15	1008 000
Methyl acetoacetate	15	1003 000	2-(2-Methyl-4-chlorophenoxy)propionic acid, diethanolamine salt	13	118 056
4-Methylacetophenone	07	55 000	2-(2-Methyl-4-chlorophenoxy)propionic acid, iso-octyl ester	13	118 057
Methyl acrylate, monomer	15	1004 000	$\alpha$ -Methylcinnamaldehyde	07	59 000
Methylal (Dimethoxymethane)	15	1320 000	Methyl cinnamate	07	60 000
Methyl alcohol, alkoxylated	12	730 700	Methyl cyanoacetate	15	448 650
Methylaluminum sesquichloride	15	1363 000	Methylcyclohexane	03	1083 000
Methylamine, mono-	15	290 000	$\alpha$ -Methylcyclohexanemethanol	07	111 730
Methylaminoacetamide dimethyl acetal (MAADMA)	15	418 800	3-(N-, &Methyl-N-cyclohexylamino)-6-methyl-7-anilino fluora	15	111 200
2-Methylaminoethanol (N-Methylethanolamine)	14	362 000	1-(2-Methylcyclohexyl)-3-phenylurea (Siduron)	13	76 000
p-Methylaminopropylamine	15	419 000	Methylcyclopentadiene	02	65 500
3-Methylaminopropylamine	15	292 200	Methylcyclopentadienylmanganese tricarbonyl	14	185 000
Methyl ammonium chloride	15	419 150	2-Methyldecanal	07	162 458
Methyl (tri-hydrogenated tallow alkyl) ammonium chloride	12	498 900	Methyl-3,5-di-tert-butyl- $\gamma$ -hydroxyhydrocinnamate	15	111 500
Methyl-1-amyly ether	14	183 000	Methyl 3-(1,2-dichloroethyl)-2,2-dimethyl-3-cyano-3-phenoxycyclohexylpropanecarboxylate	13	166 035
3-(N-Methylamino)ethanol	03	1070 000	Methyl 5-(2,4'-dichlorophenoxy)-2-nitrobenzoate	13	166 035
2-(N-Methylamino)propanitrile	03	1071 000	Methyl 3-(1,2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxate	13	76 050
p-Methylanisole	07	56 000	Methyl dodecylamine	03	1084 150
Methyl anthranilate	07	57 000	Methyl dihydrogen phosphate	12	442 800
2-Methylanthraquinone	03	1075 000	5-Methyl-1,7-dihydroxy-1,3,4-triazandolizine	15	1034 000
Methylaziridine	15	110 000	Methyl-2-(4,6-dimethoxypyrimidin-2-yl) (aminosulfuron) (Londax)	14	366 000
B-Methylbenzene propanal	07	57 070	Methyl N',N'-dimethyl-N-[(methylcarbamoyl)oxy]-1-thioxamide	13	76 045
Methylbenzene sulfonate	15	110 150	Methyl 2-[[[1(4,6-dimethyl-2-pyrimidinyl)amino]carbonyl]amino]sulfonylbenzoate	13	231 010
Methyl-2-benzimidazole carbamate	03	1464 300	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-o-cresol)	13	118 055
Methyl benzoate	07	57 100	4-Methyl-2,6-dinitrophenol	03	1084 703
Methyl-p-benzoquinone	15	110 200	N-Methylidodecylamine	12	446 200
2-Methylbenzothiazole	03	1078 000	Methyl dioleil ethoxy ammonium methyl sulfate	12	465 230
o-Methylbenzoxazole	14	365 000	N-Methyl-dithiolocarbamic acid, potassium salt	12	167 012
4-Methylbenzoyl chloride	03	1078 700	N-Methyl-dithiolocarbamic acid, sodium salt	13	241 000
o-Methylbenzoyl chloride	03	1078 800	N-Methyl-dithiolocarbamic acid, sodium salt (Metham)	13	241 000
o-Methylbenzyl acetate (Styralyl acetate)	07	58 000	Methyl-dopa	06	358 000
Methylbenzyl alcohol	03	1079 200	2,2'-Methylenedi(9-tert-butyl-p-cresol)	09	91 000
N-Methylbenzylamine	03	1079 000	2,2'-Methylenedi(6-tert-butyl-4-ethylphenol)	09	90 000
N-Methylbis (coconut oil alkyl) amine	12	441 000	4,4'-Methylenedi(2,6-di-tert-butylphenol)	03	1088 100
N-Methyl-bis-dipropylamine	03	1080 200			
N-Methylbis (hydrogenated tallow alkyl) amine	12	442 000			
Methyl, bis-(2-hydroxyethyl) hydrogenated tallow alkylammonium chloride	12	465 120			
Methyl, bis-(2-hydroxyethyl) isodecylpropylammonium chloride	12	465 135			
Methyl, bis-(2-hydroxyethyl) isotridecylpropylammonium chloride	12	465 140			
Methyl, bis-(2-hydroxyethyl) soyaalkylammonium chloride	12	465 160			
Methyl bromide (Bromomethane)	13	240 000			



Table D-1—Continued  
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Chemical name	Sect. Item No.	Sect. Item No.
4,4'-Methylenebis[N,N-diethylaniline]	03	1087 000
4,4'-Methylenebis[N,N-dimethylaniline]	03	1088 000
Methylene-bis(dimethyl)hydantoin and derivatives	14	166 000
2,2'-Methylenebis(4-methyl-6-nonyl-p-cresol)	03	1089 100
Methylenebis(thiocyanate)	13	195 010
Methylene-bridged polyalkyl phenols	14	208 000
Methylene chloride (Dichloromethane)	15	1234 000
4,4'-Methylenedianiline	03	1091 000
1,2'-Methylenedioxy-4-propylene benzene (IsoSafrole)	07	1092 000
5,5'-Methylenedioxylic acid	07	163 200
2-Methylene undecanal	07	163 200
Methyl esters of coconut oil	15	973 000
Methyl esters of tallow	15	974 500
Methyl esters of lard	15	975 000
N-Methyl-2-ethanopiperidine	03	1021 000
Methyl ether (Dimethyl ether)	15	1392 100
Methyl ethyl ketone	15	826 500
Methyl ethyl sulfide	02	93 800
α-(1-methylethyl)-x-4-trifluoro-methoxyphenyl)-5-pyrimidinemethanol (Flurpirimido)	13	168 997
Methyl formate	15	1010 000
Methyl formic acid	15	1450 000
Methyl p-formylbenzoate	03	897 500
Methyl furan	15	82 700
Methylglucoside laurate	12	713 000
1-Methyl-2-(8-heptadecenyl)-1-(9-octadecenyl)amido ethyl	12	478 850
N-(1-Methylheptyl)ethanolamine	14	185 500
N-(1-Methylheptyl)-N-phenylenediamine	09	64 000
5-Methyl-2-hexanone (Methyl isoamyl ketone)	15	827 000
Methyl hexyl ether	07	162 480
p-Methylhydratropaldehyde	07	60 800
Methyl hydrazine, mono	15	424 200
Methyl(hydrogenated tallow alkyl)diethylamine condensate; polyethoxylated, methyl sulfate	12	468 165
4-Methyl-5-hydroxymethyl imidazole	15	445 750
Methyl 12-hydroxystearate	07	978 000
(2,4-Methyl-5-imidazolyl)methylthioethylamine dihydrochloride	03	1094 853
2,2'-(1-Methylimino)diethanol (Methyldiethanolamine)	15	424 000
2-Methylindole	03	1094 900
3-Methylindole (Skatole)	07	61 000
Methylionone(α- and β-)	07	114 000
1-Methylionone	07	114 100
6-Methyl-α-ionone	07	112 000
Methyl isobutyl ketone	15	828 000
Methyl isobutyrate	07	162 500
Methyl isocyanate	15	424 500
Methyl iso-octadecenoate	15	977 500
Methylisopropyl ketone	15	828 200
Methyl isothiocyanate and 1,3-dichloropropene	13	243 012
Methyl isovalerate	07	162 520
2-Methylacetonitrile (Acetone cyanohydrin)	15	449 000
Methyl linoleate	15	977 600
Methyl mercaptan (Methanethiol)	02	94 000
Methyl methacrylate-butadiene styrene (MBS) resins	08	44 041
Methyl methacrylate, monomer	15	1011 000
N-Methyl-methanamine with borane (1:1)	15	1368 600
Methyl 2-(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amin carbonyl amino sulfonyl benzozote (Metasulfuron methyl)	13	76 060
Methyl 2-[[[N-(4-methoxy-6-methyl-1,3,5-triazin-2-yl)thylamino]carbonyl]amino]sulfonylbenzoate	13	76 062
Methyl N-methylanthranilate	07	62 000
Methyl-2-methyl butyrate	07	162 550
S-Methyl-N-(methylcarbamoyloxy)thioacetimidate (Methomyl)	13	213 400
a-Methyl-3,4-methylene dioxhydratropaldehyde	07	62 200
4-Methyl-N-(4-methylphenyl)sulfonylbenzene-sulfonamide	03	1096 200
3-Methyl-N-[2(methylsulfonamidoethyl)-N-ethyl-p-phenylenediamine] sequisulfate monohydrate	14	367 500
2-Methyl-2-(methylthio)propanaldehyde O-(methylcarbamoyl)oxime (Aldicarb)	13	213 500
4-(Methylmorpholine)	15	117 000
Methylnaphthalene	01	12 500
Methylnaphthalenesulfonic acid, sodium salt	12	173 000
N-Methyl-p-nitroaniline	03	1102 000
4-Methyl-2-nitroanisole	03	1104 000
2-Methyl-2-nitro-1-propanol	15	426 000
3-Methyl-2-nitro-1-propanol	07	162 750
Methylnonylnaphthalenesulfonic acid, sodium salt	12	174 000
2-Methyl-5-norbornene-2,3-dicarboxylic anhydride	03	1108 000
2-Methyl-1-octyl-1	11	94 000
Methyl oleate, sulfated, sodium salt	12	261 000
N-Methyl-N-decyltaurine, sodium salt	12	184 300
N-Methyl-N-palmitoyltaurine, sodium salt	12	195 000
Methyl p-chlorostearate	12	937 700
2-Methyl-2,4-pentandiol (Hexylene glycol)	15	1093 000
4-Methyl-2-pentanol	15	863 000
4-Methyl-2-pentanol (1-Methylisobutylcarbinol)	15	864 000
N-(1-Methyl-2-pentyl)-N-phenyl-p-phenylenediamine	07	162 560
Methyl pentanol	06	64 200
Methylphenylate hydrochloride	06	543 700
N-(3-Methylphenyl)acetamide	07	114 480
Methyl phenylacetate	07	63 000
4-(1-Methyl-1-phenyl)ethylphenol	03	1114 600
3-Methyl-5-phenyl-3-pyrazolidone	07	63 200
4-Methyl-1-phenyl-3-pyrazolidone	14	369 000
1-Methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1H)-pyridone (Fluridone)	13	118 063
4-Methylphthalic acid	03	1120 502
4-Methylphthalic anhydride	15	118 700
1-Methylpiperidine	03	1123 600
2-Methylpiperidine	03	1121 800
3-(2-Methylpiperidino)propyl-3,4-dichlorobenzoate (Pipron)	13	40 026
Methyl pivaloylacetate	15	1012 800
N-Methyl-N-polyoxyethylene-N-N-bis(hydrogenated tallow amidoethyl) ammonium	12	476 920

Chemical name	Sect. Item No.	Item No.
N-Methyl-N-polyoxyethylene-N,N-bis(tallow amidoethyl)	12	476, 925
Methylpropanolone	06	663, 000
2-Methyl-2-propanamine with borane (1:1)	15	1366, 700
Methyl propionate	07	162, 665
Methylpropyl ketone	15	829, 500
Methylpiperidone	15	830, 000
1-Methyl-2-pyrrolidone, monomer	15	120, 000
Methyl ricinoleate	11	110, 000
Methyl stearate	15	978, 000
α-Methylstyrene	03	1125, 000
α-Methylstyrene (Vinyltoluene)	08	45, 000
Methyl sulfide (Dimethyl sulfide)	15	1013, 000
Methyl sulfoxide (Dimethyl sulfoxide)	15	1365, 000
N-Methyl-N-(tall oil acyl)aurine, sodium salt	12	166, 000
Methyl-1-tallowamidoethyl-2-tallowimidazolium-methyl sulfate	12	496, 700
Methylalodiethylenetriamine condensate, polyethoxylated,methyl sulfate	12	465, 200
Methylaloxylated,methyl sulfate	06	641, 200
Polypyrrolidone, methyl sulfate	15	82, 800
Methyl tetrahydrofuran (Methyl THF)	15	120, 300
Methyl tetrahydrothiathal anhydride	03	1128, 500
Methylthiobenzolic acid	15	120, 400
Methyl thio phacalone oxime	13	205, 925
Methylthiosulfonic acid, S-(2-hydroxypropyl) ester	12	499, 300
Methyl tri(C9-10) ammonium chloride	15	175, 300
1-Methyl-3,5,7-triaza-1-azonia tricyclodisane chloride	15	1390, 000
Methyltrimethoxysilane and polymethyltrisiloxane	12	499, 000
Methyltricyclammonium chloride	07	163, 000
2-Methylundecanal	15	1322, 000
Methyl vinyl ether	06	81, 300
Metoclopramide hydrochloride	06	358, 300
Metoprolol tartrate	06	177, 000
Metronidazole	06	578, 000
Metryrapone	06	578, 000
Mexane-1,6-bis(tributyl ammonium bromide)	12	497, 500
Mexylsulfonamidocarboxylic acid, monoethanolamine salt	12	26, 150
Mink amidopropyl dimethyl amine (amine acid ratio=1/1)	12	564, 450
Mincycline	06	35, 000
Minoxidil	06	358, 400
Miscellaneous acyclic chemicals, all other	15	1423, 000
Mitomycin	06	279, 350
Mixed cyclic primary amines, ethoxylated and sulfated, sodium salt	12	14, 000
Mixed alcohol borates	12	1366, 720
Mixed alcohols, ethoxylated	12	762, 000
Mixed alkanesulfonic acid	12	211, 000
Mixed alkane sulfonic acid, sodium salt	12	512, 000
3-(3-Mixed alkoxy)propylammonopropyl amine (Mixed alkyl) amine	12	330, 955
(Mixed alkyl) amine, ethoxylated	12	423, 000
(Mixed alkyl) amine phosphate	12	331, 000
(Mixed alkyl) amine phosphate	12	394, 700

Chemical name	Sect. Item No.	Item No.
(Mixed alkyl)ammonium chloride	12	499, 500
Mixed alkyl benzoate	12	714, 450
Mixed 1- or -alkylcarboxylic acid salts	15	671, 100
Mixed alkyl imidazole derivative, ethoxylated	12	465, 300
(Mixed alkyl)phenol, alkoxyated	12	745, 900
(Mixed alkyl)phenol alkylene diamine/alkanolamine formaldehyde	12	762, 950
(Mixed alkyl)phenol epichlorohydrin-formaldehyde, alkoxyated	12	722, 100
(Mixed alkyl)phenol, ethoxylated	12	746, 000
(Mixed alkyl)phenol, ethoxylated, butyl ether	12	747, 000
(Mixed alkyl)phenol, ethoxylated and sulfated, sodium salt	12	286, 000
(Mixed alkyl)phenol-formaldehyde, alkoxyated	12	722, 000
Mixed alkyl phenol sulfate, ethoxylated, triethanolamine salt	12	244, 300
Mixed alkyl phosphate, sodium salt	12	102, 100
Mixed alkyl phosphate, alkylamine salt	12	101, 500
Mixed alkyl phosphate, diethanolamine salt	12	102, 000
Mixed alkyl phosphate, potassium salt	12	102, 050
Mixed alkyl phosphate, triethanolamine salt	12	102, 120
N-(Mixed alkyl)polyethylenepolyamine	12	412, 000
Mixed alkyl stearate	12	714, 520
(Mixed alkyl)sulfobetaine	12	15, 000
Mixed alpha-olefins and vegetable	12	318, 465
Mixed animal and vegetable oil, sulfated, sodium salt	12	289, 800
Mixed aryl dimides	14	167, 000
Mixed carboxylic acids	12	536, 450
Mixed (coco and soya fatty acids), reaction products with chloromethane and diethylenetriamine, ethoxylated, quaternized	12	477, 220
Mixed fatty acid amide with diethylene triamine/ethyl sulfate	12	477, 226
Mixed fatty acid-ethoxylated nonyl phenol ester	12	763, 500
Mixed fatty acids-alkylenediamine condensate, polyethoxylate	12	377, 000
Mixed fatty acids, alkyl ether, ethoxylated	12	671, 100
Mixed fatty acids, carnine/acid ratio=1/1	12	547, 855
Mixed fatty acids, diethanolamine condensate	12	578, 800
Mixed fatty acids, neutralized	12	536, 570
Mixed fatty acids-polyalkylenepolyamine condensate	12	361, 000
Mixed fish oils, sulfated, ammonium salt	12	299, 930
Mixed fish oils, sulfated, sodium salt	12	300, 000
Mixed higher glycol amine (MHGA)	15	430, 500
Mixed linear alcohols, alkoxyated, all other	12	741, 000
Mixed linear alcohols, alkoxyated	12	736, 950
Mixed linear alcohols, alkoxyated and phosphated, potassium salt	12	87, 007
Mixed linear alcohols, ethoxylated	12	737, 000
Mixed linear alcohols, ethoxylated, benzyl ether	12	757, 100
Mixed linear alcohols, ethoxylated and carbonated, sodium salt	12	318, 500
Mixed linear alcohols, ethoxylated and phosphated, sodium salt	12	87, 000

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Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
sodium salt	12	Myrcene	15
Mixed linear alcohols, ethoxylated and propoxylated	12	Myrcenyl acetate	07
Mixed linear alcohols, ethoxylated and sulfated, ammonium salt	12	Myristaldehyde	07
Mixed linear alcohols, ethoxylated and sulfated, sodium salt	12	Myristic acid (Ratio=1/1)	11
Mixed linear alcohols, sulfated, ammonium salt	12	Myristic acid esters, all other	11
Mixed linear alcohols sulfated, mixed sodium/cocodethanolamine salts	12	Myristyl alcohol, propoxylated	12
Mixed linear alcohols, sulfated, sodium salt	12	Myristylbenzyltrimethylammonium chloride·2H <sub>2</sub> O	03
Mixed linear alcohols, sulfated, triethanolamine salt	12	Myristyl bromide	15
(Mixed linear alkyl)dimethyl ammonium methyl sulfate	12	Myristyl lactate	15
Mixed linear olefin sulfonate	12	Myristyl myristate	15
Mixed oleic, lauric, stearic, and palmitic hexacyclic esters	12	Nadocil	06
Mixed polyesters	12	Nadocil, sodium	06
Mixed (secondary linear alcohol)polyethylene propionic acid, sodium salt	12	Naphazoline hydrochloride	03
Mixed tall oil and rosin acids, ethoxylated	12	1-Naphthaldehyde	02
Mixed tridecyl alcohol and 2-ethylnhexanol, phosphated, potassium salt	12	Naphthalene	01
Mixed vegetable fatty acids, potassium salt	12	Naphthalene, crude, solidifying at less than 74° C	01
Mixed vegetable fatty acids, sodium salt	12	Naphthalene, crude, solidifying at 76° C to less than 79° C	01
Mixed vegetable oils (Ratio = 2/1)	12	2,6-Naphthalenedicarboxylic acid	01
Mixed vegetable oils, sulfated, sodium salt	12	Naphthalenesulfonates, all other	02
Mixed vegetable oils, sulfated, sodium salt	12	2-Naphthalenesulfonic acid	03
Mixed wool grease and tall oil fatty acids	12	1-Naphthalenesulfonic acid, formaldehyde condensate and salt	14
Mixture of N-octyl, N-decyl, N,N-dimethyl ammonium chloride and benzyl, dimethyl, (mixed alkyl) ammonium chloride	12	2-Naphthalenesulfonic acid, formaldehyde condensate and salt	14
Mixtures not specifically itemized, all other	15	Naphthalene sulfonic acid, polymer with formaldehyde and 4,4'-dihydroxydiphenyl sulfone	12
Mixtures of alcohols, C <sub>12</sub> and higher, other	15	Naphthalene sulfonic acid, polymer with formaldehyde, sodium salt	12
Modified resin (Unsulfated)	08	2-Naphthalenesulfonic acid, sodium salt	03
Modified resin esters	08	Naphthalene sulfonic acid, sodium salt, formaldehyde condensate	12
Modified succlimides	14	Naphthalimide	03
Moeslin	06	Naphthalimide driers, mixed salts	14
Monethanolamine	15	Naphthalenic acid, acid number 150-199	02
Monoisopropanolamine	15	Naphthalenic acid, acid number 200-224	02
Monomethyl tin	15	Naphthalenic acid, acid number less than 150	02
Mordant Brown 1	04	Naphthalenic acid copper salt	13
Mordant Brown 18	04	Naphthalenic acid, ethoxylated	12
Mordant Brown 33	04	Naphthalenic acid-polyalkylene polyamine condensate	12
Mordant Brown 70	04	Naphthalenic acids-tall oil fatty acids-polyalkylene polyamine condensate	12
Mordant Orange 1	04	1-Naphthyl ethoxylated and sulfated, free acid	12
Mordant Orange 6	04	Naphthol reds, all other	05
Mordant orange dyes, all other	04	1,2-Naphthoquinone-2-diazide-5-sulfonyl chloride (215-sulfonyl chloride)	15
Mordant Yellow 20	04	α-Naphthylamine	03
Morphine sulfate	08	p-(2-Naphthylamino)phenol [N-(p-Hydroxyphenyl)-2-naphthylamine]	03
Morpholine	15	Naphthylamine	13
Morpholine salt of gluconic acid	15	1-Naphthyl N-methylcarbamate (Carbaryl)	13
Morpholine salt of p-toluene sulfonic acid	15	N-1-Naphthylthalamic acid (NPA)	13
Morpholine salt of p-toluene sulfonic acid	09	Naphthalene sulfonic acid, polymer with formaldehyde and 4,4'-dihydroxydiphenyl sulfone, ammonium salt	12
N-Morpholinyl-2-benzothiazoyl disulfide	14	Natural fats and oils, ethoxylated, all other	12
N-Morpholinyl-2,5-dibutoxybenzene diazonium chloride	06		
Moxalactam	06		
Mustard seed oil, sulfated, sodium salt	12		

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Chemical name	Sec't. Item No.	Chemical name	Sec't. Item No.
(NBR) type	10	5-Nitrodimethylisophthalate	03
Neat's foot oil, sulfated, sodium salt	12, 000	Nitrodiphenylamine	03
Neo-C <sub>9</sub> -C <sub>12</sub> acids	294, 000	Nitroethane	15
Neoalkoxy, dodecylbenzene-sulfonyl titanate	555, 970	Nitrogenous compounds, acyclic, all other	15
Neoalkoxy, tri[ <i>m</i> -amino]-phenyl titanate	137, 500	Nitrosophthalic acid	03
Neoalkoxy, trineodecanoyl titanate	331, 850	Nitrosophthalic acid	15
Neoalkoxy, trineodecanoyl titanate	59, 600	Nitrosophthalic acid	15
Neoalkoxy, tris[ <i>m</i> -amino] phenyl zirconate	59, 620	3-Nitro-4-methylacetophenone	03
Neoalkoxy, tris[ <i>m</i> -amino] phenyl zirconate	331, 890	<i>p</i> -Nitrophenol	03
Neodecanoic acid	102, 550	<i>p</i> -Nitrophenol, sodium salt	03
Neodecanoic acid	556, 000	<i>p</i> -Nitrophenol	03
Neodecanoyl chloride	557, 000	2-Nitropropane	15
Neodecanoyl chloride	557, 100	2-Nitropropane	15
Neohexane (2,2-Dimethylbutane)	67, 000	3-(and 5)-Nitrosalicylic acid	03
Neomycin (medicinal grade)	62, 000	<i>p</i> -Nitrosophenol	03
Neomycin (animal feed grade)	69, 000	4-Nitrosophenol, sodium salt	03
Neopentyl glycol adipate	64, 500	N-Nitrosophenylhydroxylamine salt	03
Neopentyl glycol diglycidyl ether	11, 000	<i>m</i> -Nitrotoluene	03
Neopentyl glycol diborate	34, 250	<i>p</i> -Nitrotoluene	03
Neopentyl glycol glutarate	123, 810	<i>p</i> -Nitrotoluene mixtures	03
Neopentyl chloride	5, 000	(2-Nitro-4-trifluoromethylphenyl)acetic acid	03
Neostigmine methylsulfate	72, 000	Nitrotoluene	03
Netilmicin	8, 000	Nitrotoluene	03
Niacin (medicinal grade)	73, 500	Nitrotoluene	03
Niacinamide (medicinal grade)	60, 000	Nitrotoluene	03
Nickel acetate	64, 000	Nitrotoluene	03
Nickel polacrilix	8, 000	Nitrotoluene	03
Nicotinic acid, 2-(4-isopropyl-4-methyl-5-oxo-2-irridazolyl)-1-	13, 118, 073	Nitrotoluene	03
Nicotinitrile (β-Cyanopyridine)	03, 162, 000	Nitrotoluene	03
Nicotinyl alcohol tartrate	06, 373, 000	Nitrotoluene	03
Nicodipole	06, 374, 200	Nitrotoluene	03
2-Nitro-6-pyrrolidinyl toluene	03, 158, 000	Nitrotoluene	03
Nitarsone	06, 458, 000	Nitrotoluene	03
Nitrated oil	15, 431, 000	Nitrotoluene	03
Nitrates, all other	15, 457, 000	Nitrotoluene	03
Nitric acid, zinc salt	14, 85, 000	Nitrotoluene	03
Nitroacetic acid	14, 78, 000	Nitrotoluene	03
Nitroacetic acid, trisodium salt	14, 81, 000	Nitrotoluene	03
Nitroacetic acid, trisodium salt	14, 82, 000	Nitrotoluene	03
Nitro-tris-methylene triphosphonic acid	14, 83, 000	Nitrotoluene	03
Nitro-tris-methylene triphosphonic acid, potas	14, 84, 000	Nitrotoluene	03
Nitro-tris-methylene triphosphonic acid, sodium salt	14, 84, 000	Nitrotoluene	03
<i>o</i> -Nitroaniline	03, 1172, 000	Nitrotoluene	03
5-Nitroanthranilic acid	03, 1173, 000	Nitrotoluene	03
1-Nitroanthraquinone	03, 1185, 000	Nitrotoluene	03
Nitrobenzamide	03, 187, 503	Nitrotoluene	03
Nitrobenzene	03, 190, 000	Nitrotoluene	03
<i>m</i> -Nitrobenzenesulfonic acid, sodium salt	03, 195, 000	Nitrotoluene	03
6-Nitrobenzimidazole	14, 371, 000	Nitrotoluene	03
<i>o</i> -Nitrobenzoyl chloride	03, 1200, 503	Nitrotoluene	03
<i>p</i> -Nitrobenzoyl chloride	03, 1200, 503	Nitrotoluene	03
<i>p</i> -Nitrobenzoic acid	03, 1201, 000	Nitrotoluene	03
4-(2-Nitrobutyl) morpholine	03, 1205, 000	Nitrotoluene	03
4-(2-Nitrobutyl) morpholine	15, 122, 406	Nitrotoluene	03
2-Nitro- <i>p</i> -cresol	03, 1210, 000	Nitrotoluene	03
5-Nitrodimethylisophthalate	03, 1215, 150	Nitrotoluene	03
Nitrodiphenylamine	03, 1212, 000	Nitrotoluene	03
Nitroethane	15, 459, 000	Nitrotoluene	03
Nitrogenous compounds, acyclic, all other	15, 484, 000	Nitrotoluene	03
Nitrosophthalic acid	03, 1215, 000	Nitrotoluene	03
Nitrosophthalic acid	15, 460, 000	Nitrotoluene	03
Nitrosophthalic acid	15, 460, 000	Nitrotoluene	03
3-Nitro-4-methylacetophenone	03, 1215, 350	Nitrotoluene	03
<i>p</i> -Nitrophenol	03, 1224, 000	Nitrotoluene	03
<i>p</i> -Nitrophenol, sodium salt	03, 1228, 000	Nitrotoluene	03
<i>p</i> -Nitrophenol	03, 1228, 000	Nitrotoluene	03
2-Nitropropane	15, 461, 000	Nitrotoluene	03
2-Nitropropane	15, 461, 000	Nitrotoluene	03
3-(and 5)-Nitrosalicylic acid	03, 1238, 000	Nitrotoluene	03
<i>p</i> -Nitrosophenol	03, 1240, 000	Nitrotoluene	03
4-Nitrosophenol, sodium salt	03, 1240, 000	Nitrotoluene	03
N-Nitrosophenylhydroxylamine salt	03, 1240, 100	Nitrotoluene	03
<i>m</i> -Nitrotoluene	03, 1243, 000	Nitrotoluene	03
<i>p</i> -Nitrotoluene	03, 1243, 000	Nitrotoluene	03
<i>p</i> -Nitrotoluene mixtures	03, 1245, 000	Nitrotoluene	03
(2-Nitro-4-trifluoromethylphenyl)acetic acid	03, 1245, 500	Nitrotoluene	03
Nitrotoluene	03, 1245, 500	Nitrotoluene	03
Nitrotoluene	06, 629, 800	Nitrotoluene	06
Nitrotoluene	07, 165, 000	Nitrotoluene	07
Nitrotoluene	15, 1344, 000	Nitrotoluene	15
Nitrotoluene	15, 1344, 000	Nitrotoluene	15
1,3-Nonanediol acetate	07, 165, 200	Nitrotoluene	07
Nonanoic acid (Pterogenic acid)	15, 559, 000	Nitrotoluene	15
Nonane (Tripropylene)	02, 80, 000	Nitrotoluene	02
Nonylsuccinic anhydride	15, 165, 770	Nitrotoluene	15
Nonylsuccinic anhydride	12, 787, 000	Nitrotoluene	12
Nonylsuccinic anhydride	12, 787, 000	Nitrotoluene	12
Nonylsuccinic anhydride	08, 27, 000	Nitrotoluene	08
Nonylsuccinic anhydride	09, 76, 700	Nitrotoluene	09
Nonylsuccinic anhydride	09, 171, 250	Nitrotoluene	09
tert-Nonyl mercaptan	03, 1262, 000	Nitrotoluene	03
Nonylphenol	15, 122, 462	Nitrotoluene	15
Nonylphenol, alkoxyated/aminated	14, 229, 000	Nitrotoluene	14
Nonylphenol, barium salt	12, 749, 000	Nitrotoluene	12
Nonylphenol, ethoxylated	12, 749, 000	Nitrotoluene	12
Nonylphenol, ethoxylated and carbonated, sodium salt	12, 318, 640	Nitrotoluene	12
Nonylphenol, ethoxylated and phosphated	12, 318, 640	Nitrotoluene	12
Nonylphenol, ethoxylated and phosphated, diethanolamine salt	12, 318, 640	Nitrotoluene	12
Nonylphenol, ethoxylated and phosphated, sodium salt	12, 318, 640	Nitrotoluene	12
Nonylphenol, ethoxylated, phosphated esters	12, 83, 100	Nitrotoluene	12
Nonylphenol, ethoxylated, phosphated esters	12, 83, 200	Nitrotoluene	12
Nonylphenol, ethoxylated, propoxylated	12, 750, 010	Nitrotoluene	12
Nonylphenol, ethoxylated and propoxylated	12, 750, 010	Nitrotoluene	12
Nonylphenol, ethoxylated and sulfated, ammonium salt	12, 287, 000	Nitrotoluene	12
Nonylphenol, ethoxylated and sulfated, sodium salt	12, 288, 000	Nitrotoluene	12
Nonyl phenol, ethoxylated with mixed fatty acids	12, 750, 050	Nitrotoluene	12
Nonylphenol-formaldehyde, alkoxyated	12, 723, 000	Nitrotoluene	12
Nonylphenol glycolyl ether	15, 122, 470	Nitrotoluene	15
Nonyl phenol oleate, ethoxylated	12, 749, 500	Nitrotoluene	12
Nonylphenol poly(ethyleneoxy)acetic acid, sodium salt	12, 45, 900	Nitrotoluene	12
Nonylphenol poly(ethyleneoxy)acetic acid, sodium salt	12, 45, 900	Nitrotoluene	12
Nonylphenol poly(ethyleneoxy)ethyl iodide	12, 751, 000	Nitrotoluene	12
Nonylphenyl phosphite, mixed	09, 85, 000	Nitrotoluene	09
Nonylphenyl glycol dicaprate	15, 1126, 400	Nitrotoluene	15
Nonyl acetate	07, 115, 000	Nitrotoluene	07
2-Nor-tal oil alkyl-1-tal oil amido-ethyl imidazole	12, 361, 050	Nitrotoluene	12
Nortriptyline hydrochloride	06, 531, 000	Nitrotoluene	06

Table D-1—Continued  
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Chemical name	Sect. Item No.	Sect. Item No.
Noscapine	06	434,500
Novobion, sodium	06	53,000
Nylon 6 (polymer for fiber, only)	14	388,000
Nylon 6,6	09	389,000
Nylon type, polyamide resins	08	25,000
Nystatin (medical grade)	09	3,700
Ocimeprate	07	163,700
Ocimeprate acetate	07	193,700
Octabromdiphenyl oxide	15	142,500
Octachlorohydro-4,7-methanoindene (Chordan)	15	143,000
n-Octadecane	15	1346,000
Octadecanoic acid, 2-(1-carboxyethoxy)-1-methyl-2-oxoethyl ester, sodium salt	15	1355,150
1-Octadecanol (Stearyl alcohol)	15	877,000
Octadecanetriole (Oleonorfile)	15	450,000
cis-9-Octadecen-1-ol (Oleyl alcohol)	15	678,000
9-Octadecenyl acetate, sulfated, sodium salt	12	267,800
9-Octadecenyl alcohol, ethoxylated	12	731,000
9-Octadecenyl alcohol, ethoxylated and phosphated	12	84,000
9-Octadecenylamine	12	432,000
9-Octadecenylamine, ethoxylated	12	324,000
Octadecyl succinic anhydride	15	165,800
N-(9-Octadecyl)trimethylenediamine	15	165,800
Octadecylamine, ethoxylated and phosphated, sodium salt	12	413,000
Octadecyl alcohol, ethoxylated	12	112,630
Octadecylamine	12	732,000
Octadecylamine acetate	12	425,000
Octadecylamine, ethoxylated	12	396,000
Octadecyl-dibenzyltrimethyl-1,3-propane diammonium chloride	12	333,000
Octadecyl-3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionate	12	527,670
N-Octadecyl-N,N-di(2-hydroxyethyl)-N-methylammonium chloride	15	124,000
Octadecylnitriole	12	465,400
N-Octadecylsulfosuccinamic acid, disodium salt	15	450,100
Octahydro-5-methoxy-4,7-methano-1H-indene, 2-carboxaldehyde	12	179,000
Octanal	07	64,600
n-Octane	07	166,000
n-Octane	15	1348,000
n-Octanesulfonic acid, sodium salt	02	75,000
1-Octanol	15	212,100
2-Octanol (sec-Capryl alcohol)	15	866,000
2-Octanone (Hexyl methyl ketone)	15	867,000
Octanoyl chloride	15	831,000
Octenes, mixed	02	75,700
Octenylsuccinic anhydride	15	165,820
N-Octyl acetate	07	166,300
tert-Octylamine	15	293,100
n-Octylamine, mono	11	293,000
n-Octyl n-decyl adipate	11	65,000
Octyl decyl dimethyl ammonium chloride	12	500,700
N-Octyl, N,N-dimethyl ammonium chloride	12	483,200
n-Octyl n-decyl phthalate	11	49,000
2-Octyldecyl-12-stearoyl stearate	11	124,540
Octyldimethylamine oxide	12	333,050
Octyldiphenylamine	09	77,000
Octyldiphenylamine, alkylated	09	78,000
Octyl formate	07	166,355
N-n-Octyl glucamine	15	464,500
Octyl isobutyrate	03	166,358
2-n-Octyl-4-isothiazolin-3-one	17	25,500
Octyl isovalerate	07	166,360
n-Octyl mercaptan	09	171,400
Octyl mercaptans	02	95,010
Octylmethoxy cinnamate	15	124,800
Octylphenol	03	1265,000
O-Octylphenol, ethoxylated	12	752,000
O-Octylphenol, ethoxylated and phosphated	12	85,000
O-Octylphenol, ethoxylated and sulfated, sodium salt	12	290,000
tert-Octylphenol, ethoxylated and sulfonated, sodium salt	12	208,000
Octylphenol-formaldehyde, ethoxylated	12	724,000
Octylphenoxydioxychloride	03	1265,118
Octylphenoxy polyethoxy ethyl sulfate	12	290,100
Octyl phosphate	12	105,000
Octyl phosphate, alkylamine salt	12	106,000
Octyl phosphate, isopropoxy titanium salt	12	106,700
Octyl phosphate, neodecyl titanium salt	12	108,000
Octyl polyphosphate	12	109,000
Octyl polyphosphate, potassium salt	12	110,100
Octyl pyrophosphate, ethylenedioxy titanium salt	12	110,150
Octyl pyrophosphate, isopropoxy titanium salt	12	110,160
Octyl pyrophosphate, neodecyl titanium salt	12	110,170
Octyl pyrophosphate, titanium salt	12	110,200
Octyl sulfate, sodium salt	12	238,000
N-Octyltriethoxy silane	15	1990,500
Oil-soluble petroleum sulfonate, all other	15	217,000
Oil-soluble petroleum sulfonate, barium salt	14	213,000
Oil-soluble petroleum sulfonate, calcium salt	14	212,000
Oil-soluble petroleum sulfonate, magnesium salt	14	214,000
Oil-soluble petroleum sulfonate, mixed salts	14	214,500
Oil-soluble petroleum sulfonate, sodium salt	14	215,000
Oleamide (Octadecene amide)	15	250,000
Oleamidopropyl betaine	15	9,900
Oleamidopropyl dimethyl amine	12	38,900
Oleamidoliposuccinamic acid, disodium salt	12	197,000
Oleic acid (Ratio = 1/1)	12	548,900
Oleic acid (Ratio = 2/1)	12	548,000
Oleic acid	15	558,000
Oleic acid, ammonium salt	15	553,800
Oleic acid, diethanolamine salt	12	29,900
Oleic acid-N,N-dimethyltrimethylenediamine condensate	12	365,800
Oleic acid esters, all other	11	96,000
Oleic acid-ethanolamine condensate, ethoxylated	11	579,000
Oleic acid-ethoxylated and propoxylated	12	671,505
Oleic acid-ethylenediamine condensate, propoxylated and sulfated, sodium salt	12	16,000
Oleic acid, mixed isopropanolamine salt	12	30,400
Oleic acid, potassium salt	12	60,000

Table D-1—Continued  
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Chemical name	Sect. Item No.	Sect. Item No.
Oleic acid, sodium salt	61,000	06
Oleic acid, sulfated, disodium salt	281,700	11
Oleic acid, sulfated, sodium salt	291,800	12
Oleic acid, triethanolamine salt	291,800	12
N-(Oleoyloxypropyl)sulfobuccinamic acid	180,000	15
Oleoylamine	251,000	12
Oleoylamine dihydrochloride	209,000	12
Oleoyl acid phosphate	732,100	12
Oleoyl alcohol, ethoxylated	16,100	12
Oleoyl betaine	94,500	11
Oleoyl oleate	212,200	12
Oleoyl ethylenediamide oxypropyl sulfonic acid	238,200	12
Oleoyl sulfate, sodium salt	212,200	12
Olive oil acids, potassium salt	81,950	12
Olive oil acids, potassium salt	136,700	15
Organo-aluminum compounds, all other	13,711,000	02
Organo-boron compounds, all other	165,000	02
Organophosphorus insecticides, cyclic, all other	13,999,000	02
Organosilicone compounds, all other	14,007,000	02
Organotin compounds, all other	14,004,910	02
Organotin mercaptides	265,500	06
Organotin phosphates	479,500	06
Organotin citrate	06	06
Other copolymer resins of acrylic and/or methacrylic acid esters	20,000	08
Other ethylene copolymer resins	31,800	08
Other homopolymer resins of acrylic and/or methacrylic acid esters	20,050	08
Other homopolymer resins of acrylic and/or methacrylic acid esters	120,000	14
7-Oxabicyclo-[2, 2, 1]-heptane-2,3-dicarboxylic acid, disodium salt (Endothal)	83,000	13
Oxacillin, sodium	18,000	06
Oxamide	251,250	15
Oxidized light ends	1451,000	15
Oxidized Fischer-Tropsch wax	566,000	15
Oxidized hydrocarbon mixture	218,000	14
Oxalalcohol bottoms, sulfated, sodium salt	238,500	12
Oxalaluminum isopropoxide	1363,050	15
Oxalaluminum stearate	1363,100	15
5-Oxo-1-phenyl-2-pyrazoline-3-carboxylic acid, ethyl ester	1273,000	03
Oxo process bottoms	1451,300	15
Oxtriphylline	745,800	06
Oxy-aluminum octanoate	1363,200	15
p,p'-Oxybis(benzenesulfonhydrazide)	109,000	09
Oxybutynin chloride	301,500	06
Oxycodone hydrochloride	406,000	06
Oxycodone tartrate	406,100	06
4,4'-Oxydianiline	1275,000	03
N-Oxydiethylene-2-benzothiazolesulfenamidesulfenamides	34,000	09
N-Oxydiethylenethiocarbonyl-N'-oxydiethylene-sulfenamides	34,100	09
Oxygen-containing quaternary ammonium salts (Except those having amide linkages), all other	467,000	12
Oxyphenacylimine hydrochloride	302,000	06
Oxyquinoline benzoate (benoxiquine)	268,000	06
Oxyquinoline citrate	269,000	06
Oxytetracycline (medicinal grade)	36,000	08
Oxytetracycline (animal feed grade)	72,000	06
Painitic acid esters, all other	101,000	11
Painitic and stearic acids (Ratio = 2/1)	540,000	12
Painitic and stearic acids, sodium salt	63,350	15
Painitoyl chloride (Ratio=1/1)	567,000	12
Palm kernel oil acids, potassium salt	549,100	12
Palm kernel oil acids, sodium salt	62,880	12
Palm oil acids-ethylenediamine condensate, monoethoxylated	62,900	12
Palm oil acids, sodium salt	379,000	12
Paranthol	63,000	12
Papain	790,000	06
Papaverine hydrochloride	102,000	14
papa-Cymene	746,000	06
n-Paraffins, other	85,000	07
n-Paraffins, C <sub>10</sub> -C <sub>14</sub>	84,000	02
n-Paraffins, C <sub>10</sub> -C <sub>16</sub>	84,250	02
n-Paraffins, C <sub>12</sub> -C <sub>16</sub>	84,260	02
n-Paraffins, C-C <sub>6</sub>	81,000	02
n-Paraffins, C-C <sub>8</sub>	83,000	02
Paralformaldehyde	1176,500	15
Parahydroxyphenylglycine potassium methyl dane salt	1121,650	03
Peanut oil, sulfated, sodium salt	310,000	12
Pectinase	116,000	14
Pelargonic acid, calcium salt (Calcium nonoate)	730,200	15
Pelargonic acid esters, all other	101,500	11
Pelargonic acid-tetraethylenepentamine condensate	366,000	12
Pelargonic alcohol, ethoxylated	732,300	12
Pemoline	547,500	06
Penicillin V	26,000	06
Penicillin G, benzathine	21,000	06
Penicillin G, potassium	22,000	06
Penicillin V, potassium	29,000	06
Penicillin G, procaine (animal feed grade)	74,000	06
Penicillin G, procaine (medicinal grade)	23,000	06
Pentachlorophenol, sodium salt	29,000	13
Pentaerythritol	1091,000	15
Pentaerythritol esters	286,000	14
Pentaerythritol stearate	1129,000	15
Pentaerythritol stearate	715,100	12
Pentaerythritol tetraakis (3-Mercaptopropionate)	1131,000	15
Pentaerythritol tetraacetate	1131,300	15
Pentaethylenehexamine	294,000	15
1, 1, 3, 3, 5-Pentamethyl-4, 6-dinitrohdan (Moskene)	64, 900	07
N,N,N',N',N'-Pentamethyl-N-(tallow alkyl)trimethylene-bis[ammonium chloride]	501,000	12
Pentamide isethionate	270,700	06
n-Pentane	55,000	02
1,5-Pentanediol	1092,000	15
2,4-Pentanediol (Acetylacetone)	833,000	15
1-Pentanol	843,000	15
3-Pentanone (Diethyl ketone)	835,000	15
Pentazocine	416,001	06
Pentazocine hydrochloride	416,001	06
2-Pentene	57,000	02

Table D-1—Continued  
Alphabetical Chemical Index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Pentenes, mixed	02	1-Phenol-2-sulfonic acid, formaldehyde condensate	14
Pentyl acetate	07	[Phenol-formaldehyde, sulfonated]	03
Pentylamine, mono-	15	Phenolsulfonic acid, sodium salt	03
$\alpha$ -Pentylcinnamaldehyde	07	Phenol, synthetic, all other	03
$\alpha$ -Pentylphenol	03	Phenol, synthetic, by caustic fusion, all other	03
<i>o</i> -tert-Pentylphenol	03	Phenol, synthetic, from chlorobenzene by vapor-phase hydrolysis, U.S.P.	03
Pepsin	14	Phenol, synthetic, from cumene by oxidation, U.S.P.	03
Perchloroethylene (Tetrachloroethene)	15	Phenoxyacetic acid derivatives, all other	13
Perchloromethanethiol (Perchloromethyl mercaptan)	15	Phenoxyacetic acid, sodium salt	03
Perfluoralkyl polyether	15	3-Phenoxybenzaldehyde	03
Perfluorothiol, C <sub>8</sub> -C <sub>10</sub> , gamma-omega	15	3-Phenoxybenzylidene cyanohydrin	06
Peroxyacetic acid (Peracetic acid)	06	Phenoxybenzamine	03
Perphenazine	06	3-Phenoxybenzoinethanol	03
3,4,9,10-Perylene-tetracarboxylic-3,4:9,10-dianhydride	03	2-Phenoxyethanol (Ethylene glycol monophenyl ether)	15
3,4,9,10-Perylene-tetracarboxylic-3,4:9,10-dilimide	03	3-(Phenoxyphenyl)acrylonitrile	07
Pesticides and related products, acyclic, all other	13	3-(Phenoxyphenyl)acrylonitrile, trans-3-(2,2-dichloroethenyl)-2,2-dimethyl cyclopropane carboxylate	13
Pesticides and related products, cyclic, all other	13	Phenol	08
Petroleum hydrocarbon resins	08	Phenol (other than for coating and adhesives)	08
Petroleum sulfonic acid, water soluble (Acid layer), sodium salt	12	Phenol-2,4-dinitrophenyl ether	03
1,10-Phenanthroline	03	Phenol-2,4,6-trinitrophenyl ether	03
Phendimethazine tartrate	06	Phenol-2,4,6-trinitrophenyl ether, sodium salt	06
Phenethyl acetate	07	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether	06
Phenethyl alcohol	07	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
2-Phenethylamine	03	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenethyl bromide	03	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenethyl formate	07	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenethyl isobutyrate	07	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenethyl isovalerate	07	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
2-Phenethyl-2-phenylacetate	12	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenethyl propionate	07	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenethyl salicylate	07	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenethyl sulfonate	07	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenethylamine	03	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenethylamine tartrate	08	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenobarbital, sodium	08	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol	03	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol, alkylated	03	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol, benzoylated	12	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol, ethoxylated	12	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol, ethoxylated and phosphated	12	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol-formaldehyde resin (with lignite)	09	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol, hindered	09	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenolic antioxidants, all other	08	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenolic and other tar acid resins	08	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol, natural, from petroleum, all other	03	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol, natural, from petroleum, U.S.P.	12	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol, propoxylated	12	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol salts, all other	14	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenols, ethoxylated, all other	12	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol, styrenated	09	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol, styrenated, mixtures	09	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenolsulfonaphthalein	03	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenolsulfonaphthalein, sodium salt	03	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	06
Phenol-sulfonated formaldehyde resin	15	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	03
Phenolsulfonated formaldehyde resin, 2,2'-[[Phenylimino]diethanol (N-Phenylidene thanolamine)	03	Phenol-2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt, 2,4,6-trinitrophenyl ether, sodium salt	03

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Item No.	Chemical name	Sect. Item No.	Item No.
2,2'-(Phenyl)imino]diethanol, diacetate ester	13	1327 500	Picramic acid, sodium salt	15	1362 000
Phenyl-5-mercaptopotrazole	04	375 000	Picric acid (Trinitrophenol)	03	1362 000
o-Phenylphenol	03	1330 000	Pigment Black 7	05	143 007
p-Phenylphenol	03	1331 000	Pigment black toners, all other	05	144 000
N-Phenylphenol sodium salt	03	1333 000	Pigment Blue 1, (PMA)	05	99 000
N-Phenyl-2-phenylenediamine	03	1334 000	Pigment Blue 1, (PTA)	05	100 000
Phenylphosphinic acid	03	1334 100	Pigment Blue 2, (PMA)	05	102 000
Phenylphosphinic acid, potassium salt	03	1334 102	Pigment Blue 14, (PMA)	05	111 000
Phenylphosphinic acid, sodium salt	03	1334 101	Pigment Blue 15, (α form)	05	113 010
1-Phenyl-1,2-propanedione, 2-oxime	03	1338 000	Pigment Blue 15:1, (α form)	05	113 020
3-Phenyl-1-propanol (Hydroclimamic alcohol)	07	78 000	Pigment Blue 15:2, (α form)	05	113 030
Phenylpropanolamine	15	134 660	Pigment Blue 15:3, (β form)	05	114 010
Phenylpropanolamine bitartrate	06	343 500	Pigment Blue 15:4, (β form)	05	114 020
Phenylpropanolamine hydrochloride	06	343 000	Pigment Blue 19	05	116 000
3-Phenylpropyl acetate	07	79 000	Pigment Blue 25	05	119 000
3-Phenylpropyl cinnamate	07	79 200	Pigment Blue 61	05	120 061
1-Phenyl-3-pyrazolidone	03	1339 853	Pigment Blue 62	05	120 062
Phenylstyrene, ethoxylated	12	754 080	Pigment Brown 5	05	124 000
di-Phenylsuccinic acid	03	1341 009	Pigment Brown toners, all other	05	140 000
5-Phenyltetrazole	09	109 200	Pigment Green 1, (PMA)	05	125 000
Phenyltoloxamine citrate	06	104 000	Pigment Green 2, (PTA)	05	128 000
Phenyltrimethyl ammonium chloride	03	1342 400	Pigment Green 4, (fugitive)	05	129 000
Phenyl xylol ethane	15	134 800	Pigment Green 4, (PMA)	05	132 000
Phenytolol	06	423 300	Pigment Green 7	05	132 000
Phenytolol, sodium	06	423 600	Pigment Green 8	05	133 000
Phosgene (Carbonyl chloride)	15	1411 000	Pigment Green 10	05	134 000
Phosphated and polyphosphated alcohols, all other	12	111 000	Pigment Green 36	05	134 260
Phosphonate ester, cyclic	12	16 000	Pigment Green 36	05	134 260
2-Phosphonobutane-1,2,4-tricarboxylic acid, sodium salt	14	134 900	Pigment Orange 1	05	135 000
N-(Phosphonomethyl)glycine, isopropylamine salt	14	86 000	Pigment Orange 1	05	135 000
N-(Phosphonomethyl)glycine, sodium sesqui salt	13	205 560	Pigment Orange 2	05	20 000
Phosphoric acid esters, all other	13	251 582	Pigment Orange 5	05	21 000
Phosphoric and polyphosphoric acid esters, all other	11	16 000	Pigment Orange 13	05	23 000
Phosphorothioates used as lubricating oil and grease additives, all other	12	115 000	Pigment Orange 15	05	24 000
Phosphorus acid esters, all other	14	244 000	Pigment Orange 16	05	25 000
Photographic chemicals, all other	14	1049 000	Pigment Orange 17	05	206 000
Prithalic acid	14	393 000	Pigment Orange 34	05	25 180
Prithalic acid, diallyl ester	11	23 400	Pigment Orange 43	05	25 270
Prithalic acid, lead salt, (Dibasic)	03	1346 000	Pigment Orange 48	05	26 046
Prithalic anhydride	03	1348 000	Pigment Orange 48	05	26 046
Prithalic anhydride type alkyl resins	08	51 000	Pigment Orange 49	05	26 049
[Phthalocyaninato(2-)]copper	03	1351 000	Pigment Orange toners, all other	05	29 000
[Phthalocyaninato(2-)]iron	03	1352 100	Pigment Red 1, (light)	05	48 000
[Phthalocyaninetetramethaniminato]copper	03	1353 300	Pigment Red 3	05	49 000
Prithalocyaninetetra-sulfonyl chloride, copper derivative	03	1353 800	Pigment Red 4	05	50 000
Prithaloyl chloride (Prithaloyl chloride)	03	1355 000	Pigment Red 5	05	31 000
2-Picoline (α-Picoline)	03	1356 000	Pigment Red 13	05	36 000
3-Picoline (α-Picoline)	03	1357 000	Pigment Red 14	05	37 000
4-Picoline (γ-Picoline)	03	1358 000	Pigment Red 17	05	39 000
Picollonitrile (2-Cyanopyridine)	03	1359 100	Pigment Red 21	05	40 021
3-Picolylamine	03	1361 000	Pigment Red 22	05	43 000
			Pigment Red 23	05	44 000
			Pigment Red 31	05	45 000
			Pigment Red 38	05	52 000
			Pigment Red 41	05	54 000



Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Sect. Item No.
Pigment Red 48:1, (barium)	55-100	05
Pigment Red 48:2, (calcium)	55-200	05
Pigment Red 48:3, (strontium)	55-300	05
Pigment Red 48:4, (manganese)	55-400	05
Pigment Red 49:1, (barium)	57-000	05
Pigment Red 49:2, (calcium)	58-000	05
Pigment Red 52:1, (calcium)	61-000	05
Pigment Red 52:2, (manganese)	62-000	05
Pigment Red 53, (sodium)	63-000	05
Pigment Red 53:1, (barium)	64-000	05
Pigment Red 57, (calcium)	67-037	05
Pigment Red 57:1, (calcium)	68-000	05
Pigment Red 60:1	209-000	05
Pigment Red 63	74-000	05
Pigment Red 81, (PMA)	75-000	05
Pigment Red 81, (PTA)	75-000	05
Pigment Red 83	74-000	05
Pigment Red 88	78-000	05
Pigment Red 101	78-000	05
Pigment Red 112	45-810	05
Pigment Red 122	79-320	05
Pigment Red 123	80-000	05
Pigment Red 146	45-847	05
Pigment Red 147	80-550	05
Pigment Red 168	80-555	05
Pigment Red 169	45-870	05
Pigment Red 170	80-660	05
Pigment Red 179	80-688	05
Pigment Red 188	80-770	05
Pigment Red 190	84-200	05
Pigment Red 200	84-202	05
Pigment Red 202	84-206	05
Pigment Red 207	84-207	05
Pigment Red 209	84-209	05
Pigment Red 210	45-910	05
Pigment Red 224	84-224	05
Pigment Red 245	84-245	05
Pigment Red 63:1, calcium	70-001	05
Pigment red toners, all other	86-000	05
Pigment Violet 1, (fugitive)	87-000	05
Pigment Violet 1, (PMA)	88-000	05
Pigment Violet 1, (PTA)	88-000	05
Pigment Violet 3, (fugitive)	89-000	05
Pigment Violet 3, (PMA)	90-000	05
Pigment Violet 3, (PTA)	91-000	05
Pigment Violet 4, (fugitive)	92-000	05
Pigment Violet 4, (PMA)	92-004	05
Pigment Violet 19	93-160	05
Pigment Violet 23	93-200	05
Pigment Violet 29	93-229	05
Pigment Violet 39, (PMA)	93-439	05
Pigment Violet 42	94-042	05
Pigment violet toners, all other	98-000	05
Pigment Yellow 1	1-000	05
Pigment Yellow 2	1-500	05
Pigment Yellow 3	2-000	05
Pigment Yellow 12	8-000	05
Pigment Yellow 13	9-000	05
Pigment Yellow 14	10-000	05
Pigment Yellow 17	11-000	05
Pigment Yellow 60	6-465	05
Pigment Yellow 75	6-465	05
Pigment Yellow 73	6-520	05
Pigment Yellow 74	6-560	05
Pigment Yellow 85	1-560	05
Pigment Yellow 95	6-897	05
Pigment Yellow 98	6-897	05
Pigment Yellow 99	6-974	05
Pigment Yellow 116	9-714	05
Pigment Yellow 124	11-724	05
Pigment Yellow 159	14-839	05
Pigment Yellow 152	11-752	05
Pigment yellow toners, all other	13-200	05
Phene hydroperoxide	136-200	05
Phenanthrene	136-500	15
2-Phenanol (cis and trans)	136-800	15
$\alpha$ -Phenene	137-000	15
$\beta$ -Phenene	138-000	15
$\alpha$ -Phene oxide	139-500	15
Phene, sulfate	140-000	15
Phene, wood	141-000	15
Phene oil, natural, sulfate	141-195	15
Phene oil, natural	141-200	15
Phene oil, synthetic	141-200	15
Piperacillin	119-200	06
Piperazine	123-000	06
Piperazine dihydrochloride	125-000	06
Piperazine hexahydrate	126-000	06
Piperazine hydrochloride	126-000	06
Piperazine sulfate	129-000	06
Piperidine	1365-000	03
Piperonal (1-heliotropin)	80-800	07
Piperylene (1,3-Pentadene)	58-600	02
Proxicam	412-500	06
Pitch of tar, all other	30-000	01
Pitch of tar: hard (M.P. 161° F and Over)	28-000	01
Pitch of tar: medium (M.P. 110° To 160° F)	27-000	01
Pitch of tar: soft (M.P. 80° To 109° F.)	26-000	01
Phaloyl chloride	569-000	15
2-Phaloyl-1,3-indandione (Pindone)	170-000	13
Plastics alloys or blends	25-200	08
Polyacrylamide	403-500	14
Polyacrylamide copolymers, all other	405-000	14
Polyacrylate methacrylate copolymers	427-000	14
Polyacrylate poly(hydroxypropylacrylate) copolymer	428-000	14
Polyacrylic acid	570-000	15
Polyacrylic acid, ethyl ester	430-000	14
Poly(acrylic acid, methyl ester)/ethylene/1,1-dichlorosuccinic acid, methylene-	423-000	14
Poly(acrylic acid, methyl ester)/ethylene/1,1-dichlorosuccinic acid, methylene- with ethyl acrylate	424-000	14
Poly(acrylic acid, methyl ester)/ethylene/1,1-dichlorosuccinic acid, methylene-	425-000	14

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Polyacrylic acid salts, all other	14	Polyethylene glycol ester of mixed fatty acids	12
Polyacrylic (ACM) type elastomers	10	Polyethylene glycol esters of chemically defined acids, all other	684.700
Polyacrylonitrile and acrylonitrile copolymers	10	Polyethylene glycol esters of mixed acids, all other	684.000
Polyacrylonitrile, hydrolyzed	14	Polyethylene glycol monoacrylate	12
Polyacrylonitrile, sodium salt	13	Polyethylene glycol monoester of coconut oil acids	687.500
Polyacrylonitrile, starch hydrolyzed polymer	14	Polyethylene glycol monoester of soybean oil acids	685.510
Polyallylene polyamines and salts and quats	12	Polyethylene glycol monoester of tall oil acids	685.700
Polyalkylene oxide	10	Polyethylene glycol monooleate	687.600
Polyalkylene glycol oleate	12	Polyethylene glycol mono(nonylphenol)ether ammonium sulfate	678.000
Polyalcohols	15	Polyethylene glycol mono-oleate	762.970
Polyamine polymethane phosphonic acid	14	Polyethylene glycol monopalmitate	679.000
Polyamine polymethane phosphonic acid, magnesium salt	14	Polyethylene glycol monopalmitate, methoxylated	680.000
Polyamines	12	Polyethylene glycol monopelargonate	680.250
Polyamine (oil of) isocyanate	14	Polyethylene glycol monopelargonate	680.200
Polybutadiene acid type alkyl resins	12	Polyethylene glycol monostearate	681.000
Polybutadiene acrylic acid acrylonitrile terpolymer (PBAN)	08	Polyethylene glycol monostearate	682.000
Polybutadiene emulsion-polymerized	10	Polyethylene glycol monotallate	682.250
Polybutadiene resins	10	Polyethylene glycol monotallate (mixed ester) of tall oil acids	685.300
Polybutadiene, solution-polymerized	08	Polyethylene glycol sesquilester of coconut oil acids	687.000
Polybutene	02	Polyethylene glycol sesquilester of tall oil acids	689.000
Polybutylene terephthalate (PBT)	08	Polyethylene glycol sesquilester of tallow acids	690.000
Polybutylene type resins	08	Polyethylene glycol terephthalate	683.000
Polybutyl ether carbamate	14	Polyethylenimine	683.200
Polybutyl ether resins	08	Polyethylenimine methyl ammonium sulfate	442.000
Polycarboxylic acid, alkylate	12	Polyethylenimine polymer with 1,4-dihydroxy-2-butyne	477.250
Polycarboxylic acid, alkylphenoxylalkoxyate	12	Polyethylene terephthalate	14
Polychloroprene (Neoprene) (CR) type	10	Polyethylene terephthalate (PET)	14
Polydextrose	14	Polyglycerol decaoleate	08
Poly(diallyldimethylammonium chloride)	14	Polyglycerol distearate	12
Poly(dimethylimino(2-hydroxytrimethylene)chloride)	12	Polyglycerol esters, all other	698.000
Poly(epichlorohydrin)	08	Polyglycerol mono-oleate	696.000
Polyester resins, saturated, all other	08	Polyglycerol monooleate	697.000
Polyester resins, unsaturated	12	Polyglycerol tetraoleate	697.450
Polyether amine, ethoxylated	12	Polyglycolis, ethylene glycol and glycol ether, mixed	1184.000
Polyether dibols	12	Polyglycolis-toluene diisocyanate reaction product	144.500
Polyetheretherketone (PEEK) resins	08	Polyhexafluoropropylene oxide	15
Polyether and polyester polyols for urethanes	08	Polyhydric alcohol esters, all other	1411.200
Polyether polyols based on propylene oxide, all other	15	Polyhydric alcohol esters, all other	1196.000
Polyether triols	12	Polyhydric alcohols, ethoxylated and phosphated	12
Polyethoxy/polypropoxy/late dibenzyl ether	12	Polyhydric alcohols, all other	1096.000
Polyethoxy/polyoxy diethylene glycol ether	15	Polyimides and amide-imide polyamers	06
Polyethylbenzene (80 percent diethylbenzene)	03	Polyisobutylene succinic anhydride	14
Poly(ethylene-butylene) glycol	15	Polyisoprene (IR) type	09
Polyethylene glycol	15	Polyisoprene phosphates	09
Polyethylene glycol butyl ether, propoxylated	15	Polymerization regulators, acyclic, other	173.000
Polyethylene glycol dibenzoate	15	Polymers for fibers, all other	14
Polyethylene glycol diester of coconut oil and oleic acids	11	Polymers, water soluble, all other	452.000
Polyethylene glycol diester of mixed liner acid/oleic acid	12	Polymethacrylic acid esters, all other	14
Polyethylene glycol diester of tall oil acids	12	Polymethacrylic acid, sodium salt	1411.300
Polyethylene glycol diisaurate	12	Polymethacrylene polyphenylene glycol diacetate	15
Polyethylene glycol dimethyl ether	15	Poly(1,1-(methylphenyl(3-chloro-2-propanol) tetramethylene)ethyleneimine	03
Polyethylene glycol dioleate	12		
Polyethylene glycol distearate	12		445.000
			1023.000
			446.000



Table D-1—Continued  
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Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Propionic acid	15	2,4-(1H,3H)Pyrimidinedione	15
Propionic anhydride	572,000	2-Aminelic diamide	03
Propionic blends	463,000	2-Pyrrolidone	03
Propionitrile	450,500	2-Pyrrolidone-ethyl polymer with 1-icosene	15
Propyl chloride	473,050	4-N-(1-Pyridyl)-m-toluenediazonium chloride	14
Propylphenone	373,000	Pyridium pamoate	03
Propoxyethanol (Ethylene glycol monopropyl ether)	1187,750	Quaternary ammonium salts having amide linkages, all other	12
Propoxylated starches	4	Quaternary ammonium salts, not containing oxygen, acyclic, all other	12
Propoxyphene hydrochloride	413,000	Quaternary ammonium salts not containing oxygen, cyclic, all other	12
Propoxyphene napsylate	412,000	Quinoline-2,3-dicarboxylic acid	03
Propranolol hydrochloride	381,500	2-Quinolone	03
Propyl acetate	1050,000	8-Quinolone, copper salt	13
N-Propyl acetals	168,550	8-Quinolone, magnesium salt	13
Propyl alcohol (Propanol)	81,200	p-Quinone	15
n-Propylamine, mono	301,000	Quinone dioxime	03
3-Propylamine, mono	81,200	Quinone dioxime	03
3-Propylamine, Dihydroacetothole	206,000	Rare earths 2-ethylhexanoate	15
Propyl Butylthiocarbamate (Pebulate)	81,200	Rare earths naphthenate	14
Propyl chloroformate	1050,400	Rare earths neodecanoate	15
Propyl dipropylthiocarbamate (Vernolate)	207,000	Reactive Black 5	04
Propylene glycol	42,000	Reactive Black 9	04
Propylene glycol (1,2-Propanediol)	1093,000	Reactive Black dye, all other	04
Propylene glycol-butyl ether	1187,357	Reactive Blue 3	04
Propylene glycol dibenzoate	147,800	Reactive Blue 4	04
Propylene glycol dicaprylate/caprate	1132,300	Reactive Blue 5	04
Propylene glycol esters of hydroperated palm oil	719,500	Reactive Blue 7	04
Propylene glycol ethers (and propylene glycols), all other	1187,475	Reactive Blue 13	04
Propylene glycol monomethyl ether (1-Methoxy-2-propanol)	1187,400	Reactive Blue 19	04
Propylene glycol monochloroacetate	111,500	Reactive Blue 21	04
Propylene glycol sebacate	115,000	Reactive Blue 38	04
Propylene oxide	1323,000	Reactive Blue 41	04
Propyl fumarate	115,400	Reactive Blue 50	04
Propyl gallate	148,000	Reactive Blue 71	04
Propylhexedrine	344,000	Reactive Blue 89	04
n-Propyl mercaptan (1-Propanethiol)	95,000	Reactive Blue 174	04
Propyl oleate, sulfated, sodium salt	262,000	Reactive Blue 199	04
2-Propyn-1-ol (Propargyl alcohol)	869,000	Reactive Blue 203	04
Protease (bacterial)	104,000	Reactive blue dyes, all other	04
Proteases, all other	108,000	Reactive Brown 1	04
Protein hydrolysates	17,000	Reactive Brown 17	04
Pseudoephedrine hydrochloride	346,000	Reactive Brown 18	04
Pseudoephedrine sulfate	347,000	Reactive Brown dyes, all other	04
Pseudoionone	836,000	Reactive Green 19	04
Pseudo linyl acetate (Neobergamate)	166,700	Reactive Orange 1	04
8,16-Pyranthrene	1372,000	Reactive Orange 4	04
1,3,6,9-Pyrenetetrasulfonic acid	387,000	Reactive Orange 12	04
Pyridine hydrochloride	1382,000	Reactive Orange 13	04
3-Pyridinemethanol	1378,000	Reactive Orange 16	04
2% Pyridine, refined	1378,000	Reactive Orange 20	04
Pyridine, refined all other grades	1379,000	Reactive Orange 72	04
2-Pyridinethiol-1-oxide, sodium salt	1380,003	Reactive Orange 78	04
2-Pyridinethiol-1-oxide, zinc salt	1380,053	Reactive Orange 84	04
3-Pyridinol	1385,000		
Pyridostigmine bromide	319,000		

Table D-1—Continued  
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Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Reactive Orange 86	04 917 086	Rubber modified polystyrene	08 44 020
Reactive Red 2	04 918 000	Rubber processing chemicals, acyclic, all other	09 180 000
Reactive Red 8	04 920 000	Rubber processing chemicals, cyclic, all other	09 187 000
Reactive Red 11	04 924 000	Rust preventing additives	07 85 000
Reactive Red 21	04 925 000	Saccharin (1,2-Benzothiazolin-3-one, 1,1-dioxide)	14 172 000
Reactive Red 31	04 927 000	Saccharin sodium salt	07 87 000
Reactive Red 43	04 928 000	Salicylaldehyde	03 1404 000
Reactive Red 49	04 930 043	Salicylaldehyde oxime	07 1404 502
Reactive Red 94	04 930 049	Salicylanilide	03 1405 000
Reactive Red 120	04 931 094	Salicylic acid	06 557 000
Reactive Red 141	04 931 120	Salicylic acid ammonium salt	15 161 500
Reactive Red 147	04 931 141	Salicylic acid magnesium salt	15 162 200
Reactive Red 198	04 931 147	Salicylic acid, tech.	03 1406 000
Reactive Red 243	04 931 180	Salts of organic acids, all other	05 389 000
Reactive Violet 1	04 931 198	Sarcoline	15 781 000
Reactive Violet 5	04 932 000	Sebacic acid	14 16 000
Reactive Violet 33	04 936 000	Sebacoyl chloride	15 574 000
Reactive violet dyes, all other	04 936 033	Secoborbutyl sodium	06 460 000
Reactive Yellow 7	04 937 000	Secondary and tertiary monoamines, all other	06 461 000
Reactive Yellow 15	04 904 000	Semicarbazide hydrochloride	12 471 000
Reactive Yellow 16	04 906 000	Semisynthetic penicillins, all other	05 20 000
Reactive Yellow 37	04 907 000	Silicone greases	15 1392 000
Reactive Yellow 62	04 910 042	Silicone resins	14 462 000
Reactive Yellow 65	04 910 088	Silicone (Q) type elastomers	08 14 000
Reactive Yellow 152	04 910 125	Silverstallin	10 21 000
Reactive Yellow 160	04 910 135	Sluomycin	06 328 500
Reactive yellow dyes, all other	04 911 000	3-Sodiosulfobenzoic acid	05 56 700
Remlin	04 928 035	Sodium acetate	15 162 230
Resorcinol	04 105 000	Sodium aminobenzoate	06 396 000
Resorcinol diglycidyl ether	06 172 000	Sodium ammonium polyacrylate and copolymers	14 431 000
Resorcinol dimethyl ether	05 151 500	Sodium ascorbate	06 809 000
Resorcinol, tech.	03 1389 500	Sodium benzoate	05 11 000
Resorcinol acid	03 1389 000	Sodium n-butylxanthate	15 11 000
Resorcinol acid salts, all other	03 1402 000	Sodium caprylate	14 142 000
Riboflavin	07 167 000	1-(Sodium carboxyethylene)-1-(sodium carboxymethyleneoxyethylene)-2-nor-(tall oil fatty acids)-2-Imidazolium hydroxide	12 27 100
Riboflavin (animal feed grade)	06 801 000	Sodium carboxymethyl amylose	14 432 000
Riboflavin-5-phosphate, sodium	06 802 000	Sodium carboxymethylcellulose (100%)	14 412 000
Riboflavin and acetylsalicylic acid esters, all other	06 803 000	1-(Sodium carboxymethyl)-1-(sodium carboxymethyleneoxyethylene)-2-nor-(coconut oil fatty acids)-2-Imidazolium lauryl sulfate	12 27 200
Rose oxide	11 111 000	Sodium citrate	14 432 200
Rose acid salts, all other	15 172 000	Sodium carboxymethyl starch	15 626 000
Rosin acids	07 115 500	Sodium cresylate	01 18 050
Rosin acids potassium salt	15 160 000	Sodium diacetate	15 604 000
Rosin acids sodium salt	12 65 000	Sodium di-sec-butyl phosphorodithioate	15 731 000
Rosin acids, triethanolamine salt	12 66 000	Sodium di-sec-butyl phosphorodithioate	15 732 000
Rosin amine, ethoxylated	12 352 000	Sodium diethyl phosphorodithioate	15 733 000
Rosin amines	12 353 000	Sodium dihexyl phosphorodithioate	15 734 000
Rosin esters, unmodified (Ester gums)	14 136 000	Sodium disobutyl phosphorodithioate	15 734 500
Roxarsone	06 159 000	Sodium diisopropyl phosphorodithioate	15 735 000
Roxarsone, sodium	06 160 000	Sodium ethylxanthate	14 144 000

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Sect. Item No.
Sodium fluoroacetate	13	232,000
Sodium formate, technical	15	655,000
Sodium gluconate	15	862,000
Sodium heparin	06	630,000
Sodium lactate (Nelaac)	15	674,000
Sodium mercaptoacetate	15	697,000
Sodium methoxide (Sodium methylate)	15	1418,250
Sodium-N-methyl-N-oley] laurate	15	743,350
Sodium nitroprusside	06	359,500
Sodium oleate	15	719,500
Sodium oxalate	15	726,000
Sodium polyacrylate	14	433,000
Sodium polyacrylate, grafted	15	733,000
Sodium propionate	15	298,000
Sodium salicylate	15	762,100
Sodium stearate	15	1416,100
Sodium p-sulfophenylmethyl ether	08	837,005
Sodium tetradecyl sulfate	03	1410,500
Sodium trichlorobenzenesulfate	03	1410,500
Solid type polyvinylidene chloride resins	08	50,020
Solubilized Sulfur Black 2	04	111,000
Solvent Black 3	04	1052,000
Solvent Black 13	04	1053,000
Solvent Black 26	04	1055,000
Solvent Black 46	04	1057,046
Solvent Black 47	04	1057,046
Solvent Black 49	04	1057,049
Solvent Blue 3	04	1020,000
Solvent Blue 5	04	1022,000
Solvent Blue 23	04	1028,023
Solvent Blue 35	04	1028,035
Solvent Blue 36	04	1029,000
Solvent Blue 38	04	1031,000
Solvent Blue 43	04	1032,000
Solvent Blue 58	04	1033,000
Solvent Blue 59	04	1034,000
Solvent Blue 98	04	1037,000
Solvent Blue 99	04	1037,059
Solvent Blue 100	04	1038,100
Solvent Blue 101	04	1038,101
Solvent Blue 102	04	1038,102
Solvent Blue 129	04	1038,129
Solvent blue dyes, all other	04	1039,000
Solvent Brown 12	04	1045,000
Solvent Brown 20	04	1047,000
Solvent Brown 22	04	1048,000
Solvent Brown 52	04	1049,052
Solvent Green 3	04	1042,000
Solvent Orange 2	04	977,000
Solvent Orange 3	04	978,000
Solvent Orange 7	04	981,000
Solvent Orange 20	04	982,000
Solvent Orange 23	04	984,000
Solvent Orange 25	04	984,000
Solvent Orange 31	04	985,000
Solvent Orange 60	04	987,060
Solvent Orange 67	04	987,077
Solvent Orange 97	04	987,097
Solvent orange dyes, all other	04	988,000
Solvent Red 23	04	989,000
Solvent Red 24	04	991,023
Solvent Red 26	04	992,000
Solvent Red 27	04	993,000
Solvent Red 29	04	994,000
Solvent Red 49	04	999,000
Solvent Red 68	04	1001,000
Solvent Red 74	04	1003,000
Solvent Red 111	04	1008,000
Solvent Red 164	04	1011,000
Solvent Red 168	04	1012,000
Solvent Red 169	04	1012,168
Solvent Red 175	04	1012,175
Solvent Red 207	04	1012,207
Solvent Red 208	04	1012,208
Solvent Red 222	04	1012,222
Solvent red dyes, all other	04	1013,000
Solvent Violet 8	04	1014,000
Solvent Violet 11	04	1015,011
Solvent Violet 13	04	1016,000
Solvent Violet 14	04	1017,000
Solvent Violet 38	04	1018,038
Solvent violet dyes, all other	04	1019,000
Solvent Yellow 3	04	957,000
Solvent Yellow 13	04	958,000
Solvent Yellow 14	04	959,000
Solvent Yellow 18	04	959,016
Solvent Yellow 18	04	959,018
Solvent Yellow 33	04	963,000
Solvent Yellow 40	04	965,000
Solvent Yellow 42	04	966,000
Solvent Yellow 43	04	967,000
Solvent Yellow 47	04	970,000
Solvent Yellow 56	04	971,000
Solvent Yellow 72	04	973,000
Solvent Yellow 94	04	974,094
Solvent Yellow 107	04	975,000
Solvent Yellow 131	04	975,131
Solvent Yellow 135	04	975,135
Solvent Yellow 143	04	975,143
Solvent Yellow 160	04	975,160
Solvent Yellow 161	04	975,161
Solvent Yellow 167	04	975,167
Solvent yellow dyes, all other	04	976,000
Sorbic acid (2,4-Hexadienoic acid)	15	576,000
Sorbitol (70% by Weight)	15	1084,000
Sorbitol, alkoxylated	15	1186,900
Sorbitol, atoxylated	15	1189,000
Sorbitol monostearate	15	1190,300
Sorbitol, propoxylated	15	1190,300
Soya fatty acids, reaction products with chloromethane	15	1190,300

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. item No.	Sect. item No.
and diethylenetriamine, ethoxylated, quaternized	12	477,350
Soya fatty acids, reaction products with chloromethane	12	477,360
and diethylenetriamine, propoxylated, quaternized	12	541,500
Soybean oil acids (Ratio=2/1)	12	549,300
Soybean oil acids (Ratio=1/1)	12	427,000
(Soybean oil alkyl)amine, ethoxylated	12	335,000
N-(Soybean oil alkyl)trimethylenediamine	12	414,000
Soybean oil, sulfated, sodium salt	12	312,000
Specific gravity 0.940 and below	08	31,100
Specific gravity over 0.940	08	31,400
Spectinomycin (animal feed grade)	06	32,000
Spectinomycin (medicinal grade)	06	37,000
Sperm oil alcohol, ethoxylated	12	739,000
Spiro[3H-1,2-benzoxathiole-3,9'-(9H)-xanthene]-3,6'-diol-1,1'-dioxide	03	1410,600
Spironolactone	06	740,500
Stannous dioctyl phthalate (Dioctyl tin phthalate)	15	164,300
Stannous 2-ethylhexanoate	15	643,000
Stanzolol	06	641,600
Stearamide (Octadecane amide)	15	283,000
Stearamideethyldiethanolamine	12	368,900
Stearamideethylethanolamine acetate	12	368,950
Stearamideethyl-2-heptadecyl imidazole	12	414,500
Stearamidopropyl dimethylcetyltriethylammonium tosylate and propylene glycol	12	477,380
Stearic acid (Ratio = 2/1)	12	543,000
Stearic acid (Ratio = 1/1)	12	561,000
Stearic acid (Ratio = 2/1)	12	562,000
Stearic acid (Ratio = 1/1)	12	550,000
Stearic acid aminoethanolamine (amine acid ratio = 1.0/1.65)	12	575,450
Stearic acid-N-aminomethyl ethanolamine condensate	12	581,200
Stearic acid, ammonium salt	12	67,990
Stearic acid, diethanolamine condensate, methyl sulfate	12	389,500
Stearic acid-diethylenetriamine condensate	12	367,000
Stearic acid-diethylenetriamine condensate, ethyl sulfate	12	367,500
Stearic acid, N,N-dimethylamino-propylamine condensate	12	369,600
Stearic acid esters, all other	11	125,000
Stearic acid ethylenediamine condensate	12	368,290
Stearic acid-ethylenediamine condensate amine/acid ratio=1/2	12	588,000
Stearic acid-ethylenediamine condensate, monoethoxylated	12	382,000
Stearic acid ethylene diamine methyl ammonium sulfate	12	501,500
Stearic acid mixed amine condensate	12	369,500
Stearic acid monoethanolamine condensate	12	581,500
Stearic acid, potassium salt	12	68,000
Stearic acid, sodium salt	12	69,000
Stearic acid-tetraethylenepentamine condensate	12	370,000
Stearic acid,N,N,N',N'-tetraakis(2-hydroxyethyl)-ethylenediamine salt	12	33,000
Stearic acid, triethanolamine salt	12	34,000
N-Stearoyl-p-aminophenol	09	104,000
Stearoyl chloride	15	577,000
Stearoyl iso-lactylate, sodium salt	12	318,790
Stearoyl lactylate, mixed sodium and calcium salt	12	318,780
Stearoyl lactylate, sodium salt	12	318,800
Stearoyl lactylate, sodium salt	12	1035,300
Stearyl acid phosphate	15	733,310
Stearyl alcohol, propoxylated	12	738,700
Stearyl alcohol, propoxylated	12	738,700
Stearylamidopropyl dimethylamine	12	368,200
Stearylamidopropyl dimethylamine lactate	15	474,120
Stearylamidopropyl dimethyl myristyl acetate ammonium chloride	12	477,400
Stearylceramide	13	554,000
Stearyl methacrylate	15	163,500
Stearyl pyridium chloride	12	591,500
Stearyl stearamide	15	579,600
Stearyl stearate	13	474,030
Straight polystyrene	06	76,000
Streptomycin	06	279,500
Streptozocin	06	762,200
Stromlium stearate	15	3,500
Styrenated-alkyls, or copolymer, alkyls	08	3,500
Styrene (Vinylbenzene)	03	1411,000
Styrene-acylonitrile copolymer resins (SAN)	08	43,000
Styrene-allyl alcohol copolymer resins	08	44,043
Styrene-butadiene latex type	08	3,100
Styrene-butadiene latex type	08	44,050
Styrene-butadiene latex type	10	3,500
Styrene-butadiene type elastomers, other	10	4,500
Styrene-butadiene-vinylpyridine	10	4,000
Styrene-copolymer, all other	08	44,049
Styrene-divinylbenzene copolymer resins	08	44,049
Styrene latexes, all other	08	44,080
Styrene-maleic anhydride copolymer resins	08	44,045
Styrene-methyl methacrylate copolymer resins	08	44,047
Styrene oxide	15	165,000
Styrene type plastics materials, all other	08	45,500
Succinic anhydride	15	165,500
Succinylcholine chloride	06	486,000
Succhiyl peroxide	15	1296,500
Sucralate	06	621,500
Sucrose acetate isobutyrate	11	126,000
Sucrose benzoate	15	166,000
Sucrose octa-acetate	15	1133,000
Sulfacetamide	06	208,000
Sulfacetamide, sodium	06	212,000
Sulfadiazine	06	215,000
Sulfadiazine, silver	06	215,200
Sulfadimethoxine	06	217,000
Sulfamethazine	06	221,000
Sulfamethazine, sodium	06	222,000
Sulfamethazole	06	223,000
Sulfamethazole	06	224,000
Sulfamic acid (p-Aminobenzenesulfonic acid) and salt	03	1414,000
Sulfasalazine	12	390,000
Sulfated cyclic ethers, all other	12	291,000

Table D-1—Continued  
Alphabetical Chemical Index

Chemical name	Sect. Item No.	Sect. Item No.
Sulfated esters, all other	12	269,000
Sulfated ethers, all other	12	263,000
Sulfathiazole, sodium	06	234,000
Sulfisoxazole	06	235,000
Sulfisoxazole, acetyl	06	217,000
5-Sulfisophtalic acid, 1,3-dimethyl ester	03	147,300
5-Sulfisophtalic acid, 1,3-dimethyl ester, sodium salt	03	147,300
5-Sulfisophtalic acid, lithium salt	03	147,300
5-Sulfisophtalic acid, sodium salt	03	119,000
Sulfone diglycol	15	215,000
Sulfonic acids, all other	12	189,000
Sulfonic acids having amide linkages, all other	12	209,000
Sulfonic acids with ether linkages, all other	12	209,000
4-Sulfophtalic acid	03	1421,000
Sulfosuccinic acid, bis[(disubstityl)ester, amidodisodium salt	12	190,000
Sulfosuccinic acid, bis[2,6-dimethyl-4-heptyl]ester, sodium salt	12	191,000
Sulfosuccinic acid, bis[2-ethynylhexyl]ester, sodium salt	12	192,000
Sulfosuccinic acid, dimethyl ester, sodium salt	12	194,000
Sulfosuccinic acid, disubstityl ester, sodium salt	12	194,210
Sulfosuccinic acid, disubstityl ester, sodium salt	12	194,220
Sulfosuccinic acid, diethyl ester, sodium salt	12	194,300
Sulfosuccinic acid, diethyl ester, sodium salt	12	195,000
Sulfosuccinic acid, diethyl ester, sodium salt	12	195,000
Sulfosuccinic acid, (lauryl) polyethylene glycol ether ester, disodium salt	12	196,450
Sulfosuccinic acid esters, all other	12	197,000
Sulfosuccinic acid (coconut oil alkyl)iminopropanol half-ester, sodium salt	12	193,400
Sulfosuccinic acid, monolaurate ester, disodium salt	12	196,495
Sulfosuccinic acid, myristyl ester, disodium salt	12	196,580
monoethanolamine salt	12	196,580
Sulfosuccinic acid, nonoxynyl-10 ester, disodium salt	12	196,570
Sulfosuccinic acid, oleamidopolyethyleneglycol, disodium salt	12	196,600
Sulfosuccinic acid, ricinoleamide monoethanolamine, disodium salt	12	196,800
Sulfosuccinic acid	06	149,000
Sulfur Black 1	04	1106,000
Sulfur Black 11, 11-1	04	1114,000
Sulfur brown dyes, all other	04	1105,000
Sulfur compounds, all other	14	264,000
Sulfuric acid esters, all other	12	317,000
Sulfurized corn oil	15	1330,050
Sulfurized lard oil	14	202,000
Sulfurized sperm oil substitutes	14	200,000
Sulfur orange dyes, all other	04	1067,000
Sulfur Red 10	04	1070,000
Sulfur yellow dyes, all other	04	1065,000
Sulfur yellow dyes, all other	05	414,500
Sulfinic acid	06	349,000
Sympathomimetic (adrenergic) agents, all other	12	302,500
Synthetic fatty alcohol ester, sulfated, sodium salt	06	107,000
Synthetic sweetener material, all other	07	86,000
Tacrine	06	837,007
Tall oil acids (Ratio = 2/1)	12	543,000
Tall oil acids/n-methylolefinamine condensate	12	541,000
Tall oil acids/diethanolamine salt (Condensate)	12	370,900
Tall oil acids-diethylamine condensate	12	34,300
Tall oil acids-dimethylamine condensate	12	371,000
Tall oil acids (Ratio = 1/1)	12	587,500
Tall oil acids, ethoxylated	12	672,400
Tall oil acids, ethoxylated and propoxylated	12	672,420
Tall oil acids, exbottom ester, sulfated, sodium salt	12	268,650
Tall oil acids-polyalkylenepolyamine condensate	12	372,000
Tall oil acids-polyalkylene polyamine condensate, salts, with dodecylbenzene sulfonic acid and/or tall oil fatty acids	12	372,010
Tall oil acids, potassium salt	12	70,000
Tall oil acids, sodium salt	12	71,000
Tall oil acids, sulfated, sodium salt	12	268,700
Tall oil acids, triethanolamine salt	12	34,360
Tall oil acyl chloride	15	167,400
3-(Tall oil amino)propyl amine	15	414,600
Tall oil, chemically modified	15	168,000
Tall oil fatty acids (Ratio = 1/2)	12	555,300
Tall oil fatty acids (ratio = 2/1)	12	555,310
Tall oil fatty acids (ratio = 1.5/1)	12	555,305
Tall oil fatty acids, polymerized	15	167,600
Tall oil fatty acids-triethanolamine condensate	12	575,600
(Tall oil fatty acids), triethanolamine salt	12	34,370
Tall oil monomer	15	168,050
Tall oil: Pentaerythritol talate	15	168,100
Tall oil, refined, ethoxylated	12	672,500
Tall oil salts, all other (Linoleic-rosin acid salts)	15	179,000
Tall oil sulfated, ammonia salt	12	312,50*
Tall oil, sulfated, sodium salt	12	312,700
Tallow acids (Ratio = 2/1)	12	544,000
Tallow acids	12	552,000
Tallow acids (amine/acid ratio=1.00/1.65)	12	567,450
Tallow acids, potassium salt	12	72,000
Tallow acids, sodium salt	12	73,000
Tallow acids, triethanolamine salt	12	34,500
Tallow alcohol, ethoxylated	12	740,000
(Tallow alkyl)amine	12	429,000
(Tallow alkyl)amine acetate	12	399,000
(Tallow alkyl)amine, ethoxylated	12	336,000
(Tallow alkyl)amine, ethoxylated, diethosulfate	12	465,940
(Tallow alkyl)amine, propoxylated	12	336,040
N-(Tallow alkyl) dipropylamine	12	415,000
N-(Tallow alkyl)-3-iminodipropionic acid, disodium salt	12	18,000
N-(Tallow alkyl) trimethylenediamine	12	416,000
N-(Tallow alkyl) trimethylenediamine acetate	12	400,000
N-(Tallow alkyl) trimethylenediamine, ethoxylated	12	337,000
Tallow amide, hydrogenated	15	255,000
Tallow amine, ethoxylated, quaternary ammonium salt	12	477,700
Tallow, n-3-(dimethylamino)propyl [amine/acid ratio=1/3]	12	567,600
(Tallow ethyl alkyl)amine, ethoxylated, sulfate	12	336,020
Tallow fatty acids-aminoethylethanolamine condensates	12	373,550



Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Yellow fatty acids, ethoxylated	12 672,500	Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione (DMT)	13 12,000
Yellow nitrile	15 453,000	Tetrahydrofuran	03 1438,000
Zinc acid, sodium salt	12 295,000	Tetrahydrofurfuryl alcohol	03 83,000
Zinc acid, NF	15 180,000	Tetrahydrofurfuryl oleate	11 53,000
Zinc acrylate, synthetic, all other	14 471,000	Tetrahydrofurfuryl phenol	07 169,170
Zinc bases, crude bases (Dry bases)	01 10,000	Tetrahydrofurfurylamine (Tetrafin)	15 186,000
Zinc bases, all other	01 22,000	1,2,3,4-Tetrahydrophthalene	03 1438,253
Zinc distillate, all other	01 24,000	Tetrahydrofurfurylamine from tall oil fatty acids and propylenediamine	14 174,000
Zinc for other uses: crude	01 25,000	2,2',3,3'-Tetrahydro-3,3',3''-tetramethyl-1,1'-spiro[11H-indene]-5,5',6,6'-tetrol	03 1439,500
Zinc for other uses: refined	01 23,000	Tetrahydrothiophene	15 187,000
Zepyl acetate	07 169,000	Tetrahydrothiophene-1,1-dioxide (Sulfolane)	15 186,000
Zeranol	06 359,900	2,2',4,4'-Tetrahydroxybenzophenone	14 497,000
Zerbutaline sulfate	06 347,500	Tetrahydrozoline hydrochloride	06 348,000
Zerphthalic acid	03 1422,000	Tetra-isopropoxy titanium (bis dicycyl) phosphite	12 784,550
Zerphthalic acid, dimethyl ester	03 1424,000	Tetraisopropyl titanate	15 1061,000
Zerphthaloyl chloride	03 1424,500	Tetrakis(2-chloroisopropyl)ethylene diphosphate	15 1035,550
Zerphenyl hydrocarbons, monocyclic (Solvenol)	03 1426,000	Tetrakis(2-ethylhexyl)titanate	15 1062,000
Zerphenyl (Phenylphenyl) (m-, o-, and p-isomers)	07 116,500	N,N,N',N'-Tetrakis(2-hydroxyethyl)ethylenediamine	12 338,100
Zerpinene-o	07 117,000	N,N,N',N'-Tetrakis(2-hydroxypropyl)ethylenediamine	12 337,590
α-Terpinol	07 117,000	N,N,N',N'-Tetrakis(2-hydroxypropyl)ethylenediamine, propoxylated	12 339,000
α-Terpinyl acetate	07 120,000	N,N,N',N'-Tetrakis(2-hydroxypropyl)ethylene diamine	15 188,500
α-Terpinyl propionate	07 121,000	N,N,N',N'-Tetrakis(2-hydroxypropyl)ethylene diamine, propoxylated and ethoxylated	15 1324,000
1-Tert-butyl-2,5-dimethoxybenzene	03 377,500	Tetrakis[methylene(3,5-di-tert-butyl-4-hydroxyhydroxymethyl)methane]	15 188,500
Tertiary amyl per-2-ethylhexanoate	15 1263,200	1,1,3,3-Tetramethoxypropane	15 305,000
Tetosteroe	06 641,800	1,2,4,5-Tetramethylbenzene (Durene)	15 477,000
Tetosterone cypionate	08 642,300	N,N,N',N'-Tetramethyl-1,3-butanediamine	03 1442,100
Tetosterone propionate	08 642,300	N,N,N',N'-Tetramethyl-1,3-butanediamine	15 304,000
Tetraammonium phosphate	05 184,000	p-(1,1,3,3-Tetramethylbutyl)phenol	03 1443,000
Tetraamorphthalic anhydride	03 1429,000	2,4,7,7-Tetramethyl-5-decane-4,7-diol, ethoxylated	12 766,000
Tetraaryl titanate	13 31,200	Tetramethylmethylenediamine	15 305,000
2,4,5,6-Tetrachloroisophthalonitrile	03 1435,600	Tetramethyl, octahydro acetylphenone	07 88,800
Tetrachlorophthalic anhydride	03 1435,600	Tetramethyl octahydro acetyl naphthalene	07 88,810
Tetracycline	06 379,000	3,3',4,4'-Tetramethylphenol ether	03 1443,200
1-Tetradecane (Myristyl alcohol)	15 185,500	Tetraoxoxy titanium (bis-tridecyl phosphite)	12 784,100
2-Tetradecyloxyethyl aniline	15 185,500	Tetra/penta glycols, mixed	15 192,000
Tetra-(2,2-dialkylloxymethyl)-1-butoxy titanium bis-(dridecyl) phosphite	12 784,500	Textile chemicals, other than surface active agents, all other	14 507,000
Tetraethyl ammonium bromide	15 474,500	Thebaine	06 435,000
Tetraethylene glycol	15 1191,000	Thermoplastic resins, benzoid, all other	06 52,000
Tetraethylene glycol di(2-ethylhexanoate)	11 126,100	Thermosetting acrylate resins	08 20,030
Tetraethylenepentamine	15 303,000	Thermosetting resins, benzoid, all other	08 18,000
Tetraethyl lead	14 186,000	Thermosetting resins, nonbenzoid, all other	08 18,000
O,O',O''-Tetraethyl S,S'-methylene bisphosphorodithioate (Ethion)	13 227,000	Thermoplastic elastomers (such as styrene-block copolymers, thermoplastic olefin elastomers, thermoplastic polyethylenes elastomers, and copolyester)	08 18,000
Tetraethyl orthosilicate (Tetraethyl silicate)	15 1054,000	Thiobazole	10 5,000
1,2,2,2-Tetrafluoroethane	15 1269,800	1,3,4-Thiadiazole, 2,5-bis (dialkylthio) derivatives	06 132,000
Tetrafluoroethylene (F-1114)	15 1270,000	Thiamin mononitrate	06 805,000
Tetrafluoromethane (F-14)	15 1271,000	Thiaryls, sodium	06 463,000
Tetraethyl ammonium bromide	12 501,635		
Tetrahydro-allocimerol(50/50 mixture of tetrahydro-linalool and tetrahydro-γ-terpinol)	07 169,140		
Tetrahydroalcochmethyl hydrochloride [Tetrahydro-dimethyltriene hydrochloride]	15 1244,400		
Tetrahydro-3,5-dimethyl-2[1H]-pyrimidinone[3-(4-(trifluoromethyl)phenyl)-1-[2-(4-(trifluoromethyl)phenyl)ethenyl]-2-propenylidene]hydrozone	13 166,028		

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Thiazole derivatives, cyclic, other	09	p-Toluenesulfonamide	03
Thioacetic acid; potassium salt	15	p-Toluenesulfonamide, o-, p-mixtures	11
4,1-Thiobis(5-tert-butyl-1-cresol)	15	p-IP-Toluenesulfonamide/diphenylamine	09
N,N'-thiobis(methylpiperino)carbonyloxy bis	13	p-Toluenesulfonic acid, aniline salt	03
ethanamine	13	p-Toluenesulfonic acid, potassium salt	12
Thiocarbamide (Diphosphithiourae)	14	p-Toluenesulfonic acid, sodium salt	12
Thioctic acid, methylene ester	13	p-Toluenesulfonoyl chloride	09
2-(1-Thiocyanomethylthio)benzothiazole	13	p-Toluenesulfonoylhydrazide	09
2,2'-Thiodiethanol (Thioglycol)	15	p-Toluenesulfonoyl isocyanate	09
Thiodiethylene bis(3,5-di-tert-butyl-4-hydroxyhydrochinamate)	15	p-Toluenesulfonoylsemicarbazide	09
Thiodiphenol	03	p-Toluenesulfonoyl sulfonic acid	12
O,O'-(Thiodi-4,1-phenylene)bis(o, o-dimethyl phosphorothioate (Templos))	13	m-Toluc acid	03
3,3'-Thiodipropionic acid	15	p-Toluc acid, methyl ester	03
3,3'-Thiodipropionitrile	15	o-Toluidine	03
Thiodisuccinic acid	15	m-Toluidine	03
Thioethanol, sodium salt	15	m-Toluidine, ethoxylated	12
Thiohexanol, sodium salt	06	m-Toluidinomethanesulfonic acid	12
Thiophane (Tetrahydrothiophene)	02	p-Tolylacetaldehyde	07
Thiophene	15	p-Tolyl acetate	07
Thiophenol	03	2,2-(m-Tolylimino)diethanol	03
Thiosemicarbazide	15	p-Tolyl isobutyrate	07
Thiostrepton	08	p-Tolyl octanoate	07
Thiothixene hydrochloride	06	p-Tolylphenylacetate	07
Thiourae resins	08	Tolyltriazole	03
Thyroglobulin	06	Tolyltriazole, potassium salt	15
Ticarcillin, disodium	08	Tretinoin (vitamin A acid)	06
Tinimol maleate	15	Trialkyl phosphite	15
Tin carboxylate	15	Triallylamine	15
Tin laurate	15	Triaminolone	06
Titanic acid esters, all other	15	Triaminolone acetate	06
Titanium acetylacetonate	15	Triaminolone diacetate	06
N-2(C <sub>2</sub> to C <sub>17</sub> )allylamido-N-carboxyethyl-N-2-hydroxyethyl, 3-amino-2-methoxypropyl phosphate, disodium salt	12	Triamterene	09
Tobramycin	06	Triaryl phosphites	09
Tocainide	06	1,3,5-Triazine-(1,3,5I2H,4H,6H))-trithanone	15
d-α Tocopherol	06	Tri(benzyloxy)methyl(trimethoxymethyl)amine	14
d-α Tocopherol	06	N,N,N-Tribenzylamine	03
d-α Tocopheryl acetate	06	ar-Tribromoethyl benzene	03
d-α Tocopheryl acetate (animal feed grade)	06	2,4,6-Tribromophenol	03
d-α Tocopheryl acetate (medicinal grade)	06	3,4',5-Tribromosalicylanilide	03
Tolamide	06	Tri(2-butoxyethyl) phosphate	11
Tolbutamide	06	Tributyl acetyltriate	11
P-Tolaldehyde	07	Tri-n-butylaluminum	15
Toluene-2,3-(and 3,4)-diamine (35/65 Mixture)	03	Tri-n-butylamine	15
Toluene-2,4-(and 2,6)-diamine (4-r-Tolylenediamine)	03	Tributyl citrate	11
Toluene-3,4-diamine	03	2,4,6-tri-tert-Butylphenoxy	12
Toluene 2,4-and 2,6-dicyanate (80/20 Mixture)	03	Tributyl phosphite	11
Toluene (Toluol) other grades	01	Tributyl phosphate	11
Toluene High purity (98-100%)	02	S,S,S-Tributyl phosphorothioate	13
Toluene Other	02	Tributyl phosphorothioate (Merphos)	13
		Tributyltin chloride	12
		Tri(castor oil alkyl)phosphate	06
		Trichloromethane	02
		Trichloroacetoneitrile	15

Table D-1—Continued  
Alphabetical chemical index

Chemical name	Sect. No.	Item No.	Chemical name	Sect. No.	Item No.
1,2,3-(and 1,2,4)-Trichorobenzene	03	1490,000	Triethanolamine salicylate	12	340,100
1,2,4-Trichorobenzene	03	1491,000	Triethanolamine, sulfuric & phosphoric acid salts	15	482,200
1,1,1-Trichloro-2,2-bis(p-methoxyphenyl)ethane (Methoxychlor)	13	146,000	Triethanolamine titanate	15	1062,500
3,4,4'-Trichlorocarbamide	15	203,000	Triethyl acetylacrylate	11	71,300
1,1,1-Trichloroethane (Methyl chloroform)	15	1245,000	Triethylaluminum	15	1364,000
1,1,2-Trichloroethane (Vinyl trichloride)	15	1246,000	Triethylamine	15	279,000
Trichloroethylene	15	1247,000	Triethylamine, nitric acid salt	15	482,300
Trichlorofluoromethane (F-11)	15	1272,000	Triethylborane	15	1368,800
Trichlorofluoromethane	15	203,500	Triethyl borate	11	71,400
Trichloromethylsilane	15	1394,000	Triethylenediamine	15	305,600
3-Trichloromethyl-1,2,4-triazazole	03	1492,500	Triethylene glycol	15	1194,000
N-Trichloromethylthio-4-cyclohexene-1,2-dicarboximide (Caplan)	13	34,000	Triethylene glycol d(caprylate-caprate)	11	127,000
N-Trichloromethylthiothalamide (Folpet)	03	35,000	Triethylene glycol d(2-ethylbutyrate)	11	128,000
1,2,4-Trichloro-5-nitrobenzene	03	1493,000	Triethylene glycol d(2-ethylhexanoate)	11	209,000
Trichloroantimethane (Chloropirn)	03	242,000	Triethylenetetramine	15	326,000
Trichlorophenylsilane	03	1494,000	Trl(2-ethylhexyl) trimellitate	11	54,750
1,2,3-Trichloropropane	15	1248,000	Triethyl orthoacetate	15	1084,000
Trichloropropylsilane	15	1395,000	Triethyl orthoformate	15	1085,000
3,5,9-Trichloro-2-pyridinyloxyacetic acid	03	118,064	Triethyl orthophosphate	15	1086,000
$\alpha,\alpha,\alpha$ -Trichlorotoluene (Benzotrchloride)	03	1495,000	Triethyl phosphate	11	103,000
2,4,6-Trichloro-s-triazine (Cyanuric chloride)	03	1499,000	Triethyltrimethyltriamine	09	7,000
1,3,5-Trichloro-s-triazine-2,4,6-(1H,3H,5H)trione (Trichloroisocyanuric acid)	15	204,000	Trifluoroacetic acid	15	584,009
Trichlorotrifluoroethane (F-113)	15	1273,000	Trifluoroacetic anhydride	15	584,010
Trichlorovinylsilane	15	1398,000	Trifluoroacetyl chloride	15	584,015
Trichlorovinylene	11	14,000	$\alpha,\alpha,\alpha$ -Trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine (Trifluralin)	13	116,000
1-Tridecanol	15	880,000	$\alpha,\alpha,\alpha$ -Trifluoro-2,6-dinitro-N-ethyl-N-(2-methyl-2-propenyl)-p-toluidine (Ethylfluralin)	13	116,100
Tridecyl alcohol, ethoxylated and phosphated, polyalkylene polyamine salt	12	90,010	Trifluoroethanol	15	1420,300
Tridecyl alcohol, ethoxylated	12	769,000	Trifluoroethyl methacrylate	15	1056,130
Tridecyl alcohol, ethoxylated and carbonated, sodium salt	12	319,000	Trifluoropropene	15	1273,550
Tridecyl alcohol, ethoxylated and phosphated, potassium salt	12	90,000	Tri-n-hexyl aluminum	15	1364,900
Tridecyl alcohol, ethoxylated and phosphated, potassium salt	12	90,000	Tri-n-hexyltrimellitate	11	54,850
Tridecyl alcohol, ethoxylated and sulfated, sodium salt	12	90,020	Tri(hydrogenated tallow) amine	12	446,050
Tridecyl alcohol, propoxylated and ethoxylated	12	292,000	Trihydrogenated tallow ammonium chloride	12	501,800
Tridecylbenzenesulfonic acid	12	136,100	Triisobutylaluminum	15	1365,000
Tridecylbenzenesulfonic acid, sodium salt	12	136,200	Triisobutylene polysulfide	14	263,000
Tridecylisopropyl (ethyleneoxy) acetic acid, sodium salt	12	138,200	Triisododecylamine	12	444,300
Tridecylisopropyl (ethyleneoxy) propionic acid, potassium salt	12	50,000	Triisodecylphosphite	15	1040,500
3-(3-Tridecylisopropylamino)propyl amine	12	16,500	Triisodecyl trimellitate	11	54,900
Tridecyl propinate	12	339,600	Triisooctyl phosphite	11	54,950
Tridecyl stearate	12	110,300	Triiso-octyl trimellitate	11	55,000
Tridecyl sulfate, sodium salt	11	980,000	Triisopropylamine	15	409,000
Tri(dimethylaminoethyl)phenol	12	124,800	1,3,5-Triisopropyl benzene	15	204,800
Tri(4-allyloxybutylphenyl) phosphite	03	1499,206	Triisopropyl phosphite	15	1042,000
Tridecylamine	15	204,500	Triisulcylamine	12	444,600
Triethanolamine	15	444,000	Trimellitic acid esters, all other	11	57,000
Triethanolamine, ethoxylated	12	381,000	Trimellitic anhydride, acid chloride	03	1509,100
Triethanolamine hydrochloride	15	340,000	Trimellitic trichloride	03	1509,300
Triethanolamine phosphate ester	15	482,150	Trimer dibasic acids	15	584,100
	12	340,050	Trimethylolpropanetriamine	06	275,000
			Trimethylolpropanetriamine	15	1369,000



Table D-1—Continued  
Alphabetical Chemical Index

Chemical name	Sect. Item No.	Chemical name	Sect. Item No.
Vat Blue 19	04 1172.019	Violet 5:1	05 220.000
Vat Blue 20, 14	04 1173.000	Violet 27	05 93.227
Vat Blue 29	04 1173.029	Vitamin A, all other	06 776.000
Vat Blue 43	04 1175.000	Vitamin C, all other	06 810.000
Vat Blue 66	04 1175.066	Vitamin A acetate (medical grade)	06 772.000
Vat Brown 1, 11	04 1187.000	Vitamin A alcohol	06 773.000
Vat Brown 11, 12	04 1190.000	Vitamin A palmitate (medical grade)	06 775.000
Vat Brown 13, 17	04 1200.000	Waxes and paraffinic products	06 632.000
Vat Brown 57, 12.8	04 1200.000	Wool wax alcohols, ethoxylated	12 740.800
Vat brown dyes, all other	04 1201.000	Xanthan gum	09 451.000
Vat Green 1, 6	04 1178.000	Xanthates and sulfides, acyclic, other	09 195.000
Vat Green 3, 10	04 1180.000	Xanthates and sulfides, cyclic, other	09 195.000
Vat Green 7	04 1180.007	o-Xylene (90-100% of o-xylene isomer)	03 1540.000
Vat green dyes, all other	04 1188.000	m-Xylene (90-100% of m-xylene isomer)	03 1539.000
Vat Orange 1, 20	04 1131.000	p-Xylene (90-100% of p-xylene isomer)	03 1541.000
Vat Orange 2, 12	04 1132.000	Xylene High purity (98-100%)	02 30.500
Vat Orange 7, 11	04 1138.000	Xylene Other	03 1542.800
Vat Orange 9, 12	04 1137.000	2,4-Xylenesulfonic acid	03 1543.000
Vat Red 1, 13	04 1142.000	Xylenesulfonic acid, ammonium salt	03 1543.502
Vat Red 10, 18	04 1144.000	Xylenesulfonic acid, mixed isomers	03 150.000
Vat Red 13, 11	04 1148.000	Zinc sulfonic acid, sodium salt	03 1544.200
Vat Red 15, 10	04 1148.000	2-Xylenol	03 1544.500
Vat Red 16, 11	04 1154.000	3-Xylenol	03 1544.503
Vat red dyes, all other	04 1155.000	4-Xylenol	03 1544.503
Vat Violet 1, 11	04 1159.000	Xylenol crystals	03 1544.000
Vat Violet 13, 8-1/4	04 1118.000	Xylenol, low boiling point	03 1545.000
Vat Yellow 2, 8-1/2	04 1127.000	Xylenol, not classified as to boiling point	03 1547.000
Vat Yellow 33, 15	04 1130.400	Xylidine, original mixture	03 1550.000
Vegetable glycerides, hydrogenated	15 330.400	Xylidine	06 581.500
Vegetable oils, sulfated, all other	12 313.000	Xylose (intestinal malabsorption test)	03 1553.000
Veratridine	03 329.000	4-(2,4-Xylazo)-2,5-xylidine	06 643.000
Very high molecular weight (>1000) hydrocarbons	04 292.000	Zeranol	06 606.000
Vetivonal	07 124.000	Zinc acetate	15 671.950
Vetivynyl acetate	06 285.000	Zinc $\alpha$ -alkylcarboxylate	15 483.390
Vinblastine sulfate	06 282.000	Zinc bis(monothioammine)dichloride	14 235.000
Vincristine sulfate	06 282.000	Zinc dialkylthiophosphate	14 236.000
Vinyl acetate-acrylate copolymers	08 50.080	Zinc dialkylphenol dithiophosphate	14 239.000
Vinyl acetate, monomer	15 1069.000	Zinc dibutyl phosphorodithioate	15 644.000
Vinyl bromide (Bromoethylene)	15 1215.000	Zinc 2-ethylhexanoate	06 767.300
Vinyl chloride-acetate copolymer resins	08 50.080	Zinc gluceptate	06 767.300
Vinyl chloride, monomer (Chloroethylene)	15 1274.000	Zinc gluconate	14 242.000
Vinyl fluoride, monomer	15 1275.000	Zinc isopropyl (Activator, physical property improver, and processing auxiliary)	09 154.800
Vinylidene fluoride, monomer (1,1-Dichloroethylene)	15 1275.000	Zinc laurate	09 179.000
2-Vinylpyridine	03 1536.000	Zinc naphthanate	14 315.000
4-Vinylpyridine	03 1536.000	Zinc neodecanoate	15 710.000
1-Vinyl-2-pyrrolidone—other copolymers	15 216.000	Zinc phenolsulfonate	06 560.000
1-Vinyl-2-pyrrolidone, copolymers with vinyl acetate	14 450.500	Zinc salicylate	06 560.500
1-Vinyl-2-pyrrolidone, methylacrylic acid, dimethylamino ethyl ester copolymer	15 214.000	Zinc stearate	15 763.000
1-Vinyl-2-pyrrolidone, monomer	15 215.000	Zinc tellate	15 178.000
1-Vinyl-2-pyrrolidone, polymers	14 450.000	Zinc undecylenate	06 140.000
1-Vinyl-2-pyrrolidone—vinyl acetate copolymer	15 217.000	Zircosulfamate compounds	15 1409.400
Vinyl toluene, all other	08 51.000	Zirconium acetate	15 607.000
Vinyl toluene, stylics	08 3.800	Zirconium $\alpha$ -alkylcarboxylate	15 671.975
Vinyltriethoxysilane	15 1398.000	Zirconium 2-ethylhexanoate	15 645.000
Vinyl trimethoxy silane	15 1398.300	Zirconium neodecanoate	15 711.000





# NEWS

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Contact: Betsy Godley  
or  
Ed Carroll  
202-252-1819

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## ITC PUBLISHES 73D ANNUAL REPORT ON SYNTHETIC ORGANIC CHEMICALS

The combined production of all synthetic organic chemicals and primary products from petroleum and natural gas in 1989 was 173.0 billion kilograms, according to the ITC. That amount is 1.6 percent less than the output in 1988.

Sales of these materials in 1989, which totaled 98.4 billion kilograms valued at \$96.1 billion, were 0.2 percent more than in 1988 in terms of quantity and 2.9 percent more in terms of value. These figures include data measured at several successive steps in the manufacturing process and, therefore, they necessarily reflect some duplication.

The report, which is the 73d in an annual series, covers about 6,000 individual chemicals and chemical products and presents statistics in as great detail as possible without revealing the operations of individual producers. The report was prepared from data supplied by 698 primary manufacturers and includes a list of manufacturers of each item for which production and/or sales was reported.

The method for ordering the report this year is different from the past. This year you must order the report directly from the ITC rather than from the Government Printing Office, and there will be no charge for the report. Copies of the report Synthetic Organic Chemicals, United States Production and Sales, 1989 (USITC Publication 2338, December 1990) may be obtained by calling 202-252-1809 or from the Office of the Secretary, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436. Requests may also be faxed to 202-252-2186.







