

UNITED STATES INTERNATIONAL TRADE COMMISSION

**SYNTHETIC
ORGANIC CHEMICALS**

**United States Production
and Sales, 1976**

USITC Publication 833



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SYNTHETIC ORGANIC CHEMICALS**

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U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1977

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UNITED STATES INTERNATIONAL TRADE COMMISSION

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INTRODUCTION

This is the sixtieth 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 consists of 15 sections, each covering a specified group (based principally on use) of organic chemicals as follows: Tar and tar crudes; primary products from petroleum and natural gas; intermediates; dyes; 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 800 producers.

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.¹

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 for all sections are 5,000 pounds of production or sales and \$5,000 of value of sales with the following exceptions: Plastics and resin materials--50,000 pounds or \$50,000; pigments, medicinal chemicals, flavor and perfume materials, rubber-processing chemicals, and elastomers--1,000 pounds or \$1,000. They are usually given in terms of undiluted materials; however, products of 95 percent or more purity are considered to be 100 percent pure. Commercial concentrations are applied to 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 item 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 which 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.

Table 1 of the Appendix is a directory, alphabetized by the names of the manufacturers reporting in all sections and includes their office addresses.

Table 2 of the Appendix summarizes and gives the competitive status of U.S. general imports in 1976 of benzenoid intermediates and finished benzenoid products, entered under schedule 4, parts 1B and 1C, of the Tariff Schedules of the United States.

Table 3 of the Appendix lists synonymous names for cyclic intermediates. Information on all 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 Colourists.

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 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% 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 reaction system or when it is not isolated, but weighed, analyzed, or otherwise measured. This includes byproducts and co-products that are not classifiable as waste materials;

¹ Title 18, U.S.C. 1905 and Title 44, U.S.C. 3508.

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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%-owned subsidiaries or affiliates;
Produced and sold to, or bartered with, other firms (including less than 100% 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, your 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 agreements;
Shipments to subsidiary or affiliated companies, provided the ownership is less than 100%.

SALES EXCLUDES:

All intra-company transfers within a corporate entity;
All shipments to 100% owned subsidiary or affiliated companies;
All resales of imported or purchased material, including materials obtained by barter;
All shipments of a commodity produced for others under toll agreements.

VALUE OF SALES is the net selling price f.o.b. plant or warehouse, or delivered price. F.o.b. prices are preferred, but if they are not readily available from your records, delivered prices are acceptable.

SUMMARY

Combined production of all synthetic organic chemicals, tar, tar crudes, and primary products from petroleum and natural gas in 1976 was 289,292 million pounds--an increase of 17.3 percent over the output in 1975 (see table 1). Sales of these materials in 1976, which totaled 151,760 million pounds valued at \$33,657 million, were 11.8 percent larger than in 1975 in terms of quantity and 19.0 percent larger 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.

In 1976 production of all synthetic organic chemicals, including cyclic intermediates and finished products, totaled 162,873 million pounds, or 4.9 percent more than the output in 1975. Cyclic intermediates showed an apparent decrease in production of 37.0 percent, however, several items previously included in this section were transferred to the section on primary products from petroleum and natural gas. This latter section, therefore, shows an inordinately high apparent increase in production. Pesticides and related products (1,364 million pounds), with a decline of 14.9 percent from 1975, was the only other section to exhibit a decline in production. Rubber-processing chemicals (384 million pounds) lead the increase with a gain of 37.6 percent; organic pigments (68 million pounds) were 36.4 percent greater than in 1975; flavor and perfume materials (129 million pounds) increased 27.1 percent; dyes (256 million pounds) increased 24.4 percent; plastics and resin materials (29,680 million pounds) increased 19.4 percent; elastomers (synthetic rubber) (5,386 million pounds) increased 17.6 percent; plasticizers (1,587 million pounds) increased 17.4 percent; medicinal chemicals (236 million pounds) increased 13.2 percent; and surface-active agents (4,582 million pounds) increased 5.4 percent. The sections on miscellaneous end-use chemicals and chemical products and miscellaneous cyclic and acyclic chemicals were previously included in the section listed as miscellaneous chemicals. Together these two new sections show an increase of 15.3 percent over the output of miscellaneous chemicals in 1975.

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS AND THEIR RAW MATERIALS;
U.S. PRODUCTION AND SALES, 1975 AND 1976

	PRODUCTION			SALES					
				QUANTITY			VALUE		
	1975	1976	Increase, or decrease (-), 1976 over 1975 ¹	1975	1976	Increase, or decrease (-), 1976 over 1975 ¹	1975	1976	Increase, or decrease (-), 1976 over 1975 ¹
	Million pounds	Million pounds	Percent	Million pounds	Million pounds	Percent	Million pounds	Million pounds	Percent
Grand Total ² -----	246,587	289,292	17.3	135,778	151,760	11.8	28,293	33,657	19.0
Tar-----	6,455	6,364	-1.4	2,848	2,905	2.0	99	96	-3.0
Tar crudes ³ -----	6,797	7,182	5.7	4,378	4,519	3.2	268	285	6.3
Primary products from Petroleum and Natural Gas ⁴ -----	78,089	112,873	44.5	44,562	59,083	32.6	2,988	5,490	83.7
Synthetic organic chemicals total ² -----	155,246	162,873	4.9	83,990	85,253	1.5	24,939	27,786	11.4
Cyclic intermediates ⁴ -----	31,412	19,796	-37.0	14,780	7,664	-48.2	3,169	2,387	-24.7
Dyes-----	206	256	24.4	209	250	19.7	476	620	30.4
Organic pigments-----	50	68	36.4	42	54	27.9	186	261	40.4
Medicinal chemicals-----	208	236	13.2	149	161	8.1	772	742	-4.0
Flavor and perfume materials-----	101	129	27.1	83	111	34.1	143	195	36.2
Plastics and resin materials-----	24,868	29,680	19.4	20,955	24,837	19.5	7,003	8,619	23.1
Rubber-processing chemicals-----	279	384	37.6	204	224	9.8	207	247	19.3
Elastomers (synthetic rubber)-----	4,579	5,386	17.6	3,948	3,710	-6.0	1,458	1,529	4.9
Plasticizers-----	1,352	1,587	17.4	1,338	1,466	9.6	470	566	21.1
Surface-active agents-----	4,349	4,582	5.4	2,182	2,512	15.1	717	821	14.5
Pesticides and related products-----	1,603	1,364	-14.9	1,328	1,193	-10.2	2,366	2,410	1.8
Miscellaneous end-use chem- icals and chemical products ⁵ -----	-	15,851	-	-	9,160	-	-	2,251	-
Miscellaneous cyclic and acyclic chemicals ⁵ -----	(86,238)	-	-	(38,774)	-	-	(7,971)	-	-
	-	83,553	-	-	33,912	-	-	7,137	-

¹ Percentages calculated from figures rounded to thousands.

² Because of rounding, figures may not add to the totals shown.

³ Estimated in part to avoid disclosing individual company operations.

⁴ The large increases in 1976 over 1975 for primary products from petroleum and natural gas, and decreases for cyclic intermediates were caused, in part, by the transfer, in 1976, of ethylbenzene, cyclohexane, styrene, m-xylene, o-xylene, p-xylene, and cumene, from the intermediates section to the primary products from petroleum and natural gas section.

⁵ Items in these two sections were previously included in the section named miscellaneous chemicals

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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 materials, elastomers, 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 intermediate 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 1976 was 162,873 million pounds or 4.9 percent more than the output of 155,246 million pounds reported for 1975 and 55.5 percent more than the output of 104,711 million pounds reported for 1967 (see table 2). Sales of synthetic organic chemicals in 1976 amounted to 85,253 million pounds, valued at \$27,786 million, compared with 83,990 million pounds, valued at \$24,939 million in 1975 and 55,177 million pounds, valued at \$10,438 million in 1967. Production of all cyclic products (intermediates and finished products combined) in 1976 totaled 44,192 million pounds or 11.5 percent less than the 49,963 million pounds reported for 1975 and 32.0 percent more than the 33,479 million pounds reported for 1967, however, the transfer of several items, in 1976, from the cyclic intermediates section to the section on primary production from petroleum and natural gas has caused the output of cyclic products to appear much lower in relation to 1967 and 1975 than would otherwise have resulted. Production of all acyclic products in 1976 totaled 118,681 million pounds, or 12.7 percent more than the 105,283 million pounds reported for 1975 and 66.6 percent more than the 71,232 million pounds reported for 1967.

TABLE 2.--SYNTHETIC ORGANIC CHEMICALS: SUMMARY OF U.S. PRODUCTION AND SALES
OF INTERMEDIATES AND FINISHED PRODUCTS, 1967, 1975, AND 1976

[Production and sales in thousands of pounds; sales value in thousands of dollars]						
CHEMICAL	1967 ¹	1975	1976	Increase, or decrease (-)		
				1976 over		
				1967	1975	
Organic chemicals, cyclic and acyclic,				Percent	Percent	
Grand total:						
Production-----	104,711,357	155,245,961	162,873,300	55.5	4.9	
Sales-----	55,176,823	83,990,306	85,252,538	54.5	1.5	
Sales value-----	10,438,453	24,938,928	27,785,930	166.2	11.4	
Cyclic, total:						
Production-----	33,479,469	49,962,996	44,192,345	32.0	-11.6	
Sales-----	19,328,628	28,562,903	23,993,824	24.1	-16.0	
Sales value-----	4,610,293	11,316,374	11,547,071	150.5	2.0	
Acyclic, total:						
Production-----	71,231,888	105,282,965	118,680,955	66.6	12.7	
Sales-----	35,848,195	55,427,403	61,258,714	70.9	10.5	
Sales value-----	5,828,160	13,622,554	16,238,859	178.6	18.8	
1. Cyclic Intermediates ²						
Production-----	20,793,132	31,412,575	19,795,832	-4.8	-37.0	
Sales-----	9,461,180	14,779,570	7,663,691	-19.0	-48.2	
Sales value-----	1,000,359	3,169,243	2,386,993	138.6	-24.7	
2. Dyes						
Production-----	206,240	206,034	256,250	24.2	24.4	
Sales-----	198,592	208,768	249,887	25.8	19.7	
Sales value-----	332,049	475,609	620,294	86.8	30.4	
3. Organic Pigments						
Production-----	53,322	49,653	67,727	27.0	36.4	
Sales-----	42,867	42,372	54,211	26.5	27.9	
Sales value-----	108,354	185,990	261,089	141.0	40.4	
4. Medicinal Chemicals						
Cyclic:						
Production-----	110,129	123,624	136,374	23.8	10.3	
Sales-----	70,120	77,847	79,581	13.5	2.2	
Sales value-----	348,873	676,431	642,829	84.2	-5.0	
Acyclic:						
Production-----	69,941	84,765	99,431	42.2	17.3	
Sales-----	56,804	70,966	81,253	43.0	14.5	
Sales value-----	36,402	95,674	98,692	171.1	3.2	

See footnotes at end of table.

TABLE 2.--SYNTHETIC ORGANIC CHEMICALS: SUMMARY OF U.S. PRODUCTION AND SALES
OF INTERMEDIATES AND FINISHED PRODUCTS, 1967, 1975, AND 1976--CONTINUED

[Production and sales in thousands of pounds; sales value in thousands of dollars]						
CHEMICAL	1967 ¹	1975	1976	Increase, or decrease (-)		
				1976 over 1967	1976 over 1975	
5. Flavor and Perfume Materials						
				Percent	Percent	
Cyclic:						
Production-----	57,978	44,751	55,090	-5.0	23.1	
Sales-----	47,285	33,044	48,503	2.6	46.8	
Sales value-----	52,866	91,851	125,479	137.4	36.6	
Acyclic:						
Production-----	53,558	56,589	73,756	37.7	30.3	
Sales-----	49,311	49,639	62,445	26.6	25.8	
Sales value-----	40,495	51,580	69,843	72.5	35.4	
6. Plastics and Resin Materials						
Cyclic:						
Production-----	5,033,497	7,806,999	8,943,083	77.7	14.6	
Sales-----	4,224,121	6,696,592	7,684,865	81.9	14.8	
Sales value-----	1,036,940	2,763,341	3,113,430	200.2	12.7	
Acyclic:						
Production-----	8,759,452	17,060,723	20,737,169	136.7	21.5	
Sales-----	7,753,242	14,258,062	17,151,982	121.2	20.3	
Sales value-----	1,635,690	4,239,701	5,505,923	236.6	29.9	
7. Rubber-Processing Chemicals						
Cyclic:						
Production-----	220,139	224,997	334,735	52.0	48.8	
Sales-----	169,970	172,637	186,393	9.7	8.0	
Sales value-----	116,318	186,853	218,263	87.6	16.8	
Acyclic:						
Production-----	43,994	53,995	49,688	12.9	-8.0	
Sales-----	30,878	31,198	37,879	22.7	21.4	
Sales value-----	15,477	20,040	28,594	84.8	42.7	
8. Elastomers (Synthetic Rubber)						
Cyclic:						
Production-----	2,297,637	2,778,884	3,146,083	36.9	13.2	
Sales-----	1,940,099	2,302,389	1,970,636	1.6	-14.4	
Sales value-----	439,580	639,357	560,386	27.5	-12.4	
Acyclic:						
Production-----	1,524,908	1,799,841	2,239,717	46.9	24.4	
Sales-----	1,321,945	1,645,726	1,739,501	31.6	5.7	
Sales value-----	434,657	818,335	968,676	122.8	18.4	
9. Plasticizers						
Cyclic:						
Production-----	929,871	1,038,204	1,185,909	27.5	14.2	
Sales-----	865,084	1,042,188	1,110,869	28.4	6.6	
Sales value-----	167,827	307,923	360,453	114.8	17.1	
Acyclic:						
Production-----	332,908	313,498	401,525	20.6	28.1	
Sales-----	296,767	296,129	354,842	19.6	19.8	
Sales value-----	93,142	162,467	205,812	121.0	26.7	
10. Surface-Active Agents						
Cyclic: ³						
Production-----	1,418,444	1,921,358	2,312,728	63.0	20.4	
Sales-----	852,238	1,084,899	1,393,489	63.5	28.4	
Sales value-----	95,810	211,449	319,422	233.4	51.1	
Acyclic:						
Production-----	2,060,851	2,423,039	2,269,670	10.1	-6.5	
Sales-----	897,786	1,096,680	1,118,596	24.6	2.0	
Sales value-----	220,877	505,972	501,818	127.2	-0.8	

See footnotes at end of table.

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TABLE 2.--SYNTHETIC ORGANIC CHEMICALS: SUMMARY OF U.S. PRODUCTION AND SALES OF INTERMEDIATES AND FINISHED PRODUCTS 1967, 1975, AND 1976--CONTINUED

[Production and sales in thousands of pounds; sales value in thousands of dollars]						
CHEMICAL	1967 ¹	1975	1976	Increase, or decrease (-)		
				1976 over 1967	1976 over 1975	
11. <i>Pesticides and Related Products</i>						
				Percent	Percent	
Cyclic:						
Production-----	823,158	1,196,310	940,263	14.2	-21.4	
Sales-----	681,532	964,739	838,814	23.1	-13.1	
Sales value-----	627,742	1,891,064	1,843,896	193.7	-2.5	
Acyclic:						
Production-----	226,505	406,706	424,128	87.2	4.3	
Sales-----	215,831	363,297	353,790	63.9	-2.6	
Sales value-----	159,301	475,319	566,238	255.4	19.1	
12. <i>Miscellaneous End-Use Chemicals and Chemical Products</i> ⁴						
Cyclic:						
Production-----	(1,535,922)	(3,159,607)	3,137,093	...	...
Sales-----	(775,540)	(1,157,858)	909,875	...	...
Sales value-----	(283,575)	(717,263)	412,387	...	...
Acyclic:						
Production-----	(58,159,771)	(83,078,809)	12,713,987	...	...
Sales-----	(25,225,631)	(37,615,706)	8,249,695	...	...
Sales value-----	(3,192,119)	(7,253,466)	1,838,740	...	...
13. <i>Miscellaneous Cyclic and Acyclic Chemicals</i> ⁴						
Cyclic:						
Production-----	...	...	3,881,178	...	...
Sales-----	...	...	1,803,010	...	...
Sales value-----	...	...	682,150	...	...
Acyclic:						
Production-----	...	...	79,671,884	...	...
Sales-----	...	...	32,108,731	...	...
Sales value-----	...	...	6,454,523	...	...

¹ Standard reference base period for Federal Government general-purpose index numbers.

² The large decrease for cyclic intermediates were caused, in part, by the transfer, in 1976, of ethylbenzene, cyclohexane, styrene, m-xylene, o-xylene, p-xylene, and cumene, from the intermediates section to the primary products from petroleum and natural gas section.

³ Includes ligninsulfonates.

⁴ Items in these two sections were previously included in the section named miscellaneous chemicals.

The following tabulation shows, by chemical groups, the number of companies that reported production in 1976 of one or more of the chemicals included in the groups listed in table 2:

Chemical group	Number of companies	Chemical group	Number of companies
Cyclic intermediates-----	175	Rubber-processing chemicals-----	32
Dyes-----	42	Elastomers (synthetic rubber)-----	32
Organic pigments-----	34	Plasticizers-----	57
Medicinal chemicals-----	99	Surface-active agents-----	178
Flavor and perfume materials-----	47	Pesticides and related products-----	85
Plastics and resin materials-----	253	Miscellaneous end-use chemicals and chemical products-----	126
		Miscellaneous cyclic and acyclic chemicals-----	245

TAR

John J. Gersic

Coal tar is produced chiefly by the steel industry as a byproduct of the manufacture of coke; water-gas tar and oil-gas tar are produced by the fuel-gas industry. Production of coal tar, therefore, depends on the demand for steel; production of water-gas tar and oil-gas tar reflects the consumption of manufactured gas for industrial and household use. Water-gas and oil-gas tars have properties intermediate between those of petroleum asphalts and coal tar. Petroleum asphalts are not usually considered to be raw materials for chemicals.

The quantity of tar produced in the United States in 1976 was almost entirely coal tar, which amounted to 636 million gallons (see table 1). Production in 1976 was 1.4 percent less than the 646 million gallons of coal tar produced in 1975. Sales of coal tar in 1976 amounted to 291 million gallons compared with 285 million gallons in 1975. U.S. production of water-gas and oil-gas tars was not reported to the Commission for 1975 or 1976; production of these tars in 1968 amounted to 21 million gallons, according to trade publications.

Consumption of tar in 1976 amounted to an estimated 604 million gallons, of which 72 percent was consumed in distillation. Tar used by the producers as fuel amounted to 165 million gallons; a lesser amount, 5.5 million gallons, was consumed by coke-oven operators in miscellaneous uses (see table 1A).

TAR CRUDES

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 and 1B.

Domestic production of industrial and specification grades of benzene reported by coke-oven operators and petroleum refinery operators in 1976 amounted to 1,425 million gallons--39.2 percent more than the 1,024 million gallons reported for 1975. These statistics include data for benzene produced from light oil and petroleum. Sales of benzene by coke-oven operators and petroleum refiners in 1976 amounted to 637 million gallons compared with 548 million gallons in 1975. In 1976 the output of toluene (including material produced for use in blending in aviation fuel) amounted to 999 million gallons--42 percent more than the 705 million gallons reported for 1975. Sales of toluene in 1976 were 618 million gallons

compared with 441 million gallons in 1975. The output of xylene in 1976 (including that produced for blending in motor fuels) was 722 million gallons, compared with 639 million gallons in 1975. Over 99 percent of the 722 million gallons of xylene produced in 1976 was obtained from petroleum sources.

Production (or sales) figures on crude naphthalene from coal-tar oils in 1976 could not be published without disclosing the operations of individual companies. Production of petroleum-derived naphthalene in 1976 amounted to 107 million pounds, compared with 110 million pounds in 1975. Production figures on road tar for 1976 cannot be published; in 1972 production amounted to 30 million gallons.

Some of the products obtained from tar and included in the statistics in table 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.

Data for 1976 tar crudes were supplied by 9 companies and company divisions.

SECTION I

Tar and Tar Crudes

Extensive revisions were made to the 1976 SOC questionnaire. These revisions were made after consultation with an industry task force, government agencies, and considerable reflection on what the finished report's objectives should be.

A new subsection B (Inventory and Capacity of Selected Items for Fuel, Chemical and Other Uses) was added to the questionnaire for Section I; its purpose was to obtain inventory and capacity data on benzene, toluene, xylenes and benzene-toluene-xylenes concentrate. These data will increase the value of the report to its users. However, so few of the respondents have yet completed subsection B that it is not possible to publish a meaningful compilation of these data at this time.

Organic Chemicals From Coal

Although coal-tar chemicals have been around a long time, the manufacture of coal-tar dyestuffs, medicinals, and photographic chemicals was relatively unimportant in the United States until after World War I. Prior to that time Germany dominated the world's production and trade, accounting for three-fourths of world production of coal-tar dyes and even more of that of coal-tar medicinals. U.S. shortages caused by the war, coupled with increases in U.S. import duties on dyestuffs and related products, encouraged U.S. capital investment in a domestic dye industry. 1/

Coal remained the basis of the world's synthetic organic chemicals industry through the 1930's, until the development of petrochemical processes, which was due at least in part to the abundance of relatively cheap petroleum. The U.S. petrochemical industry was developed during World War II to supply synthetic materials to replace natural products which were unavailable. The industry expanded considerably after the war with the discovery of large Middle East oilfields.

Because of the availability of petroleum and its easy transport, it rapidly displaced coal as the primary fossil fuel, and at the same time petrochemicals largely displaced coal-tar chemicals.

Prospects for the "chemicals from coal" industry

Traditionally, the major source of "chemicals from coal" has been the light oils produced as coke-oven byproducts during the carbonization of coal. These oils contain benzene, toluene, and xylene along with lesser amounts of other chemicals. Few coke ovens are built today for any purpose other than the production of metallurgical coke, most of which has been used in blast furnaces for steel production. But today, owing to the use of supplemental fuels in blast furnaces, the consumption of coke per ton of metal produced is decreasing and will probably continue to decrease, at least in the near future, although metal production will probably continue to increase.

If there is to be a renaissance of production of chemicals from coal, new technology must play a leading part. Of particular concern are high manufacturing costs, sulfur content problems, and the increasing tendency of producers of light oils to sell these oils to petroleum refineries, which process them along with their petroleum fractions. This, however, does not mean that customary processes will be replaced entirely. For example, in the United Kingdom there are presently three producers of coal liquids producing some 19,000 barrels of chemical feedstock a day, with projected production of 22,000 barrels a day by 1980. 2/

1/ United States Tariff Commission, Dyes and Other Coal-Tar Chemicals, 1918, p.11.

2/ Oil and Gas Journal, Dec. 5, 1975, p. 82.

About a 10-percent increase in the price of naphtha or gas oil adds about 2 cents a pound to the ethylene transfer price, 1/ which would make ethylene from coal economically competitive.

Currently, aromatics from coal are roughly competitive with those from petroleum. The following tabulation contains cost data from aromatics arrived at in the Chem Systems study: 2/

<u>Process</u>	<u>Aromatic cost</u> <u>(cents per gallon)</u>
Hydropyrolysis	52
Crude oil processing	60
H-coal	64
COED <u>3/</u>	78

Overall, it therefore appears that chemicals from coal will probably increase in importance in the future. With our large coal deposits, raw materials should be readily available. In addition, expected domestic shortages of crude petroleum could be partially alleviated by the diversion of feedstocks intended for petrochemical manufacture to fuel uses, thus decreasing import dependence. Further, depending upon the relative prices of coal and crude petroleum, chemicals from coal could help the United States increase its healthy trade surplus in chemicals.

Trade

Though imports of benzene, toluene, and xylene doubled from 1971 to 1976 (from \$48 million to \$96 million), exports increased more than elevenfold (from \$13 million to \$156 million). The largest growth was in toluene exports, which rose from \$2.6 million in 1971 to \$75.2 million in 1976.

Benzene has had a negative trade balance (in both volume and value) since 1971. This has been due to the availability of cheap benzene from overseas sources. Imports decreased in 1976, and exports increased to the point that the trade balance was less unfavorable than in the preceding 5 years. In 1977, as the world continues to emerge from recession, benzene exports could exceed imports again, as last happened in 1970.

Toluene had a negative trade balance from 1969 through 1973. In each year since 1974 the trade balance has become increasingly favorable. Most of the toluene exports are used for octane improvement of gasoline and as solvents. As decreasing quantities of additives are permitted to improve octane, the demand for certain aromatics, including toluene, should continue to rise. However, while this means an increasing export market for toluene, it is possible that increasing demand in the United States could prevent our export trade from increasing as rapidly as otherwise might be expected.

1/ Chem Systems, Inc., op. cit., p. 224.

2/ Ibid., p. 58.

3/ Pyrolysis Process.

New technology

New developments in coal technology are centered, essentially, in the areas of combined fuels/chemicals operations, synthetic natural gas, coal-chemical complexes, and flash hydrogenation. The last is the newest and perhaps the most promising route to a more attractive chemical product mix from coal. The principal products are benzene, toluene, xylene, char, and smaller quantities of methane and ethane. The aromatics would be used to make other chemicals or in gasoline. The methane would be the feedstock for synthetic natural gas, while the ethane would be the feedstock for producing ethylene. The development of flash hydrogenation is principally funded by the Government, although some private funds have also been invested in research and development. The Energy Research and Development Administration is deeply involved and has at least four outside principal contractors. 1/

The coal-chemical complexes could include synthetic natural gas plants, flash hydrogenation facilities, and acetylene-processing hardware. Such complexes could lead to a quadrupling of coal's share of markets for a dozen key chemicals from 1.6 percent in 1975 to 6.6 percent in 1985. 2/

A plan linking together 11 major process steps into a "comprehensive combined energy and petrochemicals production complex" has been presented by a prominent engineering firm at a national technical society meeting. 3/ The complex is designed to consume 66,000 tons of coal a day and produce 17 major products, including 1 billion pounds of ethylene and 434 million pounds of propylene a year, 34 million gallons of benzene, 16 million gallons of toluene and 71.5 million gallons of mixed xylenes a year and 2,395 tons of sulfur and 214 tons of ammonia a day. 4/ Assuming extensive development of such complexes, in 1980 and 1990 coal-derived chemicals could supply the following shares of U.S. demand for the following basic organic chemicals (in percent): 5/

	<u>1980</u>	<u>1990</u>
Ethylene-----	10.0	10.0
Propylene-----	8.2	8.2
Benzene-----	6.4	7.5
Toluene-----	3.8	4.6
Xylene-----	19.2	23.0

The yield pattern of chemicals from coal depends upon both the process and the type of coal used. A recent patent on flash hydrogenation indicates a yield of 46 percent benzene, plus minor amounts of toluene and

1/ Chemical Week, Sept. 1, 1976, p. 33.

2/ Oil and Gas Journal, Feb. 2, 1976, p. 90.

3/ Chemical and Engineering News, Sept. 6, 1976, p. 7.

4/ Ibid., p. 8.

5/ Ibid., p. 33.

xylene. 1/ Another patent claims a 90-percent conversion of coal to liquids and gases, 2/ while an entrained-flow reactor using North Dakota lignite for feedstock yielded 15 percent benzene, 10 percent oils, 31 percent methane, 4 percent propane, and char and unreacted carbon. 3/ In general the major task for coal conversion technology is to increase the yields of gases and liquids at the expense of char and unreacted material.

Economics of coal chemicals vis-a-vis petrochemicals

To be commercially viable, any chemical-from-coal process must be able to compete with processes based on natural gas or petroleum. As most of the coal processes generate synthetic natural gas, the "wellhead" price of natural gas is obviously very important. It has been stated that coal-based projects are likely to be started as soon as the "wellhead" price reaches around \$3.00 per million Btu's. 4/ Currently, interstate natural gas is sold for a maximum of \$1.42 per thousand cubic feet (roughly 1 million Btu's), while intrastate natural gas, not being regulated, has been sold at times for as much as about \$2.50 per thousand cubic feet. The National Energy Plan proposes that "all new gas sold anywhere in the country from new reservoirs would be subject to a price limitation at the Btu equivalent of the average refiner acquisition price (without tax) of all domestic crude oil." Under this proposal the price would be approximately \$1.75 per thousand cubic feet at the beginning of 1978, 5/ and the refiner acquisition price of all domestic crude oil would have to reach approximately \$18.00 a barrel for natural gas to be priced at \$3.00 per thousand cubic feet. It appears that under the proposed oil pricing scheme outlined in The National Energy Plan such a price could only occur in the 1980's, assuming an inflation rate in the United States of 5 percent a year.

Ethylene-from-coal economics based on the two most promising coal-based routes (methanol homologation and dimethyl ether cracking) are compared with the petroleum-based routes in the following tabulation, which contain the transfer prices for ethylene which were arrived at in the Chem Systems study: 6/

<u>Process</u>	<u>Ethylene transfer price</u> <u>(cents per pound)</u>
Natural gas liquids cracking-----	16.61
Gas oil-----	17.24
Naphtha cracking-----	17.66
Dimethyl ether cracking-----	18.22
Methanol homologation-----	19.89
Coal syncrude-----	22.70

1/ Chemical Week, Sept. 1, 1976, p. 33.

2/ Ibid., p. 36.

3/ Ibid.

4/ Hydrocarbon Processing, Mar. 11, 1977, p. 15.

5/ Executive Office of the President, Energy and Policy Planning, The National Energy Plan, Apr. 29, 1977, p. 53.

6/ Chem Systems, Inc., Chemicals from Coal and Shale: An R&D Analysis for the National Science Foundation, June 1975, p. 224.

The xylene trade balance became positive in 1974 and has increased each year since. It had been negative in the previous 5 years. As with toluene, major end-uses include those as a gasoline octane improver and as a solvent. Exports have increased during each of the last 6 years and could continue, depending primarily on domestic xylene demand for use in nonleaded gasoline.

A renaissance in the chemicals-from-coal industry could greatly expand our trade surplus in benzene, toluene, and xylene. Lowered manufacturing costs resulting from technological breakthroughs in the production of aromatics from coal could enable the United States to maintain and possibly increase export markets even in the face of large-scale manufacture of aromatics in the Middle East.

TABLE 1.--TAR AND TAR CRUDES: U.S. PRODUCTION AND SALES, 1976

[Listed below are all tar crudes for which any reported data on production or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists separately all products for which data on production and/or sales were reported and identifies the manufacturers of each]

	UNIT OF QUANTITY	PRODUCTION	SALES		
			QUANTITY	VALUE	UNIT VALUE ¹
				1,000 dollars	
Tar: ² Coke-oven operators-----	1,000 gal--	636,382	290,536	96,417	\$0.332
Crude light oil: ³ Coke-oven operators-----	1,000 gal--	198,056	104,645	52,532	.502
Intermediate light oil: Coke-oven operators-----	1,000 gal--	5,419	1,923	543	.282
Light-oil distillates:					
Benzene, specification and grades, total ⁴ -----	1,000 gal--	1,425,222	637,284	489,485	.768
Coke-oven operators-----	1,000 gal--	60,411	59,822	47,526	.794
Petroleum refiners-----	1,000 gal--	1,364,811	577,462	441,959	.765
Toluene, all grades, total ⁴ -----	1,000 gal--	998,976	618,291	334,376	.541
Coke-oven operators-----	1,000 gal--	8,824	8,446	4,642	.550
Petroleum refiners-----	1,000 gal--	990,152	609,845	329,734	.541
Xylene, all grades, total ⁴ -----	1,000 gal--	722,014	714,546	352,583	.493
Coke-oven operator-----	1,000 gal--	1,496	1,251	732	.585
Petroleum refiners-----	1,000 gal--	720,518	713,295	351,851	.493
Solvent naphtha: ³ Coke-oven operators-----	1,000 gal--	1,968	1,792	713	.398
Crude tar-acid oils: Coke-oven operators-----	1,000 gal--	5,678	5,679	2,143	.377
Creosote oil (Dead Oil) (tar distillers and coke-oven operators) (100% creosote basis), total-----	1,000 gal--	113,967	78,284	43,203	...
Distillate as such (100% creosote basis)-----	1,000 gal--	77,126	51,913	25,677	.474
Creosote content of coal tar solution (100% creosote basis)---	1,000 gal--	36,841	26,371	17,526	(⁵)
All other distillates, total-----	1,000 gal--	...	35,321	12,740	.361
Coke-oven operators, total-----	1,000 gal--	6,475	3,750	856	.228
From light oil-----	1,000 gal--	3,993	1,398	505	.361
Other-----	1,000 gal--	2,482	2,352	351	.149
Tar distillers ⁶ -----	1,000 gal--	...	31,571	11,884	.376
Tar, refined, for uses other than road tar-----	1,000 gal--	16,668	5,712	3,038	.532
Pitch of tar (tar distillers and coke-oven operators), total-----	1,000 tons-	1,314	984	100,440	102.073
Soft (water softening point less than 100° F): Coke-oven operators-----	1,000 tons-	516	274	25,347	92.507
Other ⁷ -----	1,000 tons-	798	710	75,093	105.765

¹ Unit value per gallon, pound, or ton as specified.

² Includes only data for coal tar reported to the Division of Fuels Data, U.S. Bureau of Mines, (Mineral Industry Surveys, Coke and Coal Chemicals, Feb. 11, 1977). Data on U.S. Production of water-gas tar and oil-gas tar are not collected by the U.S. International Trade Commission, but according to trade publications, production of these tars amounted to 21 million gallons in 1968.

³ Data reported by tar distillers are not included because publication would disclose the operations of individual companies.

⁴ 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.

Footnotes for table 1--Continued

⁵ In 1976, production of coal-tar solution containing creosote (100% solution basis) amounted to 52,439 thousand gallons; sales were 36,076 thousand gallons valued at 17,526 thousand dollars, with a unit value of \$0.486 per gallon.

⁶ Includes data for crude light oil, solvent naphtha, pyridine crude bases, crude tar-acid oils, crude cresylic acid, methylnaphthalene, crude tar for other uses, unspecified tar distillates, road tar and refined anthracene, crude tetralin, crude coal tar solvent, carbon black, and primary and refractory oil.

⁷ Includes pitch emulsion, medium and hard pitch, and small amounts of soft pitch.

Note.--Statistics for materials produced in coke and gas-retort ovens are compiled by the Division of Fuels Data, U.S. Bureau of Mines, Department of the Interior. Statistics for materials produced in tar and petroleum refineries are compiled by the U.S. International Trade Commission.

TABLE 1A.--TAR: U.S. PRODUCTION AND CONSUMPTION, 1975 AND 1976

(In thousands of gallons)			
Product	1975	1976	
PRODUCTION			
Coal tar from coke-oven byproduct plants, total ¹ -----	645,537	636,382	
CONSUMPTION			
Total-----	617,235	604,376	
Tar consumed by distillation, total-----	450,159	433,747	
Coal tar distilled or topped by coke-oven operators ¹ -----	178,147	163,051	
Coal tar and water-gas tar distilled by tar distillers ² ---	272,012	270,696	
Tar consumed by the producers chiefly as fuel ¹ -----	162,112	165,169	
Coal tar consumed at coke-oven plants in miscellaneous uses ¹ -----	4,964	5,460	

¹ Reported to the Division of Fuels Data, U.S. Bureau of Mines.

² Reported to the U.S. International Trade Commission. Represents tar purchased from companies operating coke-ovens and gas-retort plants and distilled by companies operating tar-distillation plants. Statistics also include tar consumed other than by distillation by tar distillers.

TABLE 1B.--TAR AND TAR CRUDES: SUMMARY OF U.S. PRODUCTION OF SPECIFIED PRODUCTS,
1967, 1975, AND 1976

[Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.]

PRODUCT	UNIT OF QUANTITY	1967 ¹	1975	1976	INCREASED, OR DECREASED (-)	
					1976 OVER: 1976 OVER	
					1967	1975
					Percent	Percent
Tar ² -----	1,000 gal--	780,334	645,537	636,382	-18.4	-1.4
Benzene: ³						
Coke-oven operators-----	1,000 gal--	90,642	65,050	60,411	-33.4	-7.1
Petroleum refiners-----	1,000 gal--	878,704	958,863	1,364,811	55.3	42.3
Total-----	1,000 gal--	969,346	1,023,913	1,425,222	47.0	39.2
Toluene: ³						
Coke-oven operators-----	1,000 gal--	19,357	9,841	8,824	-54.4	-10.4
Petroleum refiners-----	1,000 gal--	⁴ 624,454	695,226	990,152	58.6	42.4
Total-----	1,000 gal--	643,811	705,067	998,976	55.2	41.7
Xylene: ³						
Coke-oven operators-----	1,000 gal--	5,488	1,884	1,496	-72.7	-20.6
Petroleum refiners-----	1,000 gal--	⁴ 449,349	637,215	720,518	60.3	13.1
Total-----	1,000 gal--	454,837	639,099	722,014	58.7	13.0
Naphthalene:						
Crude ⁵ -----	1,000 lb --	520,991	(⁶)	(⁶)	(⁶)	(⁶)
Petroleum naphthalene, all grades-----	1,000 lb --	376,679	109,919	107,191	-71.5	-2.5
Total-----	1,000 lb --	897,670	(⁶)	(⁶)	(⁶)	(⁶)
Creosote oil (Dead oil): ⁷						
Distillate as such (100% creosote basis)-----	1,000 gal--	108,832	79,164	77,126	-29.2	-2.6
Creosote content of coal tar solution (100% creosote basis)-----	1,000 gal--	17,402	35,671	36,841	111.7	3.3
Total-----	1,000 gal--	126,234	114,835	113,967	-9.7	-8

¹ Standard reference base period for Federal Government general-purpose index numbers.

² Includes only data for coal tar reported to the Division of Fuels Data, U.S. Bureau of Mines.

³ Data reported by tar distillers are not included because publication would disclose the operations of individual companies.

⁴ Includes data for material produced for use in blending motor fuels. Statistics are not comparable with monthly figures which include some o-xylene.

⁵ Naphthalene solidifying at less than 79°C. Figures include production by tar distillers and coke-oven operators and represent combined data for the commercial grades of naphthalene. Because of conversion between grades, the figures may include some duplication. Statistics on naphthalene refined from domestic crudes are reported in the section on cyclic intermediates.

⁶ Statistics for 1975 and 1976 cannot be published; to do so would disclose the operations of individual companies.

⁷ Includes data for creosote oil produced by tar distillers and coke-oven operators and used only in wood preserving.

TABLE 2.--TAR CRUDES FOR WHICH U.S. PRODUCTION OR SALES WERE REPORTED,
IDENTIFIED BY MANUFACTURERS, 1976

[Tar crudes for which separate statistics are given in table 1 are marked with an asterisk (*); products not so marked do not appear in table 1 because the reported data are accepted in confidence and may not be published. Manufacturers' identification codes shown below are taken from table 3. Table 3 identifies all U.S. producers of tar crudes (except producers that report to the Division of Fuels Data, U.S. Bureau of Mines)]

Product	Manufacturers' identification codes (according to list in table 3)
*Crude light oil ¹ -----	CBT.
*Light-oil distillates: Solvent naphtha ¹ -----	NEV.
Pyridine, crude bases ¹ -----	KPT.
Naphthalene, crude, solidifying at: ¹	
Less than 74° C-----	ASC, COP.
74° C. to less than 79° C.:-----	
74° C. to less than 76° C-----	KPT.
76° C. to less than 79° C-----	ASC, KPT.
Methylnaphthalene-----	KPT.
*Crude tar-acid oils: ¹	
Tar-acid content 5% to less than 24%-----	KPT.
Tar-acid content 24% to 50%-----	ASC.
Cresylic acid, crude-----	KPT, PRD.
*Creosote oil (Dead oil): ¹	
*Distillate as such-----	ASC, CBT, COP, HUS, KPT, RIL, WTC.
*Creosote in coal tar solution-----	ASC, KPT, RIL, WTC.
*All other distillate products ¹ -----	ASC, KPT, WTC.
Tar, road-----	ASC, KPT, RIL.
Tar for other uses:	
Crude-----	KPT, RIL.
*Refined ¹ -----	ASC, KPT, RIL.
*Pitch of tar: ¹	
*Soft (water softening point less than 110° F.)-----	ASC, KPT.
Medium (water softening point 110° F. to 160° F.)-----	ASC, CBT, COP, KPT, RIL.
Hard (water softening point above 160° F.)-----	ASC, HYS, KPT, RIL, WTC.
Pitch emulsion-----	JEN.

¹ Does not include manufacturers' identification codes for producers who report to the Division of Fuels Data, U.S. Bureau of Mines. Those producers are listed in the U.S. Bureau of Mines Mineral Industry Survey, November 6, 1976, entitled "Coke Producers in the U.S. in 1976."

TABLE 3.--TAR AND TAR CRUDES: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production or sales of tar and tar crudes to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ASC	Allied Chemical Corp.	KPT	Koppers Co., Inc., Organic Materials Div.
CBT	Samuel Cabot, Inc.	KPT	Koppers Co., Inc., Roads Materials Div.
COP	Coopers Creek Chemical Corp.	NEV	Neville Chemical Co.
HUS	Husky Industries, Inc.	RIL	Reilly Tar & Chemical Corp.
JEN	Jennison-Wright Corp.		

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION

19

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS

John J. Gersic and J. Röss Lewis, Jr.

Primary products that are derived from petroleum and natural gas¹ 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 are related to their intermediates and finished products. Many of the primary products derived from petroleum are identical with those derived from coal tar (e.g., benzene, toluene, and xylene). 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 to derive other chemicals. 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 xylene which are used in blending aviation and motor fuel.

The output of primary products derived from petroleum and natural gas as a group amounted to 112,873 million pounds in 1976. Production in 1975 was 78,089 million pounds. However, these totals can not be compared owing to transfer of items from the cyclic intermediates section to this section.²

The output of aromatic and naphthenic products from petroleum amounted to 48,167 million pounds in 1976, compared with 20,605 million pounds in 1975. Sales amounted to \$2,757 million in 1976 and \$897 million in 1975. The output of 1° and 2° benzene from petroleum in 1976 (9,827 million pounds) was 40.0 percent more than the 7,019 million pounds produced in 1975.

Production of all aliphatic hydrocarbons and derivatives from petroleum and natural gas was 64,706 million pounds in 1976, compared with 57,484 million pounds in 1975. Sales of these products were valued at \$2,732 million in 1976 compared with \$2,091 million in 1975. Production of ethylene was 22,475 million pounds in 1976--9.6 percent more than the 20,499 million pounds produced in 1975. The output of 1,3-butadiene in 1976 (3,507 million pounds) increased from the production in 1975 (2,597 million pounds). Production of 1,3-butadiene (3,682 million pounds) in 1974 was a record production.

Data for 1976 crude products from petroleum and natural gas for chemical conversion were supplied by 77 companies and company divisions.

¹ Statistics on aromatic chemicals from coal tar are given in the report on "Tar and Tar Crudes."

² Items transferred from cyclic intermediates are ethylbenzene, cyclohexane, styrene, m-xylene, o-xylene, p-xylene.

SECTION II

Primary Products from Petroleum and Natural Gas
For Chemical Conversion

Three new subsections (i.e., A, B and D) were added to the 1976 SOC questionnaire for Section II. These sections were added after consultation with Government agencies, an industry task force, and extensive discussion with users of the report.

Each of the added subsections were designed to fulfill a particular need. Subsection A (Production and Sales of Selected Items for Fuel, Chemical and Other Uses) was designed to capture all of the basic aromatics and olefins that are produced regardless of use. Subsection B (Inventory and Capacity of Selected Items for Fuel, Chemical and Other Uses) was added to obtain inventory and capacity data for the basic aromatics and olefins. Subsection D's (Captive Uses of C₁ to C₄ Aliphatic Hydrocarbons for Use as Petrochemical Feedstock for Your Own Use) purpose was to capture all (nine) of the lower aliphatic hydrocarbons used as chemical feedstocks. Few respondents have yet supplied data; in many cases those sections completed must be corrected. Therefore, it is not possible to publish summaries of these sections at this time.

Olefins and Aromatics

Though the terms "olefins" and "aromatics" cover many products, most of the comments here will be directed toward ethylene, propylene, benzene, toluene, and xylene. These are the most important "building block" raw materials for all synthetic organic chemicals and are principally derived from petroleum and natural gas. They are used to make products such as chemical intermediates, plastics, synthetic fibers, synthetic rubber, pesticides, and detergents.

Primary products from petroleum and natural gas

Of the top 50 chemicals ranked by production in 1976, as compiled by a reputable trade publication, 11 were organic chemicals classifiable in section II of this report. These organic chemicals are listed in the following table by rank in the top 50 chemicals in 1975 and 1976; also included are average annual U.S. production growth rates for the periods 1966-71 and 1971-76. Of those chemicals listed, the first four are the organic chemicals with the largest production volume.

Future growth for these building-block chemicals is expected to continue to be strong. An industry forecast indicates that ethylene demand is expected to increase at an average annual rate of 8 percent a year through the end of this decade and 6 percent a year in the early 1980's. 1/ The fastest growing ethylene derivatives and their growth rates are expected to be high-density polyethylene (12 percent a year) and vinyl acetate (10 percent a year). 2/ Propylene demand is predicted to grow at a faster rate (8.5 to 9 percent a year) than ethylene through 1985 by at least one industry observer. 3/ The fastest growing derivatives will be polypropylene (12 percent a year) and propylene oxide (10 percent per year). Benzene demand growth is forecast to average about 5.6 percent a year from 1976 to 1985; however, it could be lower owing to at least a partial change from benzene to other feedstocks for the manufacture of maleic anhydride and nylon intermediates. Furthermore, benzene exposure levels as set by the Occupational Safety and Health Administration could limit its use in certain applications and increase its cost. 4/

The toluene growth rate is forecast to decrease considerably to about 4.5 percent a year from 1976 to 1980; even lower growth rates are possible from 1980 to 1985. Styrene is an important derivative of ethylene and benzene; and in 1976 its production accounted for some 44 percent of the benzene demand and about 6 percent of the ethylene demand. For the past 16 years styrene demand has grown at an average annual rate of 8.2 percent; this rate is predicted to decrease to about 6 percent through 1980 and to 5 percent from

1/ Chemical and Engineering News, Apr. 4, 1977, p. 9.

2/ Oil and Gas Journal, Mar. 28, 1977, p. 32.

3/ Chemical and Engineering News, Apr. 4, 1977, p. 10.

4/ Ibid., May 23, 1977, p. 10.

1980 to 1985. The fastest growing derivative from 1976 to 1980 is expected to be expanded polystyrene (12 percent a year.) Butadiene demand is expected to increase slowly through 1980 and then average 3.6 percent a year from 1980 to 1985. 1/

Changes in technology, production methods, and production centers

Among the major changes expected is the increasing use of heavier feedstock for ethylene production in the United States, with the result that increasing quantities of byproduct aromatics and butadiene will become available. It is also possible that increasing quantities of olefins and aromatics destined as such or in derivative form for world trade will be made in crude-petroleum- and natural-gas-producing countries, principally those in the Organization of Petroleum Exporting Countries (OPEC). Unlike the feedstock picture in the United States, ethane is expected to be the principal steam cracker feedstock for OPEC. Also, European plants using natural gas liquids from the North Sea are expected to be built.

The following tabulation indicates the feedstocks used to make ethylene in the United States in 1976 and the forecasts for 1980 (in percent): 2/

<u>Feedstock</u>	<u>1976</u>	<u>1980</u>
Ethane-----	46	40
Heavy liquids <u>1/</u> ----	27	48
Propane-----	25	10
Butane-----	2	2
Total-----	100	100

1/ Naphtha and gas oil.

As this switch to heavier feedstocks progresses, increasing quantities of byproducts such as propylene, butadiene, benzene, toluene, and xylene will become available, and the steam cracker will increase in importance as a source of these chemicals. In addition, fuels and other similar refinery products will also be made. Since the economic viability of a heavy liquids steam cracker will depend to a considerable extent upon obtaining good prices for these byproducts, it is expected that petroleum companies, rather than chemical companies, will build most of the future heavy-liquids steam cracker capacity.

Currently, most petrochemical plants are located in the consuming nations; that is, production and consumption centers are essentially the same, whether the feedstocks are produced domestically or imported. This situation is similar to that of petroleum refineries being situated in the consuming countries. However, the likelihood is that in the future

1/ Chemical and Engineering News, Sept. 13, 1976, p. 11.

2/ Ibid., Apr. 18, 1977, p. 12.

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION

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a significant number of both petrochemical and refining facilities will be built in areas rich in feedstock rather than in the consuming areas. These facilities would be economically viable because of exports rather than local market sales. The result would be a separation of production and consumption centers with an increase in trade. To maintain security of supply in such a situation there could be a trend toward protectionism by some of the consuming centers and an increase in the use of trade as a political weapon by others.

World trade and patterns

The United States has been a leading chemical-exporting nation at least partially because of lower feedstock costs compared with those in Europe and Japan. The U.S. advantage is traceable to price-controlled domestic crude petroleum, while most of the other current petrochemical-producing nations are much more reliant on petroleum imports at world price. As the U.S. price approaches the world price under The National Energy Plan most of this advantage should disappear. 1/ U.S. exports to Europe and to third-world markets may decrease. 2/ Those U.S. products particularly involved include benzene, cyclohexane, and p-xylene.

Also working to reverse the position of U.S. exports in the future will be the expected buildup of petrochemical facilities in OPEC countries and Mexico designed primarily to supply export markets. In addition, the availability of ethane from the North Sea could decrease costs in Europe and make European production more competitive in world markets.

A comprehensive petrochemical investment plan recently unveiled by Petroleos Mexicanos if completely implemented could result in Mexico becoming a major exporter by the early 1980's. 3/ At the same time a massive buildup of Middle East petrochemical capacity is expected; the questions appear to be how massive and when it will be. Those chemicals that will probably be favored in this buildup are ethylene, ammonia, polyethylene, aromatics, polyvinyl chloride, and methanol. 4/ The following tabulation from a leading industry periodical indicates the share of forecasted 1990 demand in the United States, Western Europe and Japan that the announced 1990 Arab capacity would account for, as follows (in percent): 5/

<u>Product</u>	<u>United States</u>	<u>Western Europe</u>	<u>Japan</u>
Ethylene-----	18	16.6	52
Propylene-----	5	4	11.5
Butadiene-----	7.5	10	21.5
Benzene-----	6.5	9	16.5
o-Xylene-----	15	10	44
p-Xylene-----	8	19	19
Vinyl chloride-----	21.5	12.5	31.5
Styrene-----	16.5	12.5	31.5
Polyethylene, low density----	27.8	12.5	89
Polyethylene, high density----	14	17.5	58
Polypropylene-----	8	7.5	19

1/ Chemical and Engineering News, May 23, 1977, p.7.

2/ See "Organic Chemicals From Coal," p.10, for comments on the possibility of coal helping the United States remain a major organic exporter in the future.

3/ Oil and Gas Journal, Feb. 7, 1977, p. 36.

4/ Chemical Week, Mar. 23, 1977, p. 31.

5/ Hydrocarbon Processing, Dec., 1976, p. 116.

There is no unanimity among industry observers as to the competitive problems olefins (and derivatives) facilities using natural gas liquids from the North Sea and and OPEC countries could cause U.S. industry. This lack of unanimity is to a large extent due to differing assumptions as to the degree of host-country financial and subsidizing incentives that will be forthcoming to encourage such investment. It is generally accepted that under certain conditions such facilities could become competitive, particularly with new heavy-liquids steam cracker facilities in the United States. 1/ It has been indicated that the major advantages for the Middle East lie with those products that are energy intensive and have the lowest capital requirements. 2/ On the other hand, a leading foreign transporter of liquefied gases has forecast that olefins will be transported by refrigerated tankers from producing sites to countries around the world, where they would be made into the various derivatives. 3/

Aromatics manufacture in future export centers around the world is also possible, especially at those centers with refining capacity. The Middle East might be at a disadvantage because much of its crude petroleum lacks the large quantities of aromatics precursors found in crude petroleum from other geographic areas. In addition, gas-liquids steam crackers do not produce as byproducts the quantities of aromatics produced by heavy-liquids steam crackers. However, aromatics, being liquids, are more easily handled and transported than are the olefins. While ethylene and propylene would be among the most expensive chemicals to ship, benzene, toluene, and xylene would be relatively inexpensive. Accordingly, most of the Middle East countries do have active aromatics projects.

Probably the most attractive markets for exports from the Middle East and North Africa would be via the Suez Canal to--

- (1) Europe via Mediterranean and North Sea ports,
- (2) The U.S. east coast, and
- (3) The U.S. gulf coast.

Movements to the east via the Strait of Malacca would most likely go to--

- (1) Japan
- (2) The U.S. west coast,
- (3) South America via Capetown, and
- (4) India. 4/

From the above it is obvious that the United States is a prime future export market for Middle East production. It would also be looked to as the prime market by producers in both Canada and Mexico. All of this is not surprising.

1/ Oil and Gas Journal, Mar. 21, 1977, p. 101.

2/ European Chemical News, Sept. 24, 1976, p. 30.

3/ Chemical Week, Dec. 8, 1976, p. 45.

4/ C. Van Den Brink, Middle East Petrochemical Logistics, Chemical Marketing Research Association Meeting, Houston, Tex., Feb. 11-14, 1975.

The United States is a favorably located, sophisticated market which will probably be beset by increasing domestic production costs, and as such would be expected to be attractive to those nations and companies seeking to increase exports. The outlook may seem unfavorable for the domestic petrochemical industry as a whole, although individual petrochemical companies may invest and produce in nations with favorable feedstock positions. The domestic organic chemical industry may also be aided by the large coal reserves and increasing production if economically favorable chemicals-from-coal processes can be implemented. 1/

1/ See "Organic Chemicals From Coal," p.10, of this report.

SYNTHETIC ORGANIC CHEMICALS, 1976

Selected organic chemicals: Rank in 1975 and 1976 and average annual growth rate, 1971-76 and 1966-71.

	Rank in list of all chemicals		Average annual growth rate	
	1975	1976	1966-71 Percent	1971-76 Percent
Ethylene-----	5	5	10.4	4.0
Benzene-----	16	13	3.5	5.8
Propylene-----	13	14	8.1	7.8
Toluene, all grades-----	18	15	9.0	2.6
Xylene, all grades-----	21	18	13.6	4.5
Styrene-----	20	19	8.0	6.1
Ethylbenzene-----	19	21	9.0	3.0
Butadiene (1,3), rubber grade-----	31	30	2.7	1.0
p-Xylene-----	32	31	26.0	13.4
Cumene-----	37	33	19.1	4.8
Cyclohexane-----	39	37	(neg.)	4.6

Source: Ranks, from Chemical and Engineering News, May 2, 1977, p. 37; growth rates, based on data published annually in U.S. International Trade Commission, Synthetic Organic Chemicals: United States Production and Sales.

TABLE 1.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL
CONVERSION: U.S. PRODUCTION AND SALES, 1975

[Listed below are the primary products from petroleum and natural gas for chemical conversion for which any reported data on production or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists separately all primary products from petroleum and natural gas for chemical conversion for which data on production and/or sales were reported and identifies the manufacturers of each]

CRUDE PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Grand total-----	112,873,340	59,083,390	5,489,485	\$0.093
AROMATICS AND NAPHTHENES ²				
Total-----	48,167,093	26,928,545	2,757,335	.102
Benzene (1° and 2°)-----	9,826,636	4,157,724	441,959	.106
Ethylbenzene-----	5,769,602	555,233	31,968	.058
Cyclohexane-----	2,186,581	2,017,387	265,082	.131
Cumene-----	2,715,832	1,397,184	169,572	.121
Naphthalene, all grades-----	562,645	448,844	94,376	.210
Naphthenic acid-----	44,433	13,507	1,949	.144
Styrene-----	6,301,397	2,753,814	541,843	.197
Toluene, all grades, total-----	7,138,997	4,396,984	329,734	.075
Nitration grade, 1°-----	6,154,715	3,852,323	291,122	.076
Pure commercial grade, 2°-----	581,285	...	...	...
All Other ^{3,4} -----	402,997	544,661	38,612	.070
Xylenes, mixed, total-----	5,475,932	5,421,041	351,851	.064
3° grade-----	2,235,028	2,525,802	140,854	.055
5° grade-----	2,619,776	2,238,675	165,160	.073
All other ⁴ -----	621,128	656,564	45,837	.069
o-Xylene-----	853,813	660,989	70,907	.107
p-Xylene-----	2,911,451	1,779,422	278,967	.157
All other aromatics and naphthenes ⁵ -----	4,379,774	3,326,416	179,127	.054
ALIPHATIC HYDROCARBONS				
Total-----	64,706,247	32,154,845	2,732,150	.085
C ₂ hydrocarbons, total-----	30,841,877	13,562,471	1,021,836	.075
Acetylene ⁶ -----	304,181	...	...	...
Ethane-----	8,063,126	6,486,104	229,107	.035
Ethylene-----	22,474,570	7,076,367	792,729	.112
C ₃ hydrocarbons, total-----	16,900,503	10,438,049	767,732	.073
Propane-----	6,870,042	5,992,081	436,784	.073
Propylene ⁷ -----	10,030,461	4,445,968	330,948	.074
C ₄ hydrocarbons, total-----	10,447,313	4,789,154	576,332	.120
Butadiene and butylene fractions-----	1,398,731	406,743	35,670	.087
1,3-Butadiene, grade for rubber (elastomers)-----	3,507,295	2,188,720	387,018	.176
n-Butane-----	1,948,426	982,844	65,403	.066
1-Butene-----	61,424	47,175	7,249	.153
1-Butene and 2-butene, mixed ⁸ -----	1,157,915	109,069	10,770	.098
Isobutane-----	1,127,584	268,827	17,822	.066
Isobutylene, 2-butene and mixed butylenes-----	564,932	202,177	26,200	.129
All other ⁹ -----	681,006	583,599	26,200	.044
C ₅ hydrocarbons, total-----	1,137,758	600,320	47,689	.079
Amylenes and pentenes-----	215,926	...	...	...
Isoprene (2-Methyl-1,3-butadiene)-----	341,261	122,146	14,339	.117
All other ¹⁰ -----	580,571	478,174	33,350	.070

See footnotes at end of table.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL
CONVERSION: U.S. PRODUCTION AND SALES, 1975--CONTINUED

CRUDE PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
ALIPHATIC HYDROCARBONS--Continued	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
All other aliphatic hydrocarbons, derivatives, and mixtures, total	5,378,796	2,764,851	318,561	\$0.115
Alpha olefins ¹¹ -----	313,736	288,141	55,650	.193
Dodecene (Tetrapropylene)-----	302,110	115,058	14,781	.128
Polybutene-----	283,256	215,678	30,155	.140
Hexane-----	275,572	255,299	19,026	.074
Hydrocarbon derivatives ¹² -----	264,797	247,741	33,646	.136
Nonene (Tripropylene)-----	260,247	128,303	10,107	.078
n-Paraffins, total ¹³ -----	1,489,312	988,721	69,993	.071
All other ¹⁴ -----	2,189,766	525,910	85,203	.162

¹ Calculated from rounded figures.

² 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 or sales of benzene, toluene, and xylene from all sources are given in tables 1 and 1B of the report "Tar and Tar Crudes."

³ Includes toluene, solvent grade, 90 percent.

⁴ Includes toluene and xylene used as solvents, as well as that which is blended in aviation and motor gasolines.

⁵ Includes data for alkyl aromatics, crude cresylic acid, distillates, solvents, and miscellaneous cyclic hydrocarbons.

⁶ Production figures on acetylene from calcium carbide for chemical synthesis are collected by the U.S. Bureau of the Census.

⁷ Includes data for refinery propylene.

⁸ The statistics represent principally the butene content of crude refinery gases from which butadiene is manufactured.

⁹ Includes data for butanes, 1-butene, and mixed C₄ streams.

¹⁰ Includes data for C₅ hydrocarbon mixtures, pentanes, and piperylenes.

¹¹ Includes data for the following molecular weight ranges: C₆-C₇; C₈-C₁₀; C₈-C₁₀; C₁₀-C₁₆; C₁₁-C₁₅; C₁₂-C₁₄; C₁₄-C₁₆; C₁₅-C₂₀; C₁₆-C₁₈; and C₁₆-C₃₀.

¹² Includes data for methyl, ethyl, propyl, butyl, octyl, nonyl, decyl, hexadecyl, and miscellaneous mercaptans, and other hydrocarbon derivatives.

¹³ Includes data for following chain lengths: C₆-C₈; C₆-C₉; C₁₀-C₁₄; C₁₀-C₁₆; C₁₅-C₁₇; and others.

¹⁴ Includes data for di-isobutylene, methane, octanes, mixtures of C₂ and C₃ hydrocarbons, triisobutylene, and other hydrocarbons, and sales of acetylene, heptene, C₉-C₁₅ hydrocarbons, mixed heptenes and others.

TABLE 2.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED IDENTIFIED BY MANUFACTURER, 1976.

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
AROMATICS AND NAPHTHENES	
ALKYL AROMATICS:	
CYCLOSOLS-	SHC.
ALKYL AROMATICS: ALL OTHER	ACC, MON.
@BENZENE:	
@BENZENE 1 DEGREE (99-100%) (E.G., 4.85 DEGREE C SOLIDIFYING POINT MINIMUM)	ACU, APF(E), APR, ASH, ATR, BRP, CCP, CPI, CSD, CSO, CSP, DOW(E), EKX, ENJ(E), GOC, GRS, HES, MOC, MON, PLC, PPR, SHC, SKO, SM(E), SNT(E), SOG, SUN(E), TOC, TX, UCC, UOC(E).
@BENZENE 2 DEGREE (98-98.9%)	SOC.
CRESYLIC ACID (LESS THAN 75 PERCENT DISTILLING OVER 215 DEGREES C)	PRD.
@CUMENE	ACC, ASH, CLK, CSP, DOW(E), GOC, MOC, MON, SKO, SNT(E), SOC, TX, UCC.
@CYCLOHEXANE	CSD, ENJ(E), GOC, GRS, PLC, PPR, SUN(E), SWC, TX, UOC(E).
CYCLOHEXENE (TETRAHYDROBENZENE)	PLC, TBO.
CYCLOPENTANE	PLC.
DICYCLOPENTADIENE (INCLUDING CYCLOPENTADIENE)	GOC, MON.
@ETHYLBENZENE	ACC, ATR, CSD, DOW(E), ELP, FG, KPP(E), KPT, MON, SNT(E), SOG, STY, TOC, UCC.
@NAPHTHALENE	ASH, COL, ENJ(E), MON, SUN(E), TID, UCC.
@NAPHTHENIC ACID:	
ACID NUMBER LESS THAN 150-	ATR(E), SUN(E), TX.
ACID NUMBER 150-199-	ATR(E), GOC, SOC, SUN(E).
ACID NUMBER 200-224-	ATR(E), SOC.

TABLE 2.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED IDENTIFIED BY MANUFACTURER, 1976

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
AROMATICS AND NAPHTHENES--CONTINUED	
NAPHTHENIC ACID--CONTINUED	
ACID NUMBER 225-249- - - - -	: PRD.
PETROLEUM PHENOLS- - - - -	: SKO.
SODIUM CARBOLATE AND PHENATE, CRUDE- - - - -	: ATR.
@STYRENE- - - - -	: ACC, CSD, DOW(E), ELP, FG, GOC, KPP(E), MCB, MON, SHC, : SNT(E), TX, UCC.
@TOLUENE ALL GRADES, TOTAL:	
@1 DEGREE (99.5-100%) - - - - -	: APF(E), ASH, ATR, CCP, CPI, CSD, ENJ(E), GOC, GRS, : KPP(E), MOC, MON, PLC, PPR, SHC, SKO, SM(E), SNT(E), : SOG, SUN(E), TOC, TX, UCC, UOC(E).
@2 DEGREE (98.5-99.4%) - - - - -	: ATR, DOW(E), ELP, HES, SHO.
@90-98.4% (NON-FUEL) - - - - -	: CSP, FG, MON, SKO.
@XYLENES, MIXED, TOTAL:	
@5 DEGREES (98-98.9%)	
(INCLUDE XYLENE BLENDED IN AVIATION AND MOTOR FUELS)- - - - -	: ATR, CPI, GOC, HES, MOC, SOC, SOG, STY.
@3 DEGREES (99-100%) - - - - -	: APF(E), CCP, CSO, ENJ(E), GRS, PPR, SHC, SUN(E), UCC, : UOC(E).
90-97.9% (NON-FUEL) - - - - -	: ASH, CSP, MON, TOC.
@ORTHO-XYLENE (90-100% OF ORTHO-XYLENE ISOMER) - - - - -	: ATR, CPI, CSD, ENJ(E), MON, PPR, SHC, SNT(E), SOC, : TOC.
@PARA-XYLENE (90-100% OF PARA-XYLENE ISOMER) - - - - -	: ACC, ATR, ENJ(E), HCR, PPR, SHC, SNT(E), SOC, SOG, : TOC.
ALL OTHER AROMATICS AND NAPHTHENES:	
C9 AROMATICS - - - - -	: JCC, OMC, TX.
HYDROCARBON POLYMER- - - - -	: JCC.
POLYETHYLBENZENE - - - - -	: FG.
ALL OTHER PRODUCTS FROM PETROLEUM AND NATURAL GAS, C	
YCLIC - - - - -	: ACU, CBN, CO, CPI, EKK, ENJ(E), GOC, JCC, MOC, MON, : NWP, SHC, SOG.
ALIPHATIC HYDROCARBONS	
C/1 HYDROCARBONS:	
METHANE- - - - -	: MOC, MON.
@C/2 HYDROCARBONS:	
@ACETYLENE (FOR CHEMICAL USE ONLY) - - - - -	: DOW(E), MNO, RH, UCC.
@ETHANE - - - - -	: ACU, DOW(E), ENJ(E), MOC, MON, OMC, PAN, PLC, PUE, : SHO, SM, TX, UOC(E), USI.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED IDENTIFIED BY MANUFACTURER, 1976

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ALIPHATIC HYDROCARBONS--CONTINUED	
C/2 HYDROCARBONS--CONTINUED	
@ETHYLENE	ACC, ACU, AMO, ATR, BAS, BFG, CBN, CO, CPX, DOW(E), DUP, EKX, ELP, ENJ(E), GOC, JCC, KPP(E), MOC, MON, NWP, OMC, PLC, PUE, SHC, SM(E), SNO, TX, UCC, USI.
@C/3 HYDROCARBONS:	
@PROPANE (COMMERCIAL AND HD-5)	AMO, APR, ASH, ATR, CCP, COR, CPI, CSD, CSO, CSP, ENJ(E), GRS, MOC, OMC, PAN, PLC, PUE, SHO, SM, SNT(E), SOG, SUN(E), TX, UCC, UOC(E), USI.
@PROPYLENE	ACU, AMO, ASH, ATR, BFG, CBN, CLK(E), CO, CPX, CSD, CSO, DOW(E), DUP, EKX, ELP, ENJ(E), GOC, JCC, KPP(E), MOC, MON, NWP, OMC, PUE, SHC, SIO, SM(E), SNT(E), SOC, SOG, SUN(E), TX, UCC.
C2 AND C3 HYDROCARBONS, MIXED (SPECIFY)	MON.
@C/4 HYDROCARBONS:	
@1,3-BUTADIENE, GRADE FOR RUBBER (ELASTOMERS)	ATR, BFG, CPY, DOW(E), ELP, ENJ(E), FRS, MON, PLC, PTT, PUE, SHC, SM(E), TUS, UCC.
@BUTADIENE AND BUTYLENE FRACTIONS	ACC, ACU, ATR, CO, CPX, DOW(E), EKX, GOC, UCC.
@N-BUTANE	APF(E), APR, COR, CSD, CSP, MOC, OMC, PLC, SHO, SM, SNT(E), SUN(E), UCC, USI.
1-BUTENE	GOC, PLC, PTT.
2-BUTENE	MON.
@1-BUTENE AND 2-BUTENE, MIXED	AMO, CSO, DOW(E), ENJ(E), GOC, MOC, PTT, SHC, UCC.
@ISOBUTANE (2-METHYLPROPANE)	AMO, CSP, ELP, ENJ(E), MOC, OMC, SHO, SM, SUN(E), TBO, TX, UCC, USI.
@ISOBUTYLENE (2-METHYLPROPENE)	ENJ(E), OCC, PLC, PTT, SHC.
C4 FRACTION	BFG, JCC.
C4 HYDROCARBONS: ALL OTHER	ENJ(E), MON, SM(E), USI.
@C/5 HYDROCARBONS:	
DIBUTANIZED AROMATIC CONCENTRATE	CPX, DUP.
ISOPENTANE (2-METHYLBUTANE)	PLC.
@ISOPRENE (2-METHYL-1,3-BUTADIENE)	BFG, ENJ(E), MON, SHC.
N-PENTANE	APR, MOC.
@PENTENES, MIXED	MON, PUE, TX.
C5 HYDROCARBONS: ALL OTHER	BFG, MON, PLC, SHC, UCC.

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION

TABLE 2.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED IDENTIFIED BY MANUFACTURER, 1976

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ALIPHATIC HYDROCARBONS--CONTINUED	
ALL OTHER ALIPHATIC HYDROCARBONS, DERIVATIVES, AND MIXTURES:	
C/6 HYDROCARBONS:	
C5-C6 MIXTURES - - - - -	COR.
@HEXANE - - - - -	APR, ENJ (E), HMY, SOG, UOC (E).
C6 HYDROCARBONS: ALL OTHER - - - - -	SWC.
C/7 HYDROCARBONS:	
N-HEPTANE- - - - -	EKX, SOG.
HEPTENES, MIXED- - - - -	ACC, ENJ (E), TID.
C7 HYDROCARBONS: ALL OTHER - - - - -	APR, CPI, ENJ (E), UOC (E).
C/8 HYDROCARBONS:	
DI-ISOBUTYLENE (DI-ISOBUTENE) - - - - -	PTT, TX.
N-OCTANE - - - - -	SOG.
C8 HYDROCARBONS: ALL OTHER - - - - -	ENJ (E), TID.
C/9 AND ABOVE HYDROCARBONS (EXCEPT ALPHA OLEFINS):	
@1-DODECENE (TETRAPROPYLENE)- - - - -	CO, ENJ (E), HMY, SOC, SUN (E), TX, UOC (E).
EICOSANE - - - - -	HMY.
@NONENE (TRIPROPYLENE)- - - - -	ATR, ENJ (E), SUN (E), TID, UOC (E).
@ALPHA OLEFINS:	
C16-C30 HYDROCARBONS - - - - -	GOC.
C11-C15- - - - -	GOC, SOC.
C6-C7- - - - -	GOC, SHC, SOC.
C8-C10 - - - - -	GOC, SOC.
ALPHA OLEFINS: ALL OTHER - - - - -	SOC, TNA (E).
@N-PARAFFINS - CARBON CHAIN LENGTH:	
C6-C9- - - - -	SOG, UCC.
C10-C14- - - - -	ENJ (E), SOG, UCC.
C9-C15 - - - - -	BPG, SOG.
N-PARAFFINS: OTHER - - - - -	CO, ENJ (E), GOC.
@POLYBUTENE - - - - -	ACC, CSD, SOC.
TRI-ISOBUTYLENE- - - - -	PTT.
C5-C9 MIXTURE- - - - -	PPR.
@HYDROCARBON DERIVATIVES:	
TERT-BUTYL MERCAPTAN (2-METHYL-2-PROPANETHIOL)	
- - - - -	PAS, PLC.
DI-TERT-BUTYL DISULFIDE- - - - -	PLC.
ETHYL MERCAPTAN (ETHANOLTHIOL) - - - - -	PAS, PLC.
METHYL MERCAPTAN (METHANETHIOL)- - - - -	DOW (E), PAS.

TABLE 2.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED IDENTIFIED BY MANUFACTURER, 1976

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ALIPHATIC HYDROCARBONS--CONTINUED	
ALL OTHER ALIPHATIC HYDROCARBONS, DERIVATIVES, AND MIXTURES	
@HYDROCARBON DERIVATIVES--CONTINUED	
TERT-OCTYL MERCAPTAN - - - - -	: PAS.
N-PROPYL MERCAPTAN (1-PROPANETHIOL) - - - - -	: PAS, PLC.
N-BUTYL MERCAPTAN- - - - -	: PLC.
S-BUTYL MERCAPTAN- - - - -	: PLC.
@HYDROCARBON DERIVATIVES: ALL OTHER HYDROCARBON DERIV ATIVES- - - - -	: ACC, CBN, EKX, PAS, TX.
@ALL OTHER, INCLUDING MIXTURES- - - - -	: ATR, CO, CSO, ENJ(E), SOC.

PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL CONVERSION

TABLE 1.--PRIMARY PRODUCTS FROM PETROLEUM AND NATURAL GAS FOR CHEMICAL
CONVERSION: DIRECTOR OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production or sales of primary products from petroleum and natural gas for chemical conversion to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ACC	Amoco Chemicals Corp.	KPP	Arco/Polymers, Inc.
ACU	Allied Chemical Corp., Union Texas Petroleum Div.	KPT	
AIP	Air Products & Chemicals, Inc.	MCB	Borg-Warner Corp., Borg-Warner Chemicals
AMO	Amoco Oil Co.	MNO	Monochem, Inc.
AMO	Amoco Texas Refining Co.	MOC	Marathon Oil Co., Texas Refining Div.
APF	American Petrofina Co. of Texas	MON	Monsanto Co.
APR	Atlas Processing Co.		
ASH	Ashland Oil, Inc.	NWP	Northern Petrochemical Co.
ATR	Atlantic Richfield Co.		
		OCC	Oxirane Chemical Co.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Co. Div.	OMC	Olin Corp.
BRP	BP Oil, Inc.		
		PAN	Amoco Production Co.
CBN	Cities Service Co., Petrochemical Div.	PAS	Pennwalt Corp.
CCP	Crown Central Petroleum Corp.	PLC	Phillips Petroleum Co.
CLK	Clark Chemical Co.	PPR	Phillips Puerto Rico Core, Inc.
CO	Continental Oil Co.	PRD	Ferro Corp., Productol Chemical Div.
COL	Collier Carbon & Chemical Corp.	PTT	Petro-Tex Chemical Corp.
COR	Commonwealth Oil & Refining Co., Inc.	PUE	Puerto Rico Olefins Co.
CPI	Commonwealth Petrochemicals, Inc.		
CPX	Chemplex Co.	RH	Rohm & Haas Co.
CPY	Copolymer Rubber & Chemical Corp.	SHC	Shell Oil Co., Shell Chemical Co. Div.
CSD	Cosden Oil & Chemical Corp.	SHO	Shell Oil Co.
CSO	Cities Service Co.	SIO	Standard Oil Co. (Ohio).
CSP	Coastal States Petrochemical Co.	SKO	Getty Refining & Marketing Co.
		SM	Mobil Oil Corp. & Mobil Chemical Co.
DOW	Dow Chemical Co.	SNO	SunOlin Chemical Co.
DUP	E. I. duPont de Nemours & Co., Inc.	SNT	Suntide Refining Co.
		SOC	Standard Oil Co. of California, Chevron Chemical Co.
EKX	Eastman Kodak Co., Texas Eastman Co. Div.	SOG	Charter International Oil Co.
ELP	El Paso Products Co.	STY	Styrochem Corp.
ENJ	Exxon Chemical Co. U.S.A.	SUN	Sun Oil Co.
		SWC	Corco Cyclohexane, Inc.
FG	Foster Grant Co., Inc.		
FRS	Firestone Tire & Rubber Co., Firestone Synthetic Rubber & Latex Co. Div.	TBO	Tauber Oil Co.
		TID	Getty Refining & Marketing Co.
GOC	Gulf Oil Corp., Gulf Oil Chemicals Co.-U.S.	TNA	Ethyl Corp.
GRS	Champlin Petroleum Co.	TOC	Tenneco Oil Co.
		TUS	Texas-U.S. Chemical Co.
HCR	Hercor Chemical Corp.	TX	Texaco, Inc.
HES	Amerada Hess Corp. (Hess Oil Virgin Islands Corp.)	UCC	Union Carbide Corp.
HMY	Humphrey Chemical Co.	UOC	Union Oil Co. of California
		USI	National Distillers & Chemicals Corp., U.S. Industrial Chemicals Co.
JCC	Jefferson Chemical Co., Inc.	VEL	Velsicol Chemical Corp.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

CYCLIC INTERMEDIATES

Roger Adams

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, refined naphthalene may be used as a raw material in the manufacture of 2-naphthol or of other more advanced intermediates, or may be packaged and sold as a moth repellent or as a deodorant. In 1976 about 39 percent of the total output of cyclic intermediates was sold; the rest was consumed chiefly by the producing plants in the manufacture of more advanced intermediates and finished products.

Total product of cyclic intermediates in 1976 amounted to 19,796 million pounds. Sales of cyclic intermediates in 1976 were 7,664 million pounds, valued at \$2,387 million. These totals cannot be compared with 1975 figures because several items were transferred to the primary products from petroleum and natural gas section.¹

Intermediates whose production exceeded 1 billion pounds in 1976 were dimethyl terephthalate (7,211 million pounds), and phenol (2,121 million pounds). Other large-volume intermediates produced in 1976 were isocyanates (948 million pounds), phthalic anhydride (902 million pounds), cyclohexanone (641 million pounds), aniline (544 million pounds), dodecylbenzene (529 million pounds), bisphenol A (449 million pounds), nitrobenzene (409 million pounds), 2,4 (and 2,6)-dinitrotoluene (396 million pounds), monochlorobenzene (329 million pounds), and 2,4-dinitrotoluene (328 million pounds). The 12 chemicals noted above accounted for 75 percent of the total output of intermediates in 1976.

¹ Items transferred from cyclic intermediates to primary products from petroleum and natural gas are ethylbenzene, cyclohexane, styrene, m-xylene, o-xylene, p-xylene, and cumene.

TABLE 1.--CYCLIC INTERMEDIATES: U.S. PRODUCTION AND SALES, 1976

[Listed below are all cyclic intermediates for which any reported data on production and/or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists alphabetically all cyclic intermediates on which data on production and/or sales were reported and identifies the manufacturers of each]

CYCLIC INTERMEDIATES	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Grand total-----	19,795,832	7,663,691	2,386,993	\$0.31
Acetoacetanilide-----	...	3,867	2,759	.71
o-Acetoacetanilide-----	...	1,077	1,785	1.66
o-Acetoacetotoluidide-----	...	723	738	1.02
4'-Aminoacetanilide (Acetyl-p-phenylenediamine)-----	366	...	...	...
4-Amino-4'-nitro-2,2'-stilbendisulfonic acid-----	134	...	...	...
p-[(p-Aminophenyl)azo]benzenesulfonic acid-----	411	...	...	...
Aniline (Aniline oil)-----	543,779	156,696	42,895	.27
Anilinomethanesulfonic acid and salt-----	466	...	...	...
Benzaldehyde, tech-----	8,285	8,772	5,124	.58
Benzoic acid, tech-----	79,654	32,956	7,561	.23
2-Benzothiazolethiol, sodium salt-----	...	3,012	1,912	.63
Biphenyl-----	56,894	14,438	4,073	.28
Chlorobenzene, mono-----	329,072	67,895	16,786	.25
4-Chloro-3-nitrobenzenesulfonamide-----	697	...	...	...
4-Chloro-3-nitrobenzenesulfonyl chloride-----	524	...	...	...
Cresols, total ² -----	100,211	95,186	44,876	.47
o-Cresol-----	22,187	20,731	8,785	.42
All other ³ -----	78,024	74,455	36,091	.48
Cresylic acid, refined ² -----	57,107	31,114	11,814	.38
Cyclohexanone-----	640,794	...	...	...
Cyclohexylamine-----	...	6,045	4,327	.72
1,4-Diamino-2,3-dihydroanthraquinone-----	531	...	...	...
o-Dichlorobenzene-----	48,594	24,116	6,999	.29
p-Dichlorobenzene-----	36,699	37,460	8,545	.23
2,4-Dichlorophenol-----	...	4,389	2,444	.56
Dicyclohexylamine-----	...	686	570	.83
N,N-Diethylaniline-----	1,991	1,336	1,350	1.01
9,10-Dihydro-9,10-dioxo-1-anthracenesulfonic acid and salt (Gold salt)-----	1,073	...	...	...
1,4-Dihydroxyanthraquinone (Quinizarin)-----	1,717	167	344	2.06
2,4-Dihydroxybenzophenone-----	304	...	...	...
1,8-Dihydroxy-4,5-dinitroanthraquinone-----	251	...	...	...
N,N-Dimethylaniline-----	13,560	8,124	4,601	.57
N,N-Dimethylbenzylamine-----	184	109	198	1.82
N,N-Dimethylcyclohexylamine-----	4,028	3,889	4,283	1.10
4,4'-Dinitrostilbene-2,2'-disulfonic acid-----	11,089	...	...	...
2,4-Dinitrotoluene-----	327,983	...	...	...
2,4 (and 2,6)-Dinitrotoluene-----	396,359	...	...	...
Dodecylbenzene-----	528,681	418,109	105,523	.25
N-Ethylaniline, refined-----	1,049	910	830	.91
2-(N-Ethylanilino)ethanol-----	291	...	...	...
Hydroquinone, tech, grade-----	...	10,287	17,299	1.68
Isocyanic acid derivatives, total-----	948,277	848,840	362,280	.43
Polymethylene polyphenylisocyanate-----	312,548	259,273	115,037	.44
Toluene-2,4- and 2,6-diisocyanate (80/20 mixture)-----	563,752	532,582	201,431	.38
Other isocyanic acid derivatives-----	71,977	56,985	45,812	.80
4,4'-Isopropylidenediphenol (Bisphenol A)-----	448,832	113,192	41,470	.37
Melamine-----	126,246	80,119	26,781	.33
DL-p-Mentha-1,8-diene-----	11,173	6,078	798	.13
Metanilic acid (m-Aminobenzenesulfonic acid)-----	1,594	...	...	...
4,4'-Methylenedianiline-----	...	1,174	1,716	1.46
3-Methyl-1-phenyl-2-pyrazolin-5-one (Developer Z)-----	...	13	29	2.23
α-Methylstyrene-----	61,363	48,178	7,363	.15
3'-Nitroacetanilide-----	36	...	...	...

See footnotes at end of table.

TABLE 1.--CYCLIC INTERMEDIATES: U.S. PRODUCTION AND SALES, 1976--CONTINUED

CYCLIC INTERMEDIATES	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Nitrobenzene-----	409,023	19,544	4,521	\$0.23
5-Nitro-o-toluenesulfonic acid [SO H-1]-----	7,400	...	...	...
Nonylphenol-----	77,974	35,751	10,729	.30
1-[(7-Oxo-7H-benz[de]anthracene-3-yl)amino]anthraquinone-----	238	...	...	...
Phenol, total ² -----	2,121,434	969,277	214,580	.22
From cumene-----	1,926,403	890,798	195,560	.22
Other-----	195,031	78,479	19,020	.24
2,2'-[(Phenyl)imino]diethanol (N-phenyldiethanol-amine)-----	497	302	200	.66
Phthalic anhydride-----	902,382	528,789	118,136	.22
2-Picoline (α-Picoline) ³ -----	416	425	401	.94
Piperidine-----	509	...	...	...
Salicylaldehyde-----	4,414	2,864	7,173	2.50
Salicylic acid, tech. grade-----	31,265	3,968	3,298	.83
Terephthalic acid, dimethyl ester ⁴ -----	7,210,613	...	...	...
Toluene-2,4-diamine (4-m-Tolylenediamine)-----	233,103	...	...	...
7,7'-Ureylenebis[4-hydroxy-2-naphthalenesulfonic acid] (J Acid urea)-----	338	...	...	...
All other cyclic intermediates-----	4,005,927	4,073,814	1,289,882	.32

¹ Calculated from rounded figures.² Does not include data for coke ovens and gas-retort ovens, reported to the Division of Fuels Data, U.S. Bureau of Mines.³ Figures include (o,m,p)-cresol from coal tar and some m-cresol and p-cresol.⁴ The figures for terephthalic acid, dimethyl ester (DMT) include both the acid itself and the dimethyl ester.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AND "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
8-ACETAMIDO-1-(4-ACETAMIDO-2-HYDROXY-5-NITROPHENYLazo)-2-NAPHTHOL	TRC.
3-*(2-ACETAMIDO-4-AMINOPHENYL) AZO*-1,5-NAPHTHALENEDISULFONICACID	TRC.
2,2'-(5-ACETAMIDO-2-ETHOXYPHENYL) IMINO*DIETHANOL	EKT, TCH.
ACETANILIDE, TECH.	ARA, SAL.
ACETANILIDE N.F.	SAL.
PARA-ACETANISIDIDE	EKT.
ACETIC ACID, PHENYL ESTER	DGO.
@ ACETOACETANILIDE	EKT, FMP(E), HST.
@ ORTHO-ACETOACETANISIDIDE	EKT, FMP(E), HST.
@ ORTHO-ACETOACETOTOLUIDIDE	EKT, FMP(E), HST.
2',4'-ACETOACETOXYLIDIDE	HST.
3-ACETAMIDO-N-(2-SUCCINIMIDOETHYL)-N-ETHYLANILINE	EKT.
1'-ACETONAPHTHONE	GIV.
ACETONE PHENYLHYDRAZONE	DUP.
ACETOPHENONE, CRUDE	ACS.
ACETOPHENONE, TECH.	CLK, SKO, UCC.
PARA-ACETOTOLUIDIDE	EK.
N-ACETYLANTHRANILIC ACID	DGO, SW(E).
PARA-ACETYLBENZENESULFONAMIDE	LIL.
PARA-ACETYLBENZENESULFONIC ACID, SODIUM SALT	LIL.
PARA-ACETYLBENZENESULFONYLURETHANE	LIL.
N-ACETYSULFANILYL CHLORIDE	ACY, ARA.
ALKYLBENZENES:	
ALKYLBENZENE ALL OTHER (EXCEPT DODECYL, TRIDECYL AND STRAIGHT-CHAIN)	UCC, WTC.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
'IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ALKYLBENZENES:	
ALKYLBENZENE STRAIGHT-CHAIN (EXCEPT DODECYL AND TRIDECYL)	MON, WTC.
DODECYLBENZENE (INCLUDING TRIDECYLBENZENE):	
@DODECYLBENZENE, STRAIGHT-CHAIN	CO, MON, UCC, WTC.
DODECYLBENZENE, OTHER-	CO, SOC, WTC.
3'-AMINOACETANILIDE-	DGO, TRC.
@4'-AMINOACETANILIDE (ACETYL-PARA-PHENYLENEDIAMINE)	GAF, SAL, TRC.
3'-AMINO-PARA-ACETANISIDIDE-	EKT.
3'-AMINOACETOPHENONE	DUP, MON.
5-AMINO-2- (PARA-AMINOANILINO) BENZENESULFONIC ACID-	TRC.
2- (PARA-AMINOANILINO)-5-NITROBENZENESULFONIC ACID-	TRC.
3-AMINO-PARA-ANISANILIDE	PCW.
1-AMINOANTHRAQUINONE AND SALT-	ACY, TRC.
6-AMINO-3,4'-AZODIBENZENESULFONIC ACID (C.I. ACID YELLOW 9)	TRC.
PARA-AMINO BENZAMIDE-	SAL.
1-AMINO-4-BENZAMIDOANTHRAQUINONE	ACY, TRC.
7- (PARA-AMINO BENZAMIDO) -4-HYDROXY-2-NAPHTHALESULFONIC ACID-	TRC.
ORTHO-AMINO BENZENETHIOL-	FMT.
PARA-AMINO BENZOIC ACID, TECH.-	PD, SAL.
2-AMINO-6-BENZOTHAZOLECARBOXYLIC ACID	DUP.
1-AMINO-4-BROMO-9,10-DIHYDRO-9,10-DIOXO-2-ANTHRACENESULFONIC ACID AND SODIUM SALT	AC(E), TRC.
1-AMINO-2-BROMO-4-HYDROXYANTHRAQUINONE	ACY, DUP, VPC.
1-AMINO-2-BROMO-4-PARA-TOLUIDINOANTHRAQUINONE-	TRC.
1-AMINO-5-CHLOROANTHRAQUINONE-	TRC.
2-AMINO-1-CHLOROANTHRAQUINONE-	DUP.
4-AMINO-6-CHLORO-META-BENZENEDISULFONAMIDE	NES.
4-AMINO-6-CHLORO-META-BENZENEDISULFONAMIDE HYDROCHLORIDE	ABB.
2-AMINO-6-CHLOROBENZOTHAZOLE HYDROCHLORIDE-	DUP.
1-AMINO-2-CHLORO-4-HYDROXYANTHRAQUINONE-	TRC.
2-AMINO-6-CHLOROPYRAZINE	ACY.
3-AMINO-6-CHLOROPYRIDAZINE	ACY.
2-AMINO-5-CHLORO-PARA-TOLUENESULFONIC ACID *SO/3H=1*	ACY, HSC.
6-AMINO-4-CHLORO-META-TOLUENESULFONIC ACID *SO/3H=1*	ACY, DUP, HSC.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
2-AMINO-PARA-CRESOL - - - - -	TRC.
1-AMINO-2,4-DIBROMOANTHRAQUINONE - - - - -	DUP, TRC, VPC.
1-AMINO-2,4-DICHLOROANTHRAQUINONE - - - - -	TRC.
2-AMINO-5,6-DICHLOROBENZOTHAZOLE - - - - -	SAL.
1-AMINO-9,10-DIHYDRO-9,10-DIOXO-4-PARA-TOLUENESULFONAMID	:
O-2-ANTHRACENESULFONIC ACID, SODIUM SALT- - - - -	TRC.
5-AMINO-4,5'-DIHYDROXY-3,4'-* (2-METHOXY-5-METHYL-PARA-PH	:
ENYLENE) BIS (AZO) *-DI-2,7-NAPHTHALENEDISULFONIC ACID,	:
5'-BENZENESULFONATE - - - - -	TRC.
3-AMINO-9-ETHYLCARBAZOLE - - - - -	SDC.
4-AMINO-N-ETHYL-N- (BETA-METHYLSULFONAMIDOETHYL) -META-TOL	:
UIDINEPHOSPHATE - - - - -	WAY.
4-AMINO-5-HYDROXY-2,7-NAPHTHALENEDISULFONIC ACID, BENZEN	:
ESULFONATE- - - - -	TRC.
4-AMINO-5-HYDROXY-2,7-NAPHTHALENEDISULFONIC ACID, MONOSO	:
DIUM SALT - - - - -	ACS.
4-AMINO-3-HYDROXY-1-NAPHTHALENESULFONIC ACID - - - - -	ACY, TRC.
6-AMINO-4-HYDROXY-2-NAPHTHALENESULFONIC ACID, SODIUM SAL	:
T - - - - -	TRC.
7-AMINO-4-HYDROXY-2-NAPHTHALENESULFONIC ACID, SODIUM SAL	:
T - - - - -	AC (E), TRC.
3-AMINO-2-HYDROXY-5-NITROACETANILIDE - - - - -	TRC.
2- (2-AMINO-5-HYDROXY-7-SULFO-1-NAPHTHYLAZO) -5-NITROBENZO	:
IC ACID - - - - -	TRC.
3-AMINO-4-METHOXYBENZENESULFONIC ACID- - - - -	EK.
5-AMINO-6-METHOXY-2-NAPHTHALENESULFONIC ACID - - - - -	TRC.
META-* (4-AMINO-3-METHOXYPHENYL) AZO*BENZENESULFONIC ACID	AC (E), TRC.
2-AMINO-4-METHOXYTOLUENE - - - - -	HST.
4-* (4-AMINO-5-METHOXY-ORTHO-TOLYL) AZO*-4-HYDROXY-2,7-NAP	:
HTHALENEDISULFONIC ACID, BENZENESULFONATE - - - - -	TRC.
3- (4-AMINO-5-METHOXY-ORTHO-TOLYL AZO) -1,5-NAPHTHALENEDISU	:
LPONIC ACID - - - - -	TRC.
7-* (4-AMINO-5-METHOXY-ORTHO-TOLYL) AZO*-1,3-NAPHTHALENEDI	:
SULFONIC ACID - - - - -	TRC.
3-AMINO-4-METHYLBENZAMIDE- - - - -	SAL.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
4-AMINO-4'-(3-METHYL-5-OXO-2-PYRAZOLIN-1-YL)-2,2'-STILBE	:
NEDISULFONIC ACID - - - - -	: TRC.
2-AMINO-6-METHYLPYRIDINE - - - - -	: RIL (E) .
2-AMINO-4-(METHYLSULFONYL) PHENOL - - - - -	: TRC.
2-AMINO-6-(METHYLSULFONYL) BENZOTHAZOLE - - - - -	: EKT.
2-AMINO-5-METHYL-1,3,4-THIADIAZOLE - - - - -	: ACY.
2-AMINO-1,5-NAPHTHALENEDISULFONIC ACID - - - - -	: ACY, SDH.
3-AMINO-1,5-NAPHTHALENEDISULFONIC ACID - - - - -	: TRC.
6-AMINO-1,3-NAPHTHALENEDISULFONIC ACID (AMINO I ACID) - - - - -	: AC (E), TRC.
7-AMINO-1,3-NAPHTHALENEDISULFONIC ACID - - - - -	: AC (E), DUP, TRC.
1-AMINO-2-NAPHTHALENESULFONIC ACID (ORTHO-NAPHTHIONIC ACID) - - - - -	: DUP.
2-AMINO-1-NAPHTHALENESULFONIC ACID - - - - -	: ACY, SW (E) .
6-AMINO-2-NAPHTHALENESULFONIC ACID - - - - -	: TRC.
2-AMINONAPHTHALENE-4,6,8-TRISULFONIC ACID- - - - -	: TRC.
7-AMINO-1,3,6-NAPHTHALENETRISULFONIC ACID- - - - -	: AC (E) .
8-AMINO-2-NAPHTHOL - - - - -	: BUC, TRC.
2-(2-AMINO-1-NAPHTHYL-AZO-4-(1,1,3,3-TETRAMETHYLBUTYL) PH ENOL - - - - -	: GAP.
2-AMINO-6-NITROBENZOTHAZOLE - - - - -	: SAL.
@4-AMINO-4'-NITRO-2,2'-STILBENEDISULFONIC ACID- - - - -	: AC (E), GAP, TRC.
2-AMINO-5-NITROTHIAZOLE- - - - -	: PCW.
3-AMINO-2-OXAZOLIDINONE- - - - -	: NOR.
6-AMINOPENICILLANIC ACID - - - - -	: WYT.
ORTHO-AMINOPHENOL- - - - -	: SDC.
PARA-AMINOPHENETHYL ALCOHOL - - - - -	: EKT.
PARA-AMINOPHENOL - - - - -	: ARA, MAL, SDC.
META-(PARA-AMINOPHENYL) AZO*BENZENESULFONIC ACID - - - - -	: TRC.
@PARA-(PARA-AMINOPHENYL) AZO*BENZENESULFONIC ACID - - - - -	: ACY, DUP, TRC.
7-(4-AMINOPHENYL-AZO)-1,3-NAPHTHALENEDISULFONIC ACID- - - - -	: TRC.
5-(PARA-AMINOPHENYL) AZO*SALICYLIC ACID- - - - -	: TRC.
2-(PARA-AMINOPHENYL)-6-METHYL-7-BENZOTHAZOLESULFONIC AC ID AND SALT - - - - -	: DUP, TRC.
1-(META-AMINOPHENYL)-5-OXO-2-PYRAZOLINE-3-CARBOXYLIC ACI D - - - - -	: TRC.
2-AMINOPYRIDINE- - - - -	: NEP, RIL (E) .

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
4-AMINOPYRIDINE- - - - -	: RIL(E) .
2-AMINOPYRIMIDINE- - - - -	: ACY.
3-AMINO-PARA-TOLUAMIDE - - - - -	: SDH.
ALPHA-AMINO-PARA-TOLUENESULFONAMIDE- - - - -	: SDW.
4-AMINO-META-TOLUENESULFONIC ACID *SO/3H=1*- - - - -	: ACY, DUP.
6-AMINO-META-TOLUENESULFONIC ACID *SO/3H=1*- - - - -	: DUP, HSC.
META-(4-AMINO-3-TOLYAZO) BENZENESULFONIC ACID - - - - -	: TRC.
7-(4-AMINO-ORTHO-TOLYLAZO)-1,3-NAPHTHALENEDISULFONIC ACI D - - - - -	: TRC.
3-(4-AMINO-ORTHO-TOLYL)AZO*-1,5-NAPHTHALENEDISULFONIC A CID - - - - -	: TRC.
5-AMINO-2,4-XYLENESULFONIC ACID- - - - -	: DUP.
2-AMYLANTHRAQUINONE TECH.- - - - -	: DUP.
@ANILINE (ANILINE OIL)-----	: ACY, DUP, PST, MAL, MOB(E), RUC, UPJ, USR.
ANILINE HYDROCHLORIDE- - - - -	: ACY.
2-ANILINOETHANOL - - - - -	: MIL, TCH.
7-ANILINO-4-HYDROXY-2-NAPHTHALENESULFONIC ACID - - - - -	: TRC.
@ANILINOMETHANESULFONIC ACID AND SALT - - - - -	: ACY, DUP, TRC, VPC.
8-ANILINO-1-NAPHTHALENESULFONIC ACID (PHENYL PERI ACID) - - - - -	: SDC.
ORTHO-ANISALDEHYDE - - - - -	: ASL.
ORTHO-ANISIDINE- - - - -	: AC(E), DUP.
PARA-ANISIDINE - - - - -	: DUP.
ORTHO-ANISIDINOMETHANESULFONIC ACID- - - - -	: AC(E), GAP, TRC.
ANISOLE, TECH. - - - - -	: DUP, GIV, OPC.
ANTHRANILIC ACID - - - - -	: SW(E).
ANTHRAQUINONE, 100%- - - - -	: TRC.
N,N'-(1,5-ANTHRAQUINONYLENE)DIANTHRANILIC ACID - - - - -	: TRC.
4',4''-AZOBIS*4-BIPHENYLCARBOXYLIC ACID*- - - - -	: DUP.
@BENZALDEHYDE, TECH.- - - - -	: HN, KLM, MNR, UOP.
1-BENZAMIDO-4-BROMOANTHRAQUINONE - - - - -	: AC(E).
1-BENZAMIDO-5-CHLOROANTHRAQUINONE- - - - -	: TRC.
4-BENAMIDO-5-HYDROXY-2,7-NAPHTHENEEDISULFONIC ACID- - - - -	: TRC.
7-BENZAMIDO-4-HYDROXY-2-NAPHTHALENESULFONIC ACID - - - - -	: TRC.
BENZANILIDE- - - - -	: DUP.
7H-BENZ*DE*ANTHRACEN-7-ONE - - - - -	: AC(E), ACY, DUP, TRC.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
BENZENESULFONIC ACID - - - - -	UPF.
BENZENESULFONIC ACID, PROPYL ESTER - - - - -	CWN.
1,2,4,5-BENZENETETRACARBOXYLIC-1,2:4,5-DIANHYDRIDE - - - - -	DUP.
1,2,4-BENZENETRICARBOXYLIC ACID 1,2-ANHYDRIDE (TRIMELLITI C ANHYDRIDE) - - - - -	ACC.
BENZHYDROL - - - - -	UOP.
BENZIDINE BASE - - - - -	ACS.
BENZILIC ACID- - - - -	LEM.
@BENZOIC ACID, TECH.- - - - -	HN, KLM, PFZ, VEL.
BENZOIN- - - - -	SFS.
BENZOIN ISOBUTYL ETHER - - - - -	SFS.
BENZOIN ISOPROPYL ETHER- - - - -	SFS.
BENZONITRILE - - - - -	VEL.
@2-BENZOTHAIOLETHIOL, SODIUM SALT- - - - -	ACY, GYR, USR.
1H-BENZOTRIAZOLE - - - - -	SW (E).
2H-3,1-BENZOXAZINE-2,4 (1H)-DIONE - - - - -	SW (E).
2-BENZOXAZOLETHIOL - - - - -	EK.
ORTHO-BENZOYLBENZOIC ACID- - - - -	ACY, DUP, GAF.
BENZOYL CHLORIDE - - - - -	HK, VEL.
BENZYLAMINE- - - - -	ARS, MLS.
BENZIL - - - - -	LEM.
BENZYL ETHER (DIBENZYL ETHER) - - - - -	UOP.
3-(BENZYLETHYLAMINO) ACETANILIDE- - - - -	EKT.
4,4'-BENZYLIDENEDI-ORTHO-TOLUIDINE - - - - -	ACY.
6-BENZYLIDINEAMINOPENICILLANIC ACID, TERTIARY OCTYLAMINE SALT - - - - -	TRD.
6'-N-BENZYLOXYCARBONYL-TRI-N-SALICYLDENE KANAMYCIN A- - - - -	X.
1-BENZYL-4-PHENYLISONIPECOTIC ACID - - - - -	SDW.
1-BENZYL-4-PHENYLISONIPECOTONITRILE- - - - -	SDW.
BENZYLTRIMETHYLAMMONIUM CHLORIDE - - - - -	MLS.
*4,4'-BI-7H-BENZ*DE*ANTHRACENE*-7,7'-DIONE - - - - -	ACY, DUP.
@BIPHENYL - - - - -	CHL, DOW, GOC, MON, SNT (E).
N-N-BIS CYANOETHYLANILINE- - - - -	DUP.
3'-*BIS (2-ACETOXYETHYL) AMINO*-PARA-ACETONISIDIDE - - - - -	EKT, TCH.
BIS (PARA-AMINOCYCLOHEXYL) METHANE - - - - -	DUP.
1,4-BIS*1-ANTHRAQUINONYLAMINO*ANTHRAQUINONE- - - - -	DUP, TRC.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
1,4-BIS*1-ANTHRAQUINONYLAMINO*ANTHRAQUINONE AND 1,4-BIS*5-CHLORO-1-ANTHRAQUINONYLAMINO*ANTHRAQUINONE (MIXED)	TRC.
1,5-BIS*1-ANTHRAQUINONYLAMINO*ANTHRAQUINONE - - - - -	TRC.
2,6-BIS(PARA-AZIDOBENZYLIDENE)-4-METHYLCYCLOHEXANONE - - -	X.
ALPHA-ALPHA-BIS(3,5-DIBROMO-4-HYDROXY-ORTHO-TOLY)-ALPHA-HYDROXY-ORTHO-TOLUENESULFONIC ACID, SODIUM SALT - - -	EK.
4,4'-BIS*DIETHYLAMINO*BENZHYDROL SALT, 2,7-NAPHTHALENEDI-SULFONIC ACID MIXTURE - - - - -	TRC.
4,4'-BIS*DIETHYLAMINO*BENZOPHENONE (ETHYL KETONE BASE) - -	SDH.
4-BIS*(PARA-DIETHYLAMINOPHENYL) METHYL*-2,7-NAPHTHALENEDI-SULFONIC ACID, LEUCO FORM - - - - -	TRC.
4,4'-BIS*DIMETHYLAMINO*BENZHYDROL (MICHLER'S HYDROL) - - -	X.
4,4'-BIS*DIMETHYLAMINO*BENZOPHENONE (MICHLER'S KETONE) - -	X.
BIS(BETA-DIMETHYLAMINOETHYL) PHENYLACETONITRILE - - - - -	WYT.
1,5-BIS*2,4-DINITROPHENOXY*-4,8-DINITROANTHRAQUINONE - - -	VPC.
3'-*BIS(2-HYDROXYETHYL) AMINO*ACETANILIDE - - - - -	GAF.
3'-*BIS(2-HYDROXYETHYL) AMINO*BENZANILIDE, DIACETATE ESTER -	TCH.
3'-*BIS(2-HYDROXYETHYL) AMINO*-4'-METHOXYACETANILIDE - - -	EKT.
4,4'-BIS*(PARA-HYDROXYPHENYL) AZO*-2,2'-STILBENEDISULFONIC ACID (C.I. DIRECT YELLOW 4) - - - - -	TRC.
BIS-(ORTHO-NITROPHENYL) SULFIDE - - - - -	X.
2,4-BIS(XYLYLAZO) RESORCINOL - - - - -	DUP.
PARA-BROMOANILINE - - - - -	EK.
PARA-BROMOANISOLE - - - - -	OPC.
3-BROMO-7H-BENZ*DE*ANTHRACEN-7-ONE (3-BROMOBENZANTHRONE)	ACY, DUP.
6-BROMO-5-CHLOROBENZOXAZOLONE - - - - -	SW(E).
2-BROMO-6-CHLORO-4-NITROANILINE - - - - -	HST.
2-BROMO-4,6-DINITROANILINE - - - - -	AC(E), HST, SDC.
BROMOETHYLBENZENE - - - - -	RSA.
2-BROMO-4'-NITROACETOPHENONE - - - - -	GAF.
(PARA-BROMOPHENYL) ACETONITRILE - - - - -	SFS.
PARA-BROMOTOLUENE - - - - -	EK, SPS.
3-(N-BUTYLANILINO) PROPIONITRILE - - - - -	TCH.
2-TERT-BUTYLANTHRAQUINONE - - - - -	DUP.
PARA-TERT-BUTYLBENZALDEHYDE - - - - -	GIV.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
TERT-BUTYLBENZENE-	: UOP.
PARA-TERT-BUTYLBENZOIC ACID-	: SHC.
ORTHO-(PARA-TERT-BUTYLBENZOYL) BENZOIC ACID -	: DUP.
6-TERT-BUTYL-META-CRESOL -	: KPT.
2-TERT-BUTYL-PARA-CRESOL -	: ACY.
2'-TERT-BUTYL-4',6'-DIMETHYLACETOPHENONE -	: GIV.
2-TERT-BUTYL-4-ETHYLPHENOL -	: ACY.
TERT-BUTYLHYDROQUINONE -	: X.
NI/-BUTYL-4-METHOXYMETANILAMIDE -	: ALL.
2-TERT-BUTYL-5-METHYLANISOLE -	: GIV.
ORTHO-SEC-BUTYLPHENOL- -	: TNA (E) .
ORTHO-TERT-BUTYLPHENOL -	: TNA (E) .
PARA-TERT-BUTYLPHENOL -	: DOW, PRD, SCN.
BUTYLPHENOLS, MIXED- -	: DOW, SCN.
PARA-TERT-BUTYLTOLUENE -	: GIV, SHC.
5-TERT-BUTYL-1,2,3-TRIMETHYLBENZENE- -	: GIV.
5-TERT-BUTYL-META-XYLENE -	: GIV.
6-TERT-BUTYL-2,4-XYLENOL -	: PIT, PRD, RH.
D-10-CAMPHORSULFONIC ACID- -	: KF, OTC (E) .
2-(PARA-CARBOXYPHENOXY)-2-PIVALOYL-2,4-DICHLOROACETANILI DE- -	: EK.
CEDRENE- -	: GIV.
2-CHLOROACETAMIDO-5-CHLOROBENZOPHENONE -	: WYT.
4'-CHLOROACETOPHENONE- -	: LIL.
4'-(CHLOROACETYL) ACETANILIDE -	: DUP.
META-CHLOROANILINE -	: DUP.
ORTHO-CHLOROANILINE- -	: DUP.
PARA-CHLOROANILINE -	: DUP, MON.
3-(ORTHO-CHLOROANILINO) PROPIONITRILE -	: DUP, TCH.
5-CHLORO-ORTHO-ANISIDINE HYDROCHLORIDE -	: ALL.
1-CHLOROANTHRAQUINONE- -	: ACY, TRC.
2-CHLOROANTHRAQUINONE- -	: ACY.
ORTHO-CHLOROBENZALDEHYDE -	: HN.
PARA-CHLOROBENZALDEHYDE- -	: HN.
CHLORO-7H-BENZ*DE*ANTHRACEN-7-ONE (CHLOROBENZANTHRONE) -	: ACY, TRC.
@CHLOROBENZENE, MONO- -	: ACS, DOW, MON, MTO, PPG, SCC.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
PARA-CHLOROBENZENESULFINIC ACID-	TRC.
PARA-CHLOROBENZENESULFONAMIDE-	NES.
PARA-CHLOROBENZENESULFONIC ACID-	SHC, UPF.
ORTHO-CHLOROBENZOIC ACID -	HN.
PA-A-CHLOROBENZOYL CHLORIDE-	HN.
4,4'-(ORTHO-CHLOROBENZYLIDENE) D1-2,5-XYLIDINE-	GAF.
PARA-CHLOROBENZYL SULFONAMIDE -	PFZ.
CHLORO (PARA-CHLOROPHENYL) PHENYLMETHANE -	OPC, UOP.
CHLOROCYCLOHEXANE-	ACY.
1-CHLORO-2,5-DIETHOXY-4-NITROBENZENE -	GAF.
7-CHLORO-1,3-DIHYDRO-3-HYDROXY-5-PHENYL-2H-1,4-BENZODIAZ	
EPIN-2-ONE ACETATE ESTER-	WYT.
7-CHLORO-1,3-DIHYDRO-5-PHENYL-2H-1,4-BENZODIAZEPIN-2-ONE	
-40XIDE -	WYT.
2-CHLORO-1,4-DIHYDROXYANTHRAQUINONE-	HSB.
4'-CHLORO-2',5'-DIMETHOXYACETOACETANILIDE-	PCW.
4-CHLORO-2,5-DIMETHOXYANILINE-	PCW.
5-CHLORO-2,4-DIMETHOXYANILINE-	PCW.
2- [*] PARA-CHLORO-ALPHA-(2-DIMETHYLAMINO)-ETHYL [*] BENZYL PYRID	
INE -	SK.
2-CHLORO-10- [*] 3-(DIMETHYLAMINO) PROPYL [*] PHENOTHIAZINE -	SK.
1-CHLORO-2,4-DINITROBENZENE (DINITROCHLOROBENZENE) -	SDC.
3-CHLORO-4,6-DINITROBENZENESULFONIC ACID -	TRC.
3-CHLORODIPHENYLAMINE -	SK.
CHLORODIPHENYLMETHANE-	OPC, UOP.
N-(2-CHLOROETHYL)-N-ETHYLANILINE -	GAF.
4-CHLORO-N-ISOPROPYL-3-NITROBENZENESULFONAMIDE -	TRC.
4-CHLOROMETANILIC ACID -	DUP.
1-CHLORO-2-METHYLANTHRAQUINONE -	ACY, TRC.
ALPHA-CHLOROMETHYLNAPHTHALENE, CRUDE -	SFS.
4-CHLORO-N-METHYL-3-NITROBENZENESULFONAMIDE-	TRC.
2-CHLORO-10- [*] 3-(4-METHYL-1-PIPERAZNYL) PROPYL [*] PHENOTHIAZI	
NE-	SK.
CHLORONAPHTHALENES -	KPT.
2-CHLORO-4-NITROANILINE (ORTHO-CHLORO-PARA-NITROANILINE) -	DUP.
4-CHLORO-2-NITROANILINE (PARA-CHLORO-ORTHO-NITROANILINE) -	DUP.

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
1-CHLORO-5-NITROANTHRAQUINONE- - - - -	TRC.
1-CHLORO-2-NITROBENZENE- - - - -	DUP, MON.
1-CHLORO-3-NITROBENZENE (CHLORO-META-NITROBENZENE) - - -	DUP.
1-CHLORO-4-NITROBENZENE (CHLORO-PARA-NITROBENZENE) - - -	DUP, MON.
2-CHLORO-5-NITROBENZENESULFINIC ACID - - - - -	TRC.
4-CHLORO-3-NITROBENZENESULFONAMIDE - - - - -	AC(E), DUP, EKT, GAF, TRC, VPC.
4-CHLORO-3-NITROBENZENESULFONANILIDE - - - - -	TRC.
2-CHLORO-5-NITROBENZENESULFONIC ACID - - - - -	TRC.
2-CHLORO-5-NITROBENZENESULFONIC ACID, SODIUM SALT- - -	DUP.
4-CHLORO-3-NITROBENZENESULFONIC ACID - - - - -	TRC.
4-CHLORO-3-NITROBENZENESULFONYL CHLORIDE - - - - -	AC(E), EKT, SDC, VPC.
2-CHLORO-4-NITROBENZOIC ACID - - - - -	SAL.
2-CHLORO-5-NITROBENZOIC ACID - - - - -	TRC.
2-CHLORO-5-NITROBENZOIC ACID, METHYL ESTER - - - - -	EGR.
2-CHLORO-4-NITROBENZOIC ACID, POTASSIUM SALT - - - - -	SAL.
4-CHLORO-3-NITRO-N,N-DIMETHYLBENZENESULFONAMIDE- - -	EKT.
4-CHLORO-3-NITROPHENYL METHYL SULFONE- - - - -	TRC.
2-CHLORO-5-NITROPHENYL METHYL SULFONE- - - - -	TRC.
2-CHLORO-4-NITROTOLUENE- - - - -	DUP.
ORTHO-CHLOROPHENOL - - - - -	DOW.
PARA-CHLOROPHENOL- - - - -	DOW, MON.
(META-CHLOROPHENOL) DIETHANOLAMINE- - - - -	HST.
2-CHLOROPHENOTHIAZINE- - - - -	SK.
(PARA-CHLOROPHENYL) ACETONITRILE- - - - -	OPC, UOP.
4-CHLORO-ALPHA-PHENYL-ORTHO-CRESOL - - - - -	MON.
4-CHLORO-ORTHO-PHENYLENEDIAMINE- - - - -	PMT.
1- (4-CHLOROPHENYL)-3-METHYL-NORMAL-ETHYLANILINE- - -	HST.
1- (META-CHLOROPHENYL)-3-METHYL-2-PYRAZOLIN-5-ONE - - -	TRC.
1- (ORTHO-CHLOROPHENYL)-3-METHYL-2-PYRAZOLIN-5-ONE- - -	HST.
1- (PARA-CHLOROPHENYL)-3-METHYL-2-PYRAZOLIN-5-ONE - - -	VPC.
PARA-CHLOROPHENYL METHYL SULFONE - - - - -	TRC.
2-CHLORO-4-PHENYLPHENOL- - - - -	DOW.
4-CHLOROPHTHALIC ACID- - - - -	HSC, SW(E).
3-CHLORO-1,2-PROPANEDIOL - - - - -	EKT.
1- (3-CHLOROPROPYL)-4-METHYLPYPERAZINE- - - - -	SK.
7-CHLORO-4-QUINOLINOL- - - - -	SDW.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
4-CHLORORESORCINOL - - - - -	: AC (E) .
PARA-CHLOROTHIOPHENOL - - - - -	: SFA.
META-CHLOROTOLUENE - - - - -	: HN.
ORTHO-CHLOROTOLUENE - - - - -	: HK.
PARA-CHLOROTOLUENE - - - - -	: HN.
ALPHA-CHLOROTOLUENE (BENZYL CHLORIDE) - - - - -	: MON, SFS.
3-CHLORO-ORTHO-TOLUIDINE *NH/2=1* - - - - -	: DUP.
3-CHLORO-PARA-TOLUIDINE *NH/2=1* - - - - -	: DUP.
4-CHLORO-ORTHO-TOLUIDINE *NH/2=1* AND HYDROCHLORIDE - - - - -	: PCW.
N*(5-CHLORO-ORTHO-TOLYL)AZO*SARCOSINE - - - - -	: ALL.
1-(6-CHLORO-ORTHO-TOLYL)-3-METHYL-2-PYRAZOLIN-5-ONE - - - - -	: TRC.
6-CHLORO-ALPHA, ALPHA, ALPHA-TRIFLUORO-META-TOLUIDINE - - - - -	: HK, PCW.
2-CHLORO-PARA-XYLENE - - - - -	: DUP.
4-CHLORO-3,5-XYLENOL - - - - -	: FER.
CHOLIC ACID - - - - -	: WIL.
CINNAMIC ACID - - - - -	: SFS.
CINNAMOYL CHLORIDE - - - - -	: EK, UOP.
@CRESOLS:	:
META-CRESOL - - - - -	: KPT.
@O-CRESOL:	:
ORTHO-CRESOL, FROM COAL TAR - - - - -	: KPT, PRD.
ORTHO-CRESOL, FROM PETROLEUM - - - - -	: MER, PRD, SW (E) .
PARA-CRESOL - - - - -	: SW (E) .
CRESOLS, MIXED:	:
(M,P)-CRESOL:	:
(META, PARA)-CRESOL, FROM COAL TAR - - - - -	: KPT, PRD.
(META, PARA)-CRESOL, FROM PETROLEUM - - - - -	: MER, NPC, PRD.
(O,M,P)-CRESOL:	:
(ORTHO, META, PARA)-CRESOL, FROM COAL TAR - - - - -	: KPT.
OTHER - - - - -	: PIT.
@CRESYLIC ACID, REFINED	:
CRESYLIC ACID, REFINED; FROM COAL TAR - - - - -	: KPT, PRD.
CRESYLIC ACID, REFINED; FROM PETROLEUM - - - - -	: MER, PRD.
CRESYL VIOLET PERCHLORATE - - - - -	: EK.
2-*PARA-(CYANOACETAMIDO)PHENYL*-6-METHYL-7-BENZO-THIAZOL :	:
ESULFONIC ACID - - - - -	: DUP.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYANOACETIC ACID, 2-ETHYLHEXYL ESTER - - - - -	GAF.
4-(2-CYANOETHYL) ETHYLAMINO*-ORTHO-TOLUALDEHYDE- - - -	DUP.
N-(2-CYANOETHYL)-N-ETHYL-META-TOLUIDINE- - - - -	EKT.
N*2-(N*2-CYANOETHYL*-META-TOLUIDINE) ETHYL*SUCCINIMIDE	EKT.
PARA*(2-CYANOETHYL) METHYLAMINO*BENZALDEHYDE - - - - -	DUP, GAF.
2-CYANOPYRIDINE- - - - -	NEP.
4-CYANOPYRIDINE- - - - -	NEP.
CYCLODODECATRIENE (CDDT) - - - - -	DUP.
1,2-CYCLOHEXANEDICARBOXYLIC ANHYDRIDE- - - - -	ACS.
CYCLOHEXANOL - - - - -	ALF, DUP, MON.
@CYCLOHEXANONE- - - - -	ALF, CEL, CNP, DBC, DUP, MON.
CYCLOHEXANONE OXIME- - - - -	CNP.
CYCLOHEXENE- - - - -	USR.
4-CYCLOHEXENE-1,2-DICARBOXIMIDE- - - - -	SFC.
CYCLOHEXENE OXIDE- - - - -	USR.
@CYCLOHEXYLAMINE- - - - -	ABB, MON, RBC, VGC.
2-CYCLOPENTANONE-BETA-(2,5-DIHYDROXYBENZENE) ETHYL KETON	
E - - - - -	X.
PARA-CYMELE- - - - -	HPC.
DEOXYCHOLIC ACID - - - - -	WIL.
1,5 (AND 1,8)-DIACETAMIDOANTHRAQUINONE- - - - -	AC(E).
1,4-DIAMINOANTHRAQUINONE - - - - -	SDC, TRC.
1,5 (AND 1,8)-DIAMINOANTHRAQUINONE- - - - -	AC(E).
2,6-DIAMINOANTHRAQUINONE - - - - -	AC(E).
3,3'-DIAMINOBENZANILIDE- - - - -	TRC.
2,4-DIAMINOBENZENESULFONIC ACID *SO ₃ H=1*- - - - -	DUP, TRC.
3,5-DIAMINOBENZOIC ACID- - - - -	SAL.
4,4'-DIAMINO-2,2'-BIPHENYLDISULFONIC ACID- - - - -	ACY.
1,3 DIAMINOCYCLOHEXANE - - - - -	DUP.
1,4-DIAMINO-2,3-DICHLOROANTHRAQUINONE- - - - -	DUP.
@ 1,4-DIAMINO-2,3-DIHYDROANTHRAQUINONE - - - - -	AC(E), ACY, DUP, HSH, TRC.
4,8-DIAMINO-9,10-DIHYDRO-1,5-DIHYDROXY-9,10-DIOXO-2,6-AN	
THRACENEDISULFONIC ACID - - - - -	TRC.
4,8 (AND 4,5)-DIAMINO-9,10-DIHYDRO-1,5 (AND 1,8)-DIHYDROXY	
-9,10-DIOXY-2,6 (AND 2,7)-ANTHRACENEDISULFONIC ACID- -	TRC.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
1,4-DIAMINO-9,10-DIHYDRO-9,10-DIOXO-2,3-ANTHRACENEDICARB OXIMIDE - - - - -	DUP.
1,5-DIAMINO-4,8-DIHYDROXYANTHRAQUINONE - - - - -	VPC.
4,5-DIAMINO-1,8-DIHYDROXYANTHRAQUINONE - - - - -	VPC.
2,4-DIAMINO-6-PHENYL-SEC-TRIAZINE- - - - -	RH, VEL.
2,6-DIAMINOPYRIDINE- - - - -	RIL(E).
4,4'-DIAMINO-2,2'-STILBENEDISULFONIC ACID- - - - -	ACY, CGY(E), GAP, TRC, VPC.
3,5-DIAMINO-2,4,6-TRIODOBENZOIC ACID- - - - -	SDW.
4,5'-DIBENZAMIDO-1,1'-IMINODIANTHRAQUINONE - - - - -	ACY, TRC.
DIBENZO(B,DEF)CHRYSENE-7,14-DIONE- - - - -	TRC.
1,5-DIBENZOYLNAPHTHALENE - - - - -	GAP, HST, TRC.
DIBENZYLAZODICARBOXYLATE - - - - -	WTL.
N,N'-DIBENZYLETHYLENEDIAMINE - - - - -	WYT.
N,N'-DIBENZYLETHYLENEDIAMINE DIACETATE - - - - -	WYT.
N',N'-DIBENZYLIDENETOLUENE-ALPHA,ALPHA-DIAMINE - - - - -	SDH.
3,9-DIBROMO-7H-BENZ*DE*ANTHRACEN-7-ONE - - - - -	TRC.
2,6-DIBROMO-4-NITROANILINE - - - - -	SAL.
2,6-DIBROMO-4-NITROPHENOL- - - - -	SW(E).
2,5-DIBUTOXY-4-MORPHOLINO BENZENEDIAZONIUM SULFATE SALT (: DBB SULFATE)- - - - -	ALL.
2,6-DI-TERT-BUTYL-4-NONYLPHENOL- - - - -	GAP.
2,4 DI-TERT-BUTYLPHENOL- - - - -	DUP.
3,4-DICHLOROANILINE- - - - -	DUP, EGR, MON.
3-(2,4-DICHLOROANILINO)-1-(2,4,6-TRICHLOROPHENYL)-2-PYRA : ZOLIN-5-ONE - - - - -	EK.
1,5-DICHLOROANTHRAQUINONE- - - - -	TRC.
2,6-DICHLOROBENZALDEHYDE - - - - -	DUP.
DICHLOROBENZANTHRONE - - - - -	ACY.
@ORTHO-DICHLOROBENZENE- - - - -	ACS, DOW, MON, PPG.
ORTHO (AND PARA)-DICHLOROBENZENE- - - - -	MTO.
@PARA-DICHLOROBENZENE - - - - -	ACS, DOW, DVC, PPG.
3,3'-DICHLOROBENZIDINE BASE AND SALTS- - - - -	CWN, LAK.
2,2'-DICHLOROBENZIL- - - - -	MTO.
2,4-DICHLOROBENZOIC ACID - - - - -	HN.
2,4-DICHLOROBENZOYL CHLORIDE - - - - -	HN.
DICHLOROBENZYL CHLORIDE- - - - -	SFS.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
2,4-DICHLORO-3,5-DINITRO-ALPHA,ALPHA,ALPHA-TRIFLUOROTOLUENE - - - - -	GAF.
DICHLORODIPHENYLSILANE - - - - -	DCC.
2',7'-DICHLOROFLUORESCIN- - - - -	EK.
2,5-DICHLORO-4- (3-METHYL-5-OXO-2-PYRAZOLIN-1-YL) BENZENES : ULFONIC ACID- - - - -	ACY, HST, TRC.
DICHLOROMETHYLPHENYLSILANE - - - - -	DCC.
2,6-DICHLORO-4-NITROANILINE- - - - -	CWN.
1,2-DICHLORO-4-NITROBENZENE- - - - -	DUP, EGR, MON.
1,4-DICHLORO-2-NITROBENZENE (NITRO-PARA-DICHLOROBENZENE) : @2,4-DICHLOROPHENOL - - - - -	DUP. DOW, MON, RDA.
3- (2',6'-DICHLOROPHENYL)-5-METHYL-ISOXAZOLE-4-CARBONYL C : HLORIDE - - - - -	OTC (E) .
2,6-DICHLOROPYRAZINE - - - - -	ACY.
3,6-DICHLOROPYRIDAZINE - - - - -	ACY.
4,7-DICHLOROQUINOLINE- - - - -	PD, SDW.
2,5-DICHLOROSULFANILIC ACID *SO/3H=1*- - - - -	VPC.
2,5-DICHLORO-4-SULFOBENZENEDIAZONIUM SULFATE - - - - -	TRC.
PARA,ALPHA-DICHLOROTOLUENE - - - - -	DUP, HN.
ALPHA,ALPHA-DICHLOROTOLUENE (BENZAL CHLORIDE)- - - - -	SFS.
2,6-DICHLOROTOLUENE- - - - -	DUP.
@DICYCLOHEXYLAMINE- - - - -	ABB, MON, VGC.
DICYCLOPENTADIENE (INCLUDES CYCLOPENTADIENE) - - - - -	ENJ (E) .
DICYCLOPENTADIENE DIOXIDE- - - - -	VEL.
DIDODECYLBENZENE - - - - -	CO.
ALPHA, ALPHA DIETHOXYACETOPHENONE- - - - -	NEP.
PARA-DIETHOXYBENZENE - - - - -	ALL.
3-DIETHYLAMINOACETANILIDE- - - - -	DUP.
PARA- (DIETHYLAMINO) BENZALDEHYDE- - - - -	DUP, TRC.
ALPHA-*(2-DIETHYLAMINO) ETHYL*-ALPHA-PHENYLCYCLOHEXANEMET : HANOL, HYDROCHLORIDE- - - - -	ACY.
7-DIETHYLAMINO-4-METHYLCOUMARIN, CRUDE - - - - -	GAF, SDH.
META- (DIETHYLAMINO) PHENOL (N,N-DIETHYL-3-AMINOPHENOL) - - - - -	ACY.
3-*(4'-N,N-DIETHYLAMINO) PHENYLAZO*-1H-1,2,4-TRIAZOLE - - - - -	TRC.
3- (DIETHYLAMINO) PROPIOPHENONE- - - - -	ACY.
@N,N-DIETHYLANILINE - - - - -	ACS, ACY, DUP.
N,N-DIETHYL-META-ANISIDINE - - - - -	DUP.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DIETHYLBENZENE - - - - -	: DOW.
N,N-DIETHYLCYCLOHEXYLAMINE - - - - -	: DUP.
N1/,N1/-DIETHYL-4-METHOXYMETANILAMIDE- - - - -	: PCW.
N,N-DIETHYL-4-NITROSO-META-PHENETIDINE - - - - -	: GAF.
N,N-DIETHYL-META-PHENETIDINE - - - - -	: GAF.
N,N-DIETHYL-PARA-PHENYLENEDIAMINE OXALATE- - - - -	: EK.
DIETHYL-PARA-TOLUIDINE - - - - -	: RSA.
N,N-DIETHYL-META-TOLUIDINE - - - - -	: DUF.
6,11-DIHYDRODIBENZ (B,E) OXEPIN-11-ONE - - - - -	: PFZ.
9,10-DIHYDRO-9,10-DIOXO-1,5-ANTHRACENEDISULFONIC ACID- -	: TRC.
9,10-DIHYDRO-9,10-DIOXO-1,5-ANTHRACENEDISULFONIC ACID, D	: TRC.
ISODIUM SALT- - - - -	: TRC.
9,10-DIHYDRO-9,10-DIOXO-1,8-ANTHRACENEDISULFONIC ACID, P	: TRC.
POTASSIUM SALT - - - - -	: TRC.
9,10-DIHYDRO-9,10-DIOXO-2,6-ANTHRACENEDISULFONIC ACID AN	: AC (E), TRC.
D SALT- - - - -	: TRC.
9,10-DIHYDRO-9,10-DIOXO-2,7-ANTHRACENEDISULFONIC ACID AN	: TRC.
D SALT- - - - -	: TRC.
@9,10-DIHYDRO-9,10-DIOXO-1-ANTHRACENESULFONIC ACID AND SA	: AC (E), ACY, TRC.
LT (GOLD SALT)-----	: TRC.
9,10-DIHYDRO-5-NITRO-9,10-DIOXO-1-ANTHRACENESULFONIC ACI	: TRC.
D - - - - -	: EKT.
1,2-DIHYDRO-2,2,4,7-TETRAMETHYL GUINOLINE- - - - -	: X.
1,2-DIHYDRO-2,2,4-TRIMETHYL GUINOLINE - - - - -	: EKT.
17 ALPHA,21-DIHYDROXY-16 ALPHA-METHYLPREGNA-4,9(11)-DIEN	: X.
E-3,20-DIONE,21 ACETATE - - - - -	: X.
17 ALPHA,21-DIHYDROXY-16 ALPHA-METHYLPREGNA-1,4,9(11)-TR	: X.
IENE-3,20-DIONE - - - - -	: X.
17 ALPHA,21-DIHYDROXY-16 BETA-METHYL-1,4,9(11)-PREGNATRI	: X.
ENE-3,20-DIONE,21 BENZOATE- - - - -	: X.
@1,4-DIHYDROXYANTHRAQUINONE (QUINIZARIN)-----	: AC (E), ACY, DUP, EKT, HSH, ICC, TRC.
1,8-DIHYDROXYANTHRAQUINONE - - - - -	: TRC.
2,5-DIHYDROXYBENZONESULFONIC ACID, POTASSIUM SALT-----	: EK.
@2,4-DIHYDROXYBENZOPHENONE- - - - -	: ACY, DUP, EKT.
1,5-DIHYDROXY-4,8-DINITROANTHRAQUINONE - - - - -	: TRC, VPC.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@1,8-DIHYDROXY-4,5-DINITROANTHRAQUINONE - - - - -	: DUP, EKT, VPC.
6,7-DIHYDROXY-2-NAPHTHALENESULFONIC ACID - - - - -	: WAY.
3,3-DIHYDROXY-2-NAPHTHANILIDE- - - - -	: ABB, WAY.
11 BETA, 21-DIHYDROXYPREGNA-4, 16-DIENE-3, 20-DIONE, 21-ACET ATE - - - - -	: X.
11 BETA, 21-DIHYDROXYPREGNA-1, 4, 16-TRIENE-3, 20-DIONE, 21-A CETATE- - - - -	: X.
16, 17-DIHYDROXYVIOANTHRONE (DIHYDROXYDIBENZANTHRONE) - -	: ACY, DUP.
3,5-DIIODOSALICYLIC ACID, LITHIUM SALT - - - - -	: EK.
DIISOPROPYLBENZENE - - - - -	: DOW.
N,N'-DIISOPROPYL-PARA-PHENYLENEDIAMINE - - - - -	: DUP.
2,4-DIMETHOXYANILINE - - - - -	: DUP.
2,5-DIMETHOXYANILINE - - - - -	: EKT, PCW.
1,5 (AND 1,8) -DIMETHOXYANTHRAQUINONE- - - - -	: TRC.
2,5-DIMETHOXYBENZALDEHYDE- - - - -	: CWN.
META-DIMETHOXYBENZENE- - - - -	: ACY, ARS, GAF.
3,3'-DIMETHOXYBENZIDINE- - - - -	: UOP.
3,3'-DIMETHOXYBENZIDINE HYDROCHLORIDE- - - - -	: CWN, X.
2,6-DIMETHOXYBENZYLCHLORIDE- - - - -	: UPJ.
N,N'-(3,3'-DIMETHOXY-4,4'-BIPHENYLENE) BIS (AZO) *BIS*N- METHYLTAURINE*- - - - -	: GAF.
2,5-DIMETHOXY-ALPHA-METHYLPHENETHYLAMINE - - - - -	: X.
1,4-DIMETHOXY-2-NITROBENZENE - - - - -	: EKT.
2,5-DIMETHOXYTETRAHYDROFURAN - - - - -	: HEX.
PARA-(DIMETHYLAMINO) BENZALDEHYDE - - - - -	: DUP, TRC.
META-(DIMETHYLAMINO) BENZOIC ACID - - - - -	: MLS, SDH.
6-DIMETHYLAMINO-2-*2-(2,5-DIMETHYL-1-PHENYL-3-PYRRYL)-VI NYL*-1-METHYL-1-QUINOLINIUM METHYL SULFATE- - - - -	: X.
2-*2-(DIMETHYLAMINO) ETHYL*-2-THENYLAMINO*-PYRIDINE- - -	: ABB.
2-DIMETHYLAMINOMETHYL-4-NITRO-6-ETHOXYPHENOL - - - - -	: ARA.
2-DIMETHYLAMINOMETHYL-4-NITRO-6-METHOXYPHENOL- - - - -	: ARA.
6-DIMETHYLAMINO-1-METHYLQUINALDINIUM METHYLSULFATE - - -	: EK.
6-(DIMETHYLAMINO) QUINALDINE- - - - -	: EK.
META-(DIMETHYLAMINO) PHENOL - - - - -	: ACY.
11-(3-DIMETHYLAMINO-1-PROPYL)-6H-DIBENZ (B, E) OXEPIN-11-OL	: PFZ.
@N,N-DIMETHYLANILINE- - - - -	: ACS, ACY, DUP.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
7,12-DIMETHYLBENZ*AN*ANTHRACENE - - - - -	EK.
3,3'-DIMETHYLBENZIDINE HYDROCHLORIDE - - - - -	EK.
@N,N-DIMETHYLBENZYLAMINE- - - - -	ARS, MLS, RH, SW(E).
ALPHA, ALPHA-DIMETHYLBENZYL HYDROPEROXIDE - - - - -	USS.
2,2'-DIMETHYL-1,1'-BIANTHRAQUINONE - - - - -	ACY, TRC.
5,5-DIMETHYL-1,3-CYCLOHEXANEDIONE- - - - -	EKT.
@N,N-DIMETHYLCYCLOHEXYLAMINE- - - - -	ABB, DUP, JCC.
5,5-DIMETHYLHYDANTOIN- - - - -	GLY.
2,6-DIMETHYLHYDROQUINONE - - - - -	ARA.
2,3-DIMETHYLBINDOLE - - - - -	DUP.
2,5-DIMETHYL-4(2)-MORPHOLINYL METHYLPHENOL HYDROCHLORIDE	WAY.
N,N-DIMETHYL-1-NAPHTHYLAMINE- - - - -	EK.
N,N-DIMETHYL-PARA-PHENYLENEDIAMINE, MONOHYDROCHLORIDE- -	EK.
1,4-DIMETHYLPYPERAZINE - - - - -	JCC.
DIMETHYL-5-SULFOISOPHTHALATE - - - - -	X.
DIMETHYL-ORTHO-TOLUIDINE - - - - -	RSA.
N,N-DIMETHYL-PARA-TOLUIDINE- - - - -	EK, RSA.
2,4-DINITROANILINE - - - - -	HST, SDC.
PARA-(2,4-DINITROANILINO) PHENOL- - - - -	SDC.
1,5(AND 1,8)-DINITROANTHRAQUINONE- - - - -	SDC, TRC.
META-DINITROBENZENE- - - - -	DUP.
2,4-DINITROBENZENESULFONIC ACID- - - - -	EK, TRC.
3,5-DINITROBENZOIC ACID- - - - -	SAL.
3,5-DINITROBENZOYL CHLORIDE- - - - -	EK.
DINITROCAPRYLPHENOL- - - - -	RH.
2,4-DINITROCUMENE- - - - -	DUP.
1-(3,5-DINITRO-2-HYDROXYPHENYL AZO)-2-HYDROXYNAPHTHALENE	TRC.
2,4-DINITROPHENOL, TECH. - - - - -	SDC, VPC.
3,5-DINITROSALICYLIC ACID- - - - -	SAL.
@4,4'-DINITROSTILBENE-2,2'-DISULFONIC ACID- - - - -	AC(E), ACY, CGY(E), DUP, GAP, SDH, TRC.
@2,4-DINITROTOLUENE - - - - -	ACS, DUP, MOB(E), RUC.
@2,4(AND 2,6)-DINITROTOLUENE- - - - -	DUP, UCC, X.
DINONYLPHENOL- - - - -	GAP, JCC.
2,4-DI-TERT-PENTYLPHENOL - - - - -	PAS.
DI-TERT-PENTYLPHENOXYACETYL CHLORIDE - - - - -	EK.
1,5-DIPHENOXYANTHRAQUINONE - - - - -	VPC.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DIPHENYLACETONITRILE, TECH.- - - - -	: ASH.
DIPHENYLAMINE- - - - -	: ACY, DUP, ORO, RUC, USR.
2,5-DIPHENYL-PARA-BENZOQUINONE - - - - -	: EK.
N,N'-DIPHENYLETHYLENEDIAMINE - - - - -	: RPC.
DIPHENYLMETHANE- - - - -	: PD.
2,5-DIPHENYLOXAZOLE- - - - -	: EK.
4,4'-DITHIODIANILINE - - - - -	: ACY.
1,4-DI-PARA-TOLUIDINOANTHRAQUINONE - - - - -	: HSH.
DODECYLANILINE - - - - -	: ABB, X.
DIVINYLBENZENE - - - - -	: DOW, FG.
DODECYLBENZYL CHLORIDE - - - - -	: SFS.
DODECYLNITROBENZENE- - - - -	: RH.
PARA-DODECYLPHENOL - - - - -	: GAF, MCB (E), MON, X.
6-(2-ETHOXY-1-NAPHTHAMIDO) PENICILLANIC ACID - - - - -	: WYT.
2-ETHOXY-1-NAPHTHOIC ACID- - - - -	: WYT.
2-ETHOXY-1-NAPHTHOYL CHLORIDE- - - - -	: OPC, WYT.
4-ETHOXY-ORTHO-PHENYLENE DIAMINO - - - - -	: TRC.
N1/(6-ETHOXY-3-PYRIDAZINYL) SULFANILAMIDE- - - - -	: ACY.
3'-(ETHYLAMINO) ACETANILIDE - - - - -	: EKT.
ETHYL-META-AMINOBENZOIC ACID - - - - -	: RSA.
3-(ETHYLAMINO)-PARA-CRESOL - - - - -	: DUP.
N-ETHYL-N-(BETA-AMINOETHYL)-META-TOLUIDINE - - - - -	: X.
3-(ETHYLAMINO)-PARA-TOLUENESULFONIC ACID *SO/3H=1* - - - - -	: DUP.
@N-ETHYLANILINE, REFINED- - - - -	: ACS, ACY, DUP.
@2-(N-ETHYLANILINO) ETHANOL- - - - -	: DUP, MIL, TCH.
1*2-(ETHYLANILINO) ETHYLENE*PYRIDINIUM CHLORIDE- - - - -	: GAF.
*2-(N-ETHYLANILINO) ETHYL*TRIMETHYLAMMONIUM CHLORIDE- - - - -	: DUP.
3-(N-ETHYLANILINO) PROPIONITRILE- - - - -	: MIL, TCH.
ALPHA-(N-ETHYLANILINO)-META-TOLUENESULFONIC ACID - - - - -	: GAF, SDH.
ALPHA-(N-ETHYLANILINO)-PARA-TOLUENESULFONIC ACID - - - - -	: ACS, TRC.
N-ETHYL-PARA-ANISIDINE - - - - -	: EKT.
ETHYLBENZYL CHLORIDE - - - - -	: SFS.
2-(N-ETHYL-N, BETA-CYANOETHYL)-4-ACETAMINO ANISOLE- - - - -	: VPC.
3,3'--ETHYLENEDIOXYDIPHENOL- - - - -	: ABB, WAY.
N-ETHYLCYCLOHEXYLAMINE - - - - -	: ABB, VGC.
N-ETHYL-N-(2,3-DIHYDROXYPROPYL)-META-TOLUIDINE - - - - -	: EKT.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
3-ETHYL-2-*5-(3-ETHYL-2-BENZOTHAZOLINYLIDENE)-1,3-PENTA	:
DIPENYL*-BENZOTHAZOLIUM IODIDE-	: EK.
ETHYLIODOPHENYLUNDECANOATE -	: X.
2-@N-ETHYL-PARA-(6-METHOXY-2-BENZONTHIAZOYL) AZO*ANILINO	:
@ETHANOL-	: TRC.
DL-13B-ETHYL-3-METHOXY-8,14-SECOGONA-1,3,5(10),9(11)-TET	:
RAENE-14,17-DIONE -	: WYT.
N-ETHYL-N-(BETA-METHYLSULFONAMIDOETHYL)-META-TOLUIDINE -	: ABB, X.
N-ETHYL-1-NAPHTHYLAMINE-	: DUP.
ALPHA-ETHYL-3-NITROCINNAMIC ACID -	: SDW.
1-ETHYL-7-NITRO-1,2,3,4-TETRAHYDRO-2,2,4-TRIMETHYLGUINOL	:
INE -	: EKT.
PARA-ETHYLPHENOL -	: ACY.
N-ETHYL-N-PHENYLBENZYLAMINE-	: DUP, SDH.
1-ETHYL-1,2,3,4-TETRAHYDRO-2,2,4-TRIMETHYLGUINOLINE-	: EKT.
6-ETHYL-1,2,3,4-TETRAHYDRO-1,1,4,4-TETRAMETHYL-NAPHTHALE	:
NE-	: GIV.
ETHYL TOLUENE-	: DOW.
N-ETHYL-PARA-TOLUENESULFONAMIDE-	: NES.
N-ETHYL-META-TOLUIDINE -	: DUP.
N-ETHYL-ORTHO-TOLUIDINE-	: DUP.
2-(N-ETHYL-META-TOLUIDINO) ETHANOL-	: EKT, TCH.
3-(N-ETHYL-META-TOLUIDINO) PROPIONITRILE-	: DUP, TCH.
ALPHA-(N-ETHYL-META-TOLUIDINO)-META-TOLUENESULFONIC ACID	: GAF.
ORTHO-FORMYLBENZENESULFONIC ACID (ORTHO-SULFOBENZALDEH	:
YDE)-	: SDH.
FURAN-	: PLC, QKO.
FURFURYL ALCOHOL -	: QKO.
2,2'-(META-CHLOROPHENYL) IMINO*DIETHANOL -	: EKT, TCH.
HEXABROMOBENZENE -	: VEL.
HEXACHLOROBENZENE-	: DVC.
HEXACHLOROCYCLOPENTADIENE-	: VEL, X.
1,4,5,6,7,7-HEXACHLORO-5-NORBORNENE-2,3-DICARBOXYLIC ACI	:
D -	: X.
1,4,5,6,7,7-HEXACHLORO-5-NORBORNENE-2,3-DICARBOXYLIC ANH	:
YDRIDE (CHLORENDIC ANHYDRIDE) -	: VEL.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
HEXAHYDRO-1-METHYL-4-PHENYL-1H-AZEPINE-4-CARBONITRILE-	WYT.
HEXAMETHYLENIMINE-	CEL, DUP.
HIPPURIC ACID-	SFS.
PARA-HYDRAZINOBENZENESULFONIC ACID	GAF, STG.
HYDRAZOBENZENE	LAK.
@HYDROQUINONE, TECH.	CRS, EKT, GYR.
3'-HYDROXYACETOPHENONE	SDH.
6'-HYDROXY-META-ACETOTOLUIDIDE	TRC.
03 BETA-HYDROXYANDROST-5-EN-17-ONE-PARA-*BIS-(2-CHLOROET HYL)-AMINOPHENYL*ACETATE-	X.
PARA-HYDROXYBENZALDEHYDE	DOW.
PARA-HYDROXYBENZENESULFONIC ACID	PRD, UPF.
PARA-HYDROXYBENZOIC ACID	HN.
3'-HYDROXY-2-(N-BENZYL-N-METHYLAMINO) ACETOPHENONE HYDROC HLORIDE	SDW.
ALPHA-HYDROXY-ALPHA-ALPHA-BIS (PARA-HYDROXYPHENYL) -ORTHO-	
TOLUENESULFONIC ACID, GAMMA-SULTONE	EK.
N-HYDROXY-5-ENDO-CIS-NONBORNENE-2,3-DICARBOXIMIDE-	X.
4'- (2-HYDROXYETHOXY) ACETANILIDE-	GAF.
META- (BETA-HYDROXYETHOXY) PHENOL-	BJL.
ORTHO- (BETA-HYDROXYETHOXY) PHENOL	BJL.
3-*N- (2-HYDROXYETHYL) ANILINO*PROPIONITRILE	MIL, TCH.
3-*N- (2-HYDROXYETHYL) ANILINO*PROPIONITRILE, ACETATE-	MIL, TCH.
N- (BETA-HYDROXYETHYL) -3,5-DIHYDROXYBENZAMIDE	ABB, WAY.
3-N-2-HYDROXYETHYL-META-TOLUIDINE-PROPIONITRILE-	DUP.
N-*7-HYDROXY-8- (2-HYDROXY-5-METHYLSULFAMAYL) PHENYLAZO*-1 -NAPHTHYL ACETAMIDE	TRC.
6'-HYDROXY-5'-(2-HYDROXY-5-NITROPHENYL) AZO*-META-ACETOT OLUIDIDE-	TRC.
4-HYDROXYMETANILAMIDE-	DUP, TRC.
4-HYDROXYMETANILANILIDE-	TRC.
4-HYDROXYMETANILIC ACID-	TRC.
3-HYDROXY-2-METHYLCINCHONINIC ACID	GAF, TRC.
4-HYDROXY-N1/-METHYLMETANILAMIDE	TRC.
3-HYDROXY-N- (3-N-MORPHOLINOPROPYL) -2-NAPHTHAMIDE	FMT, WAY.
7-HYDROXY-1,3-NAPHTHALENEDISULFONIC ACID	DUP, TRC.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
3-HYDROXY-2,7-NAPHTHALENEDISULFONIC ACID, DISODIUM SALT	: ACY, TRC.
7-HYDROXY-1,3-NAPHTHALENEDISULFONIC ACID, DISODIUM SALT	: ACY.
6-HYDROXY-2-NAPHTHALENESULFONIC ACID, SODIUM SALT - - -	: ACY, TRC.
8-HYDROXY-1-NAPHTHALENESULFONIC ACID, GAMMA-SULTONE- - -	: TRC.
3-HYDROXY-2-NAPHTHOIC ACID - - - - -	: ACY, PCW.
1-(2-HYDROXY-1-NAPHTHYAZO)-6-NITRO-2-NAPHTHOL-4-SULFONIC	:
ACID - - - - -	: TRC.
N-(7-HYDROXY-1-NAPHTHYL) ACETAMIDE- - - - -	: TRC.
2-HYDROXY-5-NITROMETANILIC ACID- - - - -	: TRC.
1-(2-HYDROXY-4-NITROPHENYLAZO)-2-HYDROXYNAPHTHALENE- - -	: TRC.
1-HYDROXY-6-OCTADECYLOXY-2-NAPTHOIC ACID - - - - -	: ARA.
2-HYDROXY-4-NORMAL-OCTOXYBENZOPHENONE- - - - -	: ACY, CCW.
2-HYDROXY-4-SULFO-1-NAPHTHALENEDIAZONIUM HYDROXIDE, INNE	:
R SALT- - - - -	: ACY.
1-HYDROXY-4-PARA-TOLUIDINOANTHRAQUINONE- - - - -	: HSH.
2-IMIDAZOLIDINONE- - - - -	: VAL.
1,1'-IMINOBIS*4-AMINOANTHRAQUINONE*- - - - -	: ACY, TRC.
1,1'-IMINOBIS*4-BENZAMIDOANTHRAQUINONE*- - - - -	: ACY.
1,1'-IMINOBIS*4-NITROANTHRAQUINONE*- - - - -	: ACY, TRC.
1,1'-IMINODIANTHRAQUINONE- - - - -	: ACY.
2-INDOLECARBOXYLIC ACID- - - - -	: ARA.
INDOLE-2,4-DIONE - - - - -	: DUP, TRC.
2-IODACETAMIDO-5-CHLOROBENZOPHENONE- - - - -	: WYT.
2-IODOTHIOPHENE- - - - -	: EK.
ISOBUTYLBENZENE- - - - -	: PLC, TNA (E).
@ ISOCYANIC ACID DERIVATIVES:	:
BITOLYLENE DIISOCYANATE- - - - -	: CWN, UPJ.
DIPHENYLMETHANE 4,4'-DIISOCYANATE- - - - -	: MOB (E), UPJ.
TRIS (2-ISOCYANATE-PARA-TOLYL ISOCYANATE) - - - - -	: DUP.
PHENYLISOCYANATE - - - - -	: MOB (E), UPJ.
@ POLYMETHYLENE POLYPHENYLISOCYANATE - - - - -	: JCC, MOB (E), RUC, UPJ.
TOLUENE 2,4-DIISOCYANATE - - - - -	: DUP, MOB (E).
TRIMERS OF TOLUENE 2,4 AND 2,6 DIISOCYANATE- - - - -	: DUP.
TOLUENE 2,4-AND 2,6-DIISOCYANATE (65/35 MIXTURE) - - -	: DUP, MOB (E).
@ TOLUENE 2,4-AND 2,6-DIISOCYANATE (80/20 MIXTURE) - - -	: ACS, BAS, DOW, DUP, MOB (E), OMC, RUC, UCC.
@ ISOCYANIC ACID DERIVATIVES, ALL OTHER- - - - -	: CWN, DOW, DUP, MOB (E).

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
2-ISONITROSOACETANILIDE- - - - -	DUP.
ISOOCYLPHENOL - - - - -	PRD.
ISOPHTHALIC ACID - - - - -	ACC, ATR.
ISOPHTHALIC ACID, DIALLYL ESTER- - - - -	FMP (E) .
ISOPHTHALIC ACID, DIPHENYL ESTER- - - - -	BJL.
ISOPHTHALONITRILE- - - - -	SW (E) .
ISOPHTHALOYL CHLORIDE- - - - -	DUP.
N-ISOPROPYLANILINE - - - - -	USR.
4,4'-ISOPROPYLIDENE BIS*2,6-DIBROMOPHENOL* (TETRABROMOBIS PHENOL A) - - - - -	DOW.
5,5'-ISOPROPYLIDENE BIS(2-HYDROXY-META-XYLENE-ALPHA,ALPHA '-DIOL) - - - - -	ARK.
@4,4'-ISOPROPYLIDENEDIPHENOL (BISPHENOL A)-----	DOW, GE, SHC, UCC.
4,4'-ISOPROPYLIDENEDIPHENOL, ETHOXYLATED - - - - -	ICI.
4,4'-ISOPROPYLIDENEDIPHENOL, PROPOXYLATED- - - - -	ICI.
ORTHO-ISOPROPYLPHENOL- - - - -	TNA (E) .
ISOPROPYLPHENOL, MIXED - - - - -	FMP (E) .
4-ISOPROPYL-META-PHENYLENEDIAME- - - - -	DUP.
LEUCO QUINIZARIN - - - - -	TRC.
2,4-LUTIDINE - - - - -	KPT.
3,4-LUTIDINE - - - - -	KPT, UCC.
MANDELONITRILE - - - - -	KF.
@MELAMINE - - - - -	ACS, ACY, MLC.
PARA-MENTHA-1,4 (8) -DIENE - - - - -	GIV.
@DL-PARA-MENTHA-1,8-DIENE- - - - -	ARZ, GIV, HPC, NCI.
PARA-MENTH-1-ENE (CARVOMENTHENE) - - - - -	GIV.
ORTHO-MERCAPTOBENZOIC ACID - - - - -	AMB.
@METANILIC ACID - - - - -	ACY, DUP, MRA, TRC.
2-METHOXY-5-ACETAMINO-N,N-BIS (ACETOXYETHYL) ANILINE - - - - -	HST.
4'-METHOXY-2- (PARA-METHOXYPHENYL) ACETOPHENONE- - - - -	ARA.
METHOXYMETHYLOIPHENYL OXIDE- - - - -	SFS.
N- (2-METHOXY-1-NAPHTHYL) ACETAMIDE- - - - -	TRC.
(PARA-METHOXYPHENYL) ACETIC ACID- - - - -	UOP.
6-METHOXYQUINOLINE - - - - -	DUP.
METHYLACETOACETICESTER ENAMINE OF D-2-AMINO-2- (1,4-CYCLO HEXADIENYL) ACETIC ACID, SODIUM SALT - - - - -	TRD.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
1-(METHYLAMINO) ANTHRAQUINONE - - - - -	: AC (E) , ACY.
1-(METHYLAMINO)-4-PARA-TOLUIDINOANTHRAQUINONE- - - - -	: VPC.
2-(N-METHYLANILINO) ETHANOL - - - - -	: MIL, TCH.
3-(N-METHYLANILINO) PROPIONITRILE - - - - -	: DUP, MIL.
5-METHYL-ORTHO-ANISIDINE *NH/2=1*- - - - -	: SW (E) .
5-METHYL-ORTHO-ANISIDINESULFONIC ACID- - - - -	: ACS.
META-METHYLANISOLE - - - - -	: GIV.
2-METHYLANTHRAQUINONE- - - - -	: ACY.
3-METHYLBENZO*P*QUINOLINE- - - - -	: ACY.
2-METHYLBENZOTHAZOLE- - - - -	: FMT.
N-METHYLBENZYLAMINE- - - - -	: MLS, SDW.
META-METHYLBENZYLPIPERAZINE- - - - -	: PFZ.
METHYL BIPHENYL- - - - -	: DOW.
3-METHYLCHOLANTHRENE - - - - -	: EK.
1-METHYL-4-(3-CHLOROPROPYL)-PIPERAZINE HYDROCHLORIDE - - - - -	: SK.
METHYLCYCLOHEXANE- - - - -	: PLC.
METHYLCYCLOPENTADIENE- - - - -	: ENJ (E) .
N-METHYLDICYCLOHEXYLAMINE- - - - -	: ABB.
4,4'-METHYLENEBIS*2-CHLOROANILINE* - - - - -	: APO, DUP.
4,4'-METHYLENEBIS*N,N-DIETHYLANILINE*- - - - -	: ACY, TRC.
4,4'-METHYLENEBIS*N,N-DIMETHYLANILINE* (METHANE BASE)- - - - -	: ACY, DUP, SDH.
@4,4'-METHYLENEDIANILINE- - - - -	: ACS, DOW, DUP, MOB (E) , RUC.
5,5'-METHYLENEDISALICYLIC ACID - - - - -	: HN.
METHYLHYDROQUINONE - - - - -	: EKT.
2-METHYLINDOLE-3-CARBOXALDEHYDE- - - - -	: GAP.
6-METHYL-2-(2-METHYL-6-QUINOLYL)-7-BENZOTHAZOLE SULFONIC ACID- - - - -	: DUP.
N-METHYL-PARA-NITROANILINE - - - - -	: ACY, EK.
5-METHYL-4-NITRO-ORTHO-ANISIDINE - - - - -	: PCW.
4-METHYL-2-NITROANISOLE- - - - -	: SW (E) .
2-METHYL-5-NITROIMIDAZOLE- - - - -	: RDA.
2-METHYL-5-NORBORNENE-2,3-DICARBOXYLIC ANHYDRIDE - - - - -	: VEL.
5-METHYL-5-NORBORNENE-2,3-DICARBOXYLIC ANHYDRIDE - - - - -	: ACS.
META-(3-METHYL-5-OXO-2-PYRAZOLIN-1-YL) BENZENESULFONIC ACID- - - - -	: TRC, VPC.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
PARA-(3-METHYL-5-OXO-2-PYRAZOLIN-1-YL)BENZENESULFONIC ACID	ACY, GAP, TRC.
3-(3-METHYL-5-OXO-2-PYRAZOLIN-1-YL)-1,5-NAPHTHALENEDISULFONIC ACID	TRC.
4-(3-METHYL-5-OXO-2-PYRAZOLIN-1-YL)-META-TOLUENESULFONIC ACID *SO/3H=1*	TRC.
1-METHYL-4-PHENYLISONIPECOTIC ACID	SDW, WYT.
1-METHYL-4-PHENYL-4-PIPERIDINE CARBONITRILE	WYT.
@3-METHYL-1-PHENYL-2-PYRAZOLIN-5-ONE	ACY, DUP, SDH.
4'-*(4-METHYL-2-PYRIMIDINYL) SULFAMOYL*ACETANILIDE	DUP.
1-METHYLPYRROLE	PCW.
@ALPHA-METHYLSTYRENE	ACS, CLK, DOW, GP, SKO, UCC, USS.
AR-METHYLSTYRENE	DOW.
2-(METHYLSULFONYL)-4-NITROANILINE	TRC.
1,5-NAPHTHALENEDISULFONIC ACID	DUP.
2,7-NAPHTHALENEDISULFONIC ACID	TRC.
1-NAPHTHALENESULFONIC ACID	TRC.
2-NAPHTHALENESULFONIC ACID	ACY.
1-NAPHTHALENESULFONIC ACID, SODIUM SALT	TRC.
2-NAPHTHALENESULFONIC ACID, SODIUM SALT	ACY.
1,4,5,8-NAPHTHALENETETRACARBOXYLIC ACID	TRC.
NAPHTHALIMIDE	ACS.
1-NAPHTHOL	UCC.
2-NAPHTHOL, TECH.	ACY.
NAPHTH*1,2-D**1,2,3*OXADIAZOLE-5-SULFONIC ACID	TRC.
1-NAPHTHYLAMINE	DUP.
PARA-(2-NAPHTHYLAMINO) PHENOL (N-(PARA-HYDROXYPHENYL)-2-NAPHTHYLAMINE)	SDC.
(2-NAPHTHYLTHIO)ACETIC ACID	ACY.
NICOTINONITRILE	NEP.
@3'-NITROACETANILIDE	DUP, EKT, TRC.
4'-NITROACETANILIDE	GAP, TRC.
3'-NITRO-PARA-ACETANISIDE	EKT.
4'-NITRO-ORTHO-ACETANISIDIDE	DUP.
3'-NITROACETOPHENONE	SDH.
META-NITROANILINE	X.
ORTHO-NITROANILINE	BUC, MON.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
PARA-NITROANILINE - - - - -	MON, X (E) .
2-NITRO-PARA-ANISIDINE *NH/2=1* - - - - -	DUP.
4-NITRO-ORTHO-ANISIDINE *NH/2=1* - - - - -	DUP.
ORTHO-NITROANISOLE - - - - -	DUP.
PARA-NITROANISOLE - - - - -	DUP.
5-NITROANTHRANILIC ACID - - - - -	TRC.
1-NITROANTHRAQUINONE - - - - -	ACY, TRC.
META-NITROBENZALDEHYDE - - - - -	SDH.
9-NITROBENZENE - - - - -	ACY, DUP, FST, RUC.
META-NITROBENZENESULFONIC ACID - - - - -	ACY, DUP.
META-NITROBENZENESULFONIC ACID, SODIUM SLAT- - - - -	MRA.
PARA-NITROBENZYL BROMIDE - - - - -	DUP.
4-(PARA-NITROBENZYL) PYRIDINE - - - - -	EK.
META-NITROBENZOIC ACID - - - - -	SAL.
PARA-NITROBENZOIC ACID - - - - -	DUP.
META-NITROBENZOIC ACID, SODIUM SALT- - - - -	SAL.
4'-NITRO-4-BIPHENYLCARBOXYLIC ACID - - - - -	DUP.
2-NITRO-PARA-CRESOL - - - - -	SW (E) .
NITRODIPHENYLAMINE - - - - -	ACY, MON.
5-NITROISOPHTHALIC ACID - - - - -	SAL.
1-NITRONAPHTHALENE - - - - -	DUP.
3-NITRO-1,5-NAPHTHALENEDISULFONIC ACID - - - - -	TRC.
7 (AND 8) -NITRONAPHTH*1,2-D*1,2,3*OXADIAZOLE-5-SULFONIC ACID - - - - -	GAF, TRC.
ORTHO-NITROPHENOL - - - - -	DUP, MON.
PARA-NITROPHENOL - - - - -	DUP, MON.
4'-(PARA-NITROPHENYL) ACETOPHENONE - - - - -	ASH, DUP.
2-(ORTHO-NITROPHENYLAZO)-4,6-DI-TERT-AMYLPHENOL (OH=1) - - - - -	TRC.
4-NITRO-ORTHO-PHENYLENEDIAMINE - - - - -	ASH, FMT.
(PARA-NITROPHENYL) HYDRAZINE - - - - -	EK.
2-(PARA-NITROPHENYL)-2H-NAPHTHO*1,2-D*TRIAZOLE-6,8-DISUL FONIC ACID - - - - -	TRC.
4-NITROSO-N-ETHYL-N-(BETA-METHYLSULFONAMIDOETHYL)-META-T OLUIDINE - - - - -	ABB, X.
PARA-NITROSOPHENOL - - - - -	ACY, SDC.
BETA-NITROSTYRENE - - - - -	CWN.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
4-NITRO-4'-(5-SULFO-2H-NAPHTHO*1,2-D*TRIAZOL-2-YL)-2,2'-	:
STILBENEDISULFONIC ACID - - - - -	: TRC.
3-NITRO-PARA-TOLUAMIDE - - - - -	: SDH.
META-NITROTOLUENE- - - - -	: DUP, FST.
ORTHO-NITROTOLUENE - - - - -	: DUP, FST.
PARA-NITROTOLUENE- - - - -	: DUP, FST.
NITROTOLUENE MIXTURES- - - - -	: DUP, FST.
PARA-NITROTOLUENE-ORTHO-SULFONIC ACID- - - - -	: CGY (E).
@5-NITRO-ORTHO-TOLUENESULFONIC ACID *SO/3H=1* - - - - -	: ACY, DUP, GAF, SDH.
3-NITRO-PARA-TOLUENESULFONIC ACID *SO/3H=1*- - - - -	: TRC.
3-NITRO-PARA-TOLUIC ACID, METHYL ESTER - - - - -	: SDH.
5-NITRO-ORTHO-TOLUIDINE *NH/2=1* - - - - -	: PCW.
2-NITRO-PARA-TOLUIDINE *NH/2=1*- - - - -	: SW (E).
4-NITRO-META-XYLENE- - - - -	: DUP.
NONYL-DINONYLPHENOL, MIXTURE - - - - -	: USR.
@NONYLPHENOL- - - - -	: GAF, JCC, KLM, MCB (E), MON, PRD, RH, SCN, UCC.
OCTYLPHENOL- - - - -	: RH, SCN.
OXANILIDE- - - - -	: EK.
@1-(7-OXO-7H-BENZ*DE*ANTHRACENE-3-YL) AMINO*-ANTHRAQUINON	:
E - - - - -	: ACY, DUP, TRC.
1,1'-(7-OXO-7H-BENZ*DE*ANTHRACEN-3,9-YLENE)-DIIMINO*DIA	:
NTHRAQUINONE- - - - -	: TRC.
5-OXO-1-PHENYL-2-PYRAZOLINE-3-CARBOXYLIC ACID, ETHYL EST	:
ER- - - - -	: STG.
5-OXO-1-(PARA-SULFOPHENYL)-2-PYRAZOLINE-3-CARBOXYLIC ACI	:
D - - - - -	: ACY, HST, STG, VPC.
4,4'-OXYDIANILINE- - - - -	: DUP.
PENTABROMOCHLOROCYCLOHEXANE- - - - -	: DOW.
PENTACHLOROPYRIDINE- - - - -	: DOW.
1,1,3,3,5-PENTANETHYLINDAN - - - - -	: GIV.
ORTHO-PENTYLPHENOL - - - - -	: PAS.
PARA-TERT-PENTYLPHENOL - - - - -	: EK, PAS.
3,4,9,10-PERYLENETETRA-CARBOXYLIC-3,4:9,10-DIIMIDE- - - - -	: ACS.
2-PHENETHYLAMINE - - - - -	: MLS.
ALPHA-PHENETHYLAMINE - - - - -	: MLS.
PARA-PHENETIDINE - - - - -	: MON.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@PHENOL:	
NATURAL:	
FROM COAL TAR:	
NATURAL PHENOL FROM COAL TAR, 39 DEGREES C., M.P.	: PRD.
NATURAL PHENOL FROM COAL TAR, ALL OTHER-	: KPT, SW(E).
FROM PETROLEUM:	
NATURAL PHENOL FROM PETROLEUM, ALL OTHER - - - -	: MER, PRD.
SYNTHETIC:	
SYNTHETIC PHENOL BY CAUSTIC FUSION, U.S.P. - - - -	: RCI, TOC.
@SYNTHETIC PHENOL FROM CUMENE BY OXIDATION, U.S.P.- -	: ACS, CLK, DOW, GP, MON, SHC, SOC, UCC, USS.
PHENOL FROM TOLUENE BY OXIDATION U.S.P.- - - -	: KLM.
PHENOLSULFONAPHTHALEIN, SODIUM SALT- - - - -	: EK.
PHENOLSULFONIC ACID, LITHIUM SALT- - - - -	: SAL.
PHENOXYACETIC ACID, SODIUM SALT- - - - -	: SAL, SFS.
ORTHO-PHENOXYMETHYLBENZOIC ACID- - - - -	: PFZ.
PHENYLACETIC ACID- - - - -	: SFS.
PHENYLACETIC ACID, ETHYL ESTER, TECH.- - - - -	: OPC, SFS.
PHENYLACETIC ACID, POTASSIUM SALT- - - - -	: OPC, SFS.
PHENYLACETIC ACID, SODIUM SALT - - - - -	: OPC, SFS.
PHENYLACETONITRILE - - - - -	: OPC, SFS, UOP.
4'-PHENYLACETOPHENONE- - - - -	: DUP.
PARA-PHENYLAZOANILINE (C.I. SOLVENT YELLOW 1) AND HYDR	:
OCHLORIDE - - - - -	: ACY, DUP.
4- (PHENYLAZO) DIPHENYLAMINE - - - - -	: EK.
ALPHA-PHENYL-ORTHO-CRESOL- - - - -	: RBC.
META-PHENYLENEDIAMINE- - - - -	: DUP.
ORTHO-PHENYLENEDIAMINE - - - - -	: DUP, SW(E), TRC.
PARA-PHENYLENEDIAMINE- - - - -	: DUP, SDC.
D-PHENYLEPHRINE- - - - -	: SDW.
DL-PHENYLEPHRINE BASE- - - - -	: SDW.
PHENYL ETHER - - - - -	: DOW.
D(-)-PHENYLGLYCINE - - - - -	: OTC(E).
D(-)-2-PHENYLGLYCINE - - - - -	: DUP, KF, UPJ.
D(-)-2-PHENYLGLYCINE POTASSIUM ETHYL DANE SALT - - - -	: UPJ.
DL-2-PHENYLGLYCINE - - - - -	: KF, OTC(E).
D(-)-2-PHENYLGLYCINE CHLORIDE HYDROCHLORIDE- - - - -	: KF, OTC(E), UPJ.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
PHENYLGLYCINE, SODIUM SALT - - - - -	LIL.
N-PHENYLGLYCINE, SODIUM AND POTASSIUM SALTS- - - - -	ACS.
5-PHENYLHYDANTOIN- - - - -	ABB.
@ 2,2'-(PHENYL) IMINO*DIETHANOL- - - - -	EKI, MIL, TCH.
PHENYLMALONIC ACID, DIETHYL ESTER- - - - -	SFS.
PHENYLMALONIC ACID - - - - -	X.
3-PHENYL-5-METHYLISOXAZOLE-4-CARBONYL CHLORIDE - - - - -	ARS.
N-PHENYL-2-NAPHTHYLAMINE - - - - -	DUP.
ORTHO-PHENYLPHENOL - - - - -	DOW, RCI.
PARA-PHENYLPHENOL- - - - -	DOW.
ORTHO-PHENYLPHENOL, CHLORINATED- - - - -	DOW.
ORTHO-PHENYLPHENOL, SODIUM SALT- - - - -	DOW.
N-PHENYL-PARA-PHENYLENEDIAMINE - - - - -	USR.
PHENYLPHOSPHINIC ACID- - - - -	SFS.
PHENYLPHOSPHONOTHIOIC DICHLORIDE - - - - -	SFA.
PHENYLPHOSPHOROUS DICHLORIDE - - - - -	SFA.
1-PHENYL-1,2-PROPANEDIONE, 2-OXIME - - - - -	ORT.
PHENYL-2-PROPANONE - - - - -	ORT, SK.
1-PHENYL-3-PYRAZOLIDINONE- - - - -	EK.
PHENYL SALICYLATE- - - - -	DOW.
4-PHENYLSULFINYL-1,2-PHENYLENEDIAMINE- - - - -	ARA.
PHENYLUNDECANOIC ACID- - - - -	EK.
1(2H)-PHTHALAZINONE- - - - -	SDH.
PHTHALIC ACID- - - - -	EK.
PHTHALIC ACID, DIALLYL ESTER - - - - -	FMP(E).
@PHTHALIC ANHYDRIDE - - - - -	ACS, BAS, ENJ(E), HK, KPT, MON, PTO, SOC, STP, USS.
PHTHALIMIDE- - - - -	SW(E).
*PHTHALOCYANINATO (2-)*COPPER - - - - -	DUP.
PHTHALOYL CHLORIDE - - - - -	DUP, MON.
PICOLINES:	
@ 2-PICOLINE (ALPHA PICOLINE)-----	KPT, RIL(E), UCC.
3-PICOLINE - - - - -	NEP, RIL(E).
4-PICOLINE - - - - -	NEP, RIL(E), UCC.
PICOLINE - - - - -	KPT.
3-PICOLYLAMINE - - - - -	RIL(E).
PICRIC ACID- - - - -	SDC.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ PIPERIDINE - - - - -	ABB, DUP, RIL(E).
3-PIPERIDINOPROPIOPHENONE HYDROCHLORIDE- - - - -	ACY.
POLYCHLOROBENZENE- - - - -	DOW.
POLYCHLOROBIPHENYL - - - - -	MON.
POLYETHYLBENZENE - - - - -	ELP, UCC.
PROPIOPHENONE- - - - -	ORT, UOP.
8,16-PYRANTHRENE DIONE- - - - -	TRC.
PYRIDINE, REFINED:	
PYRIDINE, REFINED ALL OTHER GRADES - - - - -	KPT.
2 DEGREE PYRIDINE, REFINED - - - - -	KPT, NEP.
PYRIDINE HYDROCHLORIDE - - - - -	EK.
3-PYRIDINEMETHANOL - - - - -	RIL(E).
2-PYRIMIDINOL- - - - -	CGY(E).
2-PYRROLIDINONE- - - - -	GAF.
QUINALDINE - - - - -	ACS, ACY.
QUINOLINE:	
QUINOLINE, 1 DEGREE AND 2 DEGREE - - - - -	KPT.
QUINOLINE, OTHER GRADES (SPECIFY)- - - - -	KPT.
QUINOPHTHALONE - - - - -	ACS.
RESORCINOL, TECH,- - - - -	KPT.
BETA-RESORCYLIC ACID - - - - -	HST, KPT.
@ SALICYLALDEHYDE- - - - -	DOW, RDA, SHC.
SALICYLALDEHYDE OXIME- - - - -	EK.
SALICYLIC ACID, AMMONIUM CHROMIUM COMPLEX- - - - -	TRC.
@ SALICYLIC ACID, TECH.- - - - -	DOW, HN, MON, SDH.
SALICYLIDENEAMINOGUANIDINE OLEATE- - - - -	DUP.
SULFANILIC ACID (PARA-AMINOBENZENESULFONIC ACID) AND SA : LT- - - - -	ACY.
4-SULFOANTHRANILIC ACID- - - - -	TRC.
4,4'-SULFONYLDIPHENOL- - - - -	UPF.
4-SULFOPHTHALIC ACID - - - - -	CWN, HSC.
TEREPHTHALIC ACID- - - - -	ACC, DUP, SDH.
@ TEREPHTHALIC ACID, DIMETHYL ESTER- - - - -	ACC, DUP, EKT, HPC, HST.
TEREPHTHALOYL CHLORIDE - - - - -	DUP.
TEREPHTHALOYLDIACETIC ACID, DIETHYL ESTER- - - - -	PCW.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
TERPHENYL (PHENYLBIPHENYL) (META-, ORTHO-, AND PARA-ISOMERS)	MON.
TETRABROMOPHTHALIC ANHYDRIDE	VEL.
1,4,5,8-TETRACHLOROANTHRAQUINONE	DUP.
1,2,4,5-TETRACHLOROBENZENE	DOW.
1,2,4,5-TETRACHLORO-3-NITROBENZENE	SDH.
TETRACHLOROPYRIDINE	ABB, DOW.
TETRACHLOROPHTHALICANHYDRIDE	ABB, X.
TETRAHYDROFURAN	GAF, QKO.
TETRAHYDROFURFURYL DIMETHACRYLATE	SAR.
1,4,5,8-TETRAHYDROXYANTHRAQUINONE, LEUCO DERIVATIVE	TRC.
1,2,4,5-TETRAMETHYLBENZENE	SNI(E).
PARA-(1,1,3,3-TETRAMETHYLBUTYL) PHENOL	GAF.
N,N,N',N'-TETRAMETHYL-PARA-PHENYLENEDIAMINE, DIHYDROCHLORIDE	EK.
2-(2-THENYLAMINO) PYRIDINE	ABB.
THIANTHRENE	X.
2-THIOPHENECARBOXALDEHYDE	ABB.
THIOPHENOL	SPA.
SYM-THYMOL	GIV, KPT.
o-TOLUENE-2,4-DIAMINE	ACS, ACY, DUP, OMC, RUC, UCC.
PARA-TOLUENESULFINIC ACID, SODIUM SALT	NES.
PARA-TOLUENESULFONAMIDE	MON.
o-THO(AND PARA)-TOLUENESULFONIC ACID	MON, UPP.
PARA-TOLUENESULFONIC ACID	NES, TEN.
PARA-TOLUENESULFONIC ACID MONOHYDRATE	UPP.
PARA-TOLUENESULFONYL CHLORIDE	MON.
TOLUENESULFONYL FLUORIDE	EK.
PARA-TOLUIC ACID	SPS.
PARA-TOLUIC ACID, METHYL ESTER	DUP.
META-TOLUIDINE	DUP.
ORTHO-TOLUIDINE	DUP, PST.
PARA-TOLUIDINE	DUP.
TOLUIDINES, MIXED	DUP.
2-ORTHO-TOLUIDINOETHANOL	TCH.
ORTHO-TOLUIDINOMETHANESULFONIC ACID	TRC.

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
4-(ORTHO-TOLYLAZO)-ORTHO-TOLUIDINE (C.I. SOLVENT YELLOW 3)	ACY, ALL, DUP.
1-PARA-TOLYLDODECANE	X.
PARA-TOLYLHYDROQUINONE	X.
2,2'-(META-TOLYLIMINO) DIETHANOL	EKT, MIL, TCH.
TOLYLTRIAZOLE	SW(E).
2,3,6-TRIAMINO-5-NITROSO PYRIMIDINE	SK.
N,N,N-TRIBENZYLAMINE	MLS.
3,4',5-TRIBROMOSALICYLANILIDE	PCW.
2,4,6-TRICHLOROANALINE	UPJ.
2,4,6-TRICHLOROANILINE	CWN.
1,2,3 (AND 1,2,4)-TRICHLOROBENZENE	PPG.
1,2,4-TRICHLOROBENZENE	DOW, X.
2,4,5-TRICHLOROBENZENESULFONIC ACID, SODIUM SALT	X.
1,1,1-TRICHLORO-2,2-DIPHENYLETHANE	CWN.
1,2,4-TRICHLORO-5-NITROBENZENE	ALL, PCW.
TRICHLOROPHENYLSILANE	DCC.
ALPHA, ALPHA, ALPHA-TRICHLOROTOLUENE	HK, VEL.
ALPHA, 2, 4-TRICHLOROTOLUENE	HN.
2,4,6-TRICHLORO-S-TRIAZINE	CGY(E), NIL.
ALPHA, ALPHA', ALPHA''-TRIS(DIMETHYLAMINO) MESITOL	RH.
4-4-TRIFLUORO-1-TRIFLUOROMETHYL-ETHYLIDENE-DIPHENOL	DUF.
TRIMESIC ACID	AMB.
1,2,4-TRIMETHYLBENZENE	SNT(E).
1,3,5-TRIMETHYLBENZENE	SNT(E).
3,3,5-TRIMETHYLCYCLOHEXANOL (META-HOMOMENTHOL)	ARS.
2,3,3-TRIMETHYL-3H-INDOLE	GAF, VPC.
1,3,3-TRIMETHYL-2-METHYLENEINDOLINE	DUP, GAF, VPC.
TRIMETHYLPHENYLAMMONIUM CHLORIDE	X.
TRIMETHYLPHENYLAMMONIUM IODIDE	EK, TRC.
2,4,6-TRIMETHYLPYRIDINE	KPT.
2,4,7-TRINITROFLUOREN-9-ONE	WAY.
1,3,3-TRIMETHYL-DELTA2/, ALPHA-INDOLINEACETALDEHYDE	DUP, GAF, TRC, VPC.
TRIPHENYLMETHANE	EK.
2,4,6-TRIPROPOXYBENZALDEHYDE	X.
TRIS(2-METHYL-1-AZIRIDINYL) PHOSPHINE OXIDE	ARS.

CYCLIC INTERMEDIATES

TABLE 2.--CYCLIC INTERMEDIATES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

CYCLIC INTERMEDIATES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
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	:
	:
	:
2,4,6-TRI-NORMAL-PROPOXYBENZALDEHYDE - - - - -	: CWN.
TRI-NORMAL-PROPOXYBENZALDEHYDE - - - - -	: CWN.
@7,7'-UREYLENEBIS*4-HYDROXY-2-NAPHTHALENESULFONIC ACID* -	: DUP, GAP, TRC.
PARA-VINYLBENZENESULFONIC ACID, SODIUM SALT- - - - -	: DUP.
5-VINYI-2-PICOLINE - - - - -	: PLC.
2-VINYLPYRIDINE- - - - -	: RIL (E) .
4-VINYLPYRIDINE- - - - -	: RIL (E) .
VINYLTOLUENE (POSTASOL)- - - - -	: PG.
VIOLANTHRONE - - - - -	: ACS, DUP, TRC.
XANTHENE-9-CARBOXYLIC ACID - - - - -	: MAL.
XYLENESULFONIC ACID, MIXED ISOMERS - - - - -	: NES.
2,6-XYLENOL- - - - -	: GE, KPT.
XYLIDINES:	:
2,6-XYLIDINE - - - - -	: DUP.
2,4-XYLIDINE - - - - -	: DUP.
XYLIDINE, ORIGINAL MIXTURE - - - - -	: DUP.
4-(2,5-XYLYLAZO)-ORTHO-TOLUIDINE - - - - -	: ACY.
@CYCLIC INTERMEDIATES, ALL OTHER- - - - -	: ABB, ACS, ACY, ALD, ALL, ARS, CWN, DOW, DUP, EK, EKT, : HST, ICI, KP, LEM, LIL, MLS, OPC, PCW, PD, PFZ, PIT, : PRD, PTT, RH, SDC, SDH, SDW, STC, SW(E), TCC, TCH, : UCC, UCC, UPJ, UPJ, USR, VAL, VEL, VPC, VTC, WAY, X : X, X, X, X, X, X.

TABLE 3.--CYCLIC INTERMEDIATES: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production or sales of cyclic intermediates to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ABB	Abbott Laboratories	GIV	Givaudan Corp.
AC	American Color & Chemical Corp.	GLY	Glyco Chemicals, Inc.
ACC	Amoco Chemical Corp.	GNT	General Tire & Rubber Co., Chemical/Plastics Div.
ACS	Allied Chemical Corp., Specialty Chemicals Div.	GOC	Gulf Oil Corp., Gulf Oil Co., Chemical Co.-U.S.
ACY	American Cyanamid Co.	GP	Georgia-Pacific Corp., Rebecca Chemical Div.
ADC	Anderson Development Co.	GYR	Goodyear Tire & Rubber Co.
AIP	Air Products & Chemicals, Inc.	HEX	Hexagon Laboratories, Inc.
ALD	Aldrich Chemical Co., Inc.	HK	Hooker Chemicals & Plastics Corp.
ALF	Allied Chemical Corp., Fibers Div.	HN	Tenneco Chemicals, Inc.
ALL	Alliance Chemicals, Inc.	HPC	Hercules, Inc.
AMB	American Bio-Synthetics Corp.	HSC	Chemetron Corp., Pigments Div.
ARA	Araphahoe Chemical, Inc. Sub/Syntex Corp. (U.S.A.)	HSB	Harshaw Chemical Co. Div. of Kewanee Oil Co.
ARK	Armstrong Cork Co.	HST	American Hoechst Corp.: Hoechst Fibers Industries Rhode Island Works
ARS	Arsynco, Inc.	ICC	Inmont Corp.
ARZ	Arizona Chemical Co.	ICI	ICI United States, Inc., Specialty Chemicals Group
ASH	Ashland Oil, Inc., Ashland Chemical Co.	IMC	IMC Chemical Group, Inc.
ASL	Ansul Chemical Co.	JCC	Jefferson Chemical Co., Inc.
ATR	Atlantic Richfield Co.	KF	Kay-Fries Chemicals, Inc.
BAS	BASF Wyandotte Corp.	KIM	Kalama Chemical, Inc.
BJL	Burdick & Jackson Laboratories, Inc.	KPT	Koppers Co., Inc., Organic Materials Div.
BUC	Synalloy Corp., Blackman-Uhler Chemical Div.	LAK	Lakeway Chemicals, Inc.
CCW	Cincinnati Milacron Chemicals, Inc.	LEM	Napp Chemicals, Inc.
CEL	Celanese Corp., Celanese Chemical Co.	LIL	Eli Lilly & Co. and Puerto Rico
CGY	Ciba-Geigy Corp.	MAL	Mallinckrodt Chemical Works
CHL	Chemol, Inc.	MAY	Otto B. May, Inc.
CLK	Clark Chemical Corp.	MCB	Borg-Warner Corp.: Marbon Chemical Div. Weston Chemical Co.
CMG	Nyanza, Inc.	MER	Merichem Co.
CNP	Nipro, Inc.	MIL	Milliken Co., Milliken Chemical Div.
CO	Continental Oil Co.	MLC	Melamine Chemicals, Inc.
CRS	Carus Chemical Co.	MNR	Monroe Chemical Co.
CSD	Cosden Oil & Chemical Co.	MOB	Mobay Chemical Co.
CWN	Upjohn Co., Fine Chemicals Div.	MON	Monsanto Co.
DBC	Dow Badische Co.	MRA	Bostik South, Inc.
DCC	Dow Corning Corp.	MRK	Merck & Co., Inc.
DOW	Dow Chemical Co.	MRT	Morton Chemical Co. Div. of Morton Norwich Products, Inc.
DUP	E.I. duPont de Nemours & Co., Inc.	MTO	Montrose Chemical Corp. of California
DVC	Dover Chemical Corp. Sub of ICC Industries, Inc.	NCI	Union Camp Corp.
EGR	Eagle River Chemical Corp.	NEP	Nepera Chemical Co., Inc.
EK	Eastman Kodak Co.:	NES	Nease Chemical Co., Inc.
EKT	Tennessee Eastman Co. Div.	NIL	Nilok Chemicals, Inc.
ELP	El Paso Products Co.	NOR	Norwich Pharmacal Co.
ENJ	Exxon Chemical Co. U.S.A.	NPC	Northwest Petrochemical Corp.
FER	Ferro Corp., Ottawa Chemical Div.		
FG	Foster Grant Co., Inc.		
FIN	Hexcel Corp., Fine Organics Div.		
FMP	FMC Corp., Industrial Chemical Div.		
FMT	Fairmount Chemical Co., Inc.		
FST	First Chemical Corp.		
GAF	GAF Corp., Chemical Div.		
GE	General Electric Co.		

TABLE 3.--CYCLIC INTERMEDIATES: DIRECTORY OF MANUFACTURERS, 1976--CONTINUED

Code	Name of company	Code	Name of company
OMC	Olin Corp.	SOC	Standard Oil Co. of California, Chevron Chemical Co.
OPC	Orbis Products Corp.	STC	American Hoechst Corp., Sou-Tex Works
ORO	Chevron Chemical Co.	STG	Stange Co.
ORT	Roehr Chemicals, Inc.	STP	Stepan Chemical Co.
OTC	Story Chemical Corp., Ott Div.	STY	Styrochem Corp.
PAS	Pennwalt Corp.	SW	Sherwin-Williams Co.
PCW	Pfister Chemical, Inc.	TCC	Tanatex Chemical Corp.
PD	Parke, Davis & Co. Sub. of Warner-Lambert Co.	TCH	Emery Industries, Inc., Trylon Chemical Div.
PFZ	Pfizer, Inc. & Pfizer Pharmaceutical, Inc.	TEN	Cities Service Co., Copperhill Operations
PIT	Pitt-Consol Chemical Co.	TKL	Thiokol Corp.
PLC	Phillips Petroleum Co.	TNA	Ethyl Corp.
PPG	PPG Industries, Inc.	TOC	Tenneco Oil Co.
PRD	Ferro Corp., Productol Chemical Div.	TRC	Toms River Chemical Corp.
PTO	Puerto Rico Chemical Co., Inc.	TRD	Manufacturing Enterprises, Inc., Squibb Manufacturing, Inc., Trade Enterprise, Inc., Ersana, Inc.
PTT	Petro-Tex Chemical Corp.	TX	Texaco, Inc.
QKO	Quaker Oats Co.	UCC	Union Carbide Corp.
RBC	Fike Chemicals, Inc.	UOP	UOP, Inc., UOP Chemical Div.
RCI	Reichhold Chemicals, Inc.	UPF	Jim Walter Resources, Inc.
RDA	Rhodia, Inc.	UPJ	Upjohn Co.
RH	Rohm & Haas Co.	USR	Uniroyal, Inc., Chemical Div.
RIL	Reilly Tar & Chemical Corp.	USS	USS Chemicals Div. of U.S. Steel Corp.
RPC	Millmaster Onyx Corp., Refined-Onyx Div.	VAL	Valchem Corp.
RSA	R.S.A. Corp.	VGC	Virginia Chemicals, Inc.
RUC	Rubicon Chemicals, Inc.	VPC	Mobay Chemical Corp., Verona Div.
SAL	Salsbury Laboratories	VTC	Vicksburg Chemical Co. Div. of Vertac Consolidated
SAR	Sartomer Industries, Inc.	WAY	Philip A. Hunt Chemical Corp., Organic Chemical Div.
SCC	Standard Chlorine of Delaware, Inc.	WIL	Inolex Corp., Inolex Pharmaceutical Div.
SCN	Schenectady Chemicals, Inc.	WTC	Witco Chemical Co., Inc.
SDC	Martin-Marietta Corp., Sodyeco Div.	WTH	Union Camp Corp., Chemical Div., Dover Plant
SDH	Sterling Drug, Inc.	WTL	Pennwalt Corp., Lucidol Div.
SDW	Hilton-Davis Chemical Co. Div.	WYT	Wyeth Laboratories, Inc., Wyeth Laboratories Div. of American Home Products Corp.
SFA	Winthrop Laboratories Div.		
SFC	Stauffer Chemical Co.:		
SFS	Agricultural Div.		
SHC	Calhio Chemicals, Inc.		
SK	Specialty Chemical Div.		
SKO	Shell Oil Co., Shell Chemical Co. Div.		
SNT	Smith, Klein & French Laboratories		
	Getty Refining & Marketing Co.		
	Suntide Refining Co.		

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

DYES

DYES

Edmund Cappuccilli

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 the dyeing of leather and plastics. Of the several thousand different synthetic dyes that are known, more than one thousand are manufactured by one or more domestic producers. 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 costs that a particular use can bear. Dyes are sold as pastes, powders, lumps, and solutions; concentrations vary from 6 percent to 100 percent. The concentration, form, and purity of a dye are determined largely by the use for which it is intended.

Total domestic production of dyes in 1976 amounted to 256 million pounds, or 24.4 percent greater than the 206 million pounds produced in 1975 (table 1). Sales of dyes in 1976 amounted to 250 million pounds, valued at \$620 million, compared with 209 million pounds, valued at \$476 million, in 1975. In terms of quantity, sales of dyes in 1976 were 19.7 percent greater than in 1975 and in terms of value, 30.4 percent greater. The average unit value of sales of all dyes in 1976 was \$2.48 per pound compared with \$2.28 per pound in 1975.

In general, the production of the six classes of dyes increased substantially in 1976. Acid dyes increased by 50.5 percent from 18.7 million pounds in 1975 to 28.2 million in 1976. The other five classes of dyes increased by the following percentages: basic dyes (24.5), direct dyes (32.3), disperse dyes (13.7), fluorescent brightening agents (13.0), and vat dyes (25.4).

TABLE 1.--Dyes: U.S. PRODUCTION AND SALES, 1976

[Listed below are all dyes for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all dyes for which data on production and/or sales were reported and identifies the manufacturers of each]

DYE	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 dollars</i>	<i>Per pound</i>
Grand total-----	256,250	249,887	620,294	\$2.48
Total-----	28,248	27,006	87,108	3.23
Acid yellow dyes, total-----	9,432	9,056	25,345	2.80
Acid Yellow 17-----	177	150	460	3.06
Acid Yellow 23-----	243	181	685	3.78
Acid Yellow 34-----	13	29	99	3.36
Acid Yellow 36-----	132	131	410	3.13
Acid Yellow 40-----	...	95	409	4.29
Acid Yellow 151-----	2,120	2,245	4,117	1.83
Acid Yellow 159-----	...	394	1,142	2.90
Acid Yellow 174-----	113	...	...	...
All other-----	6,634	5,831	18,023	3.09
Acid orange dyes, total-----	4,113	3,935	11,634	2.96
Acid Orange 7-----	326	370	801	2.16
Acid Orange 8-----	257	228	497	2.19
Acid Orange 10-----	232	235	556	2.37
Acid Orange 24-----	709	749	1,708	2.28
Acid Orange 60-----	404	388	1,214	3.13
Acid Orange 116-----	551	455	1,489	3.28
All other-----	1,634	1,510	5,369	3.56
Acid red dyes, total-----	4,932	4,853	16,117	3.32
Acid Red 1-----	377	405	908	2.24
Acid Red 4-----	69	60	215	3.59
Acid Red 37-----	22	14	60	4.36
Acid Red 73-----	105	139	584	4.22
Acid Red 85-----	72	75	229	3.07
Acid Red 114-----	314	275	1,014	3.68
Acid Red 137-----	129	108	594	5.48
Acid Red 151-----	821	704	1,809	2.57
Acid Red 182-----	83	84	286	3.41
Acid Red 186-----	...	26	152	5.90
Acid Red 266-----	188	194	767	3.95
Acid Red 337-----	864	798	347	4.34
All other-----	1,888	1,971	9,152	4.64
Acid violet dyes, total-----	132	160	659	4.11
Acid violet 7-----	...	10	29	2.87
All other-----	132	150	630	4.20
Acid blue dyes, total-----	4,575	4,401	18,038	4.10
Acid Blue 9-----	...	1,420	2,461	1.73
Acid Blue 25-----	643	630	3,725	5.91
Acid Blue 27-----	52	42	226	5.43
Acid Blue 40-----	688	676	3,207	4.74
Acid Blue 113-----	468	419	1,443	3.44
All other-----	2,724	1,214	6,976	5.75
Acid green dyes-----	485	442	1,907	4.31
Acid brown dyes, total-----	1,385	1,275	4,647	3.65
Acid Brown 14-----	407	490	1,627	3.32
All other-----	978	785	3,020	3.85
Acid black dyes, total-----	3,194	2,884	8,761	3.04
Acid Black 1-----	556	450	1,191	2.65
Acid Black 52-----	756	620	1,844	2.98

See footnotes at end of table.

TABLE 1.--DYES: U.S. PRODUCTION AND SALES, 1976--CONTINUED

DYE	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
ACID DYES--CONTINUED				
Acid black dyes--Continued				
Acid Black 107-----	267	280	1,175	\$4.20
All other-----	1,615	1,534	4,551	2.97
AZOIC DYES AND COMPONENTS				
Azoic Diazo Components, Bases (Fast Color Bases)				
Azoic Diazo Components, Bases (Fast Color Bases), total-----	532	467	989	2.12
Azoic Diazo Components, Salts (Fast Color Salts)				
Total-----	1,370	1,350	1,572	1.16
Azoic Diazo Component 5, salt-----	...	65	96	1.47
Azoic Diazo Component 6, salt-----	75	...	...	...
Azoic Diazo Component 9, salt-----	211	223	201	.90
Azoic Diazo Component 13, salt-----	263	238	275	1.16
All other azoic diazo components, salts-----	821	824	1,000	1.21
BASIC DYES				
Total-----	14,595	14,889	49,770	3.34
Basic yellow dyes, total-----	4,804	4,540	13,294	3.30
Basic Yellow 11-----	885	737	1,810	2.45
Basic Yellow 13-----	236	212	500	2.36
All other-----	3,683	3,591	10,984	3.06
Basic orange dyes, total-----	1,446	1,472	4,024	2.73
Basic Orange 2-----	488	497	1,177	2.37
Basic Orange 21-----	578	527	1,414	2.68
All other-----	380	448	1,433	3.20
Basic red dyes, total-----	2,059	2,387	8,555	4.73
Basic Red 14-----	497	571	1,156	2.03
Basic Red 18-----	253	517	1,229	2.83
Basic Red 49-----	...	82	309	3.75
All other-----	1,309	1,217	5,861	4.82
Basic violet dyes, total-----	3,357	3,232	10,696	3.35
Basic Violet 1-----	1,256	1,072	3,194	2.98
Basic Violet 16-----	316	370	1,129	3.05
All other-----	1,785	1,790	6,373	3.56
Basic blue dyes, total-----	2,187	2,328	10,360	4.81
Basic Blue 7-----	64	101	710	7.01
All other-----	2,123	2,227	9,650	4.33
Basic green dyes-----	275	428	1,545	3.61
All other basic dyes-----	467	502	1,296	2.58
DIRECT DYES				
Total-----	33,527	31,606	78,772	2.49
Direct yellow dyes, total-----	12,004	11,393	28,258	2.48
Direct Yellow 4-----	585	561	1,086	2.14
Direct Yellow 6-----	255	245	647	2.64
Direct Yellow 11-----	2,655	2,593	3,015	1.16
Direct Yellow 12-----	39	52	320	6.20

See footnotes at end of table.

TABLE 1.--DYES: U.S. PRODUCTION AND SALES, 1976--CONTINUED

DYES	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
DIRECT DYES				
Direct yellow dyes--continued				
Direct Yellow 28-----	82	79	394	\$4.99
Direct Yellow 44-----	620	585	1,710	2.92
Direct Yellow 50-----	536	546	1,850	3.39
Direct Yellow 84-----	236	255	629	2.47
Direct Yellow 105-----	164	...	...	...
Direct Yellow 106-----	803	714	1,852	2.60
All other-----	6,029	5,763	16,755	2.91
Direct orange dyes, total-----	1,620	1,580	4,358	2.76
Direct Orange 8-----	...	83	155	1.86
Direct Orange 15-----	...	467	694	1.49
Direct Orange 34-----	...	61	195	3.20
Direct Orange 39-----	111	124	367	2.96
Direct Orange 72-----	289	250	681	2.73
Direct Orange 73-----	...	91	343	3.75
Direct Orange 102-----	290	223	802	3.60
All other-----	930	281	1,121	3.99
Direct red dyes, total-----	4,489	3,962	12,514	3.16
Direct Red 1-----	62	82	251	3.07
Direct Red 2-----	75	57	219	3.85
Direct Red 23-----	185	163	641	3.93
Direct Red 24-----	240	24	773	3.62
Direct Red 26-----	...	37	115	3.13
Direct Red 39-----	...	50	215	4.34
Direct Red 72-----	303	281	972	3.46
Direct Red 80-----	512	404	1,323	3.27
Direct Red 81-----	637	644	2,094	3.25
Direct Red 83-----	151	135	367	2.71
All other-----	2,324	2,085	5,544	2.66
Direct violet dyes-----	152	172	601	3.52
Direct blue dyes, total-----	7,266	6,711	19,069	2.84
Direct Blue 1-----	236	230	915	3.89
Direct Blue 2-----	771	771	1,476	1.92
Direct Blue 76-----	58	41	120	2.91
Direct Blue 80-----	491	471	1,423	3.02
Direct Blue 86-----	1,039	862	2,550	2.96
Direct Blue 98-----	139	164	489	2.98
Direct Blue 218-----	1,359	1,253	3,973	3.17
All other-----	3,173	2,919	8,123	2.78
Direct green dyes, total-----	371	455	1,511	3.32
Direct Green 1-----	169	216	457	2.12
All other-----	202	239	1,054	4.41
Direct brown dyes, total-----	1,548	1,491	3,068	2.06
Direct Brown 2-----	188	198	471	2.38
Direct Brown 31 ² -----	47	42	183	4.39
Direct Brown 95 ² -----	595	532	1,102	2.07
All other-----	718	719	1,312	1.82
Direct black dyes, total-----	6,077	5,842	9,393	1.61
Direct Black 22-----	1,499	1,186	1,351	1.14
Direct Black 38-----	3,759	3,923	6,249	1.59
All other-----	819	733	1,793	2.45
DISPERSE DYES				
Total-----	39,100	36,289	138,018	3.80
Disperse yellow dyes, total-----	7,112	7,066	19,916	2.82
Disperse Yellow 3-----	1,161	1,095	2,467	2.25

See footnotes at end of table.

TABLE 1.--DYES: U.S. PRODUCTION AND SALES, 1976--CONTINUED

DYES	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
DISPERSE DYES--CONTINUED				
Disperse yellow dyes--Continued				
Disperse Yellow 23-----	753 :	782 :	1,499 :	1.92
Disperse Yellow 33-----	194 :	163 :	353 :	2.17
Disperse Yellow 34-----	126 :	166 :	365 :	2.19
Disperse Yellow 42-----	605 :	666 :	1,487 :	2.23
Disperse Yellow 54-----	893 :	1,059 :	3,422 :	3.23
All other-----	3,380 :	3,135 :	10,323 :	3.29
Disperse orange dyes, total-----	4,993 :	4,526 :	11,854 :	2.62
Disperse Orange 3-----	106 :	81 :	217 :	2.67
Disperse Orange 17-----	78 :	62 :	106 :	1.72
Disperse Orange 25-----	821 :	607 :	1,555 :	2.56
All other-----	3,988 :	3,776 :	9,976 :	2.64
Disperse red dyes, total-----	9,271 :	8,280 :	36,501 :	4.41
Disperse Red 1-----	399 :	294 :	735 :	2.50
Disperse Red 5-----	106 :	83 :	180 :	2.17
Disperse Red 15-----	...	42 :	199 :	4.74
Disperse Red 17-----	358 :	294 :	741 :	2.52
Disperse Red 60-----	2,263 :	2,047 :	7,651 :	3.74
Disperse Red 65-----	121 :	155 :	495 :	3.20
Disperse Red 86-----	48 :	27 :	189 :	6.93
Disperse Red 177-----	218 :	183 :	652 :	3.57
All other-----	5,758 :	5,155 :	25,659 :	4.98
Disperse violet dyes, total-----	433 :	505 :	2,270 :	4.49
Disperse Violet 1-----	...	35 :	179 :	5.06
Disperse Violet 27-----	57 :	97 :	247 :	2.56
All other-----	376 :	373 :	1,844 :	4.94
Disperse blue dyes, total-----	14,081 :	13,069 :	59,895 :	4.58
Disperse Blue 3-----	1,155 :	877 :	2,556 :	2.91
Disperse Blue 64-----	516 :	468 :	1,230 :	2.63
Disperse Blue 79-----	2,622 :	2,082 :	5,883 :	2.83
All other-----	9,788 :	9,642 :	50,226 :	5.21
Disperse black dyes-----	1,612 :	1,422 :	2,969 :	2.09
Disperse brown and green dyes-----	1,598 :	1,421 :	4,613 :	3.47
FIBER-REACTIVE DYES				
Fiber-reactive dyes, total-----	3,506 :	3,982 :	21,876 :	5.49
Reactive yellow dyes-----	844 :	804 :	4,647 :	5.78
All other reactive dyes-----	2,662 :	3,178 :	17,229 :	5.42
FLUORESCENT BRIGHTENING AGENTS				
Fluorescent brightening Agent, total-----	43,429 :	37,948 :	55,464 :	1.46
Fluorescent Brightening Agent 28-----	2,371 :	2,220 :	4,391 :	1.98
Fluorescent Brightening Agent 61-----	85 :	607 :	616 :	10.16
All other fluorescent brightening agents-----	40,973 :	35,121 :	50,457 :	1.44
FOOD, DRUG, AND COSMETIC COLORS				
Total-----	5,757 :	5,110 :	31,754 :	6.21
Food, Drug, and Cosmetic Dyes				
Total-----	5,456 :	4,815 :	28,457 :	5.91
FD&C Blue No. 1-----	177 :	171 :	1,448 :	8.48
FD&C Blue No. 2-----	64 :	76 :	912 :	11.93
FD&C Red No. 2-----	54 :	91 :	458 :	5.02
FD&C Red No. 3-----	506 :	447 :	4,410 :	9.87
FD&C Yellow No. 5-----	1,673 :	1,403 :	6,573 :	4.68
FD&C Yellow No. 6-----	1,188 :	991 :	4,226 :	4.26
All other food, drug, and cosmetic dyes-----	1,794 :	1,636 :	10,430 :	6.38

See footnotes at end of table.

TABLE 1.--Dyes: U.S. PRODUCTION AND SALES, 1976--CONTINUED

DYES	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
<i>Drug and Cosmetic and External Drug and Cosmetic Dyes</i>	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 dollars</i>	<i>Per pound</i>
Total-----	301	295	3,297	\$10.74
D&C green dyes-----	18	23	549	21.22
D&C red dyes, total-----	162	171	1,451	13.57
D&C Red No. 6-----	...	27	217	8.12
D&C Red No. 7-----	...	28	180	6.37
D&C Red No. 19-----	8	10	116	11.43
All other-----	154	106	938	8.85
All other drug & cosmetic and external drug & cosmetic dyes-----	121	101	1,297	12.84
MORDANT DYES				
Total-----	660	656	2,149	3.28
Mordant orange dyes, total-----	137	129	360	2.78
Mordant orange 1-----	57	43	118	2.72
All other-----	80	86	242	2.81
Mordant brown dyes-----	172	164	628	3.83
Mordant black dyes, total-----	256	309	910	2.95
Mordant Black 11-----	...	231	705	3.05
All other-----	256	78	205	2.63
All other mordant dyes-----	95	54	251	4.65
SOLVENT DYES				
Total-----	11,940	11,509	35,341	3.07
Solvent yellow dyes-----	1,417	1,396	4,880	3.50
Solvent orange dyes-----	888	931	2,852	3.06
Solvent red dyes, total-----	2,730	2,993	8,466	2.83
Solvent Red 49-----	58	87	747	8.63
All other-----	2,672	2,906	7,719	2.66
Solvent blue dyes-----	2,413	1,628	11,132	6.84
All other solvent dyes-----	4,492	4,561	8,011	1.76
VAT DYES				
Total-----	53,231	59,077	86,876	1.47
Vat yellow dyes, total-----	1,254	969	3,657	3.77
Vat Yellow 2, 8-1/2%-----	656	394	686	1.74
All other-----	598	575	2,971	5.17
Vat orange dyes, total-----	2,761	2,593	12,090	4.66
Vat Orange 2, 12%-----	787	741	3,237	4.37
Vat Orange 15, 10%-----	...	220	947	4.31
All other-----	1,974	1,632	7,906	4.84
Vat red dyes-----	393	378	1,886	5.00
Vat violet dyes-----	307	328	1,312	4.00
Vat green dyes, total-----	5,399	5,464	10,275	1.88
Vat Green 1, 6%-----	...	1,073	2,034	1.90
Vat Green 3, 10%-----	1,748	1,843	3,477	1.89
All other-----	3,651	2,548	4,764	1.87
Vat brown dyes-----	4,202	4,041	12,996	3.22

See footnotes on following page.

TABLE 1.--DYES: U.S. PRODUCTION AND SALES, 1976--CONTINUED

DYES	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 dollars</i>	<i>Per pound</i>
VAT DYES--Continued				
Vat black dyes, total-----	3,519	3,534	6,200	\$1.75
Vat Black 25, 12-1/2%-----	1,840	1,996	3,329	1.67
Vat Black 27, 12-1/2%-----	360	239	731	3.05
All other-----	1,319	1,299	2,140	1.65
All other vat dyes-----	35,396	41,770	38,460	.92
All other dyes ³ -----	20,355	19,998	30,605	1.53

¹ Calculated from rounded figures.² The data include dyes which are similar to, but not chemically identical with, the indicated Colour Index name.³ The data include azoic compositions, azoic coupling components, oxidation bases, ingrain dyes, sulfur dyes, and miscellaneous dyes. Statistics for those groups of dyes may not be published separately because publication would disclose information received in confidence.

TABLE 1A.--DYES: U.S. PRODUCTION AND SALES, BY CLASS OF APPLICATION, 1976

CLASS OF APPLICATION	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 dollars</i>	<i>Per pound</i>
Total-----	256,250	249,887	620,294	\$2.48
Acid-----	28,248	27,006	87,108	3.23
Azoic dyes and components:				
Azoic diazo components, bases (Fast color bases)--	532	467	989	2.12
Azoic diazo components, salts (Fast color salts)--	1,370	1,350	1,572	1.16
Basic-----	14,595	14,889	49,770	3.34
Direct-----	33,527	31,606	78,772	2.49
Disperse-----	39,100	36,289	138,019	3.80
Fiber-reactive-----	3,506	3,982	21,876	5.49
Fluorescent brightening agents-----	43,429	37,948	55,464	1.46
Food, drug, and cosmetic colors-----	5,757	5,110	31,754	6.21
Mordant-----	660	656	2,149	3.28
Solvent-----	11,940	11,509	35,341	3.07
Vat-----	53,231	59,077	86,876	1.47
All Other ² -----	20,355	19,998	30,604	1.53

¹ Calculated from rounded figures.² The data include azoic composition, azoic coupling components, oxidation base, ingrain dyes, sulfur dyes, and miscellaneous dyes. Statistics for these groups of dyes may not be published separately because publication would disclose information received in confidence.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

DYES										MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)									
A C I D D Y E S																			
@ACID YELLOW DYES:																			
ACID YELLOW	1-	-	-	-	-	-	-	-	-	AC.									
ACID YELLOW	3-	-	-	-	-	-	-	-	-	ACS, AC.									
ACID YELLOW	11	-	-	-	-	-	-	-	-	ATL(E).									
ACID YELLOW	14	-	-	-	-	-	-	-	-	TRC.									
@ACID YELLOW	17	-	-	-	-	-	-	-	-	AC, ATL(E), BDO, SDH, TRC, VPC.									
ACID YELLOW	19	-	-	-	-	-	-	-	-	AC, ALT, BAS, ICI.									
@ACID YELLOW	23	-	-	-	-	-	-	-	-	AC, ACY, ALT, GAF, MRX, PDC, TRC, VPC, WJ.									
ACID YELLOW	25	-	-	-	-	-	-	-	-	GAF.									
ACID YELLOW	29	-	-	-	-	-	-	-	-	TRC.									
@ACID YELLOW	34	-	-	-	-	-	-	-	-	AC, ACS, ATL(E), PDC.									
@ACID YELLOW	36	-	-	-	-	-	-	-	-	DUP, GAF, TRC.									
ACID YELLOW	38	-	-	-	-	-	-	-	-	ATL(E), GAF.									
@ACID YELLOW	40	-	-	-	-	-	-	-	-	ACY, ALT, ATL(E), TRC.									
ACID YELLOW	42	-	-	-	-	-	-	-	-	ACY, GAF.									
ACID YELLOW	44	-	-	-	-	-	-	-	-	GAF.									
ACID YELLOW	49	-	-	-	-	-	-	-	-	DUP, VPC.									
ACID YELLOW	54	-	-	-	-	-	-	-	-	AC, TRC.									
ACID YELLOW	59	-	-	-	-	-	-	-	-	VPC.									
ACID YELLOW	63	-	-	-	-	-	-	-	-	AC.									
ACID YELLOW	65	-	-	-	-	-	-	-	-	ATL(E), TRC.									
ACID YELLOW	73	-	-	-	-	-	-	-	-	ACS, SDH.									
ACID YELLOW	76	-	-	-	-	-	-	-	-	TRC.									
ACID YELLOW	79	-	-	-	-	-	-	-	-	VPC.									
ACID YELLOW	99	-	-	-	-	-	-	-	-	GAF, TRC.									
ACID YELLOW	114	-	-	-	-	-	-	-	-	TRC.									

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C I D D Y E S--CONTINUED	
@ACID YELLOW DYES--CONTINUED	
ACID YELLOW 121-	: GAF.
ACID YELLOW 127-	: TRC.
ACID YELLOW 128-	: TRC.
ACID YELLOW 129-	: TRC.
ACID YELLOW 135-	: GAF.
@ACID YELLOW 151-	: AC, ALT, DUP, GAF, TRC, VPC.
@ACID YELLOW 159-	: ALT, GAF, TRC, VPC.
@ACID YELLOW 174-	: AC, DUP, TRC, VPC.
ACID YELLOW 198-	: DUP.
ACID YELLOW 200-	: DUP.
ACID YELLOW DYES, ALL OTHER-	: ATL(E), BAS, GAF, ICI, TRC, VPC.
@ACID ORANGE DYES:	
ACID ORANGE 1-	: AC.
ACID ORANGE 5-	: ACY.
@ACID ORANGE 7-	: AC, ACS, ACY, BDO, GAF, PDC, TRC, VPC.
@ACID ORANGE 8-	: AC, ACY, ATL(E), DUP, GAF, PDC, TRC, VPC.
@ACID ORANGE 10-	: AC, ACY, GAF, PDC, TRC.
ACID ORANGE 12-	: ATL(E), PSC.
@ACID ORANGE 24-	: ACS, ACY, GAF, TRC.
ACID ORANGE 45-	: ACS.
ACID ORANGE 51-	: TRC.
@ACID ORANGE 60-	: AC, ALT, ATL(E), DUP, GAF, TRC, VPC.
ACID ORANGE 62-	: TRC.
ACID ORANGE 63-	: ATL(E), TRC, VPC.
ACID ORANGE 64-	: ACY, DUP.
ACID ORANGE 72-	: ACY.
ACID ORANGE 74-	: GAF, TRC.
ACID ORANGE 76-	: TRC.
ACID ORANGE 86-	: TRC.
ACID ORANGE 87-	: ALT.
@ACID ORANGE 116-	: AC, ALT, GAF, TRC.
ACID ORANGE 128-	: DUP.
ACID ORANGE 132-	: DUP.
ACID ORANGE 152-	: DUP.
ACID ORANGE DYES, ALL OTHER-	: ALT, ATL(E), GAF, PDC, TRC, VPC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C I D D Y E S--CONTINUED	
@ACID RED DYES:	
@ACID RED 1	: ACS, ACY, ATL(E), BDO, DUP, GAF, HSH, TRC, VPC.
@ACID RED 4	: AC, ATL(E), BDO, CMG, GAF, TRC.
ACID RED 14	: GAF, PDC.
ACID RED 17	: ATL(E).
ACID RED 18	: GAF, TRC.
ACID RED 26	: ACY, VPC.
ACID RED 35	: GAF.
@ACID RED 37	: AC, ATL(E), TRC.
ACID RED 51	: BDO.
ACID RED 57	: ATL(E), ICI, TRC.
ACID RED 66	: AC, ATL(E).
@ACID RED 73	: ACY, ATL(E), GAF, HSH, PSC, TRC, VPC.
ACID RED 80	: AC, BDO.
@ACID RED 85	: ACS, FAB, GAF.
ACID RED 87	: SDH.
ACID RED 88	: ACY, ATL(E), GAF, TRC.
ACID RED 89	: BDO, GAF.
ACID RED 97	: ATL(E), GAF.
ACID RED 99	: AC, ATL(E), FAB.
ACID RED 111	: VPC.
@ACID RED 114	: ALT, ATL(E), DUP, GAF, TRC, VPC.
ACID RED 115	: ATL(E).
ACID RED 119	: ALT, ATL(E).
@ACID RED 137	: ATL(E), DUP, GAF, TRC.
ACID RED 138	: ALT.
@ACID RED 151	: AC, ACY, ATL(E), DUP, HSH, ICI, TRC, VPC.
ACID RED 167	: ATL(E), TRC.
@ACID RED 182	: AC, ALT, ATL(E), DUP, VPC.
ACID RED 183	: CMG.
@ACID RED 186	: AC, ACY, CMG.
ACID RED 194	: CMG, TRC.
ACID RED 213	: TRC.
@ACID RED 266	: ALT, DUP, ICI, TRC, VPC.
ACID RED 299	: AC, ALT.
ACID RED 309	: TRC.
@ACID RED 337	: ALT, DUP, TRC, VPC.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C I D D Y E S--CONTINUED	
@ ACID RED DYES--CONTINUED	
ACID RED 350 - - - - -	: GAF.
ACID RED 364 - - - - -	: DUP.
ACID RED 384 - - - - -	: DUP.
ACID RED 388 - - - - -	: DUP.
ACID RED DYES, ALL OTHER - - - - -	: ALT, ATL(E), DUP, GAF, TRC, VPC.
@ACID VIOLET DYES:	
ACID VIOLET 1- - - - -	: BDO.
ACID VIOLET 3- - - - -	: ACY, TRC.
@ACID VIOLET 7- - - - -	: ATL(E), BDO, GAF.
ACID VIOLET 12 - - - - -	: BDO, CMG.
ACID VIOLET 17 - - - - -	: GAF, SDH.
ACID VIOLET 34 - - - - -	: ATL(E).
ACID VIOLET 41 - - - - -	: ATL(E).
ACID VIOLET 43 - - - - -	: HSH.
ACID VIOLET 49 - - - - -	: ACS, ACY, SDH, TRC.
ACID VIOLET DYES, ALL OTHER- - - - -	: SDH.
@ACID BLUE DYES:	
ACID BLUE 7- - - - -	: SDH.
@ACID BLUE 9- - - - -	: ACS, GAF, SDH.
ACID BLUE 15 - - - - -	: GAF.
ACID BLUE 23 - - - - -	: TRC.
@ACID BLUE 25 - - - - -	: ATL(E), DUP, GAF, HSH, ICI, TRC, VPC.
@ACID BLUE 27 - - - - -	: ATL(E), BDO, GAF, VPC.
ACID BLUE 29 - - - - -	: PDC.
@ACID BLUE 40 - - - - -	: ALT, ATL(E), CMG, DUP, GAF, ICI, TRC, VPC.
ACID BLUE 41 - - - - -	: ATL(E), BDO, GAF.
ACID BLUE 43 - - - - -	: TRC.
ACID BLUE 45 - - - - -	: ATL(E), CMG, TRC.
ACID BLUE 62 - - - - -	: ALT, BDO.
ACID BLUE 74 - - - - -	: DUP.
ACID BLUE 78 - - - - -	: ATL(E), TRC.
ACID BLUE 80 - - - - -	: TRC.
ACID BLUE 92 - - - - -	: ATL(E), FAB.
ACID BLUE 93 - - - - -	: HSC.
ACID BLUE 104- - - - -	: GAF.
@ACID BLUE 113- - - - -	: AC, ALT, ATL(E), GAF, TRC, VPC.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C I D D Y E S--CONTINUED	
@ACID BLUE DYES--CONTINUED	
ACID BLUE 118-	: AC, ATL(E).
ACID BLUE 120-	: ATL(E).
ACID BLUE 122-	: DUP.
ACID BLUE 145-	: ACS.
ACID BLUE 158, 158:1, AND 158:2-	: AC, BDO, TRC, VPC.
ACID BLUE 203-	: VPC.
ACID BLUE 230-	: DUP.
ACID BLUE 231-	: ACY, TRC.
ACID BLUE 298-	: DUP.
ACID BLUE DYES, ALL OTHER-	: AC, ALT, ATL(E), CMG, GAF, HST, TRC, VPC.
@ACID GREEN DYES:	
ACID GREEN 1-	: ACY.
ACID GREEN 3-	: ACS, GAF, TRC.
ACID GREEN 5-	: WJ.
ACID GREEN 16-	: TRC.
ACID GREEN 20-	: BDO, GAF, TRC.
ACID GREEN 25-	: ACS, ATL(E), HSH.
ACID GREEN 35-	: TRC.
ACID GREEN 70-	: TRC.
ACID GREEN 84-	: VPC.
ACID GREEN DYES, ALL OTHER-	: ALT.
@ACID BROWN DYES:	
ACID BROWN 14-	: AC, ACY, FAB, GAF, TRC.
ACID BROWN 19-	: TRC.
ACID BROWN 28-	: TRC.
ACID BROWN 31-	: GAF.
ACID BROWN 45-	: TRC.
ACID BROWN 96-	: ACY.
ACID BROWN 97-	: ACY.
ACID BROWN 98-	: ACY, TRC.
ACID BROWN 152-	: GAF.
ACID BROWN 158-	: GAF.
ACID BROWN 223-	: VPC.
ACID BROWN 354-	: ACY.
ACID BROWN DYES, ALL OTHER-	: ALT, BAS, GAF.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C I D D Y E S--CONTINUED	
@ACID BLACK DYES:	
@ACID BLACK 1 - - - - -	: AC, ACS, ACY, ATL(E), PAB, GAF, PDC, TRC.
ACID BLACK 2 - - - - -	: ACY.
ACID BLACK 24- - - - -	: AC.
ACID BLACK 26, 26:1, 26:2, 26:3, AND 26:4- - - - -	: ATL(E).
ACID BLACK 29- - - - -	: GAF.
@ACID BLACK 52- - - - -	: AC, ALT, ATL(E), PAB, GAF, TRC.
ACID BLACK 58- - - - -	: TRC.
ACID BLACK 60- - - - -	: BDO, TRC.
ACID BLACK 92- - - - -	: ACY.
@ACID BLACK 107 - - - - -	: ALT, GAF, TRC, VPC.
ACID BLACK 108 - - - - -	: GAF.
ACID BLACK 140 - - - - -	: CMG.
ACID BLACK DYES, ALL OTHER - - - - -	: AC, ALT, ATL(E), HSH, VPC.
A Z O I C D Y E S A N D C O M P O N E N T S	
AZOIC COMPOSITIONS:	
AZOIC YELLOW COMPOSITIONS:	
AZOIC YELLOW 2 - - - - -	: ALL, BUC.
AZOIC YELLOW 3 - - - - -	: ATL(E).
AZOIC ORANGE COMPOSITIONS:	
AZOIC ORANGE 3 - - - - -	: ALL, BUC.
AZOIC ORANGE 10- - - - -	: BUC.
AZOIC RED COMPOSITIONS:	
AZOIC RED 1- - - - -	: ALL, BUC, ROC.
AZOIC RED 2- - - - -	: BUC.
AZOIC RED 6- - - - -	: ALL, BUC, ROC, SDH.
AZOIC RED COMPOSITIONS, ALL OTHER- - - - -	: ALL.
AZOIC VIOLET COMPOSITIONS:	
AZOIC VIOLET 1 - - - - -	: BDO, BUC.
AZOIC VIOLET COMPOSITIONS, ALL OTHER - - - - -	: ALL.
AZOIC BLUE COMPOSITIONS:	
AZOIC BLUE 3 - - - - -	: ALL, BUC, GAF, HST, ROC, SDH.
AZOIC BLUE COMPOSITIONS, ALL OTHER - - - - -	: ALL, BUC, GAF.
AZOIC GREEN COMPOSITIONS:	
AZOIC GREEN COMPOSITIONS, ALL OTHER- - - - -	: ALL, BUC.
AZOIC BROWN COMPOSITIONS:	
AZOIC BROWN 9- - - - -	: ALL, BUC, GAF, ROC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A Z O I C D Y E S A N D C O M P O N E N T S--CONTINUED:	
AZOIC COMPOSITIONS:	
AZOIC BROWN COMPOSITIONS--CONTINUED	
AZOIC BROWN 10 - - - - -	: BUC.
AZOIC BLACK COMPOSITIONS:	
AZOIC BLACK 4- - - - -	: BUC.
AZOIC BLACK 15 - - - - -	: GAP.
AZOIC BLACK COMPOSITIONS, ALL OTHER- - - - -	: ALL.
@AZOIC DIAZO COMPONENTS, BASES:	
AZOIC DIAZO COMPONENT 5, BASE- - - - -	: GAP.
AZOIC DIAZO COMPONENT 12, BASE - - - - -	: BUC, PFZ, SDH.
AZOIC DIAZO COMPONENT 13, BASE - - - - -	: BUC.
AZOIC DIAZO COMPONENT 32, BASE - - - - -	: ALL.
AZOIC DIAZO COMPONENTS, BASE, ALL OTHER- - - - -	: ALL.
@AZOIC DIAZO COMPONENTS, SALTS:	
AZOIC DIAZO COMPONENT 1, SALT- - - - -	: ALL, BUC.
AZOIC DIAZO COMPONENT 2, SALT- - - - -	: BUC.
AZOIC DIAZO COMPONENT 3, SALT- - - - -	: AC, ALL, BUC.
@AZOIC DIAZO COMPONENT 5, SALT- - - - -	: AC, ALL, BUC, SDH.
@AZOIC DIAZO COMPONENT 6, SALT- - - - -	: ALL, BUC, GAP.
AZOIC DIAZO COMPONENT 8, SALT- - - - -	: ALL, BUC.
@AZOIC DIAZO COMPONENT 9, SALT- - - - -	: AC, ALL, BUC, SDH.
AZOIC DIAZO COMPONENT 10, SALT - - - - -	: ALL, BUC.
AZOIC DIAZO COMPONENT 11, SALT - - - - -	: ALL.
AZOIC DIAZO COMPONENT 12, SALT - - - - -	: ALL, BUC.
@AZOIC DIAZO COMPONENT 13, SALT - - - - -	: AC, ALL, BUC, GAP.
AZOIC DIAZO COMPONENT 14, SALT - - - - -	: AC, ALL, BUC.
AZOIC DIAZO COMPONENT 32, SALT - - - - -	: ALL.
AZOIC DIAZO COMPONENT 34, SALT - - - - -	: ALL.
AZOIC DIAZO COMPONENT 41, SALT - - - - -	: ALL.
AZOIC DIAZO COMPONENT 44, SALT - - - - -	: ALL, BUC.
AZOIC DIAZO COMPONENT 49, SALT - - - - -	: ALL, BUC.
AZOIC DIAZO COMPONENT 121, SALT- - - - -	: GAP.
AZOIC COUPLING COMPONENTS:	
AZOIC COUPLING COMPONENT 2 - - - - -	: ATL(E), BUC, PFZ.
AZOIC COUPLING COMPONENT 3 - - - - -	: BUC, PFZ.
AZOIC COUPLING COMPONENT 7 - - - - -	: BUC, PFZ, SDH.
AZOIC COUPLING COMPONENT 8 - - - - -	: BUC, PFZ.
AZOIC COUPLING COMPONENT 11- - - - -	: BUC, PFZ.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A Z O I C D Y E S A N D C O M P O N E N T S--Continued	
AZOIC COUPLING COMPONENTS--CONTINUED	
AZOIC COUPLING COMPONENT 12-	PFZ.
AZOIC COUPLING COMPONENT 14-	BUC, PFZ.
AZOIC COUPLING COMPONENT 15-	BUC, GAF.
AZOIC COUPLING COMPONENT 17-	BUC, PFZ.
AZOIC COUPLING COMPONENT 18-	BUC, GAF, PFZ.
AZOIC COUPLING COMPONENT 19-	PFZ.
AZOIC COUPLING COMPONENT 20-	BUC, PFZ.
AZOIC COUPLING COMPONENT 21-	BUC, PFZ.
AZOIC COUPLING COMPONENT 29-	BUC, PFZ.
AZOIC COUPLING COMPONENT 34-	BUC, PFZ.
AZOIC COUPLING COMPONENT 35-	PFZ.
AZOIC COUPLING COMPONENT 43-	ALL, ATL(E), BUC, GAF.
AZOIC COUPLING COMPONENTS, ALL OTHER	ATL(E).
B A S I C D Y E S	
@BASIC YELLOW DYES:	
BASIC YELLOW 1-	DUP.
BASIC YELLOW 2-	ACY.
@BASIC YELLOW 11-	ARL(E), DUP, GAF, TRC, VPC.
@BASIC YELLOW 13-	ATL(E), DUP, GAF, VPC.
BASIC YELLOW 15-	DUP.
BASIC YELLOW 21-	ALT, VPC.
BASIC YELLOW 24-	BAS.
BASIC YELLOW 25-	BAS.
BASIC YELLOW 28-	GAF, VPC.
BASIC YELLOW 29-	DUP, GAF, VPC.
BASIC YELLOW 31-	DUP.
BASIC YELLOW 41-	ACY.
BASIC YELLOW 52-	DUP.
BASIC YELLOW 53-	DUP.
BASIC YELLOW 58-	DUP.
BASIC YELLOW 79-	DUP.
BASIC YELLOW 83-	DUP.
BASIC YELLOW DYES, ALL OTHER	ACY, ATL(E), BAS, DUP, EKT, GAF, SDH, VPC.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
B A S I C D Y E S--Continued	
@BASIC ORANGE DYES:	
BASIC ORANGE 1-----	: ACS, ACY, GAF, PSC, TRC.
@BASIC ORANGE 2-----	: ACS, DUP, GAF, PSC, TRC.
@BASIC ORANGE 21-----	: ALT, ATL(E), DUP, GAF, TRC, VPC.
BASIC ORANGE 24-----	: DUP.
BASIC ORANGE 25-----	: DUP.
BASIC ORANGE 26-----	: DUP.
BASIC ORANGE 28-----	: VPC.
BASIC ORANGE 31-----	: ACY.
BASIC ORANGE 39-----	: DUP.
BASIC ORANGE DYES, ALL OTHER-----	: ALT, BAS, DUP.
@BASIC RED DYES:	
BASIC RED 1-----	: BAS, DUP.
BASIC RED 2-----	: DUP.
BASIC RED 12-----	: ACY, DUP, VPC.
BASIC RED 13-----	: GAF.
@BASIC RED 14-----	: ACY, ATL(E), DUP, GAF, VPC.
BASIC RED 15-----	: ATL(E), DUP, GAF.
BASIC RED 17-----	: DUP.
@BASIC RED 18-----	: ATL(E), DUP, GAF, VPC.
BASIC RED 19-----	: DUP.
BASIC RED 22-----	: ALT, TRC.
BASIC RED 29-----	: BAS.
BASIC RED 30-----	: ACY.
@BASIC RED 49-----	: DUP, GAF, TRC, VPC.
BASIC RED 73-----	: DUP.
BASIC RED DYES, ALL OTHER-----	: ATL(E), BAS, EKT, SDH, VPC.
@BASIC VIOLET DYES:	
@BASIC VIOLET 1-----	: ACS, ACY, DSC.
BASIC VIOLET 2-----	: DSC.
BASIC VIOLET 3-----	: DSC, DUP.
BASIC VIOLET 4-----	: DUP.
BASIC VIOLET 7-----	: ATL(E), GAF.
BASIC VIOLET 10-----	: ACY, ASC, DUP, GAF.
BASIC VIOLET 15-----	: DUP.
@BASIC VIOLET 16-----	: ATL(E), DUP, GAF, TRC, VPC.
BASIC VIOLET 18-----	: ACY.
BASIC VIOLET 24-----	: DUP.
BASIC VIOLET DYES, ALL OTHER-----	: DUP, VPC.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
B A S I C D Y E S--CONTINUED	
@BASIC BLUE DYES:	
BASIC BLUE 1-----	: DSC, GAF, SDH, UPC.
BASIC BLUE 2-----	: DSC.
BASIC BLUE 3-----	: DUP, GAF, HST.
BASIC BLUE 5-----	: DSC, SDH.
BASIC BLUE 6-----	: ACY.
@BASIC BLUE 7-----	: DSC, DUP, SDH.
BASIC BLUE 9-----	: ACY, SDH.
BASIC BLUE 11-----	: DSC, SDH.
BASIC BLUE 21-----	: DUP.
BASIC BLUE 22-----	: DUP.
BASIC BLUE 26-----	: DSC, DUP, SDH.
BASIC BLUE 35-----	: DUP.
BASIC BLUE 41-----	: BAS, TRC.
BASIC BLUE 45-----	: VPC.
BASIC BLUE 54-----	: BAS.
BASIC BLUE 60-----	: ACY, GAF.
BASIC BLUE 69-----	: VPC.
BASIC BLUE 75-----	: EKT.
BASIC BLUE 77-----	: ACY, DUP.
BASIC BLUE 87-----	: DUP.
BASIC BLUE 94-----	: DUP.
BASIC BLUE DYES ALL OTHER-----	: ACS, ATL(E), BAS, DUP, EKT, SDH, VPC.
@BASIC GREEN DYES:	
BASIC GREEN 1-----	: DSC.
BASIC GREEN 4-----	: ACS, ACY, DSC.
BASIC BROWN DYES:	
BASIC BROWN 1-----	: ACY, DUP, GAF, PSC, TRC.
BASIC BROWN 2-----	: GAF.
BASIC BROWN 4-----	: ACS, ACY, GAF, PSC, TRC.
BASIC BLACK DYES:	
BASIC BLACK 9-----	: VPC.
BASIC BLACK DYES, ALL OTHER-----	: ALT, BAS, DSC, VPC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES		MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
D I R E C T D Y E S		
@DIRECT YELLOW DYES:		
@DIRECT YELLOW 4-	- - - - -	: ACY, ATL(E), DUP, GAF, TRC, VPC.
DIRECT YELLOW 5-	- - - - -	: ACY, GAF.
@DIRECT YELLOW 6-	- - - - -	: ACS, ACY, DUP, GAF, TRC.
DIRECT YELLOW 7-	- - - - -	: ATL(E).
DIRECT YELLOW 8-	- - - - -	: ATL(E).
@DIRECT YELLOW 11	- - - - -	: AC, ACS, ACY, DUP, GAF, SDH, TRC.
@DIRECT YELLOW 12	- - - - -	: ACY, ATL(E), DUP, GAF, TRC.
DIRECT YELLOW 26	- - - - -	: ATL(E).
@DIRECT YELLOW 28	- - - - -	: ATL(E), DUP, GAF, TRC.
DIRECT YELLOW 29	- - - - -	: ATL(E), GAF.
DIRECT YELLOW 34	- - - - -	: ALT, TRC.
DIRECT YELLOW 39	- - - - -	: TRC.
DIRECT YELLOW 41	- - - - -	: ATL(E).
@DIRECT YELLOW 44	- - - - -	: AC, ATL(E), DUP, GAF, HSH, TRC.
@DIRECT YELLOW 50	- - - - -	: AC, ATL(E), DUP, FAB, GAF, HSH, TRC, VPC.
DIRECT YELLOW 59	- - - - -	: ATL(E).
DIRECT YELLOW 81	- - - - -	: ATL(E).
@DIRECT YELLOW 84	- - - - -	: ATL(E), GAF, TRC, VPC.
@DIRECT YELLOW 105-	- - - - -	: AC, ALT, GAF, TRC.
@DIRECT YELLOW 106-	- - - - -	: AC, ALT, GAF, HSH, TRC.
DIRECT YELLOW 107-	- - - - -	: ATL(E), GAF, TRC.
DIRECT YELLOW 114-	- - - - -	: ACY.
DIRECT YELLOW 117-	- - - - -	: TRC.
DIRECT YELLOW 118-	- - - - -	: TRC.
DIRECT YELLOW 119-	- - - - -	: DUP.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
D I R E C T D Y E S--CONTINUED	
@DIRECT YELLOW DYES--CONTINUED	
DIRECT YELLOW 120-	: AC.
DIRECT YELLOW 127-	: DUP, TRC.
DIRECT YELLOW 131-	: DUP.
DIRECT YELLOW 137-	: DUP.
DIRECT YELLOW 139-	: DUP.
DIRECT YELLOW 147-	: DUP.
DIRECT YELLOW DYES, ALL OTHER-	: AC, ACY, ALT, ATL(E), FAB, GAF, TRC, VPC.
@DIRECT ORANGE DYES:	
DIRECT ORANGE 6-	: AC.
@DIRECT ORANGE 8-	: ACS, FAB, GAF.
@DIRECT ORANGE 15-	: AC, ACY, DUP, GAF, TRC.
DIRECT ORANGE 26-	: ATL(E), GAF, TRC.
DIRECT ORANGE 29-	: AC, ATL(E), TRC.
@DIRECT ORANGE 34-	: ATL(E), DUP, GAF, HSH.
DIRECT ORANGE 37-	: ATL(E), GAF.
@DIRECT ORANGE 39-	: AC, ACY, ALT, GAF.
DIRECT ORANGE 59-	: DUP.
DIRECT ORANGE 61-	: TRC.
DIRECT ORANGE 67-	: VPC.
@DIRECT ORANGE 72-	: AC, ATL(E), FAB, HSH, TRC, VPC.
@DIRECT ORANGE 73-	: DUP, TRC, VPC.
DIRECT ORANGE 74-	: DUP.
DIRECT ORANGE 78-	: VPC.
DIRECT ORANGE 81-	: DUP, GAF, VPC.
DIRECT ORANGE 88-	: DUP.
@DIRECT ORANGE 102-	: ACY, ATL(E), DUP, GAF.
DIRECT ORANGE DYES, ALL OTHER-	: ALT, ATL(E), TRC.
@DIRECT RED DYES:	
@DIRECT RED 1-	: ACS, FAB, GAF.
@DIRECT RED 2-	: AC, ATL(E), FAB, TRC.
DIRECT RED 4-	: ATL(E), TRC.
DIRECT RED 7-	: ATL(E).
DIRECT RED 13-	: ACS.
DIRECT RED 16-	: ATL(E), TRC.
@DIRECT RED 23-	: AC, ACY, ATL(E), DUP, GAF, HSH, TRC, VPC.
@DIRECT RED 24-	: AC, ATL(E), HSH, TRC, VPC.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
D I R E C T D Y E S--CONTINUED	
@DIRECT RED DYES--CONTINUED	
@DIRECT RED 26- - - - -	: AC, ATL(E), GAF, TRC, VPC.
DIRECT RED 28- - - - -	: ACS, FAB.
DIRECT RED 31- - - - -	: ATL(E), GAF.
DIRECT RED 37- - - - -	: ACS, GAF.
@DIRECT RED 39- - - - -	: ATL(E), GAF, TRC.
DIRECT RED 62- - - - -	: TRC.
@DIRECT RED 72- - - - -	: ATL(E), DUP, GAF, TRC.
DIRECT RED 73- - - - -	: ATL(E).
DIRECT RED 75- - - - -	: ATL(E).
DIRECT RED 76- - - - -	: GAF.
DIRECT RED 79- - - - -	: ATL(E), TRC.
@DIRECT RED 80- - - - -	: AC, ALT, ATL(E), HSH, SDH, TRC, VPC.
@DIRECT RED 81- - - - -	: AC, ACY, CMG, DUP, GAF, HSH, SDH, TRC, VPC.
@DIRECT RED 83- - - - -	: AC, ALT, ATL(E), FAB, TRC.
DIRECT RED 111 - - - - -	: CMG.
DIRECT RED 117 - - - - -	: DUP.
DIRECT RED 122 - - - - -	: TRC.
DIRECT RED 123 - - - - -	: GAF.
DIRECT RED 127, 127:1, AND 127:2 - - - - -	: ATL(E).
DIRECT RED 139 - - - - -	: ATL(E).
DIRECT RED 149 - - - - -	: ATL(E), CMG.
DIRECT RED 152 - - - - -	: CMG.
DIRECT RED 153 - - - - -	: ATL(E).
DIRECT RED 209 - - - - -	: TRC, VPC.
DIRECT RED 212 - - - - -	: VPC.
DIRECT RED 236 - - - - -	: DUP.
DIRECT RED 238 - - - - -	: DUP.
DIRECT RED DYES, ALL OTHER - - - - -	: AC, ALT, ATL(E), GAF, HSH, SDH, TRC.
@DIRECT VIOLET DYES:	
DIRECT VIOLET 9- - - - -	: DUP, GAF, TRC.
DIRECT VIOLET 51 - - - - -	: ATL(E).
DIRECT VIOLET 66 - - - - -	: DUP, TRC.
DIRECT VIOLET 67 - - - - -	: DUP.
DIRECT VIOLET DYES, ALL OTHER- - - - -	: ATL(E).
@DIRECT BLUE DYES:	
@DIRECT BLUE 1- - - - -	: AC, ACS, ACY, ATL(E), CMG, DUP, GAF, HSH, SDH, TRC,

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
D I R E C T D Y E S--CONTINUED	
@DIRECT BLUE DYES--CONTINUED	VPC.
@DIRECT BLUE 2-	ACS, FAB, GAF.
DIRECT BLUE 6-	ACS, FAB, GAF.
DIRECT BLUE 8-	ATL(E), GAF.
DIRECT BLUE 14-	TRC.
DIRECT BLUE 15-	AC, ATL(E), DUP, GAF, VPC.
DIRECT BLUE 22-	ATL(E).
DIRECT BLUE 25-	ATL(E), TRC.
DIRECT BLUE 71-	ATL(E).
DIRECT BLUE 75-	ATL(E), TRC.
@DIRECT BLUE 76-	AC, ALT, ATL(E), GAF.
DIRECT BLUE 78-	CHG.
@DIRECT BLUE 80-	AC, ALT, ATL(E), DUP, FAB, GAF, HSH, TRC.
DIRECT BLUE 81-	ATL(E).
@DIRECT BLUE 86-	AC, ALT, ATL(E), DUP, FAB, TRC, VPC.
DIRECT BLUE 87-	ATL(E).
DIRECT BLUE 91-	TRC.
@DIRECT BLUE 98-	ALT, GAF, TRC.
DIRECT BLUE 100-	ALT, FAB.
DIRECT BLUE 104-	DUP.
DIRECT BLUE 120, 120:1, 120:2, AND 120:3-	AC, ATL(E), TRC.
DIRECT BLUE 126-	ATL(E), HSH.
DIRECT BLUE 143-	DUP.
DIRECT BLUE 151-	ATL(E).
DIRECT BLUE 160-	TRC, VPC.
DIRECT BLUE 189-	TRC.
DIRECT BLUE 191-	ALT, GAF.
DIRECT BLUE 199-	DUP.
@DIRECT BLUE 218-	AC, ATL(E), DUP, FAB, GAF, TRC, VPC.
DIRECT BLUE 260-	DUP.
DIRECT BLUE 263-	DUP.
DIRECT BLUE 279-	DUP.
DIRECT BLUE DYES, ALL OTHER-	AC, ALT, ATL(E), HSH.
@DIRECT GREEN DYES:	
@DIRECT GREEN 1-	ACS, FAB, GAF, TRC.
DIRECT GREEN 6-	ACS, FAB, GAF.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
D I R E C T D Y E S--CONTINUED	
@DIRECT GREEN DYES--CONTINUED	
DIRECT GREEN 26- - - - -	: TRC.
DIRECT GREEN 27- - - - -	: TRC.
DIRECT GREEN 28- - - - -	: TRC.
DIRECT GREEN 45- - - - -	: VPC.
DIRECT GREEN 47- - - - -	: DUP, GAF.
DIRECT GREEN 51- - - - -	: TRC.
DIRECT GREEN 69- - - - -	: TRC.
DIRECT GREEN DYES, ALL OTHER - - - - -	: DUP.
@DIRECT BROWN DYES:	
DIRECT BROWN 1, 1:1, AND 1:2 - - - - -	: GAF.
@DIRECT BROWN 2 - - - - -	: ACS, FAB, GAF.
DIRECT BROWN 6 - - - - -	: FAB.
@DIRECT BROWN 31- - - - -	: ACS, ATL(E), FAB, GAF.
DIRECT BROWN 44- - - - -	: FAB, GAF.
DIRECT BROWN 74- - - - -	: ACS, FAB.
@DIRECT BROWN 95- - - - -	: ACS, ATL(E), FAB, GAF.
DIRECT BROWN 111 - - - - -	: DUP, GAF.
DIRECT BROWN 112 - - - - -	: ATL(E).
DIRECT BROWN 154 - - - - -	: ACS, FAB.
DIRECT BROWN DYES, ALL OTHER - - - - -	: AC, ALT, ATL(E), DUP, VPC.
@DIRECT BLACK DYES:	
DIRECT BLACK 4 - - - - -	: FAB, GAF.
DIRECT BLACK 19- - - - -	: ATL(E), TRC.
@DIRECT BLACK 22- - - - -	: AC, ALT, ATL(E), TRC, VPC.
@DIRECT BLACK 38- - - - -	: ACS, ACY, FAB, GAF, TRC.
DIRECT BLACK 78- - - - -	: AC.
DIRECT BLACK 80- - - - -	: AC, ATL(E), FAB.
DIRECT BLACK DYES, ALL OTHER - - - - -	: AC, ACS, FAB.
D I S P E R S E D Y E S	
@DISPERSE YELLOW DYES:	
DISPERSE YELLOW 1- - - - -	: AC, GAF.
@DISPERSE YELLOW 3- - - - -	: ATL(E), DUP, GAF, HSH, TRC, VPC.
DISPERSE YELLOW 5- - - - -	: GAF, ICC.
DISPERSE YELLOW 8- - - - -	: ATL(E).
@DISPERSE YELLOW 23 - - - - -	: AC, DUP, EKT, GAF, HSH, TRC.
@DISPERSE YELLOW 33 - - - - -	: AC, EKT, GAF, TRC.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DISPERSE DYES--CONTINUED	
@DISPERSE YELLOW DYES--CONTINUED	
@DISPERSE YELLOW 34 - - - - -	: AC, EKT, ICC.
@DISPERSE YELLOW 42 - - - - -	: AC, BUC, DUP, EKT, GAF, ICC, SDC, TRC.
DISPERSE YELLOW 50 - - - - -	: TRC.
@DISPERSE YELLOW 54 - - - - -	: BAS, DUP, GAF, ICC, SDC, TRC, VPC.
DISPERSE YELLOW 64 - - - - -	: BAS, DUP, GAF.
DISPERSE YELLOW 67 - - - - -	: DUP, VPC.
DISPERSE YELLOW 68 - - - - -	: HST.
DISPERSE YELLOW 77 - - - - -	: VPC.
DISPERSE YELLOW 85 - - - - -	: EKT, VPC.
DISPERSE YELLOW 86 - - - - -	: AC, EKT.
DISPERSE YELLOW 87 - - - - -	: EKT.
DISPERSE YELLOW 88 - - - - -	: ALT, EKT.
DISPERSE YELLOW 89 - - - - -	: EKT.
DISPERSE YELLOW 93 - - - - -	: VPC.
DISPERSE YELLOW 95 - - - - -	: VPC.
DISPERSE YELLOW 96 - - - - -	: VPC.
DISPERSE YELLOW 125 - - - - -	: SDC.
DISPERSE YELLOW 131 - - - - -	: DUP.
DISPERSE YELLOW 136 - - - - -	: DUP.
DISPERSE YELLOW 137 - - - - -	: DUP.
DISPERSE YELLOW 138 - - - - -	: DUP.
DISPERSE YELLOW DYES, ALL OTHER - - - - -	: AC, ATL(E), BAS, EKT, HST, ICI, MAY, SDC, VPC.
@DISPERSE ORANGE DYES:	
@DISPERSE ORANGE 3 - - - - -	: ATL(E), GAF, HSH, TRC.
DISPERSE ORANGE 5 - - - - -	: AC, BUC, EKT.
@DISPERSE ORANGE 17 - - - - -	: AC, EKT, GAF, HSH, ICC.
DISPERSE ORANGE 21 - - - - -	: TRC.
@DISPERSE ORANGE 25 - - - - -	: ATL(E), DUP, EKT, TRC, VPC.
DISPERSE ORANGE 29 - - - - -	: GAF, HSH, VPC.
DISPERSE ORANGE 30 - - - - -	: ICC, TRC.
DISPERSE ORANGE 37 - - - - -	: EKT, GAF, TRC.
DISPERSE ORANGE 41 - - - - -	: AC, DUP.
DISPERSE ORANGE 44 - - - - -	: DUP, TRC.
DISPERSE ORANGE 57 - - - - -	: BUC, EKT.
DISPERSE ORANGE 58 - - - - -	: EKT.
DISPERSE ORANGE 62 - - - - -	: DUP.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
D I S P E R S E D Y E S--CONTINUED	
@DISPERSE ORANGE DYES--CONTINUED	
DISPERSE ORANGE 65 - - - - -	: VPC.
DISPERSE ORANGE 75 - - - - -	: DUP, HSH.
DISPERSE ORANGE 95 - - - - -	: DUP, GAF.
DISPERSE ORANGE 98 - - - - -	: DUP.
DISPERSE ORANGE 125- - - - -	: DUP.
DISPERSE ORANGE DYES, ALL OTHER- - - - -	: AC, ALT, ATL(E), BAS, BUC, DUP, EKT, GAF, HSH, HST, MAY, SDC, TRC, VPC.
@DISPERSE RED DYES:	
@DISPERSE RED 1 - - - - -	: AC, ATL(E), DUP, EKT, GAF, HSH, ICC, TRC.
DISPERSE RED 4 - - - - -	: GAF, TRC.
@DISPERSE RED 5 - - - - -	: AC, EKT, HSH, ICC.
DISPERSE RED 7 - - - - -	: AC.
DISPERSE RED 9 - - - - -	: ATL(E).
DISPERSE RED 11- - - - -	: AC, DUP, GAF.
DISPERSE RED 13- - - - -	: GAF, VPC.
@DISPERSE RED 15- - - - -	: GAF, HSH, ICC, TRC.
@DISPERSE RED 17- - - - -	: AC, EKT, GAF, HSH, TRC.
DISPERSE RED 21- - - - -	: EKT.
DISPERSE RED 30- - - - -	: EKT, TRC.
DISPERSE RED 35- - - - -	: EKT.
DISPERSE RED 50- - - - -	: ALT, ICC, TRC.
DISPERSE RED 55- - - - -	: DUP, GAF, TRC, VPC.
DISPERSE RED 59- - - - -	: DUP, GAF.
@DISPERSE RED 60- - - - -	: AC, ALT, DUP, EKT, GAF, TRC, VPC.
@DISPERSE RED 65- - - - -	: AC, ALT, DUP, EKT, ICC, TRC.
DISPERSE RED 73- - - - -	: BAS, TRC.
DISPERSE RED 82- - - - -	: VPC.
@DISPERSE RED 86- - - - -	: EKT, HSH, TRC.
DISPERSE RED 88- - - - -	: EKT.
DISPERSE RED 90- - - - -	: VPC.
DISPERSE RED 96- - - - -	: ACY.
DISPERSE RED 117 - - - - -	: EKT.
DISPERSE RED 128 - - - - -	: DUP.
DISPERSE RED 133 - - - - -	: VPC.
DISPERSE RED 135 - - - - -	: DUP.
DISPERSE RED 136 - - - - -	: AC, EKT.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DISPERSE DYES--CONTINUED	
@DISPERSE RED DYES--CONTINUED	
DISPERSE RED 137 - - - - -	: EKT.
DISPERSE RED 138 - - - - -	: EKT.
DISPERSE RED 140 - - - - -	: AC, DUP.
DISPERSE RED 159 - - - - -	: VPC.
DISPERSE RED 161 - - - - -	: DUP.
DISPERSE RED 162 - - - - -	: DUP.
@DISPERSE RED 177 - - - - -	: ALT, ICC, SDC, VPC.
DISPERSE RED 179 - - - - -	: GAP, ICC.
DISPERSE RED 180 - - - - -	: ICC.
DISPERSE RED 217 - - - - -	: DUP.
DISPERSE RED 219 - - - - -	: DUP.
DISPERSE RED 220 - - - - -	: DUP.
DISPERSE RED 271 - - - - -	: DUP.
DISPERSE RED 276 - - - - -	: DUP.
DISPERSE RED DYES, ALL OTHER - - - - -	: ALT, BAS, BUC, DUP, EKT, GAP, HSH, HST, ICC, MAY, SDC, : TRC, VPC.
@DISPERSE VIOLET DYES:	
@DISPERSE VIOLET 1- - - - -	: AC, GAP, HSH, ICC, TRC.
DISPERSE VIOLET 8- - - - -	: GAP.
DISPERSE VIOLET 17 - - - - -	: DUP.
DISPERSE VIOLET 28 - - - - -	: DUP, TRC.
DISPERSE VIOLET 26 - - - - -	: DUP.
@DISPERSE VIOLET 27 - - - - -	: AC, ACY, DUP, EKT, ICC.
DISPERSE VIOLET 41 - - - - -	: EKT.
DISPERSE VIOLET 42 - - - - -	: EKT.
DISPERSE VIOLET 44 - - - - -	: EKT.
DISPERSE VIOLET 64 - - - - -	: DUP.
DISPERSE VIOLET DYES, ALL OTHER - - - - -	: EKT, ICI, MAY, SDC, VPC.
@DISPERSE BLUE DYES:	
DISPERSE BLUE 1- - - - -	: GAP, ICC.
@DISPERSE BLUE 3- - - - -	: AC, EKT, GAP, HSH, ICC, TRC.
DISPERSE BLUE 7- - - - -	: AC, ICC, TRC.
DISPERSE BLUE 27 - - - - -	: EKT.
DISPERSE BLUE 55 - - - - -	: TRC.
DISPERSE BLUE 56 - - - - -	: ICC, VPC.
DISPERSE BLUE 60 - - - - -	: DUP.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DISPERSE DYES--CONTINUED	
@DISPERSE BLUE DYES--CONTINUED	
DISPERSE BLUE 62	DUP, EKT.
@DISPERSE BLUE 64	AC, DUP, EKT, TRC.
DISPERSE BLUE 73	ACY, TRC.
DISPERSE BLUE 77	EKT.
@DISPERSE BLUE 79	EKT, GAF, HSH, HST, ICC, MAY, TRC.
DISPERSE BLUE 81	VPC.
DISPERSE BLUE 94	BAS.
DISPERSE BLUE 95	HST.
DISPERSE BLUE 102	EKT.
DISPERSE BLUE 109	DUP.
DISPERSE BLUE 112	EKT.
DISPERSE BLUE 118	EKT.
DISPERSE BLUE 125	ALT, TRC.
DISPERSE BLUE 132	DUP, HST.
DISPERSE BLUE 139	VPC.
DISPERSE BLUE 150	DUP.
DISPERSE BLUE 165	DUP.
DISPERSE BLUE 191	DUP.
DISPERSE BLUE 192	DUP.
DISPERSE BLUE 194	DUP.
DISPERSE BLUE 283	DUP.
DISPERSE BLUE DYES, ALL OTHER	AC, ALT, ATL(E), BAS, BUC, DUP, EKT, GAF, HSH, HST, ICC, MAY, SDC, TRC, VPC.
DISPERSE GREEN DYES:	
DISPERSE GREEN 7	DUP.
DISPERSE GREEN DYES, ALL OTHER	HSH, VPC.
DISPERSE BROWN DYES:	
DISPERSE BROWN 1	AC, ALT, ICI, SDC, TRC.
DISPERSE BROWN 2	DUP, EKT, GAF.
DISPERSE BROWN 14	DUP.
DISPERSE BROWN 15	DUP.
DISPERSE BROWN DYES, ALL OTHER	ATL(E), BAS, HSH, HST, ICC, SDC, TRC, VPC.
@DISPERSE BLACK DYES:	
DISPERSE BLACK 1	ATL(E), GAF.
DISPERSE BLACK 2	ATL(E).
DISPERSE BLACK 9	AC, EKT.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
DISPERSE DYES--CONTINUED	
@DISPERSE BLACK DYES--CONTINUED	
DISPERSE BLACK 33- - - - -	: AC, EKT, ICC.
DISPERSE BLACK DYES, ALL OTHER - - - - -	: ALT, ATL(E), BAS, HSH, ICC, SDC, VPC.
REACTIVE DYES	
@REACTIVE YELLOW DYES:	
REACTIVE YELLOW 1- - - - -	: ICI.
REACTIVE YELLOW 2- - - - -	: TRC.
REACTIVE YELLOW 3- - - - -	: TRC.
REACTIVE YELLOW 4- - - - -	: ICI.
REACTIVE YELLOW 6- - - - -	: TRC.
REACTIVE YELLOW 7- - - - -	: ICI.
REACTIVE YELLOW 15 - - - - -	: HST.
REACTIVE YELLOW 17 - - - - -	: HST.
REACTIVE YELLOW 18 - - - - -	: ICI.
REACTIVE YELLOW 24 - - - - -	: HST.
REACTIVE YELLOW 25 - - - - -	: VPC.
REACTIVE YELLOW 37 - - - - -	: HST.
REACTIVE YELLOW DYES, ALL OTHER- - - - -	: HST, ICI, VPC.
REACTIVE ORANGE DYES:	
REACTIVE ORANGE 1- - - - -	: FAB, ICI.
REACTIVE ORANGE 4- - - - -	: ICI.
REACTIVE ORANGE 12 - - - - -	: ICI.
REACTIVE ORANGE 13 - - - - -	: ICI.
REACTIVE ORANGE 14 - - - - -	: ICI.
REACTIVE ORANGE 16 - - - - -	: HST.
REACTIVE ORANGE DYES, ALL OTHER- - - - -	: HST, ICI, TRC.
REACTIVE RED DYES:	
REACTIVE RED 1 - - - - -	: ICI.
REACTIVE RED 2 - - - - -	: FAB, ICI.
REACTIVE RED 5 - - - - -	: ICI.
REACTIVE RED 8 - - - - -	: ICI.
REACTIVE RED 11- - - - -	: FAB, ICI.
REACTIVE RED 29- - - - -	: ICI.
REACTIVE RED 31- - - - -	: ICI.
REACTIVE RED 33- - - - -	: ICI.
REACTIVE RED 40- - - - -	: VPC.
REACTIVE RED 41- - - - -	: VPC.
REACTIVE RED 58- - - - -	: ICI.
REACTIVE RED DYES, ALL OTHER - - - - -	: HST, ICI, TRC, VPC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
R E A C T I V E D Y E S--CONTINUED	
REACTIVE VIOLET DYES:	
REACTIVE VIOLET 1- - - - -	: ICI.
REACTIVE VIOLET 4- - - - -	: HST.
REACTIVE VIOLET 5- - - - -	: HST.
REACTIVE VIOLET DYES, ALL OTHER- - - - -	: HST.
REACTIVE BLUE DYES:	
REACTIVE BLUE 3- - - - -	: ICI.
REACTIVE BLUE 4- - - - -	: ICI.
REACTIVE BLUE 5- - - - -	: ICI, TRC.
REACTIVE BLUE 7- - - - -	: TRC.
REACTIVE BLUE 19 - - - - -	: HST.
REACTIVE BLUE 21 - - - - -	: HST.
REACTIVE BLUE 29 - - - - -	: VPC.
REACTIVE BLUE 38 - - - - -	: HST.
REACTIVE BLUE DYES, ALL OTHER- - - - -	: HST, ICI.
REACTIVE GREEN DYES:	
REACTIVE GREEN DYES, ALL OTHER - - - - -	: HST.
REACTIVE BROWN DYES:	
REACTIVE BROWN 10- - - - -	: ICI.
REACTIVE BROWN DYES, ALL OTHER - - - - -	: HST, ICI.
REACTIVE BLACK DYES:	
REACTIVE BLACK 5 - - - - -	: HST.
REACTIVE BLACK 9 - - - - -	: ICI.
REACTIVE BLACK DYES, ALL OTHER - - - - -	: HST.
DISPERSE BLACK 33- - - - -	: AC, EKT, ICC.
DISPERSE BLACK DYES, ALL OTHER - - - - -	: ALT, ATL(E), BAS, HSH, ICC, SDC, VPC.
F L U O R E S C E N T B R I G H T E N E R S	
FLUORESCENT BRIGHTENER 9 - - - - -	: SDH.
FLUORESCENT BRIGHTENER 22- - - - -	: CGY.
FLUORESCENT BRIGHTENER 24- - - - -	: CGY, VPC.
FLUORESCENT BRIGHTENER 25- - - - -	: GAF.
@FLUORESCENT BRIGHTENER 28- - - - -	: ACY, CCW, SDH, VPC.
FLUORESCENT BRIGHTENER 46- - - - -	: CGY.
FLUORESCENT BRIGHTENER 49- - - - -	: S.
FLUORESCENT BRIGHTENER 52- - - - -	: S.
FLUORESCENT BRIGHTENER 54- - - - -	: CGY.
FLUORESCENT BRIGHTENER 59- - - - -	: CGY.
@FLUORESCENT BRIGHTENER 61- - - - -	: ACY, CCW, GAF.
FLUORESCENT BRIGHTENER 71- - - - -	: ACY, CGY.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
F L U O R E S C E N T B R I G H T E N E R S--CONTINUED	
FLUORESCENT BRIGHTENER 102 - - - - -	DUP.
FLUORESCENT BRIGHTENER 109 - - - - -	GAP.
FLUORESCENT BRIGHTENER 125 - - - - -	ACY, VPC.
FLUORESCENT BRIGHTENER 126 - - - - -	SDH.
FLUORESCENT BRIGHTENER 128 - - - - -	SDH.
FLUORESCENT BRIGHTENER 130 - - - - -	ACY.
FLUORESCENT BRIGHTENER 134 - - - - -	CGY.
FLUORESCENT BRIGHTNER 159- - - - -	ACY.
FLUORESCENT BRIGHTENERS, ALL OTHER - - - - -	ACY, CCW, DGO, S, VPC.
F O O D, D R U G, A N D C O S M E T I C C O L O R S	
@FOOD, DRUG, AND COSMETIC DYES:	
@FOOD, DRUG, AND COSMETIC BLUE 1- - - - -	ACS, ALT, KON, SDH, WJ.
@FOOD, DRUG, AND COSMETIC BLUE 2- - - - -	ACS, ALT, KON, SDH, WJ.
FOOD, DRUG, AND COSMETIC GREEN 3 - - - - -	WJ.
@FOOD, DRUG, AND COSMETIC RED 2 - - - - -	ALT, KON, SDH, WJ.
@FOOD, DRUG, AND COSMETIC RED 3 - - - - -	ALT, KON, SDH, STG, WJ.
FOOD, DRUG, AND COSMETIC RED 4 - - - - -	ALT, KON.
FOOD, DRUG, AND COSMETIC RED 40- - - - -	ACS, ALT, KON, WJ.
@FOOD, DRUG, AND COSMETIC YELLOW 5- - - - -	ACS, ALT, KON, SDH, STG, WJ.
@FOOD, DRUG, AND COSMETIC YELLOW 6- - - - -	ACS, ALT, KON, SDH, STG, WJ.
FOOD, DRUG, AND COSMETIC DYES, ALL OTHER - - - - -	SDH, STG.
@DRUG AND COSMETIC DYES,	
DRUG AND COSMETIC BLUE 6 - - - - -	KON.
DRUG AND COSMETIC GREEN 5- - - - -	ACS, KON.
DRUG AND COSMETIC GREEN 6- - - - -	KON.
DRUG AND COSMETIC GREEN 8- - - - -	KON, SDH.
DRUG AND COSMETIC ORANGE 4 - - - - -	ACS, KON.
DRUG AND COSMETIC ORANGE 5 - - - - -	SDH, SNA, TMS.
DRUG AND COSMETIC ORANGE 17- - - - -	SNA.
@DRUG AND COSMETIC RED 6- - - - -	KON, SDH, SNA.
@DRUG AND COSMETIC RED 7- - - - -	KON, SDH, SNA, TMS.
DRUG AND COSMETIC RED 9- - - - -	KON, SDH, SNA.
DRUG AND COSMETIC RED 10 - - - - -	KON, SNA.
DRUG AND COSMETIC RED 11 - - - - -	KON, SNA.
DRUG AND COSMETIC RED 12 - - - - -	SDH, SNA.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
FOOD, DRUG AND COSMETIC COLORS-- CONTINUED	
@DRUG AND COSMETIC DYES--CONTINUED	
DRUG AND COSMETIC RED 13 - - - - -	: SDH, SNA.
DRUG AND COSMETIC RED 17 - - - - -	: KON.
@DRUG AND COSMETIC RED 19 - - - - -	: ACS, KON, MRX, SNA.
DRUG AND COSMETIC RED 21 - - - - -	: SDH, SNA.
DRUG AND COSMETIC RED 22 - - - - -	: SDH.
DRUG AND COSMETIC RED 27 - - - - -	: MRX, SDH.
DRUG AND COSMETIC RED 28 - - - - -	: SDH.
DRUG AND COSMETIC RED 30 - - - - -	: KON, SNA.
DRUG AND COSMETIC RED 33 - - - - -	: ACS, KON.
DRUG AND COSMETIC RED 34 - - - - -	: KON, SNA.
DRUG AND COSMETIC RED 36 - - - - -	: ALT, KON.
DRUG AND COSMETIC RED 37 - - - - -	: ACS.
DRUG AND COSMETIC VIOLET 2 - - - - -	: ACS.
DRUG AND COSMETIC YELLOW 5 - - - - -	: CMG, KON.
DRUG AND COSMETIC YELLOW 6 - - - - -	: CMG, KON.
DRUG AND COSMETIC YELLOW 10 - - - - -	: KON.
DRUG AND COSMETIC YELLOW 11 - - - - -	: ACS, KON.
DRUG AND COSMETIC DYES, ALL OTHER - - - - -	: SDH, SNA.
DRUG AND COSMETIC DYES, EXTERNAL:	
EXTERNAL DRUG AND COSMETIC GREEN 1 - - - - -	: ACS.
EXTERNAL DRUG AND COSMETIC YELLOW 1 - - - - -	: ACS, KON.
EXTERNAL DRUG AND COSMETIC YELLOW 7 - - - - -	: KON, SDH.
EXTERNAL DRUG AND COSMETIC DYES, ALL OTHER - - - - -	: KON.
MORDANT DYES	
MORDANT YELLOW DYES:	
MORDANT YELLOW 1 - - - - -	: PDC.
MORDANT YELLOW 8 - - - - -	: PDC.
MORDANT YELLOW 16 - - - - -	: ACY.
MORDANT YELLOW 29 - - - - -	: GAF.
@MORDANT ORANGE DYES:	
@MORDANT ORANGE 1 - - - - -	: ACY, PDC, TRC.
@MORDANT ORANGE 6 - - - - -	: ATL(E), GAF, PDC, TRC.
MORDANT ORANGE 8 - - - - -	: TRC.
MORDANT RED DYES:	
MORDANT RED 7 - - - - -	: ACY, BDO, PDC.
MORDANT RED 9 - - - - -	: MEX.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
M O R D A N T D Y E S--CONTINUED	
MORDANT RED DYES--CONTINUED	
MORDANT RED 11 - - - - -	: ACY.
MORDANT RED DYES, ALL OTHER- - - - -	: SDH.
MORDANT BLUE DYES:	
MORDANT BLUE 1 - - - - -	: GAF.
MORDANT BLUE 13- - - - -	: HSH.
@MORDANT BROWN DYES:	
MORDANT BROWN 1- - - - -	: PDC, TRC.
MORDANT BROWN 15 - - - - -	: GAF.
MORDANT BROWN 18 - - - - -	: PDC.
MORDANT BROWN 33 - - - - -	: GAF, PDC, TRC.
MORDANT BROWN 63 - - - - -	: TRC.
MORDANT BROWN 70 - - - - -	: PDC.
@MORDANT BLACK:	
MORDANT BLACK 9- - - - -	: VPC.
@MORDANT BLACK 11 - - - - -	: GAF, TRC, VPC.
MORDANT BLACK 13 - - - - -	: HSH.
MORDANT BLACK 17 - - - - -	: GAF, TRC.
MORDANT BLACK 19 - - - - -	: PDC.
S O L V E N T D Y E S	
@SOLVENT YELLOW DYES:	
SOLVENT YELLOW 3 - - - - -	: PSC.
SOLVENT YELLOW 13- - - - -	: ACY, GAF.
SOLVENT YELLOW 14- - - - -	: ACY, DUP, GAF, PSC, VPC.
SOLVENT YELLOW 19- - - - -	: GAF.
SOLVENT YELLOW 29- - - - -	: GAF.
SOLVENT YELLOW 30- - - - -	: PSC.
SOLVENT YELLOW 33- - - - -	: AC, ACS, ACY.
SOLVENT YELLOW 40- - - - -	: ACS.
SOLVENT YELLOW 42- - - - -	: ACS.
SOLVENT YELLOW 43- - - - -	: DGO.
SOLVENT YELLOW 44- - - - -	: DGO.
SOLVENT YELLOW 47- - - - -	: ACY, DUP.
SOLVENT YELLOW 56- - - - -	: ACY, PSC.
SOLVENT YELLOW 71- - - - -	: ACY.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
S O L V E N T D Y E S--CONTINUED	
@SOLVENT YELLOW--CONTINUED	
SOLVENT YELLOW 72- - - - -	: AC, ACY.
SOLVENT YELLOW 87- - - - -	: ACY.
SOLVENT YELLOW 107 - - - - -	: MRT.
SOLVENT YELLOW DYES, ALL OTHER- - - - -	: AC, ATL(E), DGO, MRT.
@SOLVENT ORANGE DYES:	
SOLVENT ORANGE 3 - - - - -	: ACY, GAF, PSC.
SOLVENT ORANGE 7 - - - - -	: ACY, GAF, PSC.
SOLVENT ORANGE 20- - - - -	: ACY, GAF.
SOLVENT ORANGE 23- - - - -	: ACS.
SOLVENT ORANGE 24- - - - -	: DUP.
SOLVENT ORANGE 25- - - - -	: ACY, DUP.
SOLVENT ORANGE 51- - - - -	: ACY.
SOLVENT ORANGE DYES, ALL OTHER - - - - -	: AC, ACY, DUP, PSC.
@SOLVENT RED DYES:	
SOLVENT RED 1- - - - -	: PSC.
SOLVENT RED 8- - - - -	: GAF.
SOLVENT RED 22 - - - - -	: GAF.
SOLVENT RED 23 - - - - -	: PSC.
SOLVENT RED 24 - - - - -	: ACY, DUP, GAF, PSC.
SOLVENT RED 26 - - - - -	: ACY, PSC.
SOLVENT RED 27 - - - - -	: PSC.
SOLVENT RED 33 - - - - -	: DUP, GAF.
@SOLVENT RED 49 - - - - -	: ACY, DSC, DUP, GAF.
SOLVENT RED 68 - - - - -	: ACS.
SOLVENT RED 69 - - - - -	: DUP.
SOLVENT RED 74 - - - - -	: ACS.
SOLVENT RED 105- - - - -	: ACY.
SOLVENT RED 108- - - - -	: ACY.
SOLVENT RED 111- - - - -	: AC, ACY.
SOLVENT RED 115- - - - -	: ACY.
SOLVENT RED 126- - - - -	: ACY.
SOLVENT RED 164- - - - -	: MRT.
SOLVENT RED 166- - - - -	: MRT.
SOLVENT RED DYES, ALL OTHER- - - - -	: AC, ACY, ATL(E), MRT.
SOLVENT VIOLET DYES:	
SOLVENT VIOLET 8 - - - - -	: ACY, DSC.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
S O L V E N T D Y E S--CONTINUED	
SOLVENT VIOLET DYES--CONTINUED	
SOLVENT VIOLET 9 - - - - -	: DSC.
SOLVENT VIOLET 13- - - - -	: AC, ATL(E), HSH.
SOLVENT VIOLET 14- - - - -	: AC.
SOLVENT VIOLET DYES, ALL OTHER - - - - -	: AC.
@SOLVENT BLUE DYES	
SOLVENT BLUE 3 - - - - -	: ACY, SW(E).
SOLVENT BLUE 4 - - - - -	: DSC, DUP, SDH.
SOLVENT BLUE 5 - - - - -	: DSC.
SOLVENT BLUE 6 - - - - -	: DSC.
SOLVENT BLUE 7 - - - - -	: ACY.
SOLVENT BLUE 12- - - - -	: DUP.
SOLVENT BLUE 14- - - - -	: ACY.
SOLVENT BLUE 36- - - - -	: AC, DUP.
SOLVENT BLUE 37- - - - -	: DUP.
SOLVENT BLUE 38- - - - -	: ACY, ATL(E), DUP.
SOLVENT BLUE 58- - - - -	: ACY.
SOLVENT BLUE 59- - - - -	: AC, ACY.
SOLVENT BLUE 74- - - - -	: ACS.
SOLVENT BLUE 98- - - - -	: MRT.
SOLVENT BLUE 100 - - - - -	: MRT.
SOLVENT BLUE DYES, ALL OTHER - - - - -	: ACY, DSC, DUP, GAF, HSC, MRT, X.
SOLVENT GREEN DYES:	
SOLVENT GREEN 1- - - - -	: ACY, DSC.
SOLVENT GREEN 2- - - - -	: GAF.
SOLVENT GREEN 3- - - - -	: AC, ACS, ATL(E), HSH.
SOLVENT GREEN DYES, ALL OTHER- - - - -	: DSC.
SOLVENT BROWN DYES:	
SOLVENT BROWN 11 - - - - -	: GAF.
SOLVENT BROWN 12 - - - - -	: ACY, GAF, PSC.
SOLVENT BROWN 19 - - - - -	: DUP.
SOLVENT BROWN 20 - - - - -	: ACY, DUP.
SOLVENT BROWN 22 - - - - -	: PSC.
SOLVENT BROWN 38 - - - - -	: ACY.
SOLVENT BROWN DYES, ALL OTHER- - - - -	: ATL(E), DSC.
SOLVENT BLACK DYES:	
SOLVENT BLACK 5- - - - -	: ACY, DSC.

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
S O L V E N T D Y E S--CONTINUED	
SOLVENT BLACK--CONTINUED	
SOLVENT BLACK 7- - - - -	: ACY, DSC, PSC.
SOLVENT BLACK 13 - - - - -	: ACS.
SOLVENT BLACK 26 - - - - -	: ACY.
SOLVENT BLACK DYES, ALL OTHER- - - - -	: DSC, PSC.
S U L F U R D Y E S	
SULFUR YELLOW DYES:	
LEUCO SULFUR YELLOW 1- - - - -	: SDC.
LEUCO SULFUR YELLOW 2- - - - -	: SDC.
LEUCO SULFUR YELLOW 4- - - - -	: SDC.
SULFUR YELLOW DYES, ALL OTHER- - - - -	: SDC.
SULFUR ORANGE DYES:	
SULFUR ORANGE DYES, ALL OTHER- - - - -	: SDC.
SULFUR RED DYES:	
SULFUR RED DYES, ALL OTHER - - - - -	: SDC.
SULFUR BLUE DYES:	
LEUCO SULFUR BLUE 7- - - - -	: ACY, SDC.
LEUCO SULFUR BLUE 8- - - - -	: SDC.
LEUCO SULFUR BLUE 13 - - - - -	: ACY.
SULFUR BLUE 7- - - - -	: SDC.
SULFUR BLUE 8- - - - -	: SDC.
SULFUR GREEN DYES:	
LEUCO SULFUR GREEN 2 - - - - -	: SDC.
LEUCO SULFUR GREEN 3 - - - - -	: SDC.
LEUCO SULFUR GREEN 16- - - - -	: SDC.
SULFUR GREEN 14- - - - -	: SDC.
SULFUR GREEN DYES, ALL OTHER - - - - -	: SDC.
SULFUR BROWN DYES:	
LEUCO SULFUR BROWN 3 - - - - -	: SDC.
LEUCO SULFUR BROWN 10- - - - -	: SDC.
LEUCO SULFUR BROWN 14- - - - -	: SDC.
LEUCO SULFUR BROWN 82- - - - -	: ACY.
SULFUR BROWN DYES, ALL OTHER - - - - -	: SDC.
SULFUR BLACK DYES:	
LEUCO SULFUR BLACK 1 - - - - -	: ACY, SDC.
LEUCO SULFUR BLACK 2 - - - - -	: ACY, SDC.
LEUCO SULFUR BLACK 10- - - - -	: ACY.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
S U L F U R D Y E S--CONTINUED	
SULFUR BLACK DYES--CONTINUED	
LEUCO SULFUR BLACK 11- - - - -	: SDC.
SOLUBILIZED SULFUR BLACK 2 - - - - -	: SDC.
SULFUR BLACK 1 - - - - -	: ACY, SDC.
SULFUR BLACK 2 - - - - -	: SDC.
SULFUR BLACK 11- - - - -	: SDC.
SULFUR BLACK DYES, ALL OTHER - - - - -	: SDC.
V A T D Y E S	
@VAT YELLOW DYES:	
VAT YELLOW 1, 12-1/2% - - - - -	: ATL(E).
@VAT YELLOW 2, 8-1/2% - - - - -	: AC, TRC, VPC.
VAT YELLOW 4, 12-1/2% - - - - -	: HST, VPC.
VAT YELLOW 14, 12-1/2% - - - - -	: TRC.
VAT YELLOW 15, 11-1/2% - - - - -	: ACY.
VAT YELLOW 22, 10% - - - - -	: DUP.
VAT YELLOW 33, 15% - - - - -	: TRC, VPC.
VAT YELLOW DYES, ALL OTHER - - - - -	: VPC.
@VAT ORANGE DYES:	
VAT ORANGE 1, 20% - - - - -	: ATL(E), HST, TRC, VPC.
@VAT ORANGE 2, 12% - - - - -	: ACY, BAS, DUP, TRC.
VAT ORANGE 3, 13-1/2% - - - - -	: HST.
VAT ORANGE 4, 6% - - - - -	: DUP.
VAT ORANGE 5, 10% - - - - -	: HST.
VAT ORANGE 7, 11% - - - - -	: HST, TRC.
VAT ORANGE 9, 12% - - - - -	: ACY, ATL(E), TRC.
VAT ORANGE 11, 6% - - - - -	: DUP.
@VAT ORANGE 15, 10% - - - - -	: ACY, TRC, VPC.
VAT ORANGE DYES, ALL OTHER - - - - -	: SDC, VPC.
@VAT RED DYES:	
VAT RED 1, 13% - - - - -	: ACY, ATL(E), HST.
VAT RED 12, 8-1/2% - - - - -	: DUP.
VAT RED 13, 11% - - - - -	: DUP, TRC.
VAT RED 14, 10% - - - - -	: HST.
VAT RED 15, 10% - - - - -	: HST, TRC.
VAT RED 16, 11% - - - - -	: DUP.
VAT RED 32, 20% - - - - -	: DUP.
VAT RED 41, 20% - - - - -	: HST.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
V A T D Y E S--CONTINUED	
@VAT VIOLET DYES:	
VAT VIOLET 1, 11%-	: ATL(E), DUP, TRC.
VAT VIOLET 2, 20%-	: ACY, HST.
VAT VIOLET 3, 15%-	: HST.
VAT VIOLET 9, 12%-	: ACY, TRC.
VAT VIOLET 13, 6-1/4%-	: BAS, TRC.
VAT VIOLET 21- - - - -	: VPC.
VAT BLUE DYES:	
VAT BLUE 1, 20%-	: ACS.
VAT BLUE 4, 10%-	: ACY.
VAT BLUE 5, 16%-	: ATL(E), HST.
VAT BLUE 6, 8-1/3%-	: ACY, BAS, TRC.
VAT BLUE 12, 6-1/2%-	: DUP.
VAT BLUE 16, 16%-	: BAS.
VAT BLUE 18, 13%-	: ACY, ATL(E), DUP, TRC.
VAT BLUE 20, 14%-	: ACY, ATL(E), TRC.
VAT BLUE 43- - - - -	: SDC.
VAT BLUE DYES, ALL OTHER- - - - -	: HST, VPC.
@VAT GREEN DYES:	
@VAT GREEN 1, 6%-	: ACY, ATL(E), BAS, DUP, MAY, TRC.
@VAT GREEN 3, 10%-	: AC, ACY, ATL(E), BAS, DUP, TRC.
VAT GREEN 8, 8-1/2%-	: ATL(E), DUP.
VAT GREEN 9, 12-1/2%-	: TRC.
VAT GREEN 32 - - - - -	: VPC.
VAT GREEN DYES, ALL OTHER- - - - -	: ACY, BAS, SDC, VPC.
@VAT BROWN DYES:	
VAT BROWN 1, 11%-	: ACY, DUP, TRC.
VAT BROWN 3, 11%-	: AC, ACY, TRC.
VAT BROWN 5, 13%-	: ACY, HST.
VAT BROWN 11, 12%-	: TRC.
VAT BROWN 13, 17%-	: MAY, TRC.
VAT BROWN 57, 12.8%-	: HST, TRC.
VAT BROWN DYES, ALL OTHER- - - - -	: AC, SDC.
@VAT BLACK DYES:	
VAT BLACK 13, 14%-	: DUP.
VAT BLACK 22, 19%-	: ACY, TRC.

DYES

TABLE 2.--DYES FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

DYES	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
V A T D Y E S--CONTINUED	
@VAT BLACK DYES--CONTINUED	
@VAT BLACK 25, 12-1/2% - - - - -	: AC, ACY, DUP, TRC.
@VAT BLACK 27, 12-1/2% - - - - -	: ACY, BDO, DUP, TRC.
VAT BLACK DYES, ALL OTHER- - - - -	: ACS, ATL(E), SDC.
MISCELLANEOUS DYES, ALL OTHER- - - - -	: ACY, DUP, MRT, SDC, WAY.

DYES

TABLE 3.--DYES: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of dye manufacturers that reported production or sales to the U.S. International Trade Commission for 1976 are listed below in order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
AC	American Color & Chemical Corp.	ICC	Inmont Corp.
ACS	Allied Chemical Corp., Specialty Chemicals Div.	ICI	ICI United States, Inc., Specialty Chemicals Group
ACY	American Cyanamid Co.		
ALL	Alliance Chemical, Inc.		
ALT	Crompton & Knowles Corp.	KON	H. Kohnstamm & Co., Inc.
ATL	Atlantic Chemical Corp.		
		MAY	Otto B. May, Inc.
BAS	BASF Wyandotte Corp.	MRT	Morton Norwich Products, Morton Chemical Co. Div.
BDO	Benzenoid Organics, Inc.	MRX	Max Marx Color & Chemical Co.
BUC	Synalloy Corp., Blackman-Uhler Chemical Div.		
		PCW	Pfister Chemical Works
CCW	Cincinnati Milacron Chemicals, Inc.	PDC	Berncolors-Poughkeepsie, Inc.
CGY	Ciba-Geigy Corp.	PSC	Passaic Color & Chemical Co.
CMG	Nyanza, Inc.		
		S	Sandoz, Inc.
DGO	Day-Glo Color Corp.	SDC	Martin-Marietta Corp., Sodyeco Div.
DSC	Dye Specialties, Inc.	SDH	Sterling Drug, Inc., Hilton-Davis Chemical Co. Div.
DUP	E. I. duPont de Nemours & Co., Inc.	SNA	Sun Chemical Corp.
		STC	American Hoechst Corp., Sou-Tex Works
EKT	Eastman Kodak Co., Tennessee Eastman Co. Div.	STG	Stange Co.
		SW	Sherwin-Williams Co.
FAB	Fabricolor Manufacturing Corp.		
		TMS	Sterling Drug, Inc., Thomasset Colors Div.
GAF	GAF Corp., Chemical Div.	TRC	Toms River Chemical Corp.
HSC	Chemetron Corp., Pigments Div.	VPC	Mobay Chemical Corp, Verona Div.
HSB	Harshaw Chemical Co. Div. of Kewanee Oil Co.		
HST	American Hoechst Corp., Rhode Island Works	WAY	Philip A. Hunt Chemical Corp., Organic Chemical Div.
		WJ	Warner-Jenkinson Manufacturing Co.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

ORGANIC PIGMENTS

David B. Beck and Edmund Cappuccilli

Organic pigments are toners and lakes derived in whole or in part from benzenoid chemicals and colors.

Statistics on production and sales of all organic pigments in 1976 are given in table 1.¹ For a few important pigments already reported in table 1, supplemental data on sales by commercial forms are reported in table 1A. 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 1976 was 67.7 million pounds--36.4 percent more than the 49.9 million pounds produced in 1975 and 3.0 percent less than the 69.8 million pounds produced in 1974. Total sales of organic pigments in 1976 amounted to 54.2 million pounds, valued at \$261.1 million, compared with 42.4 million pounds, valued at \$186.0 million, in 1975 and 58.5 million pounds, valued at \$227.8 million, in 1974. In terms of quantity, sales of organic pigments in 1976 were 27.9 percent greater than in 1975 and 7.3 percent smaller than in 1974; in terms of value, sales in 1976 were 40.3 percent greater than in 1975 and 14.6 percent greater than in 1974.

Production of toners in 1976 amounted to 66.0 million pounds--38.3 percent more than the 47.7 million pounds reported in 1975. Sales in 1976 were 52.8 million pounds, valued at \$256.7 million, compared with 40.8 million pounds, valued at \$182.1 million, in 1975. Sales in 1976 were 29.5 percent greater than those in 1975 in terms of quantity, and 40.9 percent greater in terms of value. The individual toners listed in the report which were produced in the largest quantities in 1976 were Pigment Yellow 12, 7.8 million pounds; Pigment Blue 15, beta form, 6.5 million pounds; Pigment Red 49, barium toner, 4.6 million pounds, and Pigment Red 53, barium toner, 3.3 million pounds.

Production of lakes totaled 1.7 million pounds in 1976--11.6 percent less than the 1.9 million pounds reported for 1975. Sales of lakes in 1976 amounted to 1.4 million pounds, valued at \$4.4 million, compared with sales in 1975 of 1.6 million pounds, valued at \$3.9 million. Sales in 1976 were 12.6 percent less than those in 1975 in terms of quantity, and 11.7 percent greater in terms of value.

For each of 8 selected pigments, or groups of pigments, table 1A gives data on sales by commercial forms. Pigment Yellow 12, Pigment Red 53, barium toner, and Pigment Blue 15, beta form, were sold principally in the flushed form. The remaining 5 pigments, or groups of pigments, for which statistics are published were sold principally in the dry full-strength form. Statistics on sales by commercial forms could not be published for Pigment Blue 15, beta form, Pigment 49, barium toner, Pigment Red 49, calcium toner and Pigment Red 52, without revealing the operations of individual companies.

¹ See also table 2 which lists these products and identifies the manufacturers by codes. These codes are listed in table 3.

ORGANIC PIGMENTS

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TABLE 1.--ORGANIC PIGMENTS: U.S. PRODUCTION AND SALES, 1976

[Listed below are all organic pigments for which any reported data on production or sales may be published. (Leaders (...) are used where the reported data are accepted in confidence and may not be published.) Table 2 lists separately all organic pigments for which data on production or sales were reported and identifies the manufacturers of each]

ORGANIC PIGMENTS	PRODUCTION	SALES		
		QUANTITY	VALUE ¹	UNIT VALUE ²
	1,000 pounds dry basis ³	1,000 pounds dry basis ³	1,000 dollars	per pound
Grand total-----	67,727	54,211	261,089	\$ 4.81
TONERS				
Total-----	66,020	52,818	256,707	4.86
Yellow toners, total-----	17,025	11,792	50,072	4.25
Acetoacetarylide yellows:				
Pigment Yellow 1, C.I. 11 680-----	506	349	1,338	3.83
Pigment Yellow 3, C.I. 11 710-----	239	...	...	...
Pigment Yellow 73, C.I. 11 738-----	701	450	1,796	3.99
Pigment Yellow 74, C.I. 11 741-----	1,735	1,405	6,882	4.90
Benzidine yellow:				
Pigment Yellow 12, C.I. 21 090-----	7,830	5,223	17,917	3.43
Pigment Yellow 13, C.I. 21 100-----	380	203	828	4.08
Pigment Yellow 14, C.I. 21 095-----	3,000	1,992	7,216	3.62
Pigment Yellow 17, C.I. 21 105-----	767	416	1,723	4.15
All other-----	1,867	1,754	12,372	7.05
Orange toners, total-----	1,887	1,340	8,477	6.33
Pigment Orange 5, C.I. 12 075-----	799	516	1,836	3.56
Pigment Orange 13, C.I. 21 110-----	267	171	872	5.11
Pigment Orange 16, C.I. 21 160-----	475	367	1,768	4.82
Pigment Orange 34, C.I. 21 115-----	89	...	...	...
All other-----	257	286	4,001	13.99
Red toners, total-----	25,578	21,598	90,272	4.18
Naphthol reds, total-----	1,318	910	6,431	7.07
Pigment Red 2, C.I. 12 310-----	108	52	310	5.90
Pigment Red 5, C.I. 12 490-----	63	34	280	8.21
Pigment Red 9, C.I. 12 460-----	41	...	...	...
Pigment Red 17, C.I. 12 390-----	95	34	232	6.82
Pigment Red 22, C.I. 12 315-----	89	79	530	6.68
Pigment Red 23, C.I. 12 355-----	268	240	1,769	7.36
All other naphthol reds-----	654	471	3,310	7.03
Pigment Red 3 C.I. 12 120-----	2,168	1,635	5,672	3.47
Pigment Red 4, C.I. 12 085-----	188	195	610	3.12
Pigment Red 38, C.I. 21 120-----	141	...	...	...
Pigment Red 48, C.I. 15 865-----	91	...	...	...
Pigment Red 48, C.I. 15 865, barium toner-----	539	474	1,966	4.15
Pigment Red 48, C.I. 15 865, calcium toner-----	1,928	1,647	7,062	4.29
Pigment Red 48, C.I. 15 865, strontium toner--	...	8	24	2.92
Pigment Red 48, C.I. 15 865, manganese toner--	315	181	792	4.37
Pigment Red 49, C.I. 15 630, barium toner-----	4,648	4,406	10,230	2.32
Pigment Red 49, C.I. 15 630, calcium toner-----	1,460	...	...	...
Pigment Red 52, C.I. 15 860, calcium toner-----	1,514	...	...	...
Pigment Red 52, C.I. 15 860, manganese toner--	699	554	1,709	3.08
Pigment Red 53, C.I. 15 585, barium toner-----	3,319	2,633	7,228	2.75
Pigment Red 57, C.I. 15 850, calcium toner-----	2,513	1,938	8,230	4.25
Pigment Red 63, C.I. 15 880-----	37	37	149	4.04
Pigment Red 81, C.I. 45 160, PMA-----	521	502	4,347	8.66
Pigment Red 81, C.I. 45 160, PTA-----	59	58	663	11.34
All other-----	4,120	6,420	35,159	5.48
Violet toners, total-----	3,050	2,416	28,642	11.86
Pigment Violet 1, C.I. 45 170, PMA-----	62	70	638	9.08
Pigment Violet 1, C.I. 45 170, PTA-----	242	74	783	10.58
Pigment Violet 3, C.I. 42 535, fugitive-----	352	299	1,043	3.49
Pigment Violet 3, C.I. 42 535, PMA-----	514	396	2,023	5.11

See footnotes at end of table.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--ORGANIC PIGMENTS: U.S. PRODUCTION AND SALES, 1976--CONTINUED

ORGANIC PIGMENTS	PRODUCTION	QUANTITY	SALES	
			VALUE ¹	UNIT VALUE ²
	1,000 pounds dry basis ³	1,000 pounds dry basis ³	1,000 dollars	per pound
TONERS--Continued				
Violet toners, total--continued-----				
Pigment Violet 3, C.I. 42 535, PTA-----	43	34	312	\$ 9.25
Pigment Violet 23, C.I. 51 319-----	292	232	4,504	19.45
All other-----	1,545	1,311	19,339	14.75
Blue toners, total-----	14,219	12,074	56,678	4.69
Pigment Blue 1, C.I. 42 595, PMA-----	84	97	810	8.33
Pigment Blue 15, C.I. 74 160 alpha form-----	3,967	3,323	18,159	5.46
Pigment Blue 15:3, C.I. 74 160, beta form----	6,479	5,191	24,984	4.81
Pigment Blue 15:4, C.I. 74 160, beta form----	163	...	...	...
All other-----	3,526	3,463	12,725	3.67
Green toners, total-----	3,801	3,303	21,732	6.58
Pigment Green 2, C.I. 42 040 and 49 005, PMA-	17	23	208	9.12
Pigment Green 2, C.I. 42 040 and 49 005, PTA-	12	9	117	12.52
Pigment Green 7, C.I. 74 260-----	3,260	2,783	17,712	6.36
Pigment Green 36, C.I. 74 265-----	226	250	1,788	7.14
All other-----	286	238	1,907	8.01
Brown and black toners, total-----	460	295	834	2.83
Pigment Brown 5, C.I. 15 800-----	...	29	127	4.38
All other-----	460	266	707	2.66
LAKES				
Total-----	1,707	1,393	4,382	3.15
Red lakes:				
Pigment Red 60, C.I. 16 105-----	321	312	1,188	3.81
Pigment Red 83, C.I. 58 000-----	59	49	298	6.05
Violet lake: Pigment Violet 5, C.I. 58 055----	104	91	437	4.82
Blue lakes-----	678	750	2,058	2.75
All other lakes-----	545	191	401	2.10

¹ The value of sales from toners are reported on a dry full-strength basis and the value of sales for lakes are reported on a dry form basis. All sales value data exclude the additional costs of processing or packaging in commercial forms other than the dry full-strength or dry form.

² Totals and "all other" unit values calculated from rounded figures.

³ 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) numbers shown in this report are the identifying numbers given in the third edition of the Colour Index.

The abbreviations PMA and PTA stand for phosphomolybdic and phosphotungstic (including phosphotungstomolybdic) acids, respectively.

ORGANIC PIGMENTS

TABLE 1A.--U.S. SALES OF SELECTED DRY FULL-STRENGTH COLORS, DRY EXTENDED COLORS, DRY DISPERSIONS, AQUEOUS DISPERSIONS, AND FLUSHED COLORS, 1976

[Listed below are supplemental sales data, by commercial forms, of selected pigments that have been reported in table 1]

SELECTED PIGMENTS BY COMMERCIAL FORMS	SALES ¹		
	QUANTITY	VALUE	UNIT VALUE ²
	<i>1,000 pounds dry basis³</i>	<i>1,000 dollars</i>	<i>per pound</i>
Pigment Yellow 12, C.I. 21 090, total-----	5,223	17,917	\$3.43
Dry full-strength toner-----	1,632	5,398	3.31
Flushed color-----	3,529	12,311	3.49
Aqueous dispersion ⁴ and dry dispersions ⁵ -----	62	207	4.32
Pigment Yellow 13, C.I. 21 100; Pigment Yellow 14, C.I. 21 095; Pigment Yellow 17, C.I. 21 105; and other benzidine yellows, total-----	2,597	9,748	3.75
Dry full-strength toner-----	1,521	5,657	3.72
Aqueous dispersions ⁴ -----	726	2,698	3.72
Flushed color-----	337	1,336	3.97
Dry extended toner and dry dispersions ⁵ -----	13	56	4.18
Pigment Red 3, C.I. 12 120, total-----	1,635	5,672	3.47
Dry full-strength toner-----	1,015	3,497	3.44
Dry extended toner, aqueous dispersions ⁴ , and flused color ⁵ -----	620	2,175	3.51
Pigment Red 48:2 calcium toner, C.I. 15 865, total-----	1,647	7,062	4.29
Dry full-strength toner-----	1,436	6,077	4.23
Dry extended toner, dry dispersion aqueous dispersions ⁴ and and flused color ⁵ -----	211	985	4.67
Pigment Red 53:1, C.I. 15 585, barium toner, total-----	2,633	7,228	2.75
Aqueous dispersions ⁴ -----	18	50	2.80
Flushed color-----	1,784	4,911	2.75
Dry dispersion and dry full-strength toner-----	831	2,267	2.73
Pigment Red 57:1, calcium toner, C.I. 15 850, total-----	1,938	8,230	4.25
Flushed color-----	1,507	6,423	4.26
Dry full-strength toner, dry extended toner, and aqueous dispersions ^{4,5} -----	431	1,807	4.19
Pigment Blue 15, C.I. 74 160, alpha form, total-----	3,323	18,159	5.46
Dry full-strength toner-----	1,385	8,032	5.85
Aqueous dispersions ⁴ -----	842	4,121	4.89
Dry dispersions, dry extended toner, and flused color ⁵ -----	1,096	6,006	5.48
Pigment Green 7, C.I. 74 260, total-----	2,783	17,712	6.36
Dry full-strength toner-----	1,458	9,052	6.21
Flushed color-----	445	3,157	7.09
Aqueous dispersions ⁴ -----	683	4,079	5.97
Dry extended toner and dry dispersions ⁵ -----	197	1,424	7.23

¹ Sales quantities are identical in tables 1 and 1A; the sales value data in 1A generally exceed the value in table 1 because table 1A includes the additional processing and packaging costs of the various commercial forms.

² Calculated from whole figures.

³ Quantity of the various commercial forms is given in terms of dry full-strength toner content.

⁴ Includes presscake.

⁵ Separate data on these commercial forms may not be published without revealing the operation of individual companies.

Note.--The C.I. (*Colour Index*) numbers shown in this report are the identifying numbers given in the third edition of the *Colour Index*.

The abbreviations PMA and PTA stand for phosphomolybdic and phosphotungstic (including phosphotungstomolybdic) acids respectively.

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

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(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AND "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

ORGANIC PIGMENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
TONERS	
@YELLOW TONERS:	
@ACETOACETARYLIDE YELLOWS:	
@PIGMENT YELLOW 1 - - - - -	: ACS, ACY, AMS, DUP, HPC, HSC, HSH, HST, KCW, KON, S, SDH, SNA.
PIGMENT YELLOW 2 - - - - -	: KCW.
@PIGMENT YELLOW 3 - - - - -	: ACS, BNS, HPC, HSC, HSH, HST, KCW, KON, ROM.
PIGMENT YELLOW 5 - - - - -	: HPC.
PIGMENT YELLOW 6 - - - - -	: HPC.
PIGMENT YELLOW 49- - - - -	: S.
@PIGMENT YELLOW 73- - - - -	: ACS, HPC, HSC, HSH, HST, KCW, SNA.
@PIGMENT YELLOW 74- - - - -	: ACS, DUP, HPC, HSC, HSH, HST, ICP, SDH, SNA.
PIGMENT YELLOW 75- - - - -	: HPC.
ACETOACETARYLIDE YELLOWS, ALL OTHERS - - - - -	: ACS, DUP, HPC, HSH, HST, KCW, KON.
DIARYLIDE YELLOWS:	
@PIGMENT YELLOW 12- - - - -	: ACS, AMS, APO, BOR, HPC, HSC, HSH, HST, ICP, ROM, SDH, SNA.
@PIGMENT YELLOW 13- - - - -	: AMS, BUC, HPC, HSC, HST, ICP, MRA, ROM, SDH, SNA.
@PIGMENT YELLOW 14- - - - -	: ACS, AMS, BNS, BOR, BUC, GAF, HPC, HSC, HSH, HST, ICP, MRA, ROM, S, SDH, SNA, X.
@PIGMENT YELLOW 17- - - - -	: ACS, BOR, BUC, HPC, HSC, HSH, HST, ICP, ROM, SDH, SNA.
PIGMENT YELLOW 55- - - - -	: HPC, ICP.
PIGMENT YELLOW 83- - - - -	: HSC, HST, ICP, SNA.
DIARYLIDE YELLOWS, OTHER - - - - -	: ICP, ROM.
YELLOW PIGMENTS, OTHER:	
(BASIC YELLOW 2), FUGITIVE - - - - -	: LVR, MRX.
(DIRECT YELLOW 6) - - - - -	: LVR.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

ORGANIC PIGMENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
T O N E R S--CONTINUED	
@YELLOW TONERS--CONTINUED	
YELLOW PIGMENTS, OTHER--CONTINUED	
PIGMENT YELLOW 16-	: HST.
PIGMENT YELLOW 24-	: ACS.
PIGMENT YELLOW 97-	: HST.
PIGMENT YELLOW TONERS, ALL OTHER	: ACS, ICF, S.
@ORANGE TONERS:	
PIGMENT ORANGE 1-	: ACS, KCW.
PIGMENT ORANGE 2-	: HPC, UHL.
@PIGMENT ORANGE 5-	: ACY, HPC, HSC, HSH, HST, SDH, SNA.
@PIGMENT ORANGE 13-	: ACS, AMS, HPC, HSC, HSH, ICF, KON, MRA, S.
PIGMENT ORANGE 15-	: ACS.
@PIGMENT ORANGE 16-	: ACS, BNS, HPC, HSH, HST, ICF, MRA, MRX, ROM, SDH, SNA.
@PIGMENT ORANGE 34-	: BUC, ICF, ROM, SDH.
PIGMENT ORANGE 43-	: ACS, HST.
PIGMENT ORANGE 48-	: DUP.
PIGMENT ORANGE 49-	: DUP.
PIGMENT ORANGE TONERS, ALL OTHER	: ACS, KON, ROM.
@RED TONERS:	
@NAPHTHOL REDS:	
@PIGMENT RED 2-	: ACS, HPC, HSH, KCW, S.
@PIGMENT RED 5-	: GAF, HPC, HSH, ICF, ROM, S, SDH.
PIGMENT RED 7-	: HST, S.
@PIGMENT RED 9-	: HPC, HST, MRX.
PIGMENT RED 13-	: HPC, KCW.
PIGMENT RED 15-	: DUP, HST.
@PIGMENT RED 17-	: ACY, BNS, HPC, ICF, SNA, UHL.
PIGMENT RED 21-	: BNS.
@PIGMENT RED 22-	: ACY, DUP, HPC, MRX, ROM, SNA.
@PIGMENT RED 23-	: ACY, BUC, DUP, HPC, HSH, ROM, SDH, UHL.
PIGMENT RED 31-	: MRA.
PIGMENT RED 112-	: HPC, HST.
NAPHTHOL REDS, ALL OTHER	: ICF, KCW, MRA, ROM, SDH, SNA, VPC.
RED PIGMENTS, OTHER:	
PIGMENT RED 1, DARK-	: HPC, HSH, KON.
PIGMENT RED 1, LIGHT	: HPC, HSH, SDH.
@PIGMENT RED 3-	: ACY, CIK, DUP, HPC, HSC, HSH, KCW, KON, SDH, SNA, UHL.
@PIGMENT RED 4-	: ACY, AMS, HPC, HSC, KON, MRX, SDH, UHL.

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

ORGANIC PIGMENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
T O N E R S--CONTINUED	
@RED TONERS--CONTINUED	
RED PIGMENTS, OTHER--CONTINUED	
PIGMENT RED 6- - - - -	: DUP, HSH, KCW.
@PIGMENT RED 38 - - - - -	: ACS, HSH, SNA.
PIGMENT RED 41 - - - - -	: ACS.
@PIGMENT RED 48 - - - - -	: AMS, GAF, HPC, ICF.
@PIGMENT RED 48:1, BARIUM - - - - -	: BOR, DUP, HPC, HSC, HSH, S, SNA.
@PIGMENT RED 48:2, CALCIUM - - - - -	: ACY, BOR, DUP, HPC(E), HSC, HSH, MGR, MRX, SNA.
@PIGMENT RED 48:3, STRONTIUM - - - - -	: HPC, HSH, S.
@PIGMENT RED 48:4, MANGANESE - - - - -	: ACS, DUP, HPC, HSH.
@PIGMENT RED 49:1, BARIUM - - - - -	: ACY, AMS, BNS, BOR, CIK, HSC, KON, MRX, SDH, SNA, UHL.
@PIGMENT RED 49:2, CALCIUM - - - - -	: ACY, AMS, BNS, BOR, CIK, HSC, SDH.
PIGMENT RED 49, SODIUM - - - - -	: BNS, SDH.
@PIGMENT RED 52:1, CALCIUM - - - - -	: AMS, HPC, HSC, MGR, SNA.
@PIGMENT RED 52:2, MANGANESE - - - - -	: HPC, HSC, HSH.
@PIGMENT RED 53:1, BARIUM - - - - -	: ACY, AMS, BOR, CIK, HSC, HSH, ICF, KON, MGR, MRX, SDH, : SNA.
PIGMENT RED 53:2, CALCIUM - - - - -	: HSC.
PIGMENT RED 53, SODIUM - - - - -	: KON.
PIGMENT RED 54, CALCIUM - - - - -	: HSH, SDH.
@PIGMENT RED 57:1, CALCIUM - - - - -	: AMS, APO, BNS, BOR, CIK, DUP, HPC, HSC, HSH, ICF, KON, : MGR, SDH, SNA, UHL.
PIGMENT RED 58 - - - - -	: DUP, HPC.
@PIGMENT RED 63 - - - - -	: HSC, HSH, KON, SNA.
@PIGMENT RED 81, PMA - - - - -	: AMS, DUP, HPC, KON, LVR, MGR, MRX, SNA, UHL.
@PIGMENT RED 81, PTA - - - - -	: DUP, HPC, HSC, KON, MGR, MRX, UHL.
PIGMENT RED 88 - - - - -	: ACS, HST.
PIGMENT RED 90 - - - - -	: AMS, BOR, ICF, SDH.
PIGMENT RED 122 - - - - -	: ACS, HST, SNA.
PIGMENT RED 123 - - - - -	: ACS, HSC.
PIGMENT RED 168 - - - - -	: ACS, HST.
PIGMENT RED 179 - - - - -	: ACS.
PIGMENT RED 181 - - - - -	: HST.
PIGMENT RED 190 - - - - -	: ACS, HSC.
PIGMENT RED 202 - - - - -	: DUP.
PIGMENT RED 206 - - - - -	: DUP.
PIGMENT RED 207 - - - - -	: DUP.
PIGMENT RED TONERS, ALL OTHER - - - - -	: ACS, DUP, HSC, HST, ICF, X.

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

ORGANIC PIGMENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
T O N E R S--CONTINUED	
@VIOLET TONERS:	
PIGMENT VIOLET 1, FUGITIVE - - - - -	: KCW, MRX, UHL.
@PIGMENT VIOLET 1, PMA- - - - -	: HPC, MGR, MRX, SNA, UHL.
@PIGMENT VIOLET 1, PTA- - - - -	: AMS, DUP, GAF, HPC, HSC, MGR, SNA, UHL.
@PIGMENT VIOLET 3, FUGITIVE - - - - -	: ACY, AMS, HSC, KON, MGR, UHL.
@PIGMENT VIOLET 3, PMA- - - - -	: DUE, HPC, HSC, KON, MGR, MRX, SDH, UHL.
@PIGMENT VIOLET 3, PTA- - - - -	: ACY, AMS, HPC, HSC, KON, MRX.
PIGMENT VIOLET 4, FUGITIVE - - - - -	: KCW.
PIGMENT VIOLET 19- - - - -	: ACS, DUP, SNA.
@PIGMENT VIOLET 23- - - - -	: ACS, HSC, HST, SDC, SNA.
PIGMENT VIOLET 31- - - - -	: DUP.
PIGMENT VIOLET 36- - - - -	: HST.
PIGMENT VIOLET 38- - - - -	: BUC.
PIGMENT VIOLET 42- - - - -	: DUP.
PIGMENT VIOLET TONERS, ALL OTHER - - - - -	: ACY, BUC, HPC, ICF, ROM.
BLUE TONERS:	
@PIGMENT BLUE 1, PMA- - - - -	: BNS, DUP, HPC, MGR, MRX, UHL.
PIGMENT BLUE 1, PTA- - - - -	: KON, MRX.
PIGMENT BLUE 2, PMA- - - - -	: KON.
PIGMENT BLUE 2, PTA- - - - -	: KON.
PIGMENT BLUE 9, PMA- - - - -	: UHL.
PIGMENT BLUE 10, PMA- - - - -	: SDH.
PIGMENT BLUE 14, PMA- - - - -	: DUP, GAF, LVR.
@PIGMENT BLUE 15, ALPHA FORM- - - - -	: ACS, ACY, DUP, GAF, HPC, HSC, HSH, HST, MRA, SDH, TMS.
PIGMENT BLUE 15:1, ALPHA FORM- - - - -	: HSC, HST, SNA.
PIGMENT BLUE 15:2, ALPHA FORM- - - - -	: HSC, SNA.
@PIGMENT BLUE 15:3, BETA FORM - - - - -	: ACY, AMS, APO, BAS, BOR, CIK, DUP, GAF, HPC, HSC, ICF,
	: MGR, POP, ROM, SNA.
@PIGMENT BLUE 15:4, BETA FORM - - - - -	: HSC, ICF, SNA.
PIGMENT BLUE 19- - - - -	: HSC, SW(E).
PIGMENT BLUE 22- - - - -	: ACS, DUP.
PIGMENT BLUE 25- - - - -	: ICF.
PIGMENT BLUE TONERS, ALL OTHER - - - - -	: LVR, SDH, TNI, UHL.
GREEN TONERS:	
PIGMENT GREEN 1, PMA- - - - -	: DUP, MRX, UHL.
PIGMENT GREEN 1, PTA- - - - -	: MGR.

ORGANIC PIGMENTS

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

ORGANIC PIGMENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
T O N E R S--CONTINUED	
GREEN TONERS--CONTINUED	
@PIGMENT GREEN 2, PMA - - - - -	: GAP, KON, MGR, MRX, S.
@PIGMENT GREEN 2, PTA - - - - -	: ACY, HPC, KON, MRX, S.
PIGMENT GREEN 4, PMA - - - - -	: KON.
PIGMENT GREEN 4, PTA - - - - -	: ACY.
@PIGMENT GREEN 7- - - - -	: ACS, ACY, AMS, BAS, CIK, DUP, HPC, HSC, HST, POP, SDH,
	: SNA, TMS.
PIGMENT GREEN 8- - - - -	: HPC, KCW.
PIGMENT GREEN 10 - - - - -	: DUP, HPC.
@PIGMENT GREEN 36 - - - - -	: ACS, ACY, DUP, HSC, HST, SNA.
PIGMENT GREEN TONERS, ALL OTHER- - - - -	: UHL.
BROWN TONERS:	
(ACID BROWN 1) - - - - -	: LVR.
PIGMENT BROWN 1- - - - -	: S.
PIGMENT BROWN 3, PMA - - - - -	: KCW, KON.
@PIGMENT BROWN 5- - - - -	: ACS, ICF, ROM.
PIGMENT BROWN TONERS, ALL OTHER- - - - -	: SDH.
BLACK TONERS:	
PIGMENT BLACK TONERS-----	: DUP, GAP, HST, UHL.
L A K E S	
YELLOW LAKES:	
(ACID YELLOW 23) - - - - -	: KON, LVR, MRX.
(BASIC YELLOW 37)- - - - -	: BNS.
ORANGE LAKES:	
(ACID ORANGE 17) - - - - -	: KCW.
PIGMENT ORANGE 17- - - - -	: KCW, KON.
RED LAKES:	
(ACID RED 17)- - - - -	: HPC.
(ACID RED 26) - - - - -	: HPC, KCW.
(BASIC RED 1)- - - - -	: BNS.
(BASIC RED 2)- - - - -	: BNS.
@PIGMENT RED 60:1 - - - - -	: HSH, KON, MRX, SDH, SNA.
@PIGMENT RED 83 - - - - -	: HPC, HSH, KON, MRX, UHL.
VIOLET LAKES:	
(BASIC VIOLET 1) - - - - -	: BNS.
(BASIC VIOLET 4) - - - - -	: BNS.
(BASIC VIOLET 10)- - - - -	: BNS.

TABLE 2.--ORGANIC PIGMENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

ORGANIC PIGMENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
L A K E S--CONTINUED	
VIOLET LAKES--CONTINUED	
@PIGMENT VIOLET 5:1 - - - - -	: ACS, DUP, HPC, HSH, KON, MRX, S, UHL.
@BLUE LAKES:	
(BASIC BLUE 7) - - - - -	: BNS.
PIGMENT BLUE 17:1- - - - -	: GAF, SDH.
PIGMENT BLUE 24- - - - -	: BOR, KON.
BROWN LAKES:	
PIGMENT BROWN LAKES-----	: KON.
BLACK LAKES:	
PIGMENT BLACK LAKES-----	: KON.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 3.--ORGANIC PIGMENTS: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of organic pigment manufacturers that reported production or sales to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ACS	Allied Chemical Corp., Specialty Chemicals Div.	KCW	Keystone Color Works, Inc.
ACY	American Cyanamid Co.	KON	H. Kohnstamm & Co., Inc.
AMS	Ridgway Color & Chemical		
APO	Apollo Colors, Inc.	LVR	C. Lever Co., Inc.
BAS	BASF Wyandotte Corp.	MGR	Magruder Color Co., Inc.
BNS	Binney and Smith, Inc.	MRA	Bostik South, Inc.
BOR	Borden, Inc., Printing Ink Div.	MRX	Max Marx Color & Chemical Co.
BUC	Synalloy Corp., Blackman-Uhler Chemical Div.		
		POP	Pope Chemical Corp.
CIK	Flint Ink Corp., Cal/Ink Div.		
		ROM	United Merchants & Manufacturers, Inc., Roma Chemical Div.
DUP	E. I. duPont de Nemours & Co., Inc.		
		S	Sandoz, Inc., Colors & Chemicals Div.
GAF	GAF Corp., Chemical Div.	SDC	Martin-Marietta Corp., Sodyeco Div.
		SDH	Sterling Drug, Inc., Hilton-Davis Chemical Co. Div.
HPC	Hercules, Inc.	SNA	Sun Chemical Corp.
HSC	Chemetron Corp., Pigments Div.	SW	Sherwin-Williams Co.
HSH	Harshaw Chemical Co. Div. of Kewanee Oil Co.		
HST	American Hoechst Corp., Rhode Island Works	TMS	Sterling Drug, Inc., Thomasset Colors Div.
		TNI	Gillette Co., Chemical Div.
ICC	Inmont Corp.	UHL	Paul Uhlich & Co., Inc.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

MEDICINAL CHEMICALS

Tedford C. Briggs

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.

The table 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.¹ The difference between production and sales reflects inventory changes, processing losses, and captive consumption of medicinal chemicals processed into ethical and proprietary pharmaceutical products by the primary manufacturer. In some instances, the difference may also include quantities of medicinal grade products used as intermediates, e.g., penicillin G salts used as intermediates in the manufacture of semi-synthetic penicillins. All quantities are given in terms of 100-percent content of the pure bulk drug.

Total U.S. production of bulk medicinal chemicals in 1976 amounted to 235.8 million pounds, or 13.2 percent more than the 208.4 million pounds produced in 1975 and 4.0 percent less than the 246.5 million pounds produced in 1974. Total sales of bulk medicinal chemicals in 1976 amounted to 160.8 million pounds, valued at \$741.5 million, compared with sales in 1975 of 148.8 million pounds, valued at \$772.1 million, and sales in 1974 of 177.5 million pounds, valued at \$814.8 million.² In terms of quantity, sales in 1976 were thus 8.1 percent more than in 1975 and 9.0 percent less than in 1974. In terms of value, sales in 1976 were 4.0 percent less than in 1975 and 9.0 percent less than in 1974.²

Production of the more important groups of medicinal chemicals in 1976

¹ 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 who 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.

² Sales value and, to a lesser extent, sales quantity were overstated in 1974 and 1975 because a company erroneously reported sales of an antibiotic in dosage form.

was as follows: Antibiotics, 20.5 million pounds (12.0 percent more than in 1975), of which 10.4 million pounds was for medicinal use and 10.0 million pounds was for other uses; anti-infective agents other than antibiotics, 27.6 million pounds (3.0 percent less than in 1975); central nervous system depressants and stimulants, 52.7 million pounds (10.5 percent more); and vitamins, 33.3 million pounds (11.2 percent more).

Production of some of the more important individual products listed in the table was as follows: Choline chloride, 47.0 million pounds (21.5 percent larger than in 1975); aspirin, 28.3 million pounds (11.2 percent more); penicillins (except semi-synthetic), 7.1 million pounds (21.0 percent more); tetracyclines, 5.7 million pounds (22.0 percent more); and vitamin E, 4.6 million pounds (111.5 percent more).

Medicinal Chemicals

According to a recent report the drug industry suffered continued declines in profit margins in 1976. ^{1/} The study surveyed the performance of 10 major drug firms which account for more than 50 percent of the industry's profits and sales. In 1976, before-tax profits for the 10 companies were 15.2 percent of sales, down from 18.1 percent in 1975, 19.6 percent in 1974, and 21.0 percent in 1973. After-tax profits of the 10 firms climbed 9.1 percent in 1976 from 1975, whereas sales went up 10.8 percent. After-tax profits as a percentage of sales sank, therefore, even lower than 1975, which had the lowest value in more than a decade.

One factor in the profit decline is that patents have been running out on whole families of drugs developed during the 1950's, resulting in increased competition, especially foreign, and lower prices and profits for those products. Another factor lowering profits is pressure by the Department of Health, Education, and Welfare, for the prescribing of drugs by generic name rather than by the usually more costly brand-name products.

The drug industry benefits from heavy investment in offshore tax havens, chiefly Puerto Rico and Ireland. The tax rate for the 10 companies was 36.4 percent in 1976, up slightly from the 36.0-percent rate in 1975. Until 1976 the tax rate for drug companies had been dropping steadily since 1969, when it was 49 percent--the high point for the past decade.

One factor which would affect future growth in drug sales volume would be the passage of some form of national health insurance. With passage of such a program, the prescribing of drugs would be expected to increase.

The best hope for growth in drug profitability may be in the new generations of drugs. Here, the chief complaint from industry is Government regulations. Reportedly, before 1962, about 2 years usually elapsed between the discovery of a new drug and final approval by the Food and Drug Administration (FDA) for marketing. Now 7 to 10 years may be required because of increased time for tests to meet newer FDA regulations.

Future trends in the drug industry

Whole new generations of drugs, products of major breakthroughs in molecular biology and biochemistry, are building up in drug-company laboratories. Some have already been introduced abroad while others are awaiting FDA approval. Many of the newer drugs are hoped to be more specific in their actions so that they will attack only disease-causing agents or infected cells while having little or no toxic effect on the patient.

^{1/} "Drug Industry Performance Continues to Slip," Chemical and Engineering News, May 2, 1977, pp. 11-12.

The empirical approach to drug development, in which thousands of organic chemicals are tested for therapeutic effects, is now giving way to specific drug design in which medicinal chemicals are modified in ways that are likely to produce desired results. Computer programs are sometimes used in the complex strategy involved in deciding which changes to make in a drug molecule so that it will precisely fit its intended target in the human body.

Among the new drug developments is a custom-designed drug with highly promising results in the treatment of peptic ulcers; another development is an antiviral drug believed to be present in the human body in minute amounts. This drug may have broad-spectrum antiviral activity and may eventually be used to destroy cold and flu virus. Another discovery is a possibly nonaddictive analgesic more effective than morphine. Drug companies have developed new antihypertensive agents and at least one drug that may be useful in the treatment of chronic heart failure. Some scientists feel that drugs that control the levels of cyclic nucleotides in the body will be useful in treating asthma and other diseases.

Another new approach in medicinal chemistry is the development of new drugs resembling hormones that either produce a metabolic response or block or reduce such a response. Antihistamines are an example of older drugs of this type in that these antagonists prevent the hormone histamine from binding to cell receptor sites. Not since the days of the discovery and development of cortisone has a natural hormone attracted so much attention in endocrinology, chemistry, and pharmacology as have the prostaglandins. Most major drug companies have active drug development programs focused around the chemistry of these potent and multi-action natural hormones. In addition, receptor research recently led to the discovery of a new class of brain hormones which appear to mediate a large number of brain functions.

So, while the introduction of new drugs has slowed in the last 10 years, most drug companies remain optimistic about the future of the industry. In view of Government and industry spending, medicinal chemistry is one of the more active areas in the chemistry of the organic compounds. 1/

Production of drugs in Puerto Rico and in Ireland

Puerto Rico will strengthen its position as one of the principal producing areas for medicinal chemicals when a new \$70 million plant built by Hoffman-LaRoche reaches full production in 1978. 2/ Hoffman-LaRoche joins a host of other pharmaceutical companies with plants in Puerto Rico, including Eli Lilly, Upjohn, Squibb, Bristol Myers, Merck, Sharp and Dohme, Searle, Smith Kline & French, Warner-Lambert, Abbott, Johnson & Johnson, Parke Davis, Richardson Merrell, Baxter Travenol, Lenderele, Seifel, Pfizer, Schering Plough, Sterling Drug, and Endo Labs.

1/ Donald A. Buyske, "Drugs from Nature," Chemtech, June 1975, pp.361-369. "Future Drugs That Will Be Lifesavers," Fortune, December 1976, pp. 152-162.

2/ "Roche Opening of Pharmaceutical Unit Seen as Spur to Puerto Rico Drug Trade," Chemical Marketing Reporter, Dec. 12, 1976.

In 10 years the value of exports of drugs from Puerto Rico has increased from \$31.4 million in 1966 to \$352.6 million in 1976. Employment in the industry was up to 6,300 in 1976. The principal incentive for locating plants in Puerto Rico is the 10 to 30 years of tax exemption. Other factors are, reportedly, good worker productivity and a favorable climate.

Another area noted for its concentration of pharmaceutical plants is the Republic of Ireland. Production plants owned by 11 of the world's top 16 drug companies are located in Ireland. Ireland's attraction to drug producers, like that of Puerto Rico, is the tax exemption given for plants located in Ireland. Ireland gives complete tax exemption on export-derived profits until 1990, and Ireland reportedly exports over 95 percent of its drug production. There have been reports that changes will be imposed by the European Economic Community Commission in Brussels to reduce Ireland's tax holiday, presumably as part of its long-promised harmonization of European Community investment incentives. The Industrial Development Authority of Ireland declares, however, that there will be no changes in any existing agreements. Another incentive offered to industry by Ireland are grants ranging from \$6,000 to \$10,000 for each job created. 1/

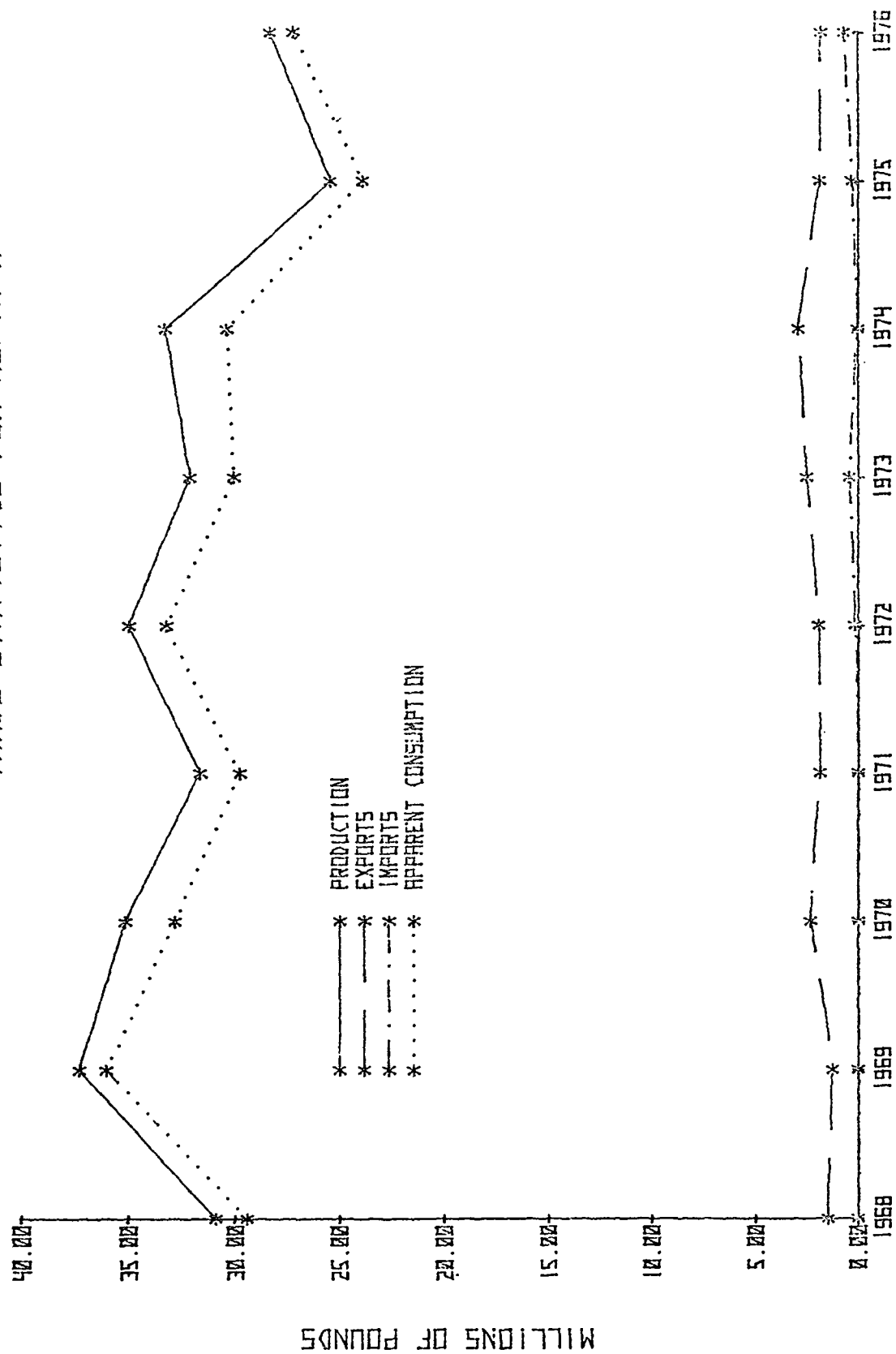
Production, foreign trade, consumption, and market trends of aspirin

Aspirin (acetylsalicylic acid) has been used to relieve pain, inflammation, and fever since 1899. Consumption of aspirin is probably more than that of any other drug with about 27 million pounds consumed during 1976 in the United States alone. The following figure shows a general declining trend in domestic aspirin production and consumption during 1968-76. The principal factor believed to be responsible for the decline in aspirin consumption is the substitution of acetaminophen by many individuals who formerly used aspirin. Imports are not yet a major factor in the aspirin market, accounting for less than 3 percent of domestic consumption in 1976. This does not mean, however, that imports of aspirin will not become important. And, in fact, there are reasons to expect that imports will capture an increasing share of the domestic market. Imports jumped from none in 1971 to 164,000 pounds in 1972 and 702,000 pounds in 1976. In 1975 almost all of the imports came from Poland, while in 1976 most of the imports of aspirin came from Poland and Romania. Exports of aspirin peaked in 1974 and declined in the 2 subsequent years.

The decline in aspirin consumption will probably not continue as aspirin remains one of the most effective drugs for the treatment of connective-tissue diseases such as arthritis. These diseases affect, to a varying degree, a large segment of the population with the incidence generally increasing with age. Demographers predict a steady increase in median age of the domestic population, and it is reasonable to predict increased use of the drugs effective in geriatrics. Domestic production may continue to decline as aspirin is a low-cost drug widely made throughout the world.

1/ "Another U.S. Pharmaceutical Project for Ireland," European Chemical News, Sept. 10, 1976.

TRADE STATISTICS FOR ASPIRIN



Production may shift to those countries that have the lowest production cost.

Studies are now underway to determine if aspirin is useful in preventing heart attacks. Aspirin is known to block prostaglandin synthesis and is being tested in a clinical study sponsored by the National Heart, Lung and Blood Institute to see whether aspirin can protect against heart attacks. It is known that some of the prostaglandins promote blood clotting and some scientists feel prostaglandins may be important in the processes causing heart attacks or stroke. However, the discovery in late 1976 that some of the prostaglandins inhibit blood clotting and arterial contraction has led some investigators to question whether taking aspirin would, in fact, prevent heart attacks. Perhaps the trial called the aspirin myocardial infarction study (AMIS) will answer these questions. The test group includes over 4,000 patients who have suffered at least one heart attack. The experimental phase of AMIS will be completed by August 1979, and the results will be closely watched by the medical profession.

In late 1976 a review panel studying nonprescription drugs for the FDA recommended that labeling of over-the-counter pain relievers, such as aspirin and acetaminophen, be restricted to indicate use for headaches, minor aches and pain, and fever. The panel also recommended warnings on the labels about the dangers of overdosage. Drug industry reaction to the recommendations was fear that the \$715 million market for the mild pain relievers would be severely hurt if patients are forced to rely on more expensive and powerful, and possibly more toxic, prescription drug products for relief of specific pain symptoms. The panel's recommendations were based upon its desire to curb what it feels is an overuse of nonprescription pain relievers. The FDA is studying the panel's proposals before taking action.

MEDICINAL CHEMICALS

TABLE 1.--MEDICINAL CHEMICALS: U.S. PRODUCTION AND SALES, 1976

[Listed below are all synthetic organic medicinal chemicals for which any reported data on production or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all medicinal chemicals for which data on production and/or sales were reported and identifies the manufacturers of each]

MEDICINAL CHEMICALS	PRODUCTION ¹	SALES ¹		
		QUANTITY	VALUE	UNIT VALUE ²
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Grand total-----	235,805	160,834	741,521	\$ 4.61
Acyclic-----	99,431	81,253	98,692	1.21
Benzenoid ³ -----	114,905	63,140	402,117	6.37
Cyclic nonbenzenoid ⁴ -----	21,469	16,441	240,712	14.64
Antibiotics, total ⁵ -----	20,472	6,520	211,529	32.44
Penicillins (except semisynthetic), total-----	7,132	2,888	34,365	11.90
Penicillin G, potassium for medicinal use-----	2,182	...	...	...
All other, for all uses-----	4,950	2,888	34,365	11.90
Semisynthetic penicillins, for medicinal use, total-----	1,433	485	43,121	88.91
Ampicillin-----	900	...	...	...
All other-----	533	485	43,121	88.91
Tetracyclines, for all uses-----	5,695	378	16,763	44.35
Other antibiotics, total-----	6,212	2,769	117,280	42.35
For medicinal use ⁶ -----	2,680	848	92,166	108.69
For nonmedicinal uses ⁷ -----	3,532	1,921	25,114	13.07
Antihistamines, total-----	489	231	6,459	27.96
Chlorpheniramine maleate-----	30	...	...	...
All other-----	459	231	6,459	27.96
Anti-infective agents (except antibiotics), total-----	27,640	15,693	72,412	4.61
Anthelmintics, total-----	11,133	6,116	36,363	5.95
Piperazine dihydrochloride-----	1,649	1,517	2,021	1.33
All other-----	9,484	4,599	34,342	7.47
Antifungal agents-----	820	870	1,310	1.51
Antiprotozoan agents-----	7,079	4,760	17,871	3.75
Sulfonamides-----	4,015	1,361	7,708	5.66
Urinary antiseptics-----	399	...	...	...
Other anti-infective agents ⁸ -----	4,194	2,586	9,160	3.54
Autonomic drugs, total-----	987	695	12,325	17.73
Parasympatholytic (anticholinergic) tertiary amines (except tropine derivatives)-----	58	...	...	...
Sympathomimetic (adrenergic) agents, total-----	877	649	9,795	15.09
Phenylpropanolamine hydrochloride-----	426	...	...	...
All other-----	451	649	9,795	15.09
Other autonomic drugs-----	52	46	2,530	55.00
Cardiovascular and hematological agents, total-----	2,334	150	12,026	80.17
Sodium heparin-----	...	4	9,635	2,408.75
All other-----	2,334	146	2,391	16.38
Central depressants and stimulants, total-----	52,676	38,723	132,782	3.43
Analgesics and antipyretics, total-----	46,185	33,514	70,137	2.09
Aspirin-----	28,282	...	...	...
Meperidine hydrochloride-----	29	...	...	...
Methadone hydrochloride-----	2	...	...	...
All other-----	17,872	33,514	70,137	2.09
Antidepressants-----	147	...	...	...
Antitussives-----	176	134	34,576	258.03
Hypnotics and sedatives (including barbiturates)-----	1,231	566	4,308	7.61
Skeletal muscle relaxants-----	493	500	4,518	9.04
Tranquilizers-----	609	...	...	...
Other central depressants and stimulants ⁹ -----	3,835	4,009	19,243	4.80
Dermatological agents (except salicylic acid) and local anesthetics-----	779	776	1,863	2.40

See footnotes at end of table.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--MEDICINAL CHEMICALS: U.S. PRODUCTION AND SALES, 1976--CONTINUED

MEDICINAL CHEMICALS	PRODUCTION ¹	SALES ¹		
		QUANTITY	VALUE	UNIT VALUE ²
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Expectorants and mucolytic agents, total-----	1,924	1,676	7,351	\$4.39
Ethylenediamine dihydriodide-----	1,307	1,186	4,334	3.65
All other-----	617	490	3,017	6.16
Gastrointestinal agents (except methionine, hydroxy analog), total-----	49,485	42,540	21,324	.50
Choline chloride (all grades)-----	47,009	38,656	16,774	.43
All other-----	2,476	3,884	4,550	1.17
Hormones and synthetic substitutes, total-----	1,032	151	74,422	492.86
Synthetic hypoglycemic agents-----	899	...	...	...
Thyroid hormone and antithyroid agents-----	119	...	...	...
All other-----	114	151	74,422	492.86
Renal-acting and edema-reducing agents, total-----	1,954	299	5,391	18.03
Benzothiadiazine derivatives-----	...	121	3,817	31.55
Theophylline derivatives-----	206	...	...	...
All other-----	1,748	178	1,574	8.84
Therapeutic nutrients-----	1,318	1,117	4,076	3.65
Vitamins, total-----	33,315	22,746	142,527	6.27
Vitamin B-----	8,017	8,705	38,783	4.46
Vitamin D ¹⁰ -----	13	9	2,754	306.00
Vitamin E, total ¹⁰ -----	4,595	3,406	48,573	14.26
All other vitamins-----	20,690	10,626	52,417	4.93
Miscellaneous medicinal chemicals ¹¹ -----	41,400	29,517	37,034	1.25

¹ The data on production and sales are for bulk medicinal chemicals only; they *exclude* finished preparations and dosage-form products, which are manufactured from bulk chemicals. All quantities are given in terms of 100% active ingredients.

² Calculated from rounded figures.

³ The term "benzenoid" as used in this report, describes any cyclic medicinal chemical whose molecule contains either a six-membered carbocyclic ring with conjugated double bonds (e.g., the benzene ring or the quinone ring) or a six-membered heterocyclic ring with 1 or 2 hetero atoms and conjugated double bonds, except the pyrimidine ring (e.g., the pyridine ring or the pyrazine ring.)

⁴ Includes antibiotics of unknown structure.

⁵ With the exception of bacitracin, the penicillins (except semisynthetic), and a few other antibiotics which were reported in terms of U.S.P. units, all quantities for antibiotics were reported as kilograms (kg) of antibiotic base. (Thus production of 481 kg of tetracycline hydrochloride, for example, would have been reported as 444 kg of tetracycline base.) For inclusion in the statistical table, all quantities were converted from kg of antibiotic base to pounds of antibiotic base (1 kg = 2.2046 pounds), or from U.S.P. units to pounds (22.7 million units of bacitracin, 458 million units of procaine penicillin G, 723 million units of potassium penicillin G, etc. = 1 pound). Sales quantity and value are lower than in previous years because in previous years a significant quantity of an antibiotic in dosage form was reported incorrectly as sales.

⁶ Production of all antibiotics for medicinal use amounted to 10,438,000 pounds, sales amounted to 2,741,000 pounds, valued at \$162,299,000. Includes antifungal and antitubercular antibiotics.

⁷ Production of all antibiotics for animal feeds and other nonmedicinal uses amounted to 10,034,000 pounds, sales amounted to 3,779,000 pounds, valued at \$49,230,000.

⁸ Includes sales of urinary antiseptics.

⁹ Includes production and sales of amphetamines, general anesthetics, and stimulants; also includes sales of antidepressants and tranquilizers.

¹⁰ All quantities for vitamins A, B₁₂, D, and E were reported in terms of kg or units, but were converted to pounds for inclusion in the statistical table (1.317 billion units of vitamin A acetate, 0.824 billion units of vitamin A palmitate, 0.4536 kg of vitamins B₁₂, 18.14 billion units of vitamin D, 617,000 units of d-alpha tocopheryl acetate, 454,000 units of dl-alpha tocopheryl acetate, etc. = 1 pound.)

¹¹ Includes production and sales of antineoplastic agents, diagnostic agents, methionine (hydroxy analog, calcium salt), salicylic acid, smooth muscle relaxants, and unclassified medicinal chemicals.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ANTIBIOTICS:	
ANTIFUNGAL AND ANTITUBERCULAR ANTIBIOTICS, FOR MEDICINAL USE:	
ANTIFUNGAL ANTIBIOTICS:	
AMPHOTERICIN B - - - - -	: OMS, TRD.
CANDICIDIN - - - - -	: PEN.
NYSTATIN (MEDICINAL GRADE) - - - - -	: ACY, OMS, TRD.
ANTITUBERCULAR ANTIBIOTICS:	
CYCLOSERINE- - - - -	: IMC.
DIHYDROSTREPTOMYCIN- - - - -	: MRK, PFZ.
STREPTOMYCIN (MEDICINAL GRADE) - - - - -	: LIL, MRK, PFZ.
@PENICILLINS, SEMI-SYNTHETIC:	
AMOXICILLIN- - - - -	: BEE, BOC.
@AMPICILLIN - - - - -	: BEE, BOC, BRS, TRD, WYT.
AMPICILLIN, SODIUM - - - - -	: BEE, BRS, OMS, WYT.
CARBENICILLIN, DISODIUM- - - - -	: BEE, PFZ.
CLOXACILLIN, SODIUM- - - - -	: BEE, BRS.
DICLOXACILLIN, SODIUM- - - - -	: BEE, BRS.
HETACILLIN - - - - -	: BRS.
METHICILLIN, SODIUM- - - - -	: BEE, BRS.
NAFCILLIN, SODIUM- - - - -	: BEE, BRS, WYT.
OXACILLIN, SODIUM- - - - -	: BEE, BRS.
TICARCILLIN- - - - -	: BEE.
@PENICILLINS (EXCEPT SEMI-SYNTHETIC) :	
FOR MEDICINAL USE:	
PENICILLIN G, BENZATHINE - - - - -	: WYT.
@PENICILLIN G, POTASSIUM- - - - -	: LIL, OMS, PFZ, WYT.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ANTIBIOTICS--CONTINUED	
@PENICILLINS (EXCEPT SEMI-SYNTHETIC)--CONTINUED	
FOR MEDICINAL USE--CONTINUED	
PENICILLIN G, PROCAINE (MEDICINAL GRADE) - - - - -	: LIL, OMS, PFZ, WYT.
PENICILLIN G, SODIUM - - - - -	: OMS, PFZ.
PHENOXYMETHYLPENICILLIN (PENICILLIN V) - - - - -	: BRS, LIL, OMS, PFZ, WYT.
PHENOXYMETHYLPENICILLIN, POTASSIUM - - - - -	: BRS, LIL.
FOR NONMEDICINAL USES:	
PENICILLIN G, PROCAINE (ANIMAL FEED GRADE) - - - - -	: MRK, OMS, PFZ.
@TETRACYCLINES:	
FOR MEDICINAL USE:	
CHLORTETRACYCLINE- - - - -	: ACY.
DEMECLOCYCLINE - - - - -	: ACY.
DOXYCYCLINE- - - - -	: PFZ.
METHACYCLINE - - - - -	: PFZ.
MINOCYCLINE- - - - -	: ACY.
OXYTETRACYCLINE (MEDICINAL GRADE) - - - - -	: PFZ.
TETRACYCLINE - - - - -	: ACY, PFZ.
FOR NONMEDICINAL USES:	
CHLORTETRACYCLINE (ANIMAL FEED GRADE) - - - - -	: ACY, RLS.
OXYTETRACYCLINE (ANIMAL FEED GRADE) - - - - -	: PFZ.
@OTHER ANTIBIOTICS:	
@FOR MEDICINAL USE: ¹	
CEPHALOSPORINS:	
CEFAZOLIN- - - - -	: LIL, SK.
CEPHALEXIN - - - - -	: LIL.
CEPHALORIDINE- - - - -	: LIL.
CEPHALOTHIN- - - - -	: LIL.
CEPHAPIRIN, SODIUM - - - - -	: BRS.
CEPHRADINE - - - - -	: SK, TRD.
OTHER THAN CEPHALOSPORINS:	
BACITRACIN (MEDICINAL GRADE) - - - - -	: IMC.
CHLORAMPHENICOL- - - - -	: PD, RLS.
CLINDAMYCIN- - - - -	: UPJ.
ERYTHROMYCIN - - - - -	: LIL, UPJ.
ERYTHROMYCIN ESTOLATE- - - - -	: LIL.
GENTAMYCIN - - - - -	: SCH.
KANAMYCIN- - - - -	: BRS.
LINCOMYCIN - - - - -	: UPJ.

SEE FOOTNOTES AT END OF TABLE.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ANTIBIOTICS--CONTINUED	:
@OTHER ANTIBIOTICS--CONTINUED	:
@FOR MEDICINAL USE ¹ --CONTINUED	:
OTHER THAN CEPHALOSPORINS--CONTINUED	:
NEOMYCIN (MEDICINAL GRADE) - - - - -	: PEN, PFZ, UPJ.
NOVOBIOCIN (MEDICINAL GRADE) - - - - -	: UPJ.
POLYMYXIN B- - - - -	: PFZ.
ROSAMICIN- - - - -	: K.
SPECTINOMYCIN (MEDICINAL GRADE) - - - - -	: ABB, UPJ.
THIOSTREPTON - - - - -	: OMS.
TYROTHRIN- - - - -	: PEN.
VANCOMYCIN - - - - -	: LIL.
@FOR NONMEDICINAL USES:	:
BACITRACIN (ANIMAL FEED GRADE) - - - - -	: IMC, PEN.
CYCLOHEXIMIDE- - - - -	: UPJ.
HYGROMYCIN B - - - - -	: LIL.
LASALOCID- - - - -	: HOF.
LINCOMYCIN (ANIMAL FEED GRADE) - - - - -	: UPJ.
MONENSIN, SODIUM - - - - -	: LIL.
NEOMYCIN (ANIMAL FEED GRADE) - - - - -	: OMS, PFZ.
NOVOBIOCIN (ANIMAL FEED GRADE) - - - - -	: UPJ.
NYSTATIN (ANIMAL FEED GRADE) - - - - -	: OMS.
SPECTINOMYCIN (ANIMAL FEED GRADE) - - - - -	: UPJ.
STREPTOMYCIN - - - - -	: MRK, PFZ.
TYLOSIN- - - - -	: LIL.
@ANTI-HISTAMINES:	:
ANTI-NAUSEANTS:	:
CYCLIZINE HYDROCHLORIDE- - - - -	: BUR.
DIMENHYDRINATE - - - - -	: SRL.
MECLIZINE HYDROCHLORIDE- - - - -	: PFZ.
TRIMETHOBENZAMIDE HYDROCHLORIDE- - - - -	: HOF.
OTHER ANTI-HISTAMINES:	:
BROMODIPHENHYDRAMINE HYDROCHLORIDE - - - - -	: PD.
BROMPHENIRAMINE MALEATE- - - - -	: HEX, SCH.
CHLORCYCLIZINE HYDROCHLORIDE - - - - -	: BUR.
@CHLORPHENIRAMINE MALEATE - - - - -	: HEX, SCH, SK.
CHLORPHENIRAMINE TANNATE - - - - -	: MAL.
CYPROHEPTADINE HYDROCHLORIDE - - - - -	: MRK.
DEXBROMPHENIRAMINE MALEATE - - - - -	: SCH.
DEXCHLORPHENIRAMINE- - - - -	: SCH.

SEE FOOTNOTES AT END OF TABLE.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ANTI-HISTAMINES--CONTINUED	
OTHER ANTI-HISTAMINES--CONTINUED	
DIMETHINDENE MALEATE - - - - -	: CGY.
DIPHENHYDRAMINE HYDROCHLORIDE- - - - -	: GAN, PD.
DOXYLAMINE SUCCINATE - - - - -	: BJL, BKC.
METHAPYRILENE FUMARATE - - - - -	: ABB.
METHAPYRILENE HYDROCHLORIDE- - - - -	: ABB, MON.
METHDILAZINE - - - - -	: BJL.
PHENINDAMINE TARTRATE- - - - -	: HOP.
PHENIRAMINE MALEATE- - - - -	: HEX.
PHENYLOXANOLAMINE CITRATE - - - - -	: X.
PYRILAMINE MALEATE - - - - -	: HEX.
PYRILAMINE RESIN ADSORBATE - - - - -	: MRK.
PYRILAMINE TANNATE - - - - -	: MAL.
PYRROBUTAMINE PHOSPHATE- - - - -	: LIL.
TRIPLENNAMINE - - - - -	: CGY.
TRIPLENNAMINE CITRATE - - - - -	: CGY.
TRIPLENNAMINE HYDROCHLORIDE - - - - -	: CGY.
TRIPROLIDINE HYDROCHLORIDE - - - - -	: BUR.
@ANTI-INFECTION AGENTS (EXCEPT ANTIBIOTICS):	
@ANTHELMINTICS:	
DICHLORVOS - - - - -	: SHC.
DIETHYLCARBAMAZINE CITRATE - - - - -	: ACY.
GENTIAN VIOLET - - - - -	: SDH.
HEXYLRESORCINOL- - - - -	: MRK.
PHENOTHIAZINE (MEDICINAL GRADE)- - - - -	: WAG.
PIPERAZINE - - - - -	: DOW, JCC.
PIPERAZINE CITRATE - - - - -	: BUR, JCC.
@PIPERAZINE DIHYDROCHLORIDE - - - - -	: DOW, FLN, JCC, WHL.
PIPERAZINE HEXAHYDRATE - - - - -	: JCC.
PIPERAZINE HYDROCHLORIDE - - - - -	: DOW, FLN, JCC.
PIPERAZINE PHOSPHATE - - - - -	: JCC.
PYRANTHEL PAMOATE - - - - -	: PFZ.
PYRANTHEL TARTRATE- - - - -	: PFZ.
RAFOXANIDE - - - - -	: MRK.
THIABENDAZOLE- - - - -	: MRK.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ANTI-INFECTIVE AGENTS (EXCEPT ANTIBIOTICS)--CONTINUED	
@ANTIPROTOZOAN AGENTS:	
ARSENIC AND BISMUTH COMPOUNDS:	
ARSANILIC ACID - - - - -	: ABB, FLM.
BISMUTH SUBSALICYLATE- - - - -	: MAL, NOR, PEN.
CARBARSONE - - - - -	: LIL, WHL.
GLYCOBIARSOL - - - - -	: SDW.
NITARSONE- - - - -	: SAL.
ROXARSONE- - - - -	: SAL.
SODIUM ARSANILATE- - - - -	: ABB.
OTHER ANTIPROTOZOAN AGENTS:	
AKLOMIDE - - - - -	: SAL.
AMODIAQUIN HYDROCHLORIDE - - - - -	: PD.
AMPROLIUM- - - - -	: MRK.
CLOPIDOL - - - - -	: DOW.
DIMETRIDAZOLE- - - - -	: RDA.
3,5-DINITRO-ORTHO-TOLUAMIDE- - - - -	: DOW.
FURAZOLIDONE - - - - -	: NOR.
HYDROXYCHLOROQUINE SULFATE - - - - -	: SDW.
IODOCHLORHYDROXYQUIN - - - - -	: CGY.
METRONIDAZOLE- - - - -	: RDA.
NIFUROXIME - - - - -	: NOR.
NITROMIDE- - - - -	: SAL.
PRIMAQUINE PHOSPHATE - - - - -	: SDW.
PYRIMETHAMINE- - - - -	: BUR.
@SULFONAMIDES:	
DINSED - - - - -	: SAL.
MAFENIDE HYDROCHLORIDE - - - - -	: SDW.
PHTHALYLSULFACETAMIDE- - - - -	: LEM.
SULFASALAZINE- - - - -	: SAL.
SULFABENZAMIDE - - - - -	: ACY.
SULFABENZAMIDE, SODIUM - - - - -	: ACY.
SULFABROMOMETHAZINE, SODIUM- - - - -	: MRK.
SULFACETAMIDE- - - - -	: LEM.
SULFACETAMIDE, SODIUM- - - - -	: LEM.
SULFACHLOROPYRAZINE, SODIUM- - - - -	: ACY.
SULFADIAZINE - - - - -	: ACY.
SULFADIMETHOXINE - - - - -	: HOF.
SULFAMERAZINE- - - - -	: ACY.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ANTI-INFECTIVE AGENTS (EXCEPT ANTIBIOTICS)--CONTINUED	
@SULFONAMIDES--CONTINUED	
SULFAMETHAZINE - - - - -	: ACY, LEM, RLS.
SULFAMETHAZINE, SODIUM - - - - -	: LEM, SAL.
SULFAMETHIZOLE - - - - -	: ACY.
SULFAMETHOXAZOLE - - - - -	: HOF.
SULFANILAMIDE- - - - -	: SAL.
SULFANILYLCTOSINE - - - - -	: PD.
SULFANITRAN- - - - -	: SAL.
SULFAPYRIDINE- - - - -	: ACY, LEM, SAL.
SULPAQUINOXALINE - - - - -	: LEM, MRK.
SULFATHIAZOLE- - - - -	: MRK.
SULFATHIAZOLE, SODIUM- - - - -	: MRK, SAL.
SULFISOXAZOLE- - - - -	: HOF.
@OTHER ANTI-INFECTIVE AGENTS:	
@ANTIFUNGAL AGENTS:	
BENZOIC ACID - - - - -	: MON.
CALCIUM UNDECYLENATE - - - - -	: WTL.
SODIUM CAPRYLATE - - - - -	: LEM.
UNDECYLENIC ACID - - - - -	: NTL.
ZINC UNDECYLENATE- - - - -	: NTL, WTL.
ANTILEPROTIC AND ANTITUBERCULAR AGENTS:	
AMINOSALICYLIC ACID- - - - -	: MLS.
ISONIAZID- - - - -	: RIL.
SODIUM AMINOSALICYLATE - - - - -	: MLS.
ANTIVIRAL AGENTS:	
AMANTADINE - - - - -	: ALD.
MERCURY COMPOUNDS:	
MERBROMIN- - - - -	: HYN.
THIMEROSAL - - - - -	: LIL.
@URINARY ANTISEPTICS:	
METHENAMINE HIPPURATE- - - - -	: RIK.
METHENAMINE MANDELATE- - - - -	: ARN, NEP.
METHYLENE BLUE - - - - -	: ACY.
NITROFURANTOIN - - - - -	: NOR.
PHENAZOPYRIDINE HYDROCHLORIDE- - - - -	: HOF, NEP.
GENERAL ANTISEPTICS AND ANTIBACTERIAL AGENTS:	
AMINACRINE HYDROCHLORIDE - - - - -	: SDW.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ANTI-INFECTIVE AGENTS (EXCEPT ANTIBIOTICS)--CONTINUED	
@OTHER ANTI-INFECTIVE AGENTS--CONTINUED	
GENERAL ANTISEPTICS AND ANTIBACTERIAL AGENTS--CONTINUED	
BENZALKONIUM CHLORIDE- - - - -	: SDW.
BETANAPTHOL- - - - -	: ACY.
BROMOFORM- - - - -	: DOW.
CARBADOX - - - - -	: PEN, PFZ.
CETALKONIUM CHLORIDE - - - - -	: FIN, SDW.
CETYLPYRIDINIUM CHLORIDE - - - - -	: FIN, HEX.
CHLOROBUTANOL- - - - -	: SFS.
CHLOROTHYMOL - - - - -	: OPC.
8-HYDROXY-5-QUINOLINESULFONIC ACID - - - - -	: MRK.
IODOFORM - - - - -	: MAL, PEN.
NALIDIXIC ACID - - - - -	: SDH.
OXOLINIC ACID- - - - -	: NEP.
OXYQUINOLINE - - - - -	: ASH, MRK.
OXYQUINOLINE BENZOATE- - - - -	: LEM.
OXYQUINOLINE CITRATE - - - - -	: ASH, MRK.
OXYQUINOLINE SULFATE - - - - -	: ASH, LEM, MRK.
OXYQUINOLINE ZINC- - - - -	: MRK.
POVIDONE - IODINE COMPLEX- - - - -	: GAF.
RESORCINOL - - - - -	: KPT.
THYMOL - - - - -	: GIV.
THYMOL IODIDE- - - - -	: MAL.
TRIMETHOPRIM - - - - -	: BUR.
@AUTONOMIC DRUGS:	
@SYMPATHOMIMETIC AGENTS:	
CINNAMEDRINE HYDROCHLORIDE - - - - -	: SDW.
CYCLOPENTAMINE HYDROCHLORIDE - - - - -	: LIL.
EPHEDRINE- - - - -	: UPJ.
ISOPROTERENOL HYDROCHLORIDE- - - - -	: SDW.
LEVARTERENOL BITARTRATE- - - - -	: SDW.
MEPHENTERMINE- - - - -	: ARA.
METARAMINOL BITARTRATE - - - - -	: MRK.
METHOXYPHENAMINE HYDROCHLORIDE - - - - -	: MLS.
NAPHAZOLINE HYDROCHLORIDE- - - - -	: CGY.
NORDEFRIN HYDROCHLORIDE- - - - -	: SDW.
NYLIDRIN HYDROCHLORIDE - - - - -	: BKL.
PHENYLEPHRINE- - - - -	: SDW.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@AUTONOMIC DRUGS--CONTINUED	
@SYMPATHOMIMETIC AGENTS--CONTINUED	
PHENYLEPHRINE HYDROCHLORIDE- - - - -	: GAN, SDW.
@PHENYLPROPANOLAMINE HYDROCHLORIDE- - - - -	: ARS, GAN, NEP, ORT, X.
PROPYLHEXEDRINE- - - - -	: SK.
PSEUDOEPHEDRINE HYDROCHLORIDE- - - - -	: BUR, GAN, SDW, UPJ.
PSEUDOEPHEDRINE SULFATE- - - - -	: GAN.
TETRAHYDROZOLINE HYDROCHLORIDE - - - - -	: PFZ.
@OTHER AUTONOMIC DRUGS:	
GANGLIONIC BLOCKING AGENTS:	
TETRAETHYLAMMONIUM CHLORIDE- - - - -	: RSA.
PARASYMPATHOLYTIC QUATERNARY AMMONIUM COMPOUNDS (EXCEPT TROPANE DERIVATIVES):	
CARBIDOPA- - - - -	: MRK.
DIPHENANIL METHYLSULFATE - - - - -	: SCH.
HEXOCYCLIUM METHYLSULFATE- - - - -	: ABB.
ISOPROPAMIDE IODIDE- - - - -	: SK.
MEPENZOLATE BROMIDE- - - - -	: LKL.
TRIDIHEXETHYL IODIDE - - - - -	: ACY.
@PARASYMPATHOLYTIC TERTIARY AMINES (EXCEPT TROPANE DERIVATIVES):	
ADIPHENINE HYDROCHLORIDE - - - - -	: CGY.
CYCRIMINE HYDROCHLORIDE- - - - -	: LIL.
DICYCLOMINE HYDROCHLORIDE- - - - -	: BKC.
ORPHENADRINE CITRATE - - - - -	: PD, RIK.
OXYPHENCYCLIMINE HYDROCHLORIDE - - - - -	: PFZ.
PIPERIDOLATE HYDROCHLORIDE - - - - -	: LKL.
TRIHEXYPHENIDYL HYDROCHLORIDE- - - - -	: ACY, SDW.
PARASYMPATHOLYTIC TROPANE DERIVATIVES:	
ANISOTROPINE METHYLBROMIDE - - - - -	: ARA.
BENZTROPINE MESYLATE - - - - -	: ARA.
HOMATROPINE HYDROBROMIDE - - - - -	: ARA.
HOMATROPINE METHYLBROMIDE- - - - -	: ARA.
PARASYMPATHOMIMETIC AGENTS:	
PYRIDOSTIGMINE BROMIDE - - - - -	: HOP.
URECHOLINE CHLORIDE- - - - -	: MRK.
SYMPATHOLYTIC AGENTS:	
ERGONOVINE MALEATE - - - - -	: LIL.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED
BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@CARDIOVASCULAR AND HEMATOLOGICAL AGENTS:	
CARDIOVASCULAR AGENTS:	
ANTIHYPERTENSIVE AGENTS:	
DIAZOXIDE-	SCH.
GUANETHIDINE SULFATE-	CGY.
HYDRALAZINE HYDROCHLORIDE-	CGY.
METHYLDOPA-	MRK.
PHENOXYBENZAMINE HYDROCHLORIDE-	SK.
RESERPINE-	PEN.
BIOFLAVONOIDS:	
HESPERIDIN-	SKG.
LEMON BIOFLAVONOID COMPLEX-	SKG.
NARINGIN-	SKG.
VASODILATORS:	
AMYL NITRITE-	MAL.
DIOXYLINE PHOSPHATE-	LIL.
NICOTINYL ALCOHOL TARTRATE-	HOF.
OTHER CARDIOVASCULAR AGENTS:	
PROCAINAMIDE HYDROCHLORIDE-	LEM, OMS, PD.
HEMATOLOGICAL AGENTS:	
AMMONIUM HEPARIN-	ABB, RIK, WIL.
ANISINDIONE-	SCH.
CELLULOSE, OXIDIZED-	EKT.
DEXTRAN-	PHR.
DIPHENADIONE-	UPJ.
LITHIUM HEPARIN-	ABB, RIK, WIL.
POTASSIUM WARFARIN-	RSA.
@SODIUM HEPARIN-	ABB, RIK, WIL.
@CENTRAL DEPRESSANTS AND STIMULANTS:	
@ANALGESICS, ANTIPYRETICS, AND NONHORMONAL ANTI- INFLAMMATORY AGENTS:	
SALICYLIC ACID DERIVATIVES:	
ALUMINUM ASPIRIN-	ABB.
@ASPIRIN-	DOW, KVP, MLS, MON, NOR, SDG.
DIFLUNISAL-	MRK.
PHENYL SALICYLATE-	DOW.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@CENTRAL DEPRESSANTS AND STIMULANTS--CONTINUED	
@ANALGESICS, ANTIPIRETTICS, AND NONHORMONAL ANTI- INFLAMMATORY AGENTS--CONTINUED	
SALICYLIC ACID DERIVATIVES--CONTINUED	
POTASSIUM SALICYLATE - - - - -	: HN.
SALICYLAMIDE - - - - -	: PEN.
SALICYLSALICYLIC ACID- - - - -	: PD.
SODIUM SALICYLATE- - - - -	: HN.
@OTHER ANALGESICS AND ANTIPIRETTICS: ²	
ACETAMINOPHEN- - - - -	: ARA, ATP, MAL, MLS, NEP, NOR, PEN, SDH.
AMINO BENZOIC ACID- - - - -	: ARA, GAN.
AUROTHIOGLUCOSE- - - - -	: SCH.
CALCIUM SUCCINATE- - - - -	: LEM.
ETHOHEPTAZINE CITRATE- - - - -	: WYT.
GOLD SODIUM THIOALATE - - - - -	: MRK.
IBUPROFEN- - - - -	: CWN, UPJ.
INDOMETHACIN - - - - -	: MRK.
MECLOFENAMIC ACID, SODIUM SALT - - - - -	: PD.
MEFENAMIC ACID - - - - -	: PD.
@MEPERIDINE HYDROCHLORIDE - - - - -	: PEN, SDW, WYT.
@METHADONE HYDROCHLORIDE- - - - -	: LIL, MAL, PEN.
MORPHINE - - - - -	: MRK, X.
NAPROXEN - - - - -	: ARA.
OXYCODONE HYDROCHLORIDE- - - - -	: EN.
OXYCODONE TEREPHTHALATE- - - - -	: EN.
OXYPHENBUTAZONE- - - - -	: CGY (E) .
PHENACETIN - - - - -	: MON.
PHENYL BUTAZONE - - - - -	: CGY (E) .
POTASSIUM AMINO BENZOATE- - - - -	: GAN.
PROPOXYPHENE HYDROCHLORIDE - - - - -	: LIL.
PROPOXYPHENE NAPSYLATE - - - - -	: LIL.
SODIUM AMINO BENZOATE - - - - -	: GAN.
@ANTICONVULSANTS, HYPNOTICS, AND SEDATIVES:	
ANTICONVULSANTS (EXCEPT BARBITURATES):	
DIPHENYLHYDANTOIN- - - - -	: PD.
DIPHENYLHYDANTOIN, SODIUM- - - - -	: PD.
ETHOSUXIMIDE - - - - -	: PD.
ETHOTOIN - - - - -	: ABB.
METHSUXIMIDE - - - - -	: PD.
PHENACEMIDE- - - - -	: ABB.

SEE FOOTNOTES AT END OF TABLE.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@CENTRAL DEPRESSANTS AND STIMULANTS--CONTINUED	
@ANTICONVULSANTS, HYPNOTICS, AND SEDATIVES--CONTINUED	
ANTICONVULSANTS (EXCEPT BARBITURATES)--CONTINUED	
PHENSUXIMIDE - - - - -	PD.
BARBITURATES:	
AMOBARBITAL- - - - -	GAN.
AMOBARBITAL, SODIUM- - - - -	GAN.
BARBITAL - - - - -	GAN.
BARBITAL, SODIUM - - - - -	GAN.
BUTABARBITAL - - - - -	ABB, GAN.
BUTABARBITAL, SODIUM - - - - -	ABB, GAN.
HEXOBARBITAL - - - - -	GAN.
MEPHOBARBITAL- - - - -	SDW.
METHOHEXITAL, SODIUM - - - - -	LIL.
PENTOBARBITAL- - - - -	ABB, GAN.
PENTOBARBITAL, SODIUM- - - - -	ABB, GAN.
PHENOBARBITAL- - - - -	GAN, MAL.
PHENOBARBITAL, SODIUM- - - - -	GAN.
SECOBARBITAL - - - - -	GAN.
SECOBARBITAL, SODIUM - - - - -	GAN, LIL.
TALBUTAL - - - - -	ABB.
THIAMYLAL, SODIUM- - - - -	PD.
THIOPENTAL, SODIUM - - - - -	ABB.
HYPNOTICS AND SEDATIVES (EXCEPT BARBITURATES):	
CARBROMAL- - - - -	PD.
ETHCHLORVYNOL- - - - -	ABB.
FLURAZEPAM HYDROCHLORIDE - - - - -	HOF.
GLUTETHIMIDE - - - - -	BKL, CGY, GAN.
METHAQUALONE - - - - -	X.
METHAQUALONE HYDROCHLORIDE - - - - -	X.
METHYPRYLON- - - - -	HOF.
TRICLOPOS, SODIUM- - - - -	LKL.
PSYCHOTROPIC AGENTS:	
@ANTIDEPRESSANTS:	
AMICARBINOL- - - - -	MRK.
AMITRIPTYLINE- - - - -	MRK.
DESIPRAMINE HYDROCHLORIDE- - - - -	CGY(E), LKL.
DOXEPIN HYDROCHLORIDE- - - - -	PFZ, SK.
IMIPRAMINE HYDROCHLORIDE - - - - -	CGY(E).

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@CENTRAL DEPRESSANTS AND STIMULANTS--CONTINUED	
PSYCHOTROPIC AGENTS--CONTINUED	
@ANTIDEPRESSANTS--CONTINUED	
NORTRIPTYLINE- - - - -	LIL.
@TRANQUILIZERS:	
PHENOTHIAZINE DERIVATIVES:	
ACETOPHENAZINE MALEATE - - - - -	SCH.
CHLORPROMAZINE HYDROCHLORIDE - - - - -	SK.
FLUPHENAZINE HYDROCHLORIDE - - - - -	SCH.
PERPHENAZINE - - - - -	SCH.
PROCHLORPERAZINE EDISYLATE - - - - -	SK.
PROCHLORPERAZINE MALEATE - - - - -	SK.
PROMAZINE HYDROCHLORIDE- - - - -	WYT.
PROMETHAZINE HYDROCHLORIDE - - - - -	WYT.
OTHER TRANQUILIZERS:	
BUCLIZINE HYDROCHLORIDE- - - - -	PFZ.
CHLORDIAZEPOXIDE HYDROCHLORIDE - - - - -	HOF, SK.
CHLORMEZANONE- - - - -	SDW.
CLORAZEPATE DIPOTASSIUM- - - - -	ABB.
DIAZEPAM - - - - -	HOF.
HYDROXYZINE HYDROCHLORIDE- - - - -	PFZ.
HYDROXYZINE PAMOATE- - - - -	PFZ.
MEPROBAMATE- - - - -	BKL.
MOLINDONE HYDROCHLORIDE- - - - -	X.
OXAZEPAM - - - - -	WYT.
@OTHER CENTRAL DEPRESSANTS AND STIMULANTS: ³	
AMPHETAMINES:	
AMPHETAMINE- - - - -	ARN.
AMPHETAMINE SULFATE- - - - -	ARN.
DEXTROAMPHETAMINE- - - - -	ARN.
DEXTROAMPHETAMINE SULFATE- - - - -	ARN, SK.
METHAMPHETAMINE- - - - -	ARN.
METHAMPHETAMINE HYDROCHLORIDE- - - - -	ARN.
@ANTITUSSIVES:	
BENZONATATE- - - - -	CGY.
CARAMIPHEN EDISYLATE - - - - -	SK.
CARBETAPENTANE CITRATE - - - - -	PFZ.
CODEINE- - - - -	MRK, PEN.
DEXTROMETHORPHAN HYDROBROMIDE- - - - -	HOF.

SEE FOOTNOTES AT END OF TABLE.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@CENTRAL DEPRESSANTS AND STIMULANTS--CONTINUED	
@OTHER CENTRAL DEPRESSANTS AND STIMULANTS--CONTINUED	
@ANTITUSSIVES--CONTINUED	
ETHYLMORPHINE HYDROCHLORIDE-	MRK.
HYDROCODONE BITARTRATE -	EN, MAL, MRK, PEN.
NOSCAPINE- -	MRK.
THEBAINE - -	MRK.
GENERAL ANESTHETICS:	
KETAMINE HYDROCHLORIDE - -	PD.
RESPIRATORY AND CEREBRAL STIMULANTS:	
BENZPHETAMINE HYDROCHLORIDE- -	UPJ.
CAFFEINE, CITRATED - -	MAL.
CAFFEINE, NATURAL- -	CPR, GNF.
CAFFEINE, SYNTHETIC- -	PFZ.
DEANOL ACETAMIDOBENZOATE -	RIK.
DIETHYLPROPION HYDROCHLORIDE - -	BKC, GAN.
NIKETHAMIDE- -	CGY.
PHENDIMETRAZINE TARTRATE -	GAN.
PHENTERMINE- -	HEX.
@SKELETAL MUSCLE RELAXANTS:	
CARISOPRODOL - -	BKL.
CYCLOBENZAPRINE HYDROCHLORIDE- -	MRK.
METHOCARBAMOL- -	HEX, PEN.
NEFOPAM HYDROCHLORIDE- -	RIK.
SUCCINYLCHOLINE CHLORIDE - -	ABB, BUR.
TUBOCURARINE - -	ABB.
@DERMATOLOGICAL AGENTS (EXCEPT SALICYLIC ACID) AND LOCAL ANESTHETICS:	
DERMATOLOGICAL AGENTS:	
ALLANTOIN- -	HPT.
ALUMINUM PHENOLSULFONATE - -	SAL.
AMMONIUM PHENOLSULFONATE - -	SAL.
AZARIBINE- -	PD.
BISMUTH SUBGALLATE - -	MAL, PEN.
GLYCOL SALICYLATE- -	RDA.
PODOPHYLLUM RESIN- -	PEN.
SODIUM PHENOLSULFONATE - -	SAL.
ZINC PHENOLSULFONATE - -	MAL, SAL.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@DERMATOLOGICAL AGENTS (EXCEPT SALICYLIC ACID) AND LOCAL ANESTHETICS--CONTINUED	
LOCAL ANESTHETICS:	
BUTACAINE HYDROCHLORIDE- - - - -	: ABB.
BUTAMBEN PICRATE - - - - -	: ABB.
BUTYL AMINO BENZOATE (BUTAMBEN) - - - - -	: ABB.
COCAINE- - - - -	: MRK.
M-CRESYL ACETATE - - - - -	: ABB.
DIBUCAINE- - - - -	: CGY.
DIBUCAINE HYDROCHLORIDE- - - - -	: CGY.
DYCLONINE HYDROCHLORIDE- - - - -	: BJL.
ETHYL AMINO BENZOATE- - - - -	: LEM, PD.
ISOBUTYL AMINO BENZOATE - - - - -	: RSA.
LIDOCAINE- - - - -	: AST, SDW.
OXETHAZAINE- - - - -	: WYT.
PIPEROCAINE HYDROCHLORIDE- - - - -	: LIL.
PRAMOXINE HYDROCHLORIDE- - - - -	: ABB.
PROCAINE HYDROCHLORIDE - - - - -	: ARA, PFZ.
PROPARACAINE HYDROCHLORIDE - - - - -	: OMS.
TETRACAINE - - - - -	: SDW.
TRIETHANOLAMINE SALICYLATE - - - - -	: RSA.
@EXPECTORANTS AND MUCOLYTIC AGENTS:	
ACETYLCYSTEINE - - - - -	: CDY.
@ETHYLENEDIAMINE DIHYDRIODIDE - - - - -	: HPT, MAL, WAG, WHL.
GLYCERYL GUAIACOLATE (GUAIFENESIN) - - - - -	: GAN, HEX, PEN.
GUAIACOL - - - - -	: PEN.
IODINATED GLYCEROL - - - - -	: X.
POTASSIUM GUAIACOLSULFONATE- - - - -	: HN.
TERPIN HYDRATE - - - - -	: HPC.
@GASTROINTESTINAL AGENTS (EXCEPT METHIONINE AND ITS HYDROXY ANALOGUE) AND THERAPEUTIC NUTRIENTS:	
GASTROINTESTINAL AGENTS (EXCEPT METHIONINE AND ITS HYDROXY ANALOGUE):	
@CHOLINE CHLORIDE (ALL GRADES):	
CHOLINE CHLORIDE (ANIMAL FEED GRADE) - - - - -	: DA, DOW, HPT, IMC, TMH.
CHOLINE CHLORIDE (MEDICINAL GRADE) - - - - -	: HPT.
@OTHER GASTROINTESTINAL AGENTS:	
APOMORPHINE HYDROCHLORIDE- - - - -	: MRK.
BETAINE BASE - - - - -	: HPT.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@GASTROINTESTINAL AGENTS (EXCEPT METHIONINE AND ITS HYDROXY ANALOGUE) AND THERAPEUTIC NUTRIENTS-- CONTINUED	
GASTROINTESTINAL AGENTS (EXCEPT METHIONINE AND ITS HYDROXY ANALOGUE--CONTINUED	
@OTHER GASTROINTESTINAL AGENTS--CONTINUED	
BETAINE HYDROCHLORIDE-	HFT.
BILE ACIDS, OXIDIZED -	SRL, WIL.
BISACODYL- - - - -	PD.
CHOLINE BICARBONATE- - - - -	IMC.
CHOLINE BITARTRATE - - - - -	ACY, HFT.
CHOLINE CITRATE- - - - -	ACY, HFT.
CHOLINE DIHYDROGEN CITRATE - - - - -	HFT.
DEHYDROCHOLIC ACID - - - - -	WIL.
DEXTROTHYROXINE, SODIUM- - - - -	BAX.
DIHYDROXYALUMINUM AMINOACETATE - - - - -	CHT.
FLORANTYRONE - - - - -	SRL.
IRON BILE SALTS- - - - -	LIL, WIL.
MAGNESIUM CITRATE- - - - -	MAL.
OX BILE EXTRACT- - - - -	ABB, WIL.
PECTIN - - - - -	SKG.
PHENOLPHTHALEIN- - - - -	SCH.
SITOSTEROLS- - - - -	LIL, UPJ.
SODIUM DEHYDROCHOLATE- - - - -	WIL.
SODIUM TARTRATE- - - - -	MAL.
@THERAPEUTIC NUTRIENTS:	
AMINO ACIDS AND SALTS:	
AMINO ACID MIXTURES- - - - -	CHT, MDJ.
ASPARTIC ACID- - - - -	LEM.
GLUTAMIC ACID- - - - -	LEM.
GLUTAMIC ACID HYDROCHLORIDE- - - - -	LEM.
POTASSIUM GLUTAMATE- - - - -	LEM.
OTHER THERAPEUTIC NUTRIENTS:	
COPPER GLUCONATE - - - - -	PFZ.
FERROUS GLUCONATE- - - - -	PFZ, SDW.
MAGNESIUM GLUCONATE- - - - -	PFZ.
MANGANESE GLUCONATE- - - - -	PFZ.
POTASSIUM GLUCONATE- - - - -	PFZ.
TOLDIMFOS, SODIUM- - - - -	RSA.
ZINC GLUCONEPTONATE- - - - -	PFN.
ZINC GLUCONATE - - - - -	PFZ.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@HORMONES AND SYNTHETIC SUBSTITUTES:	
ANABOLIC AGENTS AND ANDROGENS:	
FLUOXYMESTERONE-	UPJ.
TESTOSTERONE CYPIONATE -	UPJ.
ZERANOL- - - - -	IMC.
CORTICOSTEROIDS:	
BETAMETHASONE- - - - -	SCH.
BETAMETHASONE DIPROPIONATE - - - - -	SCH.
BETAMETHASONE SODIUM PHOSPHATE - - - - -	SCH.
BETAMETHASONE VALERATE - - - - -	SCH.
CORTISONE ACETATE- - - - -	MRK, UPJ.
DEXAMETHASONE- - - - -	MRK, SCH.
FLUDROCORTISONE ACETATE- - - - -	UPJ.
FLUOROMETHOLONE- - - - -	UPJ.
9-ALPHA-FLUOROPREDNISOLONE ACETATE - - - - -	UPJ.
HALCINONIDE- - - - -	TRD.
HYDROCORTISONE - - - - -	MRK, UPJ.
HYDROCORTISONE ACETATE - - - - -	MRK, UPJ.
MEDRYSONE- - - - -	UPJ.
METHYLPREDNISOLONE - - - - -	UPJ.
PREDNISOLONE - - - - -	MRK, UPJ.
PREDNISOLONE ACETATE - - - - -	UPJ.
PREDNISONES - - - - -	UPJ.
TRIAMCINOLONE ACETONIDE- - - - -	TRD.
TRIAMCINOLONE- - - - -	TRD, X.
TRIAMCINOLONE DIACETATE- - - - -	OMS.
ESTROGENS AND PROGESTOGENS:	
ESTROGENS:	
CHLOROTRIANISENE - - - - -	BJL, BKC.
DIETHYLSTILBESTROL - - - - -	DLI.
ESTRADIOL CYPIONATE- - - - -	UPJ.
ESTROGENIC SUBSTANCES, CONJUGATED- - - - -	ORG.
NATURAL ESTROGENIC SUBSTANCE - - - - -	ORG.
PROGESTOGENS:	
11 ALPHA-HYDROXYPROGESTERONE - - - - -	UPJ.
17 ALPHA-HYDROXYPROGESTERONE - - - - -	UPJ.
MEDBOXYPROGESTERONE ACETATE- - - - -	UPJ.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@HORMONES AND SYNTHETIC SUBSTITUTES--CONTINUED	
ESTROGENS AND PROGESTOGENS--CONTINUED	
PROGESTOGENS--CONTINUED	
MEGESTROL ACETATE- - - - -	X.
MELENGESTROL ACETATE - - - - -	UPJ.
NORGESTREL - - - - -	WYT.
PROGESTERONE - - - - -	UPJ.
@SYNTHETIC HYPOGLYCEMIC AGENTS:	
ACETOHEXAMIDE- - - - -	LIL.
CHLORPROPAMIDE - - - - -	PFZ.
TOLAZAMIDE - - - - -	UPJ.
TOLBUTAMIDE- - - - -	UPJ.
@THYROID HORMONE AND ANTITHYROID AGENTS:	
METHIMAZOLE- - - - -	LIL.
PROPYLTHIOURACIL - - - - -	ARA.
2-THIOURACIL - - - - -	ACY.
THYROGLOBULIN- - - - -	NEP.
OTHER HORMONES AND SYNTHETIC SUBSTITUTES:	
CORTICOTROPIN- - - - -	ARP, ORG.
EPINEPHRINE BITARTRATE - - - - -	SDW.
GLUCAGON - - - - -	LIL.
INSULIN- - - - -	ARP, LIL.
OXYTOCIN - - - - -	PD.
@RENAL-ACTING AND EDEMA-REDUCING AGENTS:	
@BENZOTHIADIAZINE DERIVATIVES:	
BENZTHIAZIDE - - - - -	PFZ.
CHLOROTHIAZIDE - - - - -	MRK.
HYDROCHLOROTHIAZIDE- - - - -	ABB, CGY, MRK.
HYDROFLUMETHIAZIDE - - - - -	X.
METHYLCLOTHIAZIDE - - - - -	ABB.
TRICHLORMETHIAZIDE - - - - -	SCH.
@THEOBROMINE AND THEOPHYLLINE DERIVATIVES:	
AMINOPHYLLINE- - - - -	GAN, SRL.
OXTRIPHYLLINE- - - - -	NEP.
THEOPHYLLINE SODIUM GLYCINATE- - - - -	CHT.
@OTHER RENAL-ACTING AND EDEMA-REDUCING AGENTS:	
ACETAZOLAMIDE- - - - -	ACY.
AMILORIDE- - - - -	MRK.
CHLORTHALIDONE - - - - -	CGY (E) .

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@RENAL-ACTING AND EDEMA-REDUCING AGENTS--CONTINUED	
@OTHER RENAL-ACTING AND EDEMA-REDUCING AGENTS-- CONTINUED	
DICHLORPHENAMIDE - - - - -	MRK.
ETHACRYNIC ACID- - - - -	MRK.
PROBENECID - - - - -	GAN, MRK.
TRIAMTERENE- - - - -	ACY, SK.
@VITAMINS:	
VITAMIN A:	
BETA-CAROTENE (PROVITAMIN A) - - - - -	HOF.
TRETINOIN (VITAMIN A ACID) - - - - -	EK, HOF.
VITAMIN A ACETATE (FEED GRADE) - - - - -	HOF.
VITAMIN A ACETATE (MEDICINAL GRADE) - - - - -	HOF.
VITAMIN A ALCOHOL- - - - -	HOF.
VITAMIN A PALMITATE (FEED GRADE) - - - - -	HOF.
VITAMIN A PALMITATE (MEDICINAL GRADE)- - - - -	HOF.
@VITAMIN B-COMPLEX:	
NICOTINIC ACID AND DERIVATIVES:	
NIACIN (NICOTINIC ACID) (FEED GRADE) - - - - -	MRK, NEP, RIL.
NIACIN (NICOTINIC ACID) (MEDICINAL GRADE) - - - - -	MRK, RIL.
NIACINAMIDE (NICOTINAMIDE) - - - - -	MRK, NEP, PD, RIL.
PANTOTHENIC ACID AND DERIVATIVES:	
CALCIUM PANTOTHENATE (DEXTRO)- - - - -	HFT.
CALCIUM PANTOTHENATE (RACEMIC) (FEED GRADE)- - - - -	HFT.
CALCIUM PANTOTHENATE (RACEMIC) (MEDICINAL GRADE) - - - - -	HFT.
CALCIUM PANTOTHENATE (RACEMIC) - CALCIUM CHLORIDE	
COMPLEX (FEED GRADE)- - - - -	HFT.
CALCIUM PANTOTHENATE (RACEMIC) - CALCIUM CHLORIDE	
COMPLEX (MEDICINAL GRADE) - - - - -	DLI.
DEXPANTHENOL - - - - -	HOF.
PANTHENOL (RACEMIC)- - - - -	HOF, PD.
SODIUM PANTOTHENATE- - - - -	PD.
OTHER B-COMPLEX VITAMINS:	
BIOTIN - - - - -	HOF.
CYANOCOBALAMIN (FEED GRADE)- - - - -	MRK.
CYANOCOBALAMIN (MEDICINAL GRADE) - - - - -	MRK.
CYANOCOBALAMIN (USP CRYSTALLINE) - - - - -	MRK.
INOSITOL - - - - -	STA.
PYRIDOXINE - - - - -	HOF.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@VITAMINS--CONTINUED	
@VITAMIN B-COMPLEX--CONTINUED	
OTHER B COMPLEX VITAMINS--CONTINUED	
RIBOFLAVIN (FEED GRADE) - - - - -	HOF, MRK.
RIBOFLAVIN (MEDICINAL GRADE) - - - - -	HOF, MRK.
RIBOFLAVIN-5-PHOSPHATE, SODIUM - - - - -	HOF.
THIAMINE HYDROCHLORIDE - - - - -	HOF.
THIAMINE MONONITRATE - - - - -	HOF.
VITAMIN C:	
ASCORBIC ACID- - - - -	HOF, MRK, PFZ.
CALCIUM ASCORBATE- - - - -	PFZ.
SODIUM ASCORBATE - - - - -	HOF, PFZ.
@VITAMIN D:	
CHOLECALCIFEROL (VITAMIN D3) - - - - -	DA, DLI, TMH, VTM.
@VITAMIN E:	
D-ALPHA TOCOPHEROL - - - - -	EKT, GNM.
DL-ALPHA TOCOPHEROL- - - - -	GNM, HOF.
D-ALPHA TOCOPHERYL ACETATE - - - - -	EKT, GNM.
DL-ALPHA TOCOPHERYL ACETATE (FEED GRADE) - - - - -	DA, GNM, HOF.
DL-ALPHA TOCOPHERYL ACETATE (MEDICINAL GRADE)- - - - -	GNM, HOF.
D-ALPHA TOCOPHERYL ACID SUCCINATE- - - - -	EKT, GNM.
VITAMIN K:	
MENADIONE- - - - -	ABB.
MENADIONE SODIUM BISULFITE - - - - -	ABB, HET.
PHYTONADIONE - - - - -	MRK.
@OTHER MEDICINAL CHEMICALS:	
ANTINEOPLASTIC AGENTS:	
AZATHIOPRINE - - - - -	BUR.
MERCAPTOPURINE - - - - -	BUR.
STREPTOZOCIN - - - - -	PFN.
THIOGUANINE- - - - -	BUR.
VINBLASTINE SULFATE- - - - -	LIL.
VINCRIStINE SULFATE- - - - -	LIL.
DIAGNOSTIC AGENTS:	
ROENTGENOGRAPHIC CONTRAST MEDIA:	
DIATRIZOATE, MEGLUMINE - - - - -	OMS, SDW.
DIATRIZOATE, SODIUM- - - - -	OMS, SDW.
IODIPAMIDE, MEGLUMINE- - - - -	OMS.
IOPANOIC ACID- - - - -	SDW.

TABLE 2.--MEDICINAL CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MEDICINAL CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
OTHER MEDICINAL CHEMICALS--CONTINUED	
DIAGNOSTIC AGENTS--CONTINUED	
ROENTGENOGRAPHIC CONTRAST MEDIA--CONTINUED	
IOTHALAMIC ACID- - - - -	MAL.
IOTHALAMATE, MEGLUMINE - - - - -	MAL.
IOTHALAMATE, SODIUM- - - - -	MAL.
TYROPANATE, SODIUM- - - - -	SDW.
OTHER DIAGNOSTIC AGENTS:	
BETAZOLE HYDROCHLORIDE (GASTRIC SECRETION INDICATO	
R)- - - - -	LIL.
DITHIOTHREITOL (CARDIAC OUTPUT TEST) - - - - -	CDY.
GLUTAMYL-P-NITROANILINE (LIVER FUNCTION TEST) - - -	CDY.
METYRAPONE - - - - -	CGY.
SODIUM FLUORESCIN (CORNEAL TRAUMA INDICATOR)- - -	SDH.
XYLOSE (INTESTINAL MALABSORPTION TEST) - - - - -	PFN.
METHIONINE AND ITS HYDROXY ANALOGUE:	
METHIONINE, HYDROXY ANALOGUE, CALCIUM SALT - - - - -	DUP, MON.
SALICYLIC ACID:	
SALICYLIC ACID - - - - -	DOW, HN.
SMOOTH MUSCLE RELAXANTS:	
ALVERINE - - - - -	ARA.
ALVERINE CITRATE - - - - -	ARA.
ALVERINE HYDROCHLORIDE - - - - -	ARA.
FLAVOXATE HYDROCHLORIDE- - - - -	SK.
PAPAVERINE HYDROCHLORIDE - - - - -	LIL.
UNCLASSIFIED MEDICINAL CHEMICALS:	
ALLOPURINOL- - - - -	BUR.
ETHOXYZOLAMIDE (CARBONIC ANHYDRASE INHIBITOR) - - - -	ARA.

¹ INCLUDE ANTIFUNGAL AND ANTITUBERCULAR ANTIBIOTICS.

² INCLUDE SALES OF ASPIRIN, AND PRODUCTION AND SALES OF SALICYLIC ACID DERIVATIVES (OTHER THAN ASPIRIN).

³ INCLUDE SALES OF ANTIDEPRESSANTS AND TRANQUILIZERS.

TABLE 3.--MEDICINAL CHEMICALS: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production or sales of medicinal chemicals to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ABB	Abbott Laboratories	LEM	Napp Chemicals, Inc.
ACY	American Cyanamid Co.	LIL	Eli Lilly & Co. and Puerto Rico
ADC	Anderson Development Co.	LKL	Richardson-Merrell, Inc., Merrell-National Laboratories Div.
ALD	Aldrich Chemical Co.		
ARA	Arapahoe Chemicals, Inc. Sub/Syntex Corp., (U.S.A.)	MAL	Mallinckrodt Chemical Works
ARN	Arenol Chemical Corp.	MDJ	Mead Johnson & Co.
ARP	Armour Pharmaceutical Co.	MON	Monsanto Co.
ARS	Arsynco, Inc.	MRK	Merck & Co., Inc.
ASH	Ashland Oil, Inc., Ashland Chemical Co.		
AST	Astra Pharmaceutical Products, Inc.	NEP	Nepera Chemical Co., Inc.
ATP	Northern Fine Chemicals, Inc.	NES	Nease Chemical Co., Inc.
		NOR	Norwich Pharmacal Co.
BAX	Baxter Laboratories, Inc.	NTL	NL Industries, Inc.
BEE	Beecham, Inc.		
BJL	Burdick & Jackson Laboratories, Inc.	OMS	E.R. Squibb & Sons, Inc.
BKC	J.T. Baker Chemical Co.	OPC	Orbis Products Corp.
BKL	Kewanee Industries, Inc., Millmaster Chemical Co. Div.	ORG	Organics, Inc.
BOC	Biocraft Laboratories, Inc.	ORT	Roehr Chemicals, Inc.
BRS	Bristol-Myers Co., Bristol Laboratories Div.		
BUR	Burroughs-Wellcome Co.	PD	Parke, Davis & Co. Sub. of Warner-Lambert Co.
		PEN	CPC International, Inc., S.B. Penick Co.
CDY	Chemical Dynamics Corp.	PFN	Pfanzstiehl Laboratories, Inc.
CGY	Ciba-Geigy Corp. and Ciba Pharmaceutical Co.	PFZ	Pfizer, Inc., and Pfizer Pharmaceuticals, Inc.
CHT	Chattem Drug & Chemical Co., Chattem Chemicals Div.	PHR	Pharmachem Corp.
CPR	Certified Processing Corp.		
CWN	Upjohn Co., Fine Chemical Div.	RDA	Rhodia, Inc.
		RIK	Riker Laboratories, Inc., Sub. of 3M Co.
DA	Diamond Shamrock Corp.	RIL	Reilly Tar & Chemical Corp.
DLI	Dawe's Laboratories, Inc.	RLS	Rachelle Laboratories, Inc.
DOW	Dow Chemical Co.	RSA	R.S.A. Corp.
DUP	E.I. duPont de Nemours & Co., Inc.		
		SAL	Salsbury Laboratories
EK	Eastman Kodak Co.:	SCH	Schering Corp.
EKT	Tennessee Eastman Co. Div.		
EN	Endo Laboratories, Inc.	SDG	Sterling Drug Corp.:
		SDH	Glenbrook Laboratories Div.
FIN	Hexcel Corp., Fine Organics Div.	SDW	Hilton-Davis Chemical Co. Div.
FLM	Fleming Laboratories, Inc.	SFS	Winthrop Laboratories Div.
		SHC	Stauffer Chemical Co., Specialty Div.
GAF	GAF Corp., Chemical Div.	SK	Shell Oil Co., Shell Chemical Co. Div.
GAN	Gane's Chemical Inc.	SKG	Smith & Klein Chemicals
GIV	Givaudan Corp.	SRL	Sunkist Growers, Inc.
GNF	General Foods Corp., Maxwell House Div.	STA	G.D. Searle & Co.
GNM	General Mills Chemicals, Inc.		A.E. Staley Manufacturing Co.
HPC	Hercules, Inc.	TMH	Thompson-Hayward Chemical Co.
HET	Heterochemical Corp.	TRD	Manufacturing Enterprises, Inc., Squibb Manufacturing Inc., Trade Enterprises, Inc., Ersana, Inc.
HEX	Hexagon Laboratories, Inc.		
HFT	Syntex Agribusiness, Inc.	UPJ	Upjohn Co.
HN	Tenneco Chemicals, Inc.		
HOF	Hoffmann-LaRoche, Inc.	VTM	Vitamins, Inc.
HYN	Hynson, Westcott & Dunning, Inc.		
		WAG	West Agro-Chemicals, Inc.
IMC	IMC Chemical Group, Inc.	WHL	Whitmoyer Laboratories, Inc.
		WIL	Inolex Corp., Inolex Pharmaceutical Div.
JCC	Jefferson Chemical Co., Inc.	WTL	Pennwalt Corp., Lucidol Div.
		WYT	Wyeth Laboratories, Inc., Wyeth Laboratories Div. of American Home Products Corp.
KPT	Koppers Co., Inc., Organic Material Div.		
KVP	KV Products		

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

FLAVOR AND PERFUME MATERIALS

Anne Klein

Flavor and perfume materials are organic chemicals used to impart flavors and odors to foods, beverages, cosmetics, and soaps. These aromatic 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 1976 amounted to 128.8 million pounds (table 1). Sales of these materials in 1976 amounted to 110.9 million pounds, valued at \$195.3 million, compared with 82.7 million pounds, valued at \$143.4 million, in 1975. These totals do not include benzyl alcohol, which, before 1973, was included in flavor and perfume materials but is now shown in the miscellaneous cyclic section of this series. U.S. production of flavor and perfume materials in 1976 increased 27.1 percent from the level in 1975 and the quantity of sales increased by 25.5 percent.

Production of cyclic flavor and perfume materials in 1976 amounted to 55.1 million pounds; sales amounted to 48.5 million pounds, valued at \$125.5 million. Individual publishable chemicals in the cyclic group produced in the greatest volume in 1976 were terpineols, anethole, benzyl acetate, and benzyl salicylate.

U.S. output of acyclic flavor and perfume materials in 1976 amounted to 73.8 million pounds; sales of these materials amounted to 62.4 million pounds, valued at \$69.8 million. Monosodium glutamate was by far the most important of the acyclic chemicals in 1976, although the data are not publishable. Other important acyclic compounds included linalyl alcohol, geraniol, citronellol and hydroxycitronellal.

Flavor and Perfume Materials

U.S. production, sales, and consumption

Production in the United States of flavor and perfume chemicals in 1976 amounted to 128.8 million pounds, 27.1 percent higher than the 1975 level but not high enough to completely recoup the 1974-to-1975 decline. Sales by domestic producers increased to 110.9 million pounds in 1976 and thus recovered by more than the 1974-to-1975 decline. The value of sales in 1976 reached \$195.3 million.

The benzenoid, other cyclic, and acyclic breakdown of the flavor and aroma chemicals section accommodates tariff classification requirements rather than industry practice. In 1976, acyclic compounds constituted 57 percent of total output, benzenoid cyclic, 31 percent, and other cyclic, 12 percent. Ranked in order of value of sales, the top-ranking single chemicals were monosodium glutamate (MSG), vanillin, saccharin, anethole, coumarin, methyl salicylate, geranial, linalyl alcohol, geraniol, and hydroxycitronella, whose aggregate value of sales amounted to \$98.8 million, or 53 percent of the total. The top-ranking single chemicals were monosodium glutamate (sales value not publishable), anethole (\$8.1 million), linalyl alcohol (\$5.1 million), geraniol (\$4.9 million), and hydroxycitronellal (\$4.3 million). MSG was the leader in both 1975 and 1976. The value of sales of MSG as well as those of all other top-ranking chemicals increased in 1976 over their 1975 levels.

U.S. apparent consumption of flavor and aroma chemicals as a whole rose by about 19 percent during 1970-76, to a 1976 level of 110 million pounds, valued at \$226 million. This rise, however, was interrupted by depressed levels in 1971 and in 1975. MSG consumption in 1976 accounted for a significant share of the total consumption of all flavor and perfume chemicals rose by 32 percent. The following factors suggest that this rise in demand will continue and perhaps accelerate:

(1) There is believed to be increasing public acceptance of substitution of flavor and perfume chemicals for natural oils which are subject to high prices and/or supply problems.

(2) Aroma chemicals are raw materials in products whose sales are expected to grow at accelerating rates. Retail sales of cosmetics and toiletries, according to industry statistics and estimates, grew from \$4.7 billion to \$7.6 billion between 1970 and 1977 at an annual rate of increase ranging between 5.4 percent and 8.2 percent (the latter in 1977). The industry expects that growth in sales of perfumes, colognes, aftershave, and other fragrance products will be at the rate of 10 percent a year until 1980; sales of cosmetics designed for blacks will grow by 20 percent

annually; and sales of men's fragrances, aftershave lotions, and colognes will increase 10 percent annually. The value of industry shipments of aftershave preparations grew by 62 percent between 1967 and 1972, from \$93 million to \$150.4 million. The value of industry shipments of all toilet preparations rose steadily from \$2.8 billion in 1967 to \$5 billion in 1975. It is estimated that shipments of toilet preparations will reach \$6.2 billion in 1977.

(3) U.S. disposable personal incomes increased by 81.6 percent during the 1970-77 period. Median incomes of all families and of black families grew by 40 percent and 35 percent, respectively, between 1970 and 1975, according to Commerce Department statistics. From 1974 to 1975, median family incomes increased for all families by 6.3 percent and for black families (a recent growing market for cosmetics) by 9.6 percent. This pattern will probably continue through the 1977-80 period. Increased disposable income tends to increase consumption of luxury products such as prepared foods, cosmetics, and toilet preparations--end-use products in which flavor and aroma chemicals are raw materials.

The industry

Although the flavor and aroma chemical industry still largely consists of privately owned companies, it is traditionally international in orientation, and will probably continue to be so, particularly the aroma chemical segment. Of all companies reporting sales of flavor and perfume chemicals to the International Trade Commission for 1976, those companies having affiliates in one to four foreign countries accounted for about 29 percent of total sales value and were represented among the top nine companies ranked by sales values. For aroma chemicals alone, aggregate sales value of companies having foreign affiliates accounted for 36 percent of the total. The foreign affiliates are located in the United Kingdom, France, Switzerland, the Netherlands, Italy, Mexico, and Brazil. During 1976, ninth-ranking Universal Oil Products Fragrances division of UOP, Inc., became a part of Naarden International N.V. of the Netherlands.

The concentration profile of producers of flavor and perfume chemicals has changed, but not dramatically, during the 1970's. In 1971, 4 companies together accounted for 42 percent of total sales value and 19 companies for 72 percent of this total. In 1976, 4 companies together accounted for 49 percent, but only 9 companies accounted for almost 75 percent of total sales value.

In discussing the products and sales of this industry, it must be noted that important products not included here are flavor and perfume oil blends, and synthetic essential oils (worth probably over \$100 million). For reporting companies, the mean total sales of included flavor and aroma chemicals for 1976 was \$4.4 million, the median, \$1.8 million. The number of companies which reported production and/or sales

of flavor and perfume chemicals trended downward slightly during 1970-76, from 50 in 1970 to 47 in 1976, having fluctuated in the interim. The increasing use by this industry of sophisticated technology and instrumentation in research and development and production will probably continue to slow entry of smaller scale producers.

Continuation is foreseen in the use of crude sulfate turpentine, a byproduct of kraft paper mills, as a raw material in the production of about half, in terms of sales value, of all flavor and aroma chemicals. Petroleum-based raw materials (e.g., acetylene) are used in the production of the remainder.

Regulation

The flavor and perfume chemicals considered here are widely used in food products or in cosmetics and toiletries. The scope and extent of regulation of these chemicals varies, more when used in foods than in cosmetics, the latter probably being the least regulated of all consumer products. Consumer advocate groups have, however, in recent years catalyzed the trend toward increasing controls and regulation for cosmetics ingredients. Managerial, technical, and legal personnel in the industry are thus focusing increasingly on problems of compliance with Government directives deriving from authority under the Food, Drug, and Cosmetic Act.

In 1970 the Food and Drug Administration (FDA) removed the flavor enhancer monosodium glutamate from baby foods but not from its Generally Regarded As Safe (GRAS) list. Consumption of MSG, which was the largest volume chemical produced and sold in 1976 of any in the flavor and perfume materials group, has, nonetheless, grown during the period 1970-76, and is estimated to reach 56 million pounds for 1977. The sweeteners cyclamates and saccharin fared less well. The FDA, under the Delaney clause, a 1958 amendment to the Food, Drug, and Cosmetic Act which bans food additives found carcinogenic for man or animals, banned cyclamates for use in the United States in 1969 and this past March issued a proposal, albeit postponed, to ban saccharin. Debate on the Delaney clause is current, stimulated largely by the diet food industry, which says that 50 million people in the United States demand its products to control overweight, itself a health hazard. There remain ongoing searches by industry and universities for alternative artificial sweeteners.

Regulations governing perfume and cosmetic ingredients are relatively new. FDA regulations begun in 1976 affecting aroma chemicals as raw materials are involved in the following two labeling requirements for cosmetic products: (1) the listing of ingredients in descending order of prominence, effective for all labels ordered after May 31, 1976, and for all products filled and shipped after November 30, 1976; and (2) the

obligation of the producer to substantiate the safety of the product inherent in the requirement to designate ingredients on the label whose safety has not been substantiated.

Several years ago the cosmetics industry initiated self-regulation, still ongoing, by asking its member producers, on a voluntary basis, to supply to FDA (1) a register of all manufacturing plants, (2) formula information, and (3) semiannual product experience reports including reported injuries from cosmetic use. During 1976, industry increased self-regulation by sponsoring and financing research panels to carry out a review of the safety of some 2,700 cosmetic and fragrance ingredients. In view of the cosmetic industry's initiatives in these areas, Government regulation will probably not be a retarding factor in research, development, and shipments of perfume and cosmetic ingredients during 1977-80. The labeling requirements for cosmetic products may, however, impede the growth of imports of the ingredients.

International trade

The level of imports of all flavor and aroma chemicals in 1976 reached 28 million pounds, valued at \$86 million--35 percent in terms of quantity and 25 percent in terms of value over the 1975 levels. Imports of monosodium glutamate, principally from Korea and Japan, alone amounted to 13.5 million pounds or 48 percent of the total quantity, but their value of \$7.2 million constituted only 8 percent of total value. Other important sources of imports were France, Switzerland, and Canada. Important items imported in 1976 other than MSG were saccharin, vanillin, ethyl vanillin, and various artificial musks.

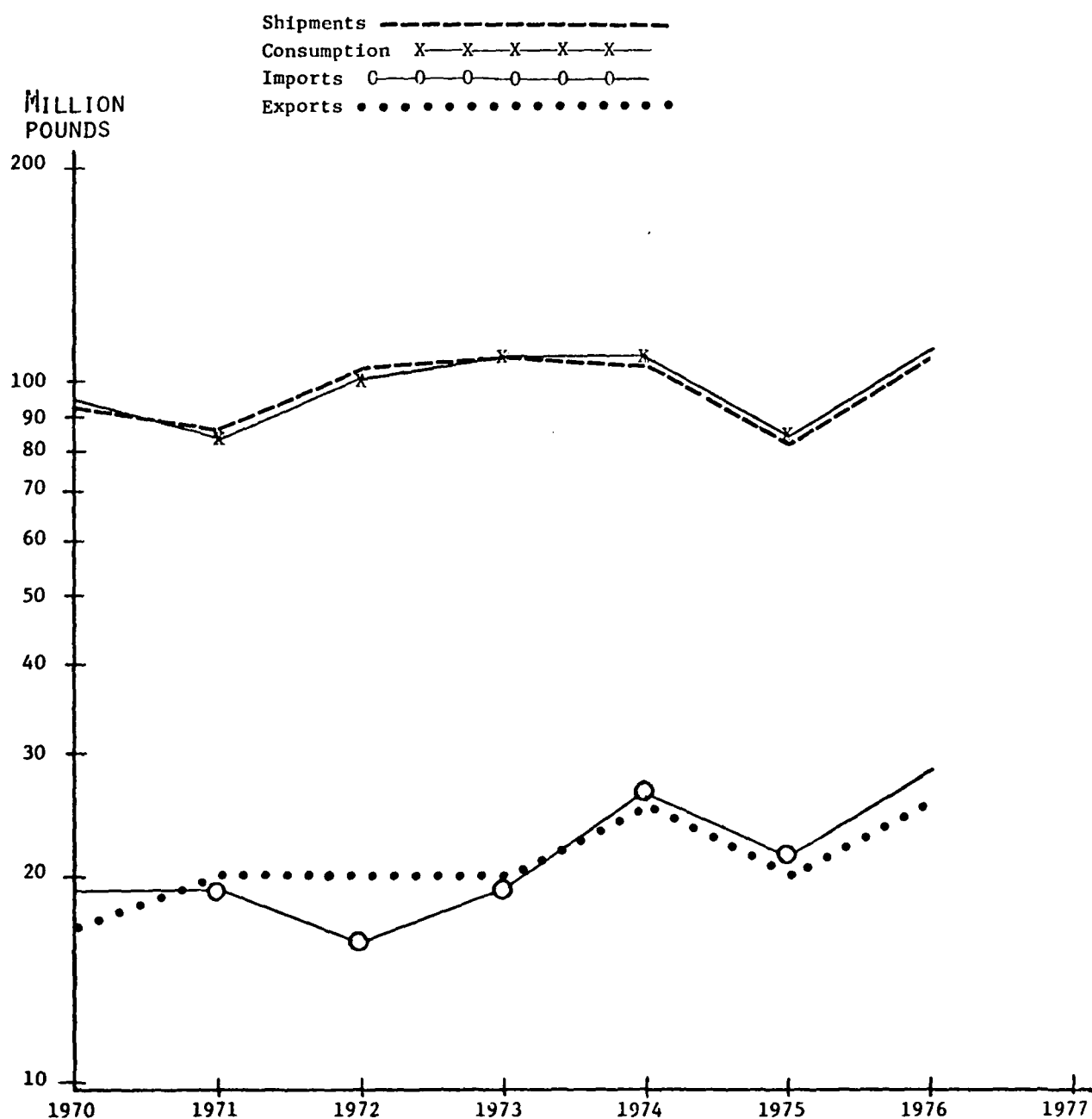
Exports fluctuated during 1970-76, but rose (46 percent) in 1976 in terms of quantity and 25 percent in terms of value from 1975 levels. France and Spain were the principal markets for U.S. exports in 1976, which amounted to 25.3 million pounds valued at \$45.6 million.

Imports exceeded exports during 1970-76 except for the period 1971-73. This unfavorable balance of trade in flavor and perfume chemicals broadened in 1976. The ratio of exports to imports was 93.6 percent in 1970 and 98.2 percent in 1974, then it dropped to 95.9 percent in 1975 and to 90.9 percent in 1976. For monosodium glutamate, imports consistently exceeded exports by a large margin during the 1970's. The ratio of exports to imports was 54.6 percent in 1970 but it declined to 30.2 percent in 1976. The multinational orientation of the principal producers of perfume or aroma chemicals will likely lead to a continuation of this unfavorable balance of trade, or trade deficit, during the 1977-80 period.

Monosodium glutamate produced in the United States became less competitive with imports, particularly those from Korea in 1976. The unit values of producers' sales of MSG in 1975 and 1976 were 69 cents and 65 cents per pound, respectively, while those of imports were 59 cents and 53 cents per pound, respectively. Imports, even with duty added, have a price advantage.

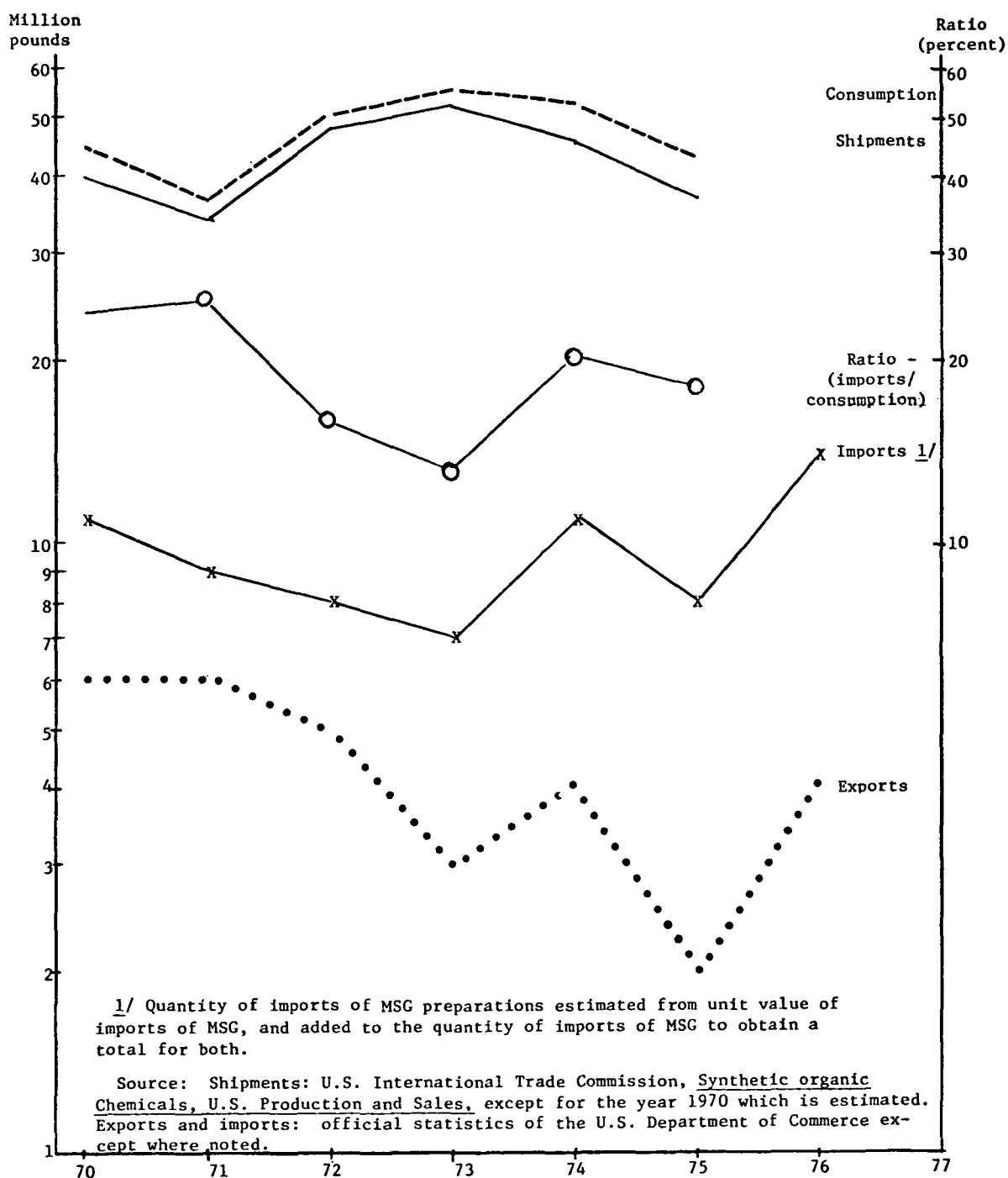
Brazil, the principal U.S. export market for monosodium glutamate, is the site of a new MSG-producing plant which was constructed by a major Japanese producer and became operational in late 1976. U.S. exports of MSG will likely diminish during the 1977-80 period.

SYNTHETIC ORGANIC CHEMICALS, 1976

FLAVOR AND PERFUME MATERIALS: U.S. SHIPMENTS, FOREIGN TRADE,
AND APPARENT CONSUMPTION, 1970-76
(SEMILOGARITHMIC SCALE)

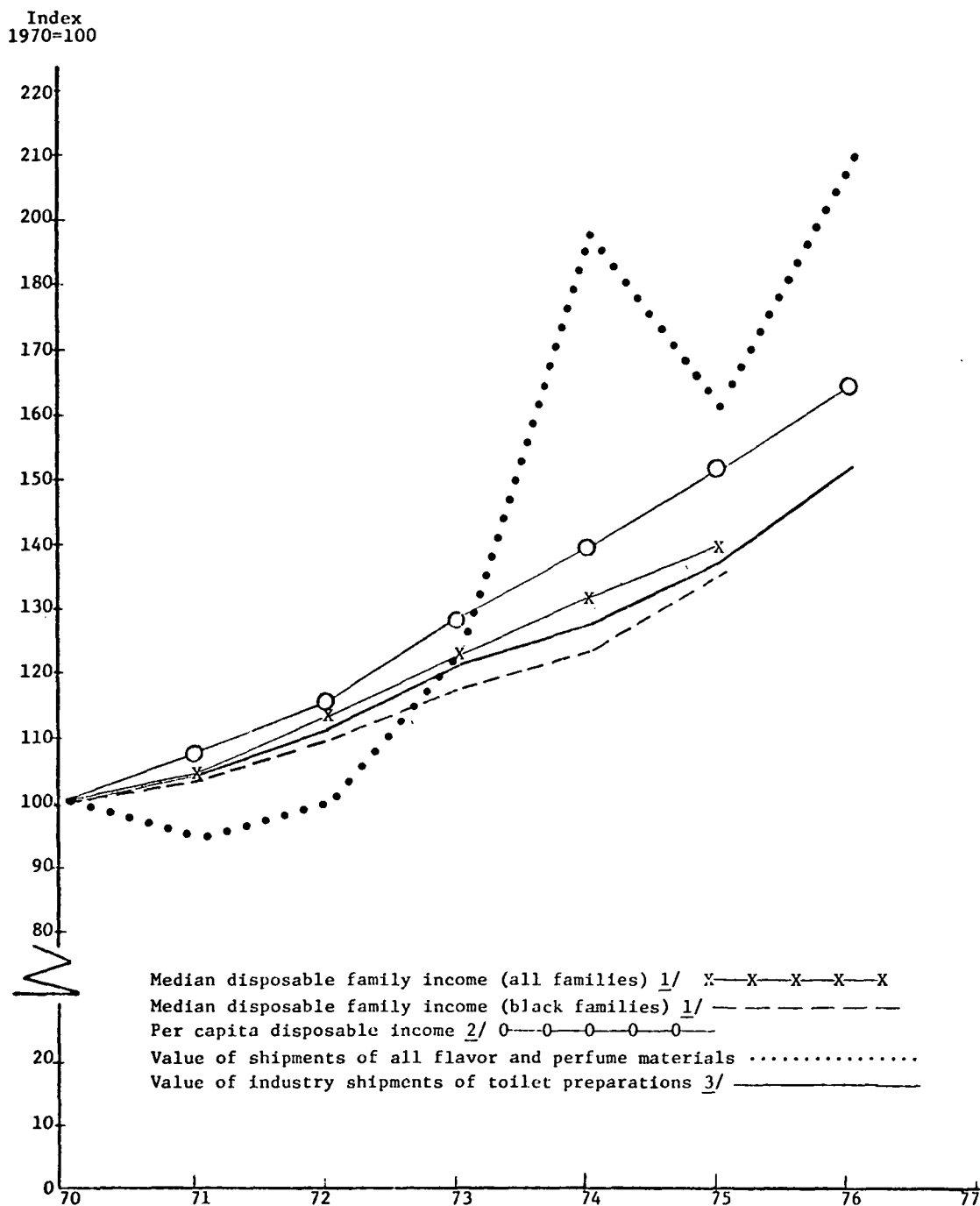
Source: U.S. International Trade Commission, Synthetic Organic Chemicals, U.S. production and Sales and official statistics of the U.S. Department of Commerce.

MONOSODIUM GLUTAMATE: U.S. SHIPMENTS, FOREIGN TRADE, APPARENT
CONSUMPTION AND RATIO OF IMPORTS TO CONSUMPTION, 1970-76



SYNTHETIC ORGANIC CHEMICALS, 1976

FLAVOR AND PERFUME MATERIALS: VALUE OF U.S. SHIPMENTS OF FLAVOR AND PERFUME MATERIALS AND TOILET PREPARATIONS; MEDIAN DISPOSABLE INCOME OF ALL U.S. FAMILIES AND OF U.S. BLACK FAMILIES; PER CAPITA DISPOSABLE INCOME, 1970-76



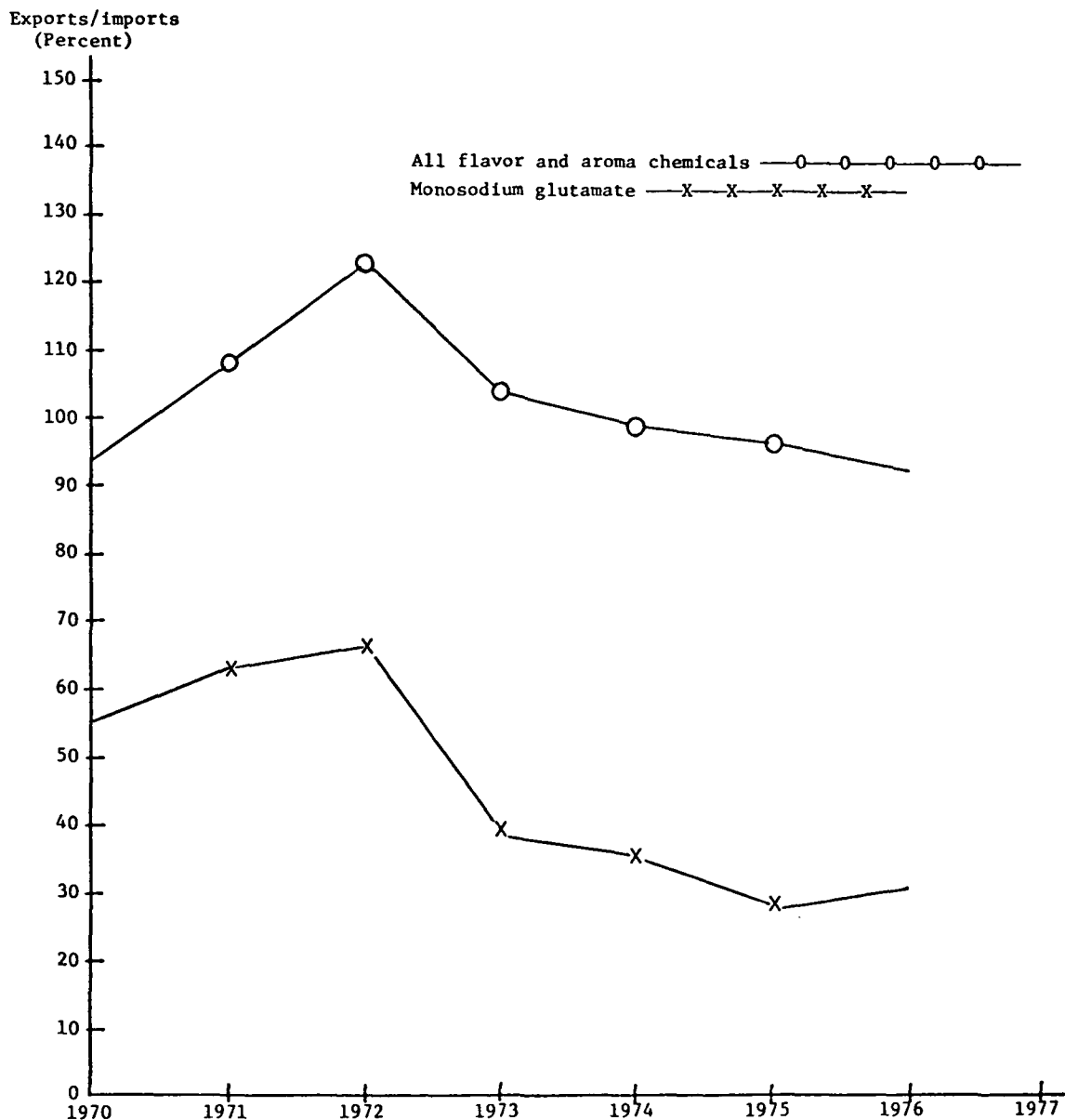
1/ Data for 1976 was not available.

2/ Seasonally adjusted at annual rates.

3/ 1976 figures were partly estimated.

Source: Based on official statistics of the
Department of Commerce.

FLAVOR AND PERFUME CHEMICALS AND MONOSODIUM GLUTAMATE: U.S. BALANCE OF TRADE
AS A RATIO OF EXPORTS TO IMPORTS, 1970-76



Source: Based on official statistics of the U.S. Department of Commerce.

TABLE 1.--FLAVOR AND PERFUME MATERIALS: U.S. PRODUCTION AND SALES, 1976

[Listed below are all synthetic organic flavor and perfume materials for which any reported data on production or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists separately all flavor and perfume materials for which data on production and/or sales were reported and identifies the manufacturers of each]

MATERIAL	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pound	1,000 pound	1,000 dollars	Per pound
Grand total-----	128,846	110,948	195,323	\$1.76
FLAVOR AND PERFUME MATERIALS, CYCLIC				
Total-----	55,090	48,503	125,479	2.59
Benzenoid and Naphthalenoid				
Total-----	40,142	36,776	91,251	2.48
4-Allyl-1,2-dimethoxybenzene (4-Allylveratrole)----	...	13	87	6.51
4-Allyl-2-methoxyphenol (Eugenol)-----	276	222	990	4.45
Anisyl acetate-----	13	12	81	6.60
Benzophenone ² -----	758	453	898	1.98
Benzyl acetate-----	1,825	2,174	2,009	.92
Benzyl cinnamate-----	...	10	62	6.25
Benzyl propionate-----	27	26	40	1.52
Benzyl salicylate-----	1,475	1,394	2,350	1.69
Cinnamaldehyde-----	...	1,104	1,455	1.32
Cinnamyl acetate-----	19	15	66	4.53
Cinnamyl anthranilate-----	...	2	15	9.11
Hydrocoumarin-----	31	37	262	7.13
Isobutyl phenylacetate-----	31	29	65	2.26
Isobutyl salicylate-----	...	13	20	1.53
Isopentyl salicylate-----	941	767	976	1.27
2-Methoxy-4-propenylphenol (Isoeugenol)-----	158	142	954	6.72
p-Methylanisole-----	59	43	66	1.53
Methyl anthranilate-----	283	254	449	1.77
α-Methylcinnamaldehyde-----	26	10	24	2.35
Methyl phenylacetate-----	35	24	61	2.60
Phenethyl acetate-----	...	79	219	2.77
Phenethyl isobutyrate-----	10	7	32	4.43
2-Phenethyl phenylacetate-----	30	20	100	5.05
2-Phenoxyethyl isobutyrate-----	60	48	120	2.50
Phenylacetaldehyde, dimethyl acetal-----	64	76	345	4.55
4-Phenyl-3-buten-2-one-----	...	35	74	2.09
3-Phenyl-1-propanol (Hydrocinnamic alcohol)-----	...	37	124	3.37
p-Propenylanisole (Anethole)-----	2,105	2,370	8,145	3.44
All other benzenoid and naphthalenoid materials-----	31,916	27,360	71,162	2.60
Terpenoid, Heterocyclic, and Alicyclic				
Total-----	14,948	11,727	34,228	2.92
Cedrol-----	25	35	225	6.28
Cedryl acetate-----	320	229	973	4.25
Dihydronordicyclopentadienyl propionate (cyclaprop)-----	26	17	40	2.33
Guaiac wood acetate-----	39	34	167	4.85
4-Hydroxynonanoic acid, gamma-lactone (γ-nonolactone)-----	6	13	126	9.97
Ionone (α- and β-)-----	35	33	228	6.89
Methylionones-----	637	402	2,463	6.12
Terpineols-----	2,490	2,704	1,587	.59
α-Terpinylacetae-----	982	927	921	.99
Vetivenyl acetate-----	24	13	569	44.19
All other terpenoid, heterocyclic, and alicyclic materials-----	10,364	7,320	26,929	3.68

See footnotes at end of table.

TABLE 1.--FLAVOR AND PERFUME MATERIALS: U.S. PRODUCTION AND SALES, 1976--CONTINUED

MATERIAL	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
FLAVOR AND PERFUME MATERIALS, ACYCLIC	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Total-----	73,756	62,445	69,844	\$1.12
Allyl hexanoate-----	38	28	71	2.53
Butyl butyryl lactate-----	60	58	228	3.91
Citronellyl acetate-----	44	29	105	3.59
Citronellyl formate-----	31	23	96	4.77
Citronellyl isobutyrate-----	...	4	27	6.24
Citronellyl propionate-----	5	...	...	...
3,7-Dimethyl-cis-2,6-octadien-1-ol (Nerol)-----	675	376	210	.56
3,7-Dimethyl-trans-2,6-octadien-1-ol (Geraniol)-----	1,852	1,905	4,854	2.55
3,7-Dimethyl-cis-2,6-octadien-1-ol acetate (neryl acetate)-----	19	10	53	5.07
3,7-Dimethyl-1,6-octadien-3-ol (Linalool; Linalyl alcohol)-----	3,050	2,795	5,089	1.82
3,7-Dimethyl-6-octen-1-al (Citronellal)-----	723	...	...	...
3,7-Dimethyl-6-octen-1-ol (Citronellol)-----	1,330	1,125	3,255	2.89
Ethyl butyrate-----	557	379	362	.95
Ethyl heptanoate-----	7	9	24	2.59
Ethyl hexanoate (Ethyl caproate)-----	13	8	18	2.40
Ethyl myristate-----	22	20	54	2.73
Ethyl nonanoate-----	...	6	23	3.51
Ethyl octanoate-----	5	3	12	3.68
Ethyl propionate-----	149	123	124	1.01
Geranyl acetate-----	120	98	336	3.43
Geranyl formate-----	...	15	77	5.22
Geranyl propionate-----	2	...	...	...
2-Hexanal-----	4	...	...	...
7-Hydroxy-3,7-dimethyl-1-octanal (Hydroxy-citronellal)-----	840	738	4,304	5.84
Isopentyl butyrate-----	84	80	97	1.21
Isopentyl formate-----	8	7	16	2.20
Isopentyl isovalerate-----	16	...	...	...
Rhodinol-----	11	...	...	...
All other acyclic materials-----	64,091	54,606	50,408	.92

¹ Calculated from the unrounded figures.² Includes significant quantities having other end uses.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "2"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
FLAVOR AND PERFUME MATERIALS, CYCLIC BENZENOID AND NAPHTHALENOID	
CYCLIC:	
BENZENOID AND NAPHTHALENOID:	
ACETALDEHYDE, DIPHENETHYL ACETAL *PHENYLETHYL ACETAL :	
* - - - - -	: GIV.
2'-ACETONAPHTHONE *BETA-METHYL NAPHTHYL KETONE*- - - - -	: GIV.
1-ACETOXY-2-SEC-BUTYL-1-ETHNYLCYCLOHEXANE- - - - -	: GIV.
@4-ALLYL-1,2-DIMETHOXYBENZENE - - - - -	: CI, FB, GIV, UOP.
PARA-ALLYLANISOLE- - - - -	: GIV, NCI.
4-ALLYL-1,2-(METHYLENEDIOXY)-BENZENE - - - - -	: FB, GIV.
ALLYL PHENOXYACETATE - - - - -	: GIV.
@4-ALLYL-2-METHOXYPHENOL- - - - -	: CI, GIV, IFF, NEO, PEN(E), UNG, UOP.
4-ALLYL-2-METHOXYPHENOL ACETATE- - - - -	: CI, FB, GIV.
ALPHA-AMYL CINNAMIC ALDEHYDE - - - - -	: IFF.
ORTHO-ANISALDEHYDE *ORTHO-METHOXYBENZALDEHYDE* - - - - -	: FB.
PARA-ANISALDEHYDE- - - - -	: CI, GIV, OPC, UOP.
@ANISYL ACETATE - - - - -	: ELN, GIV, OPC, UOP.
AURANTIUM *HYDROXYCITRONELLYLIDENE METHYL ANTHRANILA :	
TE* - - - - -	: FB.
BENZALDEHYDE GLYCERYL ACETAL - - - - -	: GIV.
@BENZOPHENONE - - - - -	: CWN, GAP, NEO, PD, UOP.
@BENZYL ACETATE - - - - -	: FB, GIV, MON, OPC, UOP.
BENZYL BENZOATE- - - - -	: MON, PFZ, UOP, VEL.
BENZYL BUTYRATE- - - - -	: ELN, FB, GIV.
@BENZYL CINNAMATE - - - - -	: FB, GIV, UOP.
BENZYL ETHER - - - - -	: FB, UOP, VEL.
BENZYL FORMATE - - - - -	: GIV, UOP.
BENZYL ISOBUTYRATE - - - - -	: ELN, GIV.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
BENZENOID AND NAPHTHALENOID--CONTINUED	
BENZYL ISOPENTYL ETHER - - - - -	: GIV.
BENZYL ISOVALERATE - - - - -	: ELN, FB.
BENZYL LAURATE - - - - -	: GIV.
1-(BENZYLOXY)-2-METHOXY-4-PROPENYLBENZENE (BENZYL	:
ISOEUGENYL ETHER) - - - - -	: GIV.
BENZYL PHENYLACETATE - - - - -	: ELN, GIV.
@BENZYL PROPIONATE- - - - -	: ELN, FB, GIV.
@BENZYL SALICYLATE- - - - -	: GIV, MON, OPC, UOP.
ALPHA-BROMOSTYRENE *ALPHA-BROMOSTYROL* - - - - -	: CDY, UOP.
PARA-TERT-BUTYL-ALPHA-METHYLHYDROCINNAMALDEHYDE - - -	: GIV, UOP.
TERT-BUTYLDIMETHYL COUMARIN- - - - -	: OPC.
4-TERT-BUTYL-2',6'-DIMETHYL-3',5'-DINITROACETOPHENON	:
E - - - - -	: GIV.
6-TERT-BUTYL-3-METHYL-2,4-DINITROANISOLE (MUSK AMB	:
RETTE) - - - - -	: GIV.
BUTYL PHENYL ACETATE - - - - -	: GIV.
1-TERT-BUTYL-3,4,5-TRIMETHYL-2,6-DINITROBENZENE (M	:
USK TIBETENE) - - - - -	: GIV.
5-TERT-BUTYL-2,4,6-TRINITRO-META-XYLENE (MUSK XYLO	:
L) - - - - -	: GIV.
CARVACROL- - - - -	: GIV.
@CINNAMALDEHYDE - - - - -	: CI, FB, UOP.
CINNAMIC ALDEHYDE DIMETHYL ACETAL- - - - -	: IFP.
@CINNAMYL ACETATE - - - - -	: ELN, FB, GIV.
CINNAMYL ALCOHOL - - - - -	: FB, GIV, UOP.
@CINNAMYL ANTHRANILATE- - - - -	: FEL, GIV, RT.
CINNAMYL CINNAMATE - - - - -	: FB.
CINNAMYL PROPIONATE- - - - -	: ELN, GIV.
CINNAMYL TIGLATE - - - - -	: FB.
COUMARIN - - - - -	: RDA.
CUMINYL ACETATE- - - - -	: IFP.
CUMINYL ALCOHOL- - - - -	: GIV, IFP.
TRANS-DECAHYDRO-BETA-NAPHTHOL- - - - -	: IFP.
2-4-DIBROMO-6-NITRO-META-CRESYL METHYL ETHER - - -	: GIV.
3,4-DIMETHOXY-BENZALDEHYDE *VERATRALDEHYDE*- - -	: GIV.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
BENZENOID AND NAPHTHALENOID--CONTINUED	
1,2-DIMETHOXY-4-PROPENYLBENZENE (4-PROPENYLVERATRO LE)	FB, GIV, UOP.
3,7-DIMETHYL-2,6-OCTADIENYL PHENYLACETATE (GERANYL PHENYLACETATE)	GIV.
ALPHA,ALPHA-DIMETHYLPHENETHYL ACETATE-	IFF.
ALPHA,ALPHA-DIMETHYLPHENETHYL ALCOHOL-	IFF.
ALPHA-ALPHA-DIMETHYLPHENETHYL BUTYRATE	IFF.
DIMETHYL PHENYLETHYL CARBINOL-	IFF.
DIPHENYLMETHANE-	UOP.
1,3-DIPHENYL-2-PROPANONE *DIBENZYLKETONE*	GIV.
PARA-ETHOXYBENZALDEHYDE-	GIV.
2-ETHOXYNAPHTHALENE-	GIV.
ETHYL ANTHRANILATE	FB.
ETHYL BENZOATE	ELN.
ETHYL CINNAMATE-	ELN, GIV.
ETHYL-ALPHA,BETA-EPOXY-BETA-METHYLHYROCINNAMATE-	ELN.
2-ETHYL HEXYL SALICYLATE	FEL, MON.
ETHYL PHENYLACETATE-	ELN, GIV.
ETHYL PHENYLGLYCIDATE-	GIV, UOP.
ETHYL SALICYLATE	FB.
3'-ETHYL-5',6',7',8'-TETRAHYDRO-5',5',8',8',-TETRAHE THYL-2'-ACETONAPHTHONE-	GIV, UOP.
GERANYL BENZOATE	GIV.
HEXYL BENZOATE	GIV.
ALPHA-HEXYLCINNAMALDEHYDE-	CI, IFF.
HYDRATROPALDEHYDE-	GIV, IFF.
HYDRATROPALDEHYDE;DIMETHYL ACETAL-	GIV, IFF.
HYDROCINNAMIC ACID	ARS.
@HYDROCUMARIN-	ARS, GIV, UOP.
HYDROXYCITRONELLAL METHYL ANTHRANILATE	GIV.
4-HYDROXY-3-ETHOXYBENZALDEHYDE *ETHYLVANILLIN*	MON, SDH, SLV.
3-HYDROXY-4-METHOXYBENZALDEHYDE *ISO-VANILLIN*	SDH.
4-HYDROXY-3-METHOXYBENZALDEHYDE *VANILLIN*	MON, SLV.
4*4-HYDROXY-3-METHOXYPHENYL*-2-BUTANONE *VANILLYACET ONE*	GIV.
PARA-HYDROXY PHENYLBUTANONE-	NEO.
INDOLE	GIV.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
BENZENOID AND NAPHTHALENOID--CONTINUED	
ISOAMYL PHENYLACETATE-	: ZLN, FB.
ISOBUTYL BENZOATE-	: ELN.
@ISOBUTYL PHENYLACETATE-	: ELN, FB, GIV, OPC.
ISOBUTYLQUINOLINE-	: IPF.
@ISOBUTYL SALICYLATE-	: FB, GIV, UOP.
ISOHEXENYL TETRAHYDROBENZALDEHYDE *MYRAC ALDEHYDE*	: IPF.
ISOPENTYL BENZOATE-	: GIV.
@ISOPENTYL SALICYLATE-	: FB, GIV, MON, UOP.
ISOPROPYLBENZALDEHYDE *CUMALDEHYDE*-	: GIV.
PARA-ISOPROPYL-ALPHA-METHYLHYDROCINNAMALDEHYDE (CY :	
CLAMEN ALDEHYDE)-	: GIV, RDA.
LINALYL ANTHRANILATE-	: FMT.
LINALYL BENZOATE-	: GIV, HOP.
LINALYL CINNAMATE-	: HOP.
PARA-MENTHA-1,8-DIENE *LIMONENE*	: RT, SKG.
MENTHYL ANTHRANILATE-	: PFW.
4'-METHOXYACETOPHENONE-	: GIV, UOP.
3,4-METHOXYBENZALDEHYDE *VERATRALDEHYDE*	: SDH.
PARA-METHOXYBENZYL ALCOHOL-	: GIV, OPC, UOP.
ORTHO-METHOXY CINNAMIC ALDEHYDE-	: CI, FB.
2-METHOXYNAPHTHALENE-	: GIV.
1-*PARA-METHOXYPHENYL*-1-PENTEN-3-ONE *ALPHA-METHYL-	
ANISYLACETONE*-	: GIV.
@2-METHOXY-4-PROPENYLPHENOL *ISOEUGENOL*-	: CI, FB, GIV, IPF, NEO, UOP.
2-METHOXY-4-PROPENYLPHENOL, ACETATE-	: CI, UOP.
4'-METHYLACETOPHENONE-	: UOP.
@PARA-METHYLANISOLE-	: GIV, OPC, SW, UOP.
@METHYL ANTHRANILATE-	: FB, SW, UNG.
METHYL BENZOATE-	: HN.
ALPHA-METHYLBENZYL ACETATE-	: CI, FB, GIV.
@ALPHA-METHYLCINNAMALDEHYDE-	: CI, FB, GIV.
6-METHYLCOUMARIN-	: GIV.
1,2-(METHYLENEDIOXY)-4-PROPENYLBENZENE (ISOSAFEROL :	
E)-	: GIV.
4-METHYL-7-ETHOXYCOUMARIN-	: GIV.
PARA-METHYLHYDRATROPALDEHYDE-	: GIV.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
BENZENOID AND NAPHTHALENOID--CONTINUED	
1-METHYL-ISOHEXYL-HEXAHYDRO BENZALDEHYDE - - - - -	: GIV.
METHYL N-METHYLANTHRANILATE- - - - -	: GIV, SW.
@METHYL PHENYLACETATE - - - - -	: ELN, GIV, OPC, SPA.
PARA-METHYL PHENYLETHYL ALCOHOL- - - - -	: NEO.
METHYL SALICYLATE- - - - -	: DOW, HN, MON.
METHYL CINNAMATE - - - - -	: FB, UOP.
MUSK 89- - - - -	: IFF.
1,1,3,3,5-PENTAMETHYL-4,6-DINITROINDAN *MOSKENE* - - - - -	: GIV.
ALPHA-PENTYLCINNAMALDEHYDE - - - - -	: CI, FB, UOP.
@PHENETHYL ACETATE- - - - -	: GIV, IFF, OPC.
PHENETHYL ALCOHOL- - - - -	: IFF, NEO.
PHENETHYL BENZOATE - - - - -	: OPC.
PHENETHYL FORMATE- - - - -	: ELN, IFF.
@PHENETHYL ISOBUTYRATE- - - - -	: ELN, GIV, IFF.
PHENETHYL ISOVALERATE- - - - -	: ELN, FB, GIV, RT.
PHENETHYL METHACRYLATE - - - - -	: NEO.
@2-PHENETHYL PHENYLACETATE- - - - -	: CI, ELN, GIV, IFF, NEO.
PHENETHYL PROPIONATE - - - - -	: ELN, GIV, IFF.
PHENETHYL SALICYLATE - - - - -	: GIV, NEO.
@2-PHENOXYETHYL ISOBUTYRATE - - - - -	: ELN, FB, GIV, IFF, OPC.
PHENOXYETHYL PROPIONATE- - - - -	: IFF.
PHENYLACETALDEHYDE - - - - -	: GIV.
@PHENYLACETALDEHYDE, DIMETHYL ACETAL - - - - -	: ELN, GIV, UOP.
PHENYLACETIC ACID- - - - -	: GIV.
PHENYLACETIC ACID ISOPENTYL ESTER- - - - -	: GIV.
ALPHA-PHENYLANISOLE- - - - -	: GIV.
ORTHO-PHENYLANISOLE *2-METHOXYBIPHENYL*- - - - -	: OPC.
ORTHO-PHENYLPHENOL *COSMETIC GRADE* - - - - -	: RSA.
@4-PHENYL-3-BUTEN-2-ONE - - - - -	: FB, NEO, UOP.
PHENYLETHYL TIGLATE- - - - -	: FB.
@3-PHENYL-1-PROPANOL- - - - -	: ELN, FB, GIV, UOP.
3-PHENYLPROPYL ACETATE - - - - -	: ELN, FB, GIV.
3-PHENYLPROPYL CINNAMATE - - - - -	: FB, RT.
PIPERONAL- - - - -	: AMB, GIV.
@PARA-PROPENYLANISOLE - - - - -	: ARZ, FB, GLD, HPC, NCI.
4-PROPENYL-1,2-DIMETHOXYBENZENE *METHYL ISOEUGENOL* - - - - -	: CI.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
BENZENOID AND NAPHTHALENOID--CONTINUED	
PARA-PROPYLANISOL- - - - -	FB, GIV.
N-PROPYL PHENYL ETHYL ALCOHOL- - - - -	GIV.
SWEETENERS, SYNTHETIC:	
CYCLOHEXANESULFAMIC ACID - - - - -	ABB.
CYCLOHEXANESULFAMIC ACID,CALCIUM SALT- - - - -	ABB.
CYCLOHEXANESULFAMIC ACID,SODIUM SALT - - - - -	ABB.
SACCHARIN (1,2-BENZISOTHIAZOLIN-3-ONE,-1,1-DIOXI DE) - - - - -	SW.
SACCHARIN,SODIUM SALT- - - - -	SW.
PARA-TOLUALDEHYDE- - - - -	FB, GIV.
PARA-TOLYLACETALDEHYDE - - - - -	GIV.
PARA-TOLYL ACETATE - - - - -	ELN, GIV.
PARA-TOLYL ISOBUTYRATE - - - - -	GIV.
PARA-TOLYLPHENYLACETATE- - - - -	GIV.
ALPHA-(TRICHLOROMETHYL) BENZYL ACETATE- - - - -	NEO.
ALL OTHER BENZENOID OR NAPHTHALENOID CHEMICALS - - -	IPF, PFW, RDA, SLV.
TERPENOID, HETEROCYCLIC, AND ALICYCLIC:	
ACETYL BUTYRYL *2,3-HEXANEDIONE* - - - - -	FB.
ACETYL ISOVALERYL *5-METHYL-2,3-HEXANEDIENE* - - - -	FB.
ACETYL PROPIONYL *2,3-PENTANEDIONE* - - - - -	FB.
ACONITIC ESTER - - - - -	GIV.
ALLO-OCIMENE *MUGUOL*- - - - -	IPF, NCI.
ALLYL CYCLOHEXYL P-OPIONATE- - - - -	GIV.
AMYRIS ACETATE - - - - -	GIV.
BORNYL ISOVALERATE - - - - -	FB.
2-SEC-BUTYLCYCLOHEXANONE - - - - -	GIV.
PARA-TERT-BUTYLCYCLOHEXANONE *ORIVONE* - - - - -	IPF.
2-TERT-BUTYL CYCLOHEXYNYL ACETATE *VERDOX* - - - -	IPF.
PARA-TERT-BUTYLCYCLOHEXYL ACETATE- - - - -	CI, IPF.
CADINENE - - - - -	FB.
BETA-CARYOPHYLLENE - - - - -	CI, GIV.
CARYOPHYLLENE ACETATE- - - - -	CI.
CARYOPHYLLENE PHENOL FREE- - - - -	FB.
CEDARWOOD ACETATE- - - - -	FB.
CEDRENE- - - - -	NEO.
ALPHA-CEDRENE EPOXIDE *ANDRANE*- - - - -	IPF.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
TERPENOID, HETEROCYCLIC, AND ALICYCLIC--CONTINUED	
CEDRENOL - - - - -	: GIV, IFF, NEO.
@CEDROL - - - - -	: ELN, GIV, IFF, NEO.
@CEDRYL ACETATE - - - - -	: ELN, GIV, IFF, NEO, UNG.
CEDRYL FORMATE - - - - -	: IFF.
CYCLOHEXYL CYCLOHEXANOL- - - - -	: CI.
2-CYCLOHEXYLCYCLOHEXANONE- - - - -	: GIV.
DIHYDRONORDICYCLOPENTADIENYL ACETATE - - - - -	: CI, GIV, IFF, OPC.
@DIHYDRONORDICYCLOPENTADIENYL PROPIONATE (CYCLAPROP :) - - - - -	: CI, GIV, OPC, PFW.
DIHYDRO TERPINEOL- - - - -	: NCI.
DIHYDROTERPINYL ACETATE- - - - -	: GIV, NCI, OPC.
3,5-DIMETHYL CYCLOHEXENE ALDEHYDE- - - - -	: PFW.
ETHYLENE BRASSYLATE- - - - -	: NEO.
ETHYL FUROATE- - - - -	: RT.
FURFURAL ACETONE - - - - -	: RT.
FURFURAL ACROLEIN- - - - -	: RT.
GALAXOLIDE*HEXAMETHYL CYCLOPENTA-GAMMA-2-BENZOPYRAN* : @GUAIAWOOD ACETATE - - - - -	: IFF. : ELN, FB, GIV, NEO.
GUAIENE- - - - -	: FB.
3-HYDROXY-2-ETHYL-4-PYRONE- - - - -	: PFZ.
@4-*4-HYDROXY-4-METHYLPENTYL*-3-CYCLOHEXENE-10-CARBOX : ALDEHYDE*LYRAL* - - - - -	: IFF.
3-HYDROXY-2-METHYL-4-PYRONE- - - - -	: PFZ.
4-HYDROXYNONANIC ACID, GAMMA-LACTONE (GAMMA-NONALA : CTONE)- - - - -	: CI, GIV, UOP.
4-HYDROXYOCTANOIC ACID, GAMMA-LACTONE (GAMMA-OCTALA : CTONE)- - - - -	: GIV, RT.
4-HYDROXYUNDECANOIC ACID, GAMMA-LACTONE (GAMMA-UNDE : CALACTONE)- - - - -	: FE, UOP.
4-HYDROXYVALERIC ACID, GAMMA-LACTONE *GAMMA-VALEROLA : CTONE*- - - - -	: GIV.
BETA-IONONE- - - - -	: HOF, STP.
ALPHA-IONONE - - - - -	: GIV, STP.
@IONONE(ALPHA- AND BETA-) - - - - -	: GIV, HOF, IFF, STP.
ISOBORNYL ACETATE- - - - -	: NCI, RDA.
ISOBORNYL PROPIONATE - - - - -	: ELN, GIV.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
TERPENOID, HETEROCYCLIC, AND ALICYCLIC--CONTINUED	
ISOCAMPHYL CYCLOHEXANOLS - - - - -	: GIV.
ISOHEXENYL CYCLOHEXENYL CARBOXYALDEHYDE - - - - -	: OPC.
ISOJASMONE - - - - -	: FB.
ISOMENTHONE - - - - -	: GIV.
2-ISOPROPYLCYCLOHEXANOL - - - - -	: CI, GIV.
JASMAL - - - - -	: IFF.
LAVANDIN, ACETYLATED - - - - -	: GIV, UNG.
PARA-MENTHA-1,4-DIENE - - - - -	: GLD.
PARA-MENTHA-6,8-DIEN-2-OL - - - - -	: FB, NEO.
PARA-MENTHA-6,8-DIEN-2-ONE *CARVONE; CARVOL* - - - - -	: FB, NEO.
L-PARA-MENTHA-6,8-DIEN-2-YL ACETATE *L-CARVYL ACETAT E* - - - - -	: FB.
PARA-MENTHAN-3-ONE - - - - -	: GIV, GLD.
PARA-MENTH-8-EN-3-OL - - - - -	: GIV.
PARA-MENTH-1-EN-3-ONE *PIPERITONE* - - - - -	: GIV.
PARA-MENTH-4-(8)-EN-3-ONE - - - - -	: GIV.
1-1-PARA-MENTHEN-6-YL-1-PROPANONE - - - - -	: GIV.
MENTHOL, SYNTHETIC, TECH. - - - - -	: GIV.
MENTHOL, SNTHETIC, U.S.P. - - - - -	: GLD.
MENTHYL ACETATE - - - - -	: FB, GIV, PFW.
@METHYLIONONES:	
6-METHYL-ALPHA-IONONE - - - - -	: GIV.
6-METHYL-BETA-IONONE - - - - -	: UNG.
METHYLIONONE (ALPHA- AND BETA-) - - - - -	: GIV, IFF, NEO, RDA, STP.
GAMMA-METHYLIONONE - - - - -	: GIV, NEO.
NOPOL - - - - -	: NCI, OPC.
NOPYL ACETATE - - - - -	: FB, FEL, NCI, OPC, RT.
3-PENTYL TETRAHYDRO-4 PYRIDINE* JESSEMAL - - - - -	: IFF.
PINENE - - - - -	: NCI.
ALPHA-SANTALOL - - - - -	: GIV, IFF.
ALPHA-SANTALYL ACETATE - - - - -	: GIV.
SASSAFRASS OIL, HYDROGENATED - - - - -	: GIV.
@TERPINEOLS:	
ALPHA-TERPINEOL - - - - -	: GLD, HPC, NCI.
TERPINEOL (ALPHA- AND BETA-) - - - - -	: GIV.
ALPHA-TERPINYL ACETATE - - - - -	: GIV, NCI, NEO, PFW, RDA, UNG.
ALPHA-TERPINYL PROPIONATE - - - - -	: ELN, GIV.
3,3,5 TRIMETHYL CYCLOHEXANOL *META-HOMOMENTHOL* - - - - -	: ARS, NEO.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
CYCLIC--CONTINUED	
TERPENOID, HETEROCYCLIC, AND ALICYCLIC--CONTINUED	
1-(2,6,6-TRIMETHYL-2-CYCLOHEXEN-1-YL)-1,6-HEPTADIEN-3-ONE	: IFF.
2,6,10-TRIMETHYL-9-UNDECEN-1-AL	: GIV.
VETIVENOL	: GIV, UOP.
@VETIVENYL ACETATE	: ELN, FB, GIV, IFF, NEO, UNG, UOP.
ALL OTHER TERPENOID, HETEROCYCLIC, OR ALICYCLIC FLAVOR AND PERFUME CHEMICALS	: PFW.
ACYCLIC:	
ALLYL DISULFIDE	: RT.
ALLYL HEPTANOATE	: ELN, FB, RT.
@ALLYL HEXANOATE	: ELN, FB, GIV, PFW.
ALLYL ISOTHIOCYANATE	: OPC.
ALLYL ISOVALERATE	: RT.
ALLYL OCTANOATE	: RT.
ALLYL SULFIDE	: RT.
AMYL PROPIONATE	: GIV.
AMYL VINYL CARBINOL	: NEO.
BRAZINOL *DIMETHYL HEPTENOL*	: RDA.
BUTTER ACIDS	: RT.
BUTTER ESTERS	: RT.
@BUTYL BUTYRL LACTATE	: ARS, BJL, ELN, RT.
BUTYL UNDECYLENATE	: CI, GIV.
CITRAL A AND B, MIXTU-E	: NCI.
CITRAL DIMETHYL ACETAL	: CI, GIV, IFF, RDA.
CITRONELLYL ACETATE	: ELN, GIV, IFF.
CITRONELLYL BUTYRATE	: ELN, GIV.
@CITRONELLYL FORMATE	: ELN, GIV, IFF, NEO.
@CITRONELLYL ISOBUTYRATE	: ELN, GIV, IFF.
CITRONELLYL OXYACETALDEHYDE	: IFF, OPC.
@CITRONELLYL PROPIONATE	: ELN, GIV, IFF.
DECANAL	: CI, GIV.
DECYL ACETATE	: GIV.
DIETHYL ACETAL	: FB.
DIETHYL SEBACATE	: ELN, UOP.
DIETHYL SUCCINATE	: ELN, IFF, UCC (E).
3,7-DIMETHYL-3-ACETOXY-OCTENE-6-YNE-1	: RDA.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--CONTINUED	
2,6-DIMETHYL-5-HEPTEN-1-AL - - - - -	: GIV.
DIMETHYL HEXANEDIOL- - - - -	: X(E).
DIMETHYL HEXYNE-1,6-DIOL- - - - -	: X(E).
3,7-DIMETHYL-2,3,6-NONADIENENITRILE- - - - -	: GIV.
3,7-DIMETHYL-TRANS-2,6-OCTADIENAL (CITRAL A; GERANIAL :) - - - - -	: FB, FEL, GIV, GLD, RDA, UOP.
@3,7-DIMETHYL-CIS-2,6-OCTADIEN-1-OL - - - - -	: ELN, FB, GIV, GLD, IPP, NCI.
@3,7-DIMETHYL-CIS-2,6-OCTADIEN-1-OL, ACETATE *NERYL ACET : ATE* - - - - -	: ELN, GIV, IPP.
@3,7-DIMETHYL-1,6-OCTADIEN-3-OL (LINALOOL) (LINALYL : ALCOHOL) - - - - -	: ELN, FB, FEL, GIV, GLD, HOF, NCI, RDA.
@3,7-DIMETHYL-TRANS-2,6-OCTADIEN-1-OL - - - - -	: CI, ELN, FB, FEL, GIV, GLD, IPP, NCI, UOP.
3,7-DIMETHYL-1,6-OCTADIEN-3-OL, ACETATE (LINALYL ACET : ATE) - - - - -	: ELN, FB, GIV, HOF, NCI, RDA.
3,7-DIMETHYL-1,6-OCTADIEN-3-YL ISOBUTYRATE (LINALYL : ISOBUTYRATE) - - - - -	: ELN, HOF.
3,7-DIMETHYL-1,6-OCTADIEN-3-YL PROPIONATE (LINALYL P : ROPIONATE) - - - - -	: ELN, GIV, HOF.
3,7-DIMETHYLOCTANOL-1 *TETRAHYDOGERANIOL*- - - - -	: GIV.
3,7-DIMETHYL-3-OCTANOL - - - - -	: IPP.
DIMETHYLOCTANYL ACETATE- - - - -	: IPP.
@3,7-DIMETHYL-6-OCTEN-1-AL- - - - -	: CI, FB, GIV, GLD, RDA, UOP.
2,6-DIMETHYL, 2-OCTENE-7-YNE-6-OL - - - - -	: RDA.
@3,7-DIMETHYL-6-OCTEN-1-OL- - - - -	: CI, ELN, FB, GIV, GLD, IPP, NCI.
3,7-DIMETHYL-7-OCTENOL 70PCT, 6-OCTENOL ISOMER 30PCT- : DIMYRCETOL - - - - -	: GIV. : IPP.
@ETHYL BUTYRATE - - - - -	: FB, NW, UOP.
ETHYL CAPRATE- - - - -	: ELN, FB.
ETHYL FORMATE- - - - -	: FB.
@ETHYL HEPTANOATE - - - - -	: ELN, FEL, RT, UOP.
@ETHYL HEXANOATE- - - - -	: ELN, FB, NW, PFW, RT.
ETHYL ISOBUTYRATE- - - - -	: FB.
ETHYL ISOVALERATE- - - - -	: ELN, FB, PFW.
ETHYL LAURATE- - - - -	: ELN, FB.
ETHYL LINALOOL *3,7-DIMETHYL-1-6-NONADIEN-3-OL*- - - - : :	: HOF.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--CONTINUED	
ETHYL LINALYL ACETATE*3,7-DIMETHYL-1,6-NONADIEN-OL	
ACETATE- - - - -	: HOF.
ETHYL-2-METHYL BUTYRATE- - - - -	: GLD, PFW.
ETHYL-2-METHYL-2-PENTENOATE- - - - -	: PFW.
ETHYL MYRISTATE- - - - -	: ELN, PFW, RT.
@ETHYL NONANOATE- - - - -	: ELN, FB, GIV.
@ETHYL OCTANOATE- - - - -	: ELN, FB, RT.
ETHYL OXYHYDRATE- - - - -	: FLO, RT.
@ETHYL PROPIONATE- - - - -	: FB, NW, UOP.
ETHYL VALERATE- - - - -	: ELN.
GERANIC ACID- - - - -	: FB.
GERANYL NITRILE *GERANO NITRILE* *CITRALVA*- - - - -	: IFF.
@GERANYL ACETATE- - - - -	: CI, ELN, FB, FEL, GIV, IFF.
GERANYL BUTYRATE- - - - -	: ELN, GIV.
GERANYL CROTONATE- - - - -	: FB.
GERANYL DIMETHYL ACRYLATE- - - - -	: FMT.
@GERANYL FORMATE- - - - -	: CI, ELN, GIV.
GERANYL ISOBUTYRATE- - - - -	: IFF.
GERANYL ISOVALERATE- - - - -	: FB.
GERANYL NERYL FORMATE *NERGER FORMATE*- - - - -	: IFF.
GERANYL NITRILE- - - - -	: CI.
@GERANYL PROPIONATE- - - - -	: ELN, FB, IFF.
GERANYL TIGLATE- - - - -	: FB.
GLUTAMIC ACID, MONOSODIUM SALT- - - - -	: GRW, IMC, SPF.
N-HEPTANAL- - - - -	: NTL.
HEPTANOLIDE-*4,1* *GAMMA-HEPTALACTONE*- - - - -	: FB.
2,4-HEXADIENEAL- - - - -	: PFW.
HEXADIENEOL- - - - -	: PFW.
@2-HEXENAL- - - - -	: FB, GIV, PFW.
CIS-3-HEXENAL-2-METHYL- - - - -	: GLD.
2-HEXENOL- - - - -	: FB.
CIS-3-HEXEN-1-OL- - - - -	: GIV, SW.
CIS-3-HEXEN-1-YL ACETATE- - - - -	: GIV.
HEXOXYACETALDEHYDE DIMETHYL ACETAL- - - - -	: FB.
HEXYL CAPROATE- - - - -	: FB.
3-HEXYNOL- - - - -	: HOF, SW.
3-HYDROXY-2-BUTANONE- - - - -	: FMT.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACYCLIC--CONTINUED	
@7-HYDROXY-3,7-DIMETHYL-1-OCTANAL (HYDROXYCITRONELLAL)	CI, GIV, GLD, IPF, RDA, UOP.
7-HYDROXY-3,7-DIMETHYL OCTANAL, DIMETHYL ACETAL (HYDR : OXYCITRONELLAL, DIMETHYL ACETAL)	GIV, UOP.
HYDROXY-2-PROPANONE *ACETOL*	PB.
ISOAMYL CAPROATE	PB.
ISOAMYL GERANATE	PB.
ISOAMYL PROPIONATE	PB.
ISOBUTYL ACETATE	PB.
ISOBUTYL BUTYRATE	PB.
ISODIHYDRO LAVANDULOL	PB.
ISODIHYDRO LAVANDULYLACETATE	PB.
ISODIHYDRO LAVANDULYLALDEHYDE	PB.
ISONONYL ACETATE	CI.
ISOPENTYL ACETATE *ISOAMYL ACETATE*	PB, NW, PFW.
@ISOPENTYL BUTYRATE	PB, GIV, NW, PFW, UOP.
@ISOPENTYL FORMATE	ELN, PB, GIV, RT.
@ISOPENTYL ISOVALERATE	ELN, PB, PFW, RT.
LAURALDEHYDE	GIV.
LINALALCOL OXIDE	HOF.
LINALYL FORMATE	HOF.
LINALYL, NERYL, GERANYL ACETATES, MIXTURE	NCI.
METHOXY CITRONELLAL	GLD.
METHYL BUTENOL	X(E).
METHYL BUTYNOL	X(E).
ALPHA-METHYL BUTRIC ACID	PFW.
METHYL HEPTADIENONE	HOF.
3-METHYL-5-HEPTANONE OXIME	GIV.
METHYL HEPTENONE	HOF, RDA.
METHYL ISOBUTYRATE	PFW.
METHYL ISOVALERATE	PB.
METHYL-2-METHYL BUTYRATE	GLD.
METHYL-2-NONENOATE	GIV, PFW.
METHYLOL METHYL HEXYL KETONE	GIV.
3-METHYL-2-*AND3*NONENE NITRILE	GIV.
METHYL PENTADIENE	PB.

TABLE 2.--FLAVOR AND PERFUME MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
4-METHYL PENTANOIC ACID-	PPW.
METHYL PENTYLNOL -	X (E).
METHYL PROPIONATE-	FB.
BETA METHYL THIOPROPIONALDEHYDE-	BT.
2-METHYLUNDECANAL-	GIV.
MYRCENYL ACETATE -	IPF.
MYRISTALDEHYDE -	GIV.
NEROLIDOL *3,7,11,TRIMETHYL-1,6,10 DODECTRIENE-3-OL*	HOP.
NONANAL-	GIV.
1,3-NONANEDIOL ACETATE -	CI, GIV.
NONANOL-	GIV.
NONYL ACETATE-	ELN, GIV.
OCIMENYL ACETATE -	IPF.
OCTANAL-	CI, GIV.
3-OCTANOL-	GIV.
3-OCTANONE -	GIV.
N-OCTYL ACETATE-	ELN, GIV.
N-OCTYL ALCOHOL-	GIV.
OCTYL ISOVALERATE-	BT.
PENTYL ACETATE -	UOP.
N-PROPYL ACETAL-	GIV.
NORMAL-PROPYL NORMAL-BUTYRETE-	PPW.
PSEUDO LINALYL ACETATE *NEOBERGAMATE*-	IPF.
@RHODINOL -	FB, FEL, GIV, IPF.
RHODINYL ACETATE -	GIV, IPF.
TEPYL ACETATE-	ELN, UOP.
TETRAHYDRO ALLO-OCIMENE-	IPF.
TETRAHYDRO PSEUDOIONONE-	CI.
3,5,5-TRIMETHYL HEXANAL-	NEO.
UNDECANAL-	GIV.
9-UNDECENAL -	GIV.
10-UNDECEN-1-YL ACETATE-	GIV.
ALL OTHER ACYCLIC FLAVOR AND PERFUME MATERIALS -	PPW, RSA.

TABLE 3.--FLAVOR AND PERFUME MATERIALS: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production or sales of flavor and perfume materials to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of Company	Code	Name of Company
ABB	Abbott Laboratories	NCI	Union Carbide Corp.
AIP	Air Products & Chemicals, Inc.	NEO	Norda Inc.
AMB	American Bio-Synthetics Corp.	NTL	NL Industries, Inc.
ARS	Arsynco, Inc.	NW	Northwestern Chemical Co.
ARZ	Arizona Chemical Co.		
		OPC	Orbis Products Corp.
BJL	Burdick & Jackson Labs., Inc.	OTC	Story Chemical Corp.
CI	Chem-Fleur, Inc.	PD	Parke, Davis & Co., Sub of Warner-Lambert Co.
CWN	Upjohn Co., Fine Chemical Div.	PEN	CPC International, Inc., Penick Div.
		PFW	Polak's Frutal Works, Inc.
DOW	Dow Chemical Co.	PFZ	Pfizer, Inc.
ELN	Elan Chemical Co.	RDA	Rhodia, Inc.
		RSA	R.S.A. Corp.
FB	Fritzsche, Dodge & Olcott, Inc.	RT	Ritter International
FEL	Felton International, Inc.		
FLO	Florasynth, Inc.	SDH	Sterling Drug, Inc., Hilton-Davis Chemical Co. Div.
FMT	Fairmount Chemical Co., Inc.		Stauffer Chemical Co.: Food Ingredients Div. Specialty Div.
		SFF	
GAF	GAF Corp., Chemical Div.	SFS	Sunkist Growers, Inc.
GIV	Givaudan Corp.	SLV	Sterwin Chemicals, Inc.
GLD	SCM Corp., Glidden-Durkee Div.	STP	Stepan Chemical Co.
GRW	Great Western Sugar Co.	SW	Sherwin-Williams Co.
HN	Tenneco Chemicals, Inc.	UCC	Union Carbide Corp.
HOF	Hoffmann-LaRoche, Inc.	UNG	Ungerer & Co.
HPC	Hercules, Inc.	UOP	UOP, Inc., UOP Chemical Div.
IFF	International Flavors & Fragrances, Inc.	VEL	Velsicol Chemical Corp.
IMC	IMC Chemical Group, Inc.		
MON	Monsanto Co.		

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

PLASTICS AND RESIN MATERIALS

Anne Klein

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. Depending on the chemical composition, manufacturing process or intended use, the commercial products may contain plasticizers, fillers, extenders, stabilizers, coloring agents, or other additives. Plastics materials may be molded, cast, or extruded into semi-finished 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 1976 are given in table 1. U.S. production of plastics and resin materials in 1976 totaled 29,680 million pounds, or 21 percent more than the 24,509 million pounds produced in 1975. Sales in 1976 totaled 24,837 million pounds, valued at \$8,619 million compared with 20,955 million pounds, valued at \$7,003 million in 1975.

Thermosetting materials are those which harden with a change in composition in the final treatment so that they cannot again be softened by heat or solvents. U.S. production of thermosetting materials totaled 5,970 million pounds in 1976 compared with 5,140 million pounds in 1975. Production of the most important products in 1976 included polyether and polyester polyols for urethanes (1,346 million pounds), phenolic resins (1,305 million pounds), amino (or urea and melamine) resins (1,230 million pounds), polyester resins, (unsaturated) (865 million pounds) and alkyd resins (705 million pounds).

Thermoplastic materials are those which can be repeatedly softened by heat and shaped. U.S. production of thermoplastic materials totaled 23,710 million pounds in 1976 compared with 19,728 million pounds in 1975. Production of the most important products in 1976 included polyethylene (8,775 million pounds), vinyl resins (5,553 million pounds), and styrene type materials (4,743 million pounds).

TABLE 1.--PLASTICS AND RESIN MATERIALS: U.S. PRODUCTION AND SALES, 1976

[Quantities and values are given in terms of the total weight of the materials (dry basis). Listed below are all plastics and resin materials, urethane type elastomers, and certain precursors for which any reported data on production or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published and/or where no data were reported.) Table 2 lists all products for which data on production and/or sales were reported and identifies the manufacturers of each]

MATERIAL	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds dry basis ²	1,000 pounds dry basis ²	1,000 dollars	Per pound
Grand total-----	29,680,253	24,836,847	8,619,353	\$0.35
Plastics and resin materials, benzenoid ³ -----	8,943,083	7,684,865	3,113,430	.41
Plastics and resin materials, nonbenzenoid-----	20,737,170	17,151,982	5,505,923	.32
THERMOSETTING RESINS				
Total-----	5,969,844	4,680,620	1,878,462	.40
Alkyd resins, total ⁴ -----	704,647	470,715	201,637	.43
Phthalic anhydride type-----	626,575	433,249	181,207	.42
Polybasic acid type-----	40,696	23,681	13,519	.57
Styrenated-alkyds or copolymer alkyds-----	34,502	12,108	5,876	.49
Other copolymer alkyds-----	2,874	1,677	1,035	.62
Dicyandiamide resins-----	1,950	1,815	1,699	.94
Epoxy resins: ^{5,6}				
Unmodified-----	202,576	187,391	135,413	.72
Advanced-----	57,669	50,182	49,025	.98
Furfuryl type resins-----	7,510	...	...	...
Melamine-formaldehyde resins (an amino resin)-----	188,374	146,923	79,681	.54
Phenolic and other tar acid resins-----	1,305,294	999,930	382,986	.38
Polyester resins, unsaturated ⁷ -----	865,198	707,443	303,927	.43
Polyether and polyester polyols for urethanes ⁸ -----	1,346,337	988,729	344,282	.34
Polyurethane elastomer and plastic products, total--	207,524	170,023	159,722	.94
Elastomers ⁹ -----	81,182	65,404	84,307	1.29
Plastics ¹⁰ -----	126,342	104,619	75,415	.72
Silicone resins-----	15,223	13,084	31,348	2.40
Urea-formaldehyde resins (an amino resin)-----	1,041,360	920,866	168,453	.16
Other thermosetting resins-----	26,182	23,519	20,289	.86
THERMOPLASTIC RESINS				
Total-----	23,710,409	20,156,227	6,740,891	.33
Acrylic resins ^{11,12} -----	888,469	...	...	...
Engineering plastics ¹³ -----	92,723	98,879	96,800	.98
Petroleum hydrocarbon resins-----	306,143	293,480	69,649	.24
Polyamide resins, nylon type ^{11,14} -----	124,313	77,131	86,303	1.12
Polyamide resins, non-nylon type-----	30,967	27,951	31,413	1.12
Polyester resins, saturated ^{11,15} -----	107,910	62,663	68,021	1.09
Polyethylene resins, total-----	8,774,658	7,583,224	2,193,686	.29
Density 0.940 and below-----	5,661,328	4,720,630	1,385,531	.29
Density over 0.940-----	3,113,330	2,862,594	808,155	.28
Polyimides and amide-imide polymers-----	2,153	...	...	...
Polypropylene resins-----	2,550,950	2,063,442	582,339	.28
Polyterpene resins-----	13,055	12,778	5,850	.46
Polytetrafluoroethylene (PTFE)-----	15,567	13,015	45,453	3.49
Rosin esters, unmodified (ester gums)-----	20,950	22,248	9,161	.41
Rosin esters, modified-----	43,421	41,254	17,799	.43
Styrene plastics materials, total-----	4,742,895	4,390,297	1,530,761	.35
Acrylonitrile-butadiene-styrene (ABS) resins-----	1,003,074	938,861	430,878	.46
Straight polystyrene-----	2,207,887	1,988,801	582,399	.29
Rubber modified polystyrene-----	778,208	773,426	218,764	.28
Other styrene copolymers-----	251,053	221,019	131,136	.59
Styrene-butadiene latexes-----	303,205	298,751	103,589	.35
All other styrene latexes-----	29,851	24,387	9,551	.39
All other styrene type plastics materials-----	169,617	145,052	54,444	.37

PLASTICS AND RESINS MATERIALS

TABLE 1.--PLASTICS AND RESIN MATERIALS: U.S. PRODUCTION AND SALES, 1976--CONTINUED

PLASTICS AND RESIN MATERIALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds dry basis ²	1,000 pounds dry basis ²	1,000 dollars	Per pound
THERMOPLASTIC RESINS--Continued				
Vinyl resins, total ¹⁶	5,553,205	4,427,173	1,343,119	\$0.30
Polyvinyl chloride and copolymers-----	4,544,811	3,579,067	925,609	\$0.26
Polyvinyl acetate ¹⁷ -----	617,152	548,276	216,743	.40
Polyvinyl alcohol ¹⁸ -----	126,465	105,628	67,091	.64
Polyvinyl butyral resins-----	...	42,913	64,336	1.50
Polyvinylidene chloride latex resins-----	16,640	16,053	9,483	.59
Other vinyl and vinylidene resins-----	248,137	135,236	59,857	.44
All other thermoplastic resins ¹⁹ -----	443,030	1,042,692	660,537	.63

¹ Calculated from rounded figures.

² 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.

³ Includes benzenoid plastics and resin materials as defined in part 1 of schedule 4 of the Tariff Schedules of the United States; also includes urethane type elastomers which are not defined in part 1 of schedule 4 of the TSUS.

⁴ The total now includes data for styrene alkyd polyesters.

⁵ 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.

⁶ Data shown for advanced epoxy resins are that part of the unmodified epoxy resins which is further processed.

⁷ Polyester resins are unsaturated alkyd resins, later to be copolymerized with a monomer (such as styrene or methyl methacrylate), and polyallyl resins (such as diallyl phthalate and diglycol carbonate). Data are on an "as sold" basis, including monomer if part of the resin system.

⁸ 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-diisocyanate. Statistics for the isocyanic acid derivatives are reported in the cyclic intermediates section of the Synthetic Organic Chemicals report.

⁹ Data for urethane type elastomers are now included in this section of the Synthetic Organic Chemicals report; these statistics previously were reported under the elastomers (synthetic rubber) section. 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.

¹⁰ The term plastic encompasses compounds containing additives such as plasticizers (Whittington's Dictionary of Plastics, First Edition, published by Technomic Publishing Co., Inc.).

¹¹ Does not include production or sales for fiber use.

¹² Includes data for acrylic resins reported to the U.S. International Trade Commission as thermosetting resins.

¹³ Engineering plastics: Includes acetal, polycarbonate, polyimide (sales only; production separately shown), polysulfone, and polyphenylene oxide. Engineering plastics are defined in Whittington's Dictionary of Plastics, as "Those [plastics] 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. The other plastics named in Whittington's Dictionary as engineering plastics, ABS resins and nylon resins, are not included in the above list as they are published separately.

¹⁴ Statistics for nylon 6 and nylon 6/6 which are used in plastic applications (e.g., molding etc.) are included here.

¹⁵ Statistics for polyethylene terephthalate which is used in plastics applications (e.g., molding, etc.) are included here.

¹⁶ 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.

¹⁷ 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.

¹⁸ Production and sales do not include polyvinyl alcohol used as a reactive intermediate for polyvinyl butyral or other vinyl resins.

¹⁹ Includes acrylic resins (sales only), cellulose plastics and resins, coumarone-indene resins, polybutylene type resins, fluorocarbon resins except PTFE, and other thermoplastics 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.

TABLE 2.--PLASTICS AND RESIN MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
THERMOSETTING RESINS	
THERMOSETTING RESINS:	
ACETONE-FORMALDEHYDE RESINS-	: ACY, AMP.
ALKYD RESINS:	
ALL OTHER COPOLYMER ALKYDS	: FLW, GLD, MCC, PPG, REL, STT.
@PHTHALIC ANHYDRIDE TYPE-	: APT, ASH, AZS, BAL, BEN, BRU, CEL, CGL, CNE, CPV, DEG, : DSO, DUP, EW, FAR, PCD, PLW, POC, PRE, GEI, GIL, GLD, : GRV, HAN, ICF, IMC, JOB, KMC, KMP, KPT, MCC, MID, MNP, : , MRO, NPV, OBC, PER, PPP, PPG, PRT, RCI, RED, REL, : RH, SCN, SED, SKT, SM, STT, SW(E), X.
@POLYBASIC ACID TYPE-	: ACY, ASH, BEN, CGL, DSO, EW, FAR, POC, GEI, GRV, HAN, : ICF, IMC, MCC, MID, MOB(E), PLS, PPG, RCI, RED, REL, : RH, SCN, SED, SKT, SM, STT, SW(E).
@STYRENATED-ALKYDS, OR COPOLYMER ALKYDS	: ACY, APT, ASH, CEL, CGL, CNE, CPV, DSO, EW, PLW, PRE, : GLD, GRV, HAN, ICF, JOB, KPT, MCC, PPG, REL, SM, STT, : SW(E).
AMINO RESINS:	
@MELAMINE-FORMALDEHYDE RESINS	: ACS, ACY, AMP, BOR, CBD, CEL, CGL, CNE, CPV, DAN, DSO, : DUP, ENJ, GLD, GRV, HAN, KPT, MID, MON, MRA, OCF, PMC, : PPG, PPL, QCP, RCI, REL, RH, SED, SM, SNW(E), STC, : SW(E), USO, VAL, WRD.
@UREA-FORMALDEHYDE RESINS	: ACS, ACY, AMP, APX, BOR, CBD, CBM, CEL, CGL, CMP, CNE, : CPV, DAN, DSO, DUP, FMS, GAF, GLD, GOC, GP, GRV, HAN, : HNC, HPC, HRT, IRI, KPT, MMM, MON, MRA, NTC, PC(E), : PMC, PPG, PPL, RCI, REL, RH, RPC, SAC, SNW(E), SOR, : USO, VAL, X.
DICYANDIAMIDE RESINS	: APX, ECC, MRA, RPC, S, SNW(E), STC, VAL, VPC.

TABLE 2.--PLASTICS AND RESIN MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
THERMOSETTING--CONTINUED	
@EPOXY RESINS:	
@ADVANCED - - - - -	: ACS, ASH, BEN, CEL, DSO, EW, GRV, HAN, HYC, ICF, MCC, : MID, MRT(E), NPV, OCF, POL, PPG, RCI, RSY, SCN, SM, : WLN.
@UNMODIFIED - - - - -	: CEL, CGY, DA, DOW, ICF, JOB, MMM, RCI, RSY, SHC, SM, : STT, UCC.
@FURFURYL TYPE RESINS - - - - -	: ACR, HVG, STC, UNO, WRD.
@PHENOLIC AND OTHER TAR ACID RESINS - - - - -	: ABS, ACR, ACS, AMP, ASH, BME, BOR, CBD, CBM, CGL, CLK, : DA, ENJ, EW, FAR, POM, GE, GEI, GIL, GLD, GOC, GP, : GRG, HER, HKD, HPC, HVG, ICF, INL, IRI, KPT, MCA, MID, : MMM, MON, MRB, NCI, NTC, OCF, PLS, PPG, PPL, PYZ, RAB, : RCI, RGC, RH, RPC, SCN, SHA, SIM, SKT, SM, SPL, STC, : SW(E), UCC, USR, VPC, VSV, WCA, WRD.
POLYESTER RESINS, UNSATURATED, AND ALLYL RESINS:	
ALLYL RESINS - - - - -	: ACS, FMP(E), SM.
@POLYESTER RESINS, UNSATURATED- - - - -	: ACS, ACY, APT, ASH, AZS, CGL, CNE, CPV, DA, DOW, DSO, : EW, FAR, FCD, FRE, GEI, GLD, GRG, HKD, ICF, ICI, IPC, : KMC, KPT, MCC, MFG, MMM, MOB(E), MRB, MRO, OBC, OCF, : POL, PPG, PPL, RCI, RH, RSC, RSY, SCN, SIL, SLC, SM, : SW(E), WLN.
@POLYETHER AND POLYESTER POLYOLS FOR URETHANES- - - - -	: APT, ARK, BAS, CHC, CPV, DOW, DSO, DUP, FRE, GPM, HPC, : ICI, JCC, JOB, MCC, MOB(E), NTL, OCF, OMC, PPG, RCI, : SKT, UCC, UNO, UPJ, WTC.
POLYURETHANE ELASTOMER AND PLASTIC PRODUCTS:	
@PLASTICS - - - - -	: APT, ASH, BAS, CGL, CPV, DSO, DUP, EW, FAR, ICF, ICI, : KMC, MCC, MID, MNP, MOB(E), MRT(E), NTL, OMC, PFP, : PPG, QUN, RCI, SCN, SLC, SM, SW(E), UPJ, USM, USR, : WLN, WTC.
@ELASTOMERS - - - - -	: ACY, BAS, BFG, CNI, DA, DNS, DUP, EPI, GRD, INP, MMM, : MOB(E), PFP, PLN, PPG, PRC, PRT, REZ, RUB, TKL, UPJ, : USR, WTC.
@SILICONE RESINS- - - - -	: ASH, CGL, DCC, GLD, JOB, RCI, SM, SPD, SWS, UCC(E).
TOLUENESULFONAMIDE RESINS- - - - -	: MON.
@ALL OTHER THERMOSETTING RESINS - - - - -	: APX, ENJ, GLD, GRV, ICF, MID, OBC, PPG, S, SHC, SM, : USO, VAL.

TABLE 2.--PLASTICS AND RESIN MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
THERMOPLASTICS RESINS	
THERMOPLASTIC RESINS:	
ACRYLIC RESINS:	
@ALL OTHER ACRYLIC RESINS - - - - -	: ACY, AZS, CEL, CHP, DSO, DUP, EFH, GLC, GLD, GNM, GRD, : ICF, JNS, JWC, MID, MRA, NPV, PPG, PRT, PVI, QUN, RH, : SM, SNW(E), UBS, X.
ETHYL ACRYLATE BUTYL ACRYLATE COPOLYMER- - - - -	: VAL.
POLYETHYL METHACRYLATE - - - - -	: SAR.
@POLYMETHYL METHACRYLATE- - - - -	: ASH, CNE, DSO, DUP, ICF, IOC, JOB, PPG, PVI, RH, SAR.
THERMOSETTING ACRYLICS - - - - -	: CPV.
CELLULOSE PLASTICS AND RESINS:	
CELLULOSE NITRATE- - - - -	: HPC.
ALL OTHER CELLULOSE PLASTICS - - - - -	: DSO, DUP, EKT.
CELLULOSE PLASTICS, ETHYL CELLULOSE - - - - -	: DOW.
COUMARONE-INDENE RESINS- - - - -	: DUP, HPC, NEV, VEL.
ENGINEERING PLASTICS:	
ACETAL RESINS- - - - -	: CEL, DUP.
POLYCARBONATE RESINS - - - - -	: GE, MOB(E).
POLYIMIDES AND AMIDE-IMIDE POLYMERS- - - - -	: ACC, DUP, EW.
POLYPHENYLENE OXIDE TYPE RESINS- - - - -	: EW, GE.
POLYSULFONE RESINS - - - - -	: UCC.
FLUOROCARBON RESINS:	
@POLYTETRAFLUOROETHYLENE (PTFE) - - - - -	: ACS, DUP, ICI.
ALL OTHER FLUOROCARBON RESINS- - - - -	: ACS, DUP, MMM, PAS.
@PETROLEUM HYDROCARBON RESINS - - - - -	: EKX, GRV, GYR, HPC, ICF, NEV, NPV, RCI, TKL(E), VEL.
POLYAMIDE RESINS:	
@NON-NYLON TYPE - - - - -	: AMP, CBY, COO(E), DEG, EMR, GNM, MCC, SM, SNW(E), USM.
@NYLON TYPE - - - - -	: ALF, AZS, BCM, CEL, CTR, DUP, PG, PRF, GNM, MON, POL, : RSN, USM.
POLYACRYLATE RESIN EMULSIONS - - - - -	: GLC.
POLYBUTYLENE TYPE RESINS - - - - -	: WTC.
@POLYESTER RESINS, SATURATED- - - - -	: CEL, COO(E), DEG, DSO, EKT, GE, GEI, GLD, GNM, HAN, : ICF, ICI, MCC, MRT(E), RUB, SED, STT, USM.
POLYETHYLENE AND COPOLYMERS RESINS:	
@DENSITY 0.940 AND BELOW (LOW DENSITY)- - - - -	: ACS, CBN, CPX, DOW, DUP, EKX, ENJ, GOC, KPP, NWP, ORO, : PLC, RCC, UCC.
DENSITY OVER 0.940 (HIGH DENSITY)- - - - -	: ACC, ACS, CPX, DOW, DUP, GOC, HPC, KPP, MON, PLC, SHC, : SIT, UCC, USI.
@POLYPROPYLENE POLYMER AND COPOLYMER RESINS - - - - -	: ACC, DA, EKX, ENJ, HPC, NVT, PLC, RCC, SHC.

TABLE 2.--PLASTICS AND RESIN MATERIALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MATERIAL	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
THERMOPLASTICS RESINS--CONTINUED	
@POLYTERPENE RESINS - - - - -	: CBY, HPC, SCN.
ROSIN MODIFICATIONS:	
@MODIFIED ROSIN ESTERS- - - - -	: ASH, CBY, DPP, EW, FAR, FLW, FRP, GLD, GRV, MCC, RCI, : SHA, STC, SW(E), TKL(E).
MODIFIED ROSIN - - - - -	: DPP.
@ROSIN ESTERS, UNMODIFIED - - - - -	: ASH, CBY, DPP, PCD, FRP, RCI.
STYRENE TYPE PLASTICS MATERIALS:	
@ACRYLONITRILE-BUTADIENE-STYRENE (ABS) TERPOLYMER RES	:
INS - - - - -	: BFG, CSD, DOW, FG, FRS, GRD, GYR, MCB, MON, RCC, USR.
ALPHA-METHYL STYRENE POLYMERS	:
- - - - -	: ACC, DOW, JNS.
@STYRENE-ACRYLONITRILE COPOLYMER RESINS (SAN) - - - - -	: BFG, DOW, MON, SKT, UCC.
POLYSTYRENE:	
@RUBBER MODIFIED POLYSTYRENE- - - - -	: ASY, DOW, GOR, MON, SHC, SOL, USS.
@STRAIGHT POLYSTYRENE - - - - -	: ACC, AEP, BAS, CSD, DOW, DSO, FG, GOR, HLM, KPP, MMM, : MON, RCC, RCD, SHC, SOL, UCC, USS, WLC.
STYRENE ALLYL ALCOHOL COPOLYMER- - - - -	: MON.
@ALL OTHER STYRENE COPOLYMERS - - - - -	: BFG, DA, DOW, DSO, DUP, GRD, GYR, HPC, IOC, JNS, MON, : MRT(E), PLC, PPG, PVI, RCC, RCD, RH, SED, SKT, UBS, : UOC(E), VEL.
STYRENE LATEXES:	
@STYRENE-BUTADIENE LATEXES- - - - -	: BOR, CEL, DOW, GAP, GNT, GRD, GYR, USR.
ALL OTHER STYRENE LATEXES- - - - -	: BFG, BOR, DOW, FIR, GNT, GRD.
VINYL RESINS:	
@POLYVINYL ACETATE RESINS - - - - -	: AIP, AZS, BAL, BEN, BLS, BOR, CEL, CNE, DAN, DSO, FAR, : FLH, FLN, GLC, GRD, JOB, KMC, KMP, MCC, MON, NPV, NSC, : OBC, QCP, RCI, RPC, SCO, SED, SPC, UCC, UOC(E), X.
@POLYVINYL ALCOHOL RESINS - - - - -	: AIP, DUP, MON.
@POLYVINYL BUTYRAL RESINS - - - - -	: DUP, MON, UCC.
@POLYVINYL CHLORIDE AND COPOLYMER RESINS- - - - -	: AIP, AME, BFG, BOR, CNT, CO, DA, FIR, GNT, GP, GRA, : GYR, HN, KYS, NSC, PNT, RUB, SFP, SLM, TNA, UCC, USR.
@POLYVINYLIDINE CHLORIDE RESINS:	
@LATEX TYPE POLYVINYLIDENE CHLORIDE RESINS- - - - -	: BFG, DOW, GRD, MRT(E), UBS.
VINYL-ACRYLATE COPOLYMER RESINS- - - - -	: DSO.
ALL OTHER VINYL RESINS - - - - -	: DOW, DUP, EW, FLW, MON, RH, UCC.
THERMOPLASTIC CHLORINATED POLYOLEFINS- - - - -	: EKY.
@ALL OTHER THERMOPLASTIC RESINS - - - - -	: CWN(E), DSO, ENJ, GLD, HPC, PLC, RPC.

TABLE 3.--PLASTICS AND RESIN MATERIALS: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production or sales of plastics and resin materials to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ABS	Abex Corp., Friction Products Group	DSO	DeSoto, Inc.
ACC	Amoco Chemical Corp.	DUP	E.I. duPont de Nemours & Co., Inc.
ACR	CPC International, Inc., Acme Resin Co. Div.	ECC	Eastern Color & Chemical Co.
ACS	Allied Chemical Corp., Specialty Chemical Div.	EFH	E.F. Houghton & Co.
ACY	American Cyanamid Co.		Eastman Kodak Co.:
AEP	A & E Plastics Pak Co., Inc.	EKT	Tennessee Eastman Co. Div.
AIP	Air Products & Chemicals, Inc.	EKX	Texas Eastman Co. Div.
ALF	Allied Chemical Corp., Fibers Div.	EMR	Emery Industries, Inc.
AME	Stauffer Chemical Co.	ENJ	Exxon Chemical Co. U.S.A.
AMR	Pacific Resins & Chemical Co.	EPI	Eagle Pitcher Industries, Inc.,
APT	Whittaker Corp., Whittaker Coatings & Chemical, Mol Rez Resins		Ohio Rubber Co.
APX	Apex Chemical Co., Inc.	EW	Westinghouse Electric Corp., Industrial Plastics Div., Chemical Products Plant
ARK	Armstrong Cork Co.		
ASH	Ashland Oil, Inc., Ashland Chemical Co. Div.	FAR	Syncon, Inc., Farnow Div.
ASY	American Synthetic Rubber Corp.	FCD	Synres Chemical Corp.
ATR	Atlantic Richfield Co.	FG	Foster Grant Co., Inc.
AZS	AZS Corp., AZ Products Co. Div.	FIR	Firestone Tire & Rubber Co., Firestone Plastics Co. Div.
		FLH	H.B. Fuller Co.
BAL	Baltimore Paint & Chemical Corp.	FLN	Franklin Chemical Corp.
BAS	BASF Wyandotte Corp.	FLW	Fuller-O'Brien Corp.
BCM	Belding Chemical Industries	FMP	FMC Corp., Industrial Chemical Div.
BEN	Bennett's	FMS	First Mississippi Corp.
BFG	B.F. Goodrich Co., B.F. Goodrich Chemical Co. Div.	FOC	Handschy Chemical Co., Farac Oil & Chemical Co. Div.
BLS	Life Savers, Inc.	FOM	Formica Corp.
BME	Bendix Corp., FMD Div.	FRE	Freeman Chemical Corp.
BOR	Borden Co., Borden Chemical Co. Div.	FRF	Firestone Tire & Rubber Co., Firestone Synthetic Fibers Co.
BRU	M.A. Bruder & Sons, Inc.	FRP	FRP Company
		FRS	Firestone Tire & Rubber Co., Firestone Synthetic Rubber & Latex Co. Div.
CBD	Chembond Corp.		
CBM	Carborundum Co.	GAF	GAF Corp., and Chemical Div.
CBN	Cities Service Co., Petrochemicals Div.	GE	General Electric Co.:
CBY	Crosby Chemicals, Inc.	GEI	Insulating Materials Products Sec.
CEL	Celanese Corp.:	GIL	Gilman Paint & Varnish Co.
	Celanese Plastics Co.	GLC	General Latex & Chemical Corp.
	Celanese Polymer Specialties Co.	GLD	SCM Corp., Coatings and Resins Div.
CGL	Cargill, Inc.	GNM	General Mills Chemicals, Inc.
CGY	Ciba-Geigy Corp., Resins Dept.	GNT	General Tire & Rubber Co., Chemical Plastics Div.
CHC	Choate Chemical Co.	GOC	Gulf Oil Corp., Gulf Oil Chemicals Co.-U.S.
CHP	C.H. Patrick & Co., Inc.	GOR	Carl Gordon Industries, Inc.
CLK	Clark Chemical Corp.	GP	Georgia-Pacific Corp.:
CMP	Commercial Products Co., Inc.		Rebecca Chemical Div.
CNE	Conchemco, Inc.		Resins Operations
CNI	Conap, Inc.	GPM	General Plastics Manufacturing Co.
CNT	CertainTeed Corp.	GRA	Great American Chemical Corp.
CO	Continental Oil Co.	GRD	W.R. Grace & Co., Polymers Chemicals Div.
COO	The Terrell Corp.	GRG	P.D. George Co.
CPV	Cook Paint & Varnish Co.	GRV	Guardsman Chemical Coatings, Inc.
CPX	Chemplex Co.	GYR	Goodyear Tire & Rubber Co.
CSD	Cosden Oil & Chemical Co.		
CTR	Customs Resins, Inc.	HAN	Hanna Chemical Coating Corp.
CWN	Upjohn Co., Fine Chemical Div.	HER	Heresite & Chemical Co.
		HKD	Hooker Chemical Corp., Durez Div.
DA	Diamond Shamrock Corp.	HLM	U.S. Industries, Inc., E. Helman Co. Div.
DAN	Dan River, Inc.		
DCC	Dow Corning Corp.		
DEG	Degan Oil & Chemical Co.		
DGO	Day-Glo Color Corp.		
DNS	Dennis Chemical Co.		
DOW	Dow Chemical Co.		
DPP	Dixie Pine Products Co., Inc.		

TABLE 3.--PLASTICS AND RESIN MATERIALS: DIRECTORY OF MANUFACTURERS, 1976--CONTINUED

Code	Name of company	Code	Name of company
HN	Tenneco Chemicals, Inc.	PER	Perry & Derrick Co.
HNC	H & N Chemical Co.	PFP	Midwest Manufacturing Corp.
HPC	Hercules, Inc.	PLC	Phillips Petroleum Co.
HRT	Hart Products Corp.	PLN	Disogrin Industries Corp.
HVG	Haveg Industries, Inc. Sub. of Hercules, Inc.	PLS	Plastics Engineering Co.
HYC	Dexter Corp., Hysol Co. Div.	PMC	Plastics Manufacturing Co.
ICF	Inmont Corp.	PNT	Pantasote Co.
ICI	ICI United States, Inc.: Plastics Div. Specialty Chemicals Div.	POL	Polymer Corp.
IMC	IMC Chemical Group, Inc., McWorter Resins	PPG	PPG Industries, Inc.
INL	Inland Steel Co., Inland Steel Container Co. Div.	PPL	Pioneer Plastics Div. of LOF Plastics, Inc.
INP	Indipol, Inc.	PRC	Products Research & Chemical Co.
IOC	Ionac Chemical Co. Div. of Sybron Corp.	PRT	Pratt & Lambert, Inc.
IPC	Interplastic Corp.	PVI	Polyvinyl Chemical Ind.
IRI	Ironsides Resins, Inc.	PYZ	Polyrez Co., Inc.
JCC	Jefferson Chemical Co.	QCP	Quaker Chemical Corp.
JNS	S.C. Johnson & Son, Inc.	QUN	K.J. Quinn & Co., Inc.
JOB	Jones-Blair Paint Co.	RAB	Raybestos-Manhattan, Inc., R.M. Friction Materials Co. Div.
JSC	Jersey State Chemical Co.	RBT	Robintech, Inc.
JWC	J.W. Carroll & Sons Div. of U.S. Industries Inc.	RCC	Rexene Polyolefins Co.
KMC	Kohler-McLister Paint Co.	RCC	Rexene Styrenics Co.
KMP	Kelly-Moore Paint Co.	RCD	Richardson Co., Polymeric Septems Div.
KPP	Arco/Polymers, Inc.	RCI	Reichhold Chemicals Inc.
KPT	Koppers Co., Organic Materials Div.	RED	Red Spot Paint and Varnish Co., Inc.
KYS	Keysor Corp.	REL	Reliance Universal, Inc., Louisville Resins Operations
MCA	Masonite Corp., Alpine Div.	REZ	Hexcel Corp., Rezolin Div.
MCB	Borg-Warner Corp., Borg-Warner Chemicals	RGC	Rogers Corp.
MCC	McCloskey Varnish Co.	RH	Rohm & Haas Co.
MFG	Rockwell International Corp., Plastics Div.	RPC	Millmaster Onyx Corp., Refined-Onyx Div.
MID	Dexter Corp., Midland Div.	RSC	Resinous Chemicals Corp.
MMM	Minnesota Mining & Manufacturing Co.	RSN	Rilsan Corp.
MNP	The Valspar Corp.	RSY	Resyn Corp.
MOB	Mobay Chemical Co.	RUB	Hooker Chemical Corp., Ruco Div.
MON	Monsanto Corp.	S	Sandoz, Inc.
MRA	Bostik South, Inc.	SAC	Southeastern Adhesives Co.
MRB	Marblette Co.	SAR	Sartomer Industries, Inc.
MRO	W.R. Grace & Co., Hatco Polyester Div.	SCN	Schenectady Chemicals, Inc.
MRT	Morton Chemical Co. Div. of Morton Norwich Products, Inc.	SCO	Scholler Bros., Inc.
NCI	Union Camp Corp.	SED	Conchemco, Inc., Colony Paint
NEV	Neville Chemical Co.	SFP	Stauffer Chemical Co., Plastics Div.
NPV	Norris Paint & Varnish Co., Inc.	SHA	Shanco Plastics & Chemicals, Inc.
NSC	National Starch & Chemical Corp.	SHC	Shell Oil Co., Shell Chemical Co. Div.
NTC	National Casein Co.	SIC	Vistron Corp., Silmar Div.
NTL	NL Industries, Inc.	SIM	Simpson Timber Co.
NVT	Novamont Corp., Neal Works	SKP	Shakespeare Co., Monofilament Div.
NWP	Northern Petrochemical Co.	SKT	Textron Inc., Spencer Kellogg Div.
OBC	O'Brien Corp.	SLC	Soluol Chemical Co., Inc.
OCF	Owens-Corning Fiberglas Corp.	SLT	Soltex Polymer Corp.
OMC	Olin Corp.	SM	Mobil Oil Corp., Mobil Chemical Co., Chemical Coatings Div.
ORO	Chevron Chemical Co.	SNW	Sun Chemical Corp., Chemicals Div.
PAS	Pennwalt Corp.	SOL	Polysar Resins, Inc.
PC	Proctor Chemical Co., Inc.	SOR	Thomason Industries, Inc., Southern Resin Div.
		SPC	Insilco Corp., Sinclair Paint Co. Div.
		SPD	General Electric Co., Silicone Products Dept.
		SPL	Spaulding Fibre Co., Inc.

TABLE 3.--PLASTICS AND RESIN MATERIALS: DIRECTORY OF MANUFACTURERS, 1976--CONTINUED

Code	Name of company	Code	Name of company
STC	American Hoechst Corp., Sou-Tex Works	USI	National Petro Chemical Corp.
STT	Standard T Chemical Co.	USM	USM Corp., Bostik Div.
SW	Sherwin-Williams Co.	USO	U.S. Oil Co.
SWS	Stauffer Chemical Co., SWS Silicones Div.	USR	Uniroyal, Inc., Chemical Div.
		USS	USS Chemicals Div. of U.S. Steel Corp.
TKL	Thiokol Corp.	VAL	Valchem
TNA	Ethyl Corp.	VEL	Veliscol Chemical Corp.
TX	Texaco, Inc.	VPC	Mobay Chemical Corp., Verona Div.
		VSV	Valentine Sugars, Inc.
UBS	A.E. Staley Manufacturing Co., Chemicals Specialties Div.	WCA	West Coast Adhesives Co.
UCC	Union Carbide Corp.	WLN	Wilmington Chemical Corp.
UNO	United-Erie, Inc.	WRD	Weyerhaeuser Co.
UOC	Union Oil Co. of California	WTC	Witco Chemical Co., Inc.
UPJ	Upjohn Co.		
USI	National Distillers & Chemical Corp., U.S. Industrial Chemicals Co. Div.	ZGL	Carolina Processing Corp.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

RUBBER-PROCESSING CHEMICALS

David B. Beck

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, blowing agents, and peptizers. Data on production and sales of rubber-processing chemicals in 1976 are given in table 1¹.

Production of rubber-processing chemicals as a group in 1976 amounted to 384 million pounds, or 37.8 percent more than the 279 million pounds in 1975. Sales of rubber-processing chemicals in 1976 amounted to 224 million pounds, valued at \$247 million, compared with 204 million pounds, valued at \$207 million, in 1975.

The production of cyclic rubber-processing chemicals in 1976 amounted to 304 million pounds, or 35.1 percent more than the 225 million pounds in 1975. Sales in 1976 were 186 million pounds, valued at \$218 million, compared with 173 million pounds, valued at \$187 million, in 1975. Of the total production of cyclic rubber-processing chemicals in 1976, accelerators, activators, and vulcanizing agents accounted for 42.3 percent and antioxidants, antiozonants, and stabilizers for 52.8 percent. Production of antioxidants, antiozonants, and stabilizers, which amounted to 160.3 million pounds in 1976, included 121.2 million pounds of amino compounds and 39.1 million pounds of phenolic and phosphite compounds. Sales of amino antioxidants, antiozonants, and stabilizers in 1976 amounted to 80.1 million pounds, valued at \$94.4 million, sales of phenolic and phosphite antioxidants, antiozonants, and stabilizers, were 26.0 million pounds, valued at \$30.4 million.

Production of acyclic rubber-processing chemicals in 1976 amounted to 49.7 million pounds, or 8.0 percent less than the 54.0 million pounds reported for 1975. Sales in 1976 totaled 37.9 million pounds, valued at \$28.6 million, compared with 31.2 million pounds, valued at \$20.0 million, in 1975. Dithiocarbamic acid derivatives accounted for 15.0 percent of sales (based on quantity) of acyclic rubber-processing chemicals in 1976 and bis-(dimethylthiocarbamoyl) disulfide accounted for 12.9 percent.

1/ See also table 2 which lists these producers and identifies the manufacturers by codes. These codes are given in table 3.

RUBBER-PROCESSING CHEMICALS

TABLE 1.--RUBBER-PROCESSING CHEMICALS: U.S. PRODUCTION AND SALES, 1976

[Listed below are all rubber-processing chemicals for which any reported data on production or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists separately all rubber-processing chemicals for which data on production and/or sales were reported and identifies the manufacturers of each]

RUBBER-PROCESSING CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Grand total-----	384,423	224,272	246,857	\$1.10
RUBBER-PROCESSING CHEMICALS, CYCLIC				
Total-----	334,735	186,393	218,263	1.17
Accelerators, activators, and vulcanizing agents, total-----	159,614	66,194	68,678	1.04
Aldehyde-amine reaction products-----	722	649	1,078	1.66
Dithiocarbamic acid derivatives-----	209	172	624	3.62
Thiazole derivatives, total-----	118,048	58,010	55,860	.96
N-Cyclohexyl-2-benzothiazolesulfenamide-----	4,097	2,937	3,488	1.19
2,2'-Dithiobis(benzothiazole)-----	18,538	8,331	7,134	.86
2-Mercaptobenzothiazole-----	...	5,351	3,217	.60
All other thiazole derivatives-----	95,413	41,391	42,021	1.02
All other accelerators, activators, and vulcanizing agents ² -----	40,635	7,363	11,116	1.51
Antioxidants, antiozonants, and stabilizers, total---	160,307	106,146	124,791	1.18
Amino compounds, total-----	121,173	80,111	94,404	1.18
Aldehyde- and acetone-amine reaction products---	...	4,363	4,133	.95
Substituted p-phenylenediamines-----	71,780	41,776	58,311	1.40
N-Phenyl-2-naphthylamine-----	746	...	...	...
All other amino compounds ³ -----	48,647	33,972	31,960	.94
Phenolic and phosphite compounds, total-----	39,134	26,035	30,387	1.17
Phenolic compounds, total-----	22,496	15,060	24,259	1.61
Polyphenolics (including bisphenols)-----	13,662	10,977	20,015	1.82
Phenol, alkylated-----	5,543	1,567	1,167	.74
Other-----	3,291	2,516	3,077	1.22
Phosphite compounds-----	16,638	10,975	6,128	.56
Peptizers-----	1,856	1,850	2,145	1.16
Retarder: N-Nitrosodiphenylamine-----	1,307	843	817	.97
All other cyclic rubber-processing chemicals ⁴ -----	11,651	11,360	21,832	1.92
RUBBER-PROCESSING CHEMICALS, ACYCLIC				
Total-----	49,688	37,879	28,594	.75
Dithiocarbamic acid derivatives, total ⁵ -----	8,094	5,777	7,810	1.35
Dibutyldithiocarbamic acid, sodium salt-----	...	70	61	.87
Dibutyldithiocarbamic acid, zinc salt-----	2,919	2,367	2,645	1.54
Dimethyldithiocarbamic acid, zinc salt-----	1,893	1,377	1,251	.91
All other dithiocarbamic acid derivatives-----	3,282	1,963	3,853	1.96
Bis(dimethylthiocarbamoyl) disulfide-----	5,358	4,895	3,832	.78
Bis(dimethylthiocarbamoyl) sulfide-----	2,266	2,034	3,069	1.51
Shortstops: Dimethyldithiocarbamic acid, sodium salt	3,080	...	...	...
All other acyclic rubber-processing chemicals ⁶ -----	30,890	25,173	13,883	.55

^{1/} Calculated from rounded figures.

^{2/} Includes guanidines and other uses not separately shown.

^{3/} Includes aldehyde- and acetone-amine reaction products (production only) and N-phenyl-2-naphthylamine (sales only).

^{4/} Includes blowing agents and other uses not separately shown.

^{5/} 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 report "Pesticides and Related Products".

^{6/} Includes "other" thiurams, xanthates, sulfides, conditioning and lubricating agents, polymerization regulators, shortstops, and other uses not separately shown.

TABLE 2.--RUBBER PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AND "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

RUBBER PROCESSING CHEMICALS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C	
@ACCELERATORS, ACTIVATORS AND VULCANIZING AGENTS:	
@ALDEHYDE-AMINE REACTION PRODUCTS:	
ACETALDEHYDE-ANILINE CONDENSATE - - - - -	: USR.
BIS (CINNAMYLIDENE) HEXAMETHYLENEDIAMINE - - - - -	: DUP.
NORMAL-BUTYRALDEHYDE-ANILINE CONDENSATE - - - - -	: DUP, RCD.
HEPTALDEHYDE-ANILINE CONDENSATE - - - - -	: USR.
TRIETHYLTRIMETHYLENETRIAMINE - - - - -	: USR.
@DITHIOCARBAMIC ACID DERIVATIVES:	
DIBENZYL DITHIOCARBAMIC ACID, SODIUM SALT - - - - -	: USR.
DIBENZYL DITHIOCARBAMIC ACID, ZINC SALT - - - - -	: USR.
DIBUTYL DITHIOCARBAMIC ACID, N,N-DIMETHYLCYCLOHEXYL	:
AMINE SALT - - - - -	: MON.
2,4-DINITROPHENYL DIMETHYL DITHIOCARBAMATE - - - - -	: USR.
PIPERIDINECARBODITHIOIC ACID, PIPERIDINIUM POTASSIUM	:
SALTS, - - - - -	: DUP.
GUANIDINES:	
DICATECHOL BORATE, DI-ORTHO-TOLYL GUANIDINE SALT - - - - -	: DUP.
1,3-DIPHENYL GUANIDINE - - - - -	: ACY.
1,3-DI-ORTHO-TOLYL GUANIDINE - - - - -	: ACY.
@THIAZOLE DERIVATIVES:	
2-BENZOTHAZYL N,N-DIETHYLTHIOCARBAMOYL SULFIDE - - - - -	: PAS.
1,3-BIS(2-BENZOTHAZOLYL) MERCAPTOETHYL UREA - - - - -	: LAK.
N-TERT-BUTYL-2-BENZOTHAZOLESULFONAMIDE - - - - -	: ACY, BFG, USR, X.
@N-CYCLOHEXYL-2-BENZOTHAZOLESULFENAMIDE - - - - -	: ACY, BFG, MON, USR.
N,N-DIISOPROPYL-2-BENZOTHAZOLESULFENAMIDE - - - - -	: ACY.

TABLE 2.--RUBBER PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AND "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

RUBBER PROCESSING CHEMICALS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C	
@ACCELERATORS, ACTIVATORS AND VULCANIZING AGENTS:	
@ALDEHYDE-AMINE REACTION PRODUCTS:	
ACETALDEHYDE-ANILINE CONDENSATE - - - - -	: USR.
BIS (CINNAMYLIDENE) HEXAMETHYLENEDIAMINE - - - - -	: DUP.
NORMAL-BUTYRALDEHYDE-ANILINE CONDENSATE - - - - -	: DUP, RCD.
HEPTALDEHYDE-ANILINE CONDENSATE - - - - -	: USR.
TRIETHYLTRIMETHYLENETRIAMINE - - - - -	: USR.
@DITHIOCARBAMIC ACID DERIVATIVES:	
DIBENZYL DITHIOCARBAMIC ACID, SODIUM SALT - - - - -	: USR.
DIBENZYL DITHIOCARBAMIC ACID, ZINC SALT - - - - -	: USR.
DIBUTYL DITHIOCARBAMIC ACID, N,N-DIMETHYLCYCLOHEXYL	:
AMINE SALT - - - - -	: MON.
2,4-DINITROPHENYL DIMETHYL DITHIOCARBAMATE - - - - -	: USR.
PIPERIDINECARBODITHIOIC ACID, PIPERIDINIUM POTASSIUM	:
SALTS, - - - - -	: DUP.
GUANIDINES:	
DICATECHOL BORATE, DI-ORTHO-TOLYLGUANIDINE SALT - - - - -	: DUP.
1,3-DIPHENYLGUANIDINE - - - - -	: ACY.
1,3-DI-ORTHO-TOLYLGUANIDINE - - - - -	: ACY.
@THIAZOLE DERIVATIVES:	
2-BENZOTHAZYL N,N-DIETHYLTHIOCARBAMOYL SULFIDE - - - - -	: PAS.
1,3-BIS(2-BENZOTHAZOLYL MERCAPTO METHYL) UREA - - - - -	: LAK.
N-TERT-BUTYL-2-BENZOTHAZOLESULFONAMIDE - - - - -	: ACY, BFG, USR, X.
@N-CYCLOHEXYL-2-BENZOTHAZOLESULFENAMIDE - - - - -	: ACY, BFG, MON, USR.
N,N-DIISOPROPYL-2-BENZOTHAZOLESULFENAMIDE - - - - -	: ACY.

TABLE 2.--RUBBER PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

RUBBER PROCESSING CHEMICALS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
@ACCELERATORS, ACTICATORS AND VULCANIZING AGENTS-- CONTINUED	
@THIAZOLE DERIVATIVES--CONTINUED	
N-(2,6-DIMETHYLMORPHOLINO)-2-BENZOTHAZOLESULFENAMIDE	MON.
@ 2,2'-DITHIOBIS (BENZOTHAZOLE)	ACY, BFG, GYR, MON, USR.
@ 2-MERCAPTOBENZOTHAZOLE	ACY, BFG, GYR, MON, USR.
2-MERCAPTOBENZOTHAZOLE, COPPER SALT	ACY.
2-MERCAPTOBENZOTHAZOLE, ZINC CHLORIDE	DUP.
2-MERCAPTOBENZOTHAZOLE, ZINC SALT	ACY, BFG, USR.
4-MORPHOLINYL 2-BENZOTHAZYL DISULFIDE	GYR.
N-OXYDIETHYLENE-2-BENZOTHAZOLESULFENAMIDE	ACY, BFG.
@ ALL OTHER CYCLIC ACCELERATORS, ACTIVATORS AND VULCANIZING AGENTS:	
PARA-BENZOQUINONEDIOXIME	ARA.
BIS (MORPHOLINOTHIOCARBONYL) DISULFIDE	ACY.
DIBENZYLAMINE	MLS, USR.
DIMETHYLETHANOLAMINE, TOLUENE-2,4-DIISOCYANATE ADDUCT	DUP.
DI-N,N'-PENTAMETHYLENETHIURAM TETRASULFIDE	DUP, VNC.
2-IMIDAZOLIDENETHIONE (1,3-ETHYLENE-2-THIOUREA)	DUP, RBC.
META-PHENYLENEBISMALEIMIDE	DUP.
POLY-PARA-DINITROSOBENZENE	DUP.
TETRAMETHYLTHIURAM DISULFIDE	DUP.
PARA-TOLUENESULFONIC ACID, ZINC SALT	USR.
@ ANTIOXIDANTS, ANTIOZONANTS AND STABILIZERS:	
@ AMINO ANTIOXIDANTS, ANTIOZONANTS AND STABILIZERS:	
@ ALDEHYDE AND ACETONE-AMINE REACTION PRODUCTS:	
BUTYRALDEHYDE-ANILINE CONDENSATE	DUP.
DIPHENYLAMINE-ACETONE CONDENSATE	ACY, BFG, USR.
PHENYL-2-NAPHTHYLAMINE-ACETONE CONDENSATE	USR.
@ SUBSTITUTED P-PHENYLENEDIAMINES:	
ALKYLARYL-PARA-PHENYLAMINE-DIAMINES	MON.
N,N'-BIS (1,4-DIMETHYLPENTYL)-PARA-PHENYLENEDIAMINE	MON, UPM, USR.
N,N'-BIS (1-ETHYL-3-METHYLPENTYL)-PARA-PHENYLENEDIAMINE	UPM.
N,N'-BIS (1-METHYLHEPTYL)-PARA-PHENYLENEDIAMINE	BFG, UPM.
N-CYCLOHEXYL-N'-PHENYL-PARA-PHENYLENEDIAMINE	UPM, USR.
DIARYLENEDIAMINES, MIXED	GYR.

TABLE 2.--RUBBER PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

RUBBER PROCESSING CHEMICALS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
@ANTIOXIDANTS, ANTIOZONANTS AND STABILIZERS--CONTINUED	
@AMINO ANTIOXIDANTS, ANTIOZONANTS AND STABILIZERS-- CONTINUED	
@SUBSTITUTED P-PHENYLENEDIAMINES--CONTINUED	
N,N-DICYCLOHEXYL-PARA-PHENYLENEDIAMINE - - - -	UPM.
N-(1,3-DIMETHYLBUTYL)-N-PHENYL-PARA-PHENYLENEDIA MINE- - - - -	GYR, UPM, USR.
N,N'-DI-2-NAPHTHYL-PARA-PHENYLENEDIAMINE - - - -	BFG.
N,N'-DIPHENYL-PARA-PHENYLENEDIAMINE- - - - -	BFG, USR.
N-ISOPROPYL-N'-PHENYL-PARA-PHENYLENEDIAMINE- - - -	USR.
N-(1-METHYLHEPTYL)-N'-PHENYL-PARA-PHENYLENEDIAMI NE- - - - -	UPM.
N-(1-METHYLPENTYL)-N'-PHENYL-PARA-PHENYLENEDIAMI NE- - - - -	USR.
OTHER AMINES:	
PARA-ANILINOPHENOL - - - - -	BFG.
1,2-DIHYDRO-6-DODECYL-2,2,4-TRIMETHYLQUINOLINE - -	X.
1,2-DIHYDRO-6-ETHOXY-2,2,4-TRIMETHYLQUINOLINE- -	X.
1,2-DIHYDRO-2,2,4-TRIMETHYLQUINOLINE - - - - -	BFG, X.
DIPHENYLAMINE-STYRENATED - - - - -	GYR.
DIPHENYLAMINE, SUBSTITUTED - - - - -	USR.
N,N'-DIPHENYLDIETHYLENEDIAMINE - - - - -	RCI.
N,N'-DIPHENYL-1,3-PROPANEDIAMINE - - - - -	RCI.
N,N'-DI-ORTHO-TOLYLETHYLENEDIAMINE - - - - -	RCI.
4-ISOPROPOXYDIPHENYLAMINE- - - - -	BFG.
4,4'-METHYLENEDIANILINE- - - - -	USR.
NONYLDIPHENYLAMINE MIXTURE (MONO-, DI-, AND TRI -)- - - - -	USR.
OCTYLDIPHENYLAMINE - - - - -	ACY, USR.
OCTYLDIPHENYLAMINE, ALKYLATED- - - - -	BFG.
OCTYLDIPHENYLAMINE MIXTURES (MONO-, NONYL-, AND DI-) - - - - -	DUP.
N-PHENYL-1-NAPHTHYLAMINE - - - - -	DUP, USR.
@N-PHENYL-2-NAPHTHYLAMINE - - - - -	BFG, DUP, USR.
TOLUENEDIAMINE (MIXED ISOMERS) - - - - -	DUP.
PARA-(PARA-TOLUENESULFONAMIDO)DIPHENYLAMINE- - -	USR.
@PHENOLIC AND PHOSPHITE ANTIOXIDANTS AND STABILIZERS:	
PHOSPHITES:	
ALKYLARYL PHOSPHITES MIXED - - - - -	X.
NONYLPHENYL PHOSPHITES, MIXED- - - - -	MCB, NPI, USR, X.

TABLE 2.--RUBBER PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

RUBBER PROCESSING CHEMICALS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
@ANTIOXIDANTS, ANTIOZONANTS, AND STABILIZERS--CONTINUED	
@PHENOLIC AND PHOSPHITE ANTIOXIDANTS AND STABILIZERS--CONTINUED	
PHOSPHITES--CONTINUED	
POLYMERIC PHOSPHITES-----	NPI.
POLYPHENOLIC PHOSPHITE, POLYALKYLATED-----	BFG.
@POLYPHENOLICS (INCLUDING BISPHENOLS):	
BISPHENOL, HINDERED-----	GYR, USR.
4,4'-BUTYLIDENE BIS(6-TERT-BUTYL-META-CRESOL)-----	MON.
2,5-DI-SEC-BUTYLDECYLHYDROQUINONE-----	USR.
2,5-DI- (1,1-DIMETHYLPROPYL) HYDROQUINONE-----	X.
2,2'-METHYLENE BIS(6-TERT-BUTYL-PARA-CRESOL)-----	ACY, ASH.
2,2'-METHYLENE BIS(6-TERT-BUTYL-4-ETHYLPHENOL)-----	ACY.
2,2'-METHYLENE BIS*6- (1-METHYLCYCLOHEXYL)-PARA-CR	
ESOL*-----	ACY, ICI.
4,4'-THIOBIS(6-TERT-BUTYL-META-CRESOL)-----	X.
THIOBISPHENOL, ALKYLATED-----	USR.
1,1,3-TRI (2-METHYL-4-HYDROXY-5-TERT-BUTYLPHENYL)	
BUTANE-----	ICI.
@ALL OTHER PHENOLIC ANTIOXIDANTS AND STABILIZERS:	
ORTHO-CRESOL, ALKYLATED-----	PIT.
@PHENOL, ALKYLATED-----	ACY, BFG, GYR, NEV, RCI.
PHENOL, HINDERED-----	DUP, GYR, USR.
PHENOL, STYRENATED, MIXTURES-----	GYR, NEV, USR.
POLYPHENOL, ALKYLATED-----	GYR.
N-STEAROYL-PARA-AMINOPHENOL-----	MLS.
TRIS-(3,5-DI-TERT-BUTYL-4-HYDROXYBENZYL) ISO-	
CYANURATE-----	X.
@ALL OTHER ANTIOXIDANTS, ANTIOZONANTS AND STABILIZERS:	
2-MERCAPTOBENZIMIDAZOLE-----	USR.
2-MERCAPTOBENZIMIDAZOLE, ZINC SALT-----	USR.
WAX BASE, OZONE PROT 80-----	RCI.
BLOWING AGENTS:	
DINITROSOPENTAMETHYLENETETRAMINE-----	NPI.
PARA, PARA'-OXYBIS (BENZENESULFONHYDRAZIDE)-----	USR.
PARA-TOLUENESULFONYL HYDRAZIDE-----	USR.
PARA-TOLUENESULFONYLSEMICARBAZIDE-----	USR.

TABLE 2.--RUBBER PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

RUBBER PROCESSING CHEMICALS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
@PEPITIZERS:	
2',2''-DITHIOBIS(BENAZNILIDE)-----	: ACY.
DIXYLYL DISULFIDES, MIXED-----	: PIT.
PENTACHLOROBENZENETHIOL-----	: SDC.
XYLENETHIOL-----	: DUP.
ALL OTHER CYCLIC RUBBER-PROCESSING CHEMICALS:	
PARA-TERT-AMYLPHENOL SULFIDE-----	: PAS
4-CHLORO-2,6-BIS(2,4-DIHYDROXYBENZYL)PHENOL-----	: ICI.
N-(CYCLOHEXYLTHIO)PHTHALAMIDE-----	: X.
2-ETHYL-1,2-NITROPROPYL-4-NITROANILINE-----	: MON.
4,4'-METHYLENEDICARBANILIC ACID, DIPHENYL ESTER-----	: USR.
NITROSODIPHENYLAMINE-----	: ACY, BFG, GYR, NPI, USE.
A C Y C L I C	
@ACCELERATORS, ACTIVATORS AND VULCANIZING AGENTS:	
@DITHIOCARBAMIC ACID DERIVATES:	
ACTIVATED DITHIOCARBAMATES - - - - -	: PAS.
DIBUTYLDITHIOCARBAMIC ACID, NICKEL SALT- - - - -	: USR.
DIBUTYLDITHIOCARBAMIC ACID, POTASSIUM SALT- - - - -	: ALC.
@DIBUTYLDITHIOCARBAMIC ACID, SODIUM SALT- - - - -	: ALC, DUP, USR, VNC.
@DIBUTYLDITHIOCARBAMIC ACID, ZINC SALT- - - - -	: DUP, PAS, USR, VNC.
DIETHYLDITHIOCARBAMIC ACID, CADMIUM SALT AND BIS(D	:
IETHYLTHIOCARBAMOYL) DISULFIDE, MIXTURE- - - - -	: VNC.
DIETHYLDITHIOCARBAMIC ACID, SELENIUM SALT- - - - -	: VNC.
DIETHYLDITHIOCARBAMIC ACID, SODIUM SALT- - - - -	: PAS.
DIETHYLDITHIOCARBAMIC ACID, TELLURIUM SALT- - - - -	: VNC.
DIETHYLDITHIOCARBAMIC ACID, ZINC SALT- - - - -	: ALC, GYR, USR.
DIMETHYLANMONIUM-DIMETHYLDITHIOCARBAMATE - - - - -	: USR.
DIMETHYLDITHIOCARBAMIC ACID, BISMUTH SALT- - - - -	: VNC.
DIMETHYLDITHIOCARBAMIC ACID, COPPER SALT- - - - -	: VNC.
DIMETHYLDITHIOCARBAMIC ACID, LEAD SALT- - - - -	: VNC.
DIMETHYLDITHIOCARBAMIC ACID, SELENIUM SALT- - - - -	: VNC.
DIMETHYLDITHIOCARBAMIC ACID, SODIUM SALT AND SODIU	:
M POLYSULFIDE - - - - -	: BFG.
@DIMETHYLDITHIOCARBAMIC ACID, ZINC SALT- - - - -	: ALC, FMN, GYR, PAS, USR, VNC.
THIURAMS:	
BIS(DIETHYLTHIOCARBAMOYL) DISULFIDE - - - - -	: DUP, GYR, PAS.
@ BIS (DIMETHYLTHIOCARBAMOYL) DISULFIDE - - - - -	: DUP, GYR, PAS.
@ BIS (DIMETHYLTHIOCARBAMOYL) SULFIDE - - - - -	: DUP, GYR, USR.

TABLE 2.--RUBBER PROCESSING CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

RUBBER PROCESSING CHEMICALS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C Y C L I C--CONTINUED	
@ACCELERATORS, ACTIVATORS AND VULCANIZING AGENTS-- CONTINUED	
THIURAMS--CONTINUED	
BIS (ISOPROPYLOCTADECYLTHIOCARBAMOYL) DISULFIDE - -	: USR.
METHYL-ETHYL THIURAMS, MIXED - - - - -	: PAS.
XANTHATES AND SULFIDES:	
DI-NORMAL-BUTYLXANTHO DISULFIDE- - - - -	: USR.
DIISOPROPYLXANTHO DISULFIDE- - - - -	: BFG.
ZINC DIISOPROPYL XANTHATE- - - - -	: VNC.
ALL OTHER ACYCLIC ACCELERATORS, ACTIVATORS AND VULCANIZING AGENTS:	
PARA-AMINOCYCLOHEXYLMETHANE CARBONATE- - - - -	: DUP.
NORMAL-BUTYRALDEHYDE-BUTYLAMINE CONDENSATE - - -	: DUP.
DI-NORMAL-BUTYLAMMONIUM OLEATE - - - - -	: DUP.
3-ETHYL-1,1-DIMETHYL-2-THIOUREA- - - - -	: VNC.
METHACRYLIC ACID, ZINC SALT- - - - -	: USR.
1,1,3-TRIMETHYL-2-THIOUREA - - - - -	: RBC, VNC.
CONDITIONING AND LUBRICATING AGENTS:	
ALKYL ALCOHOLS, MIXED- - - - -	: DUP.
MONO- AND DIALKYL ACID PHOSPHATES, MIXED - - - - -	: DUP.
MONO- AND DIALKYL PHOSPHATE AMMONIUM SALTS, MIXED- -	: DUP.
SODIUM ALKYL SULFATES- - - - -	: DUP.
POLYMERIZATION REGULATORS:	
DODECYL MERCAPTANS - - - - -	: PAS, PLC, X.
TERT-DODECYLMERCAPTANS - - - - -	: PLC.
NORMAL-OCTYL MERCAPTAN - - - - -	: PAS, PLC.
TERT-OCTYL MERCAPTAN - - - - -	: PAS, PLC.
TRIDECYL MERCAPTAN - - - - -	: PAS.
@SHORTSTOPS:	
DIMETHYLDITHIOCARBAMIC ACID, POTASSIUM SALT- - - - -	: USR.
DIMETHYLDITHIOCARBAMIC ACID, SODIUM SALT - - - - -	: ALC, DUP, GYR, USR.
@ ALL OTHER ACYCLIC RUBBER-PROCESSING CHEMICALS:	
3,7-DIOCTYLPHENOTHIAZINE - - - - -	: USR.
ZINC LAURATE (ACTIVATOR, PHYSICAL PROPERTY IMPROVER AND PROCESSING AUXILIARY)- - - - -	: USR.

TABLE 3.--RUBBER-PROCESSING CHEMICALS: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production or sales of rubber-processing chemicals to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ACY	American Cyanamid Co.	LAK	Lakeway Chemicals, Inc.
ALC	Alco Chemical Corp.	MCB	Borg-Warner Corp., Weston Chemical Div.
ARA	Arapahoe Chemicals, Inc. Sub/Syntex Corp. (U.S.A.)	MON	Monsanto Co.
ASH	Ashland Oil, Inc., Ashland Chemical Co.	NEV	Neville Chemical Co.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Co. Div.	NPI	Stepan Chemical Co., Polychem Dept.
DA	Diamond Shamrock Corp.	PAS	Pennwalt Chemicals Corp.
DUP	E. I. duPont de Nemours & Co., Inc.	PIT	Pitt-Consol Chemical Co.
FER	Ferro Corp., Ferro Chemical Div.	PLC	Phillips Petroleum Co.
FMN	FMC Corp., Agricultural Chemical Div.	RBC	Fike Chemicals, Inc.
GYR	Goodyear Tire & Rubber Co.	RCD	Richardson Co., Organic Chemical Div.
HK	Hooker Chemicals & Plastics Corp.	RCI	Reichhold Chemicals, Inc.
ICI	ICI United States, Inc., Specialty Chemicals Group	SDC	Martin-Marietta Corp., Sodeyco Div.
		VNC	Vanderbilt Chemical Copr.

Note.--Complete names and address of the above reporting companies are listed in table 1 of the appendix.

ELASTOMERS

David B. Beck

Elastomers (synthetic rubber) are high polymeric materials with properties similar to those of natural rubber. The term "elastomers" as used in this report, means a substance, whether in bale, crumb, powder, latex, and other crude form, which can be vulcanized or similarly processed into a material that can be stretched to at least twice its original length and, after having been so stretched and the stress removed, will return with force to approximately its original length. U.S. production and sales of elastomers in 1976 are shown in table 1¹.

Total U.S. production² of synthetic rubber in 1976 amounted to 5,386 million pounds, an increase of 18 percent from that produced in 1975. Total sales² of elastomers in 1976 amounted to 3,710 million pounds, a decrease of 6 percent from that produced in 1975.

Styrene-butadiene rubber (SBR, or S-type rubber) in 1976 continued to be the elastomer produced in the greatest quantity as it has been for more than a quarter of a century. U.S. production of S-type rubber, including 30 million pounds of its vinylpyridine sub-type, amounted to 3,010 million pounds in 1976, an increase of 14 percent from that reported for 1975. Solution polymerized butadiene rubber, a stereo type elastomer, was produced domestically in 1976 in the next largest amount--752 million pounds; production of isoprene and ethylene-propylene rubbers, the other stereo types, amounted to 164 million³ and 303 million pounds, respectively. Total U.S. production of these stereo type elastomers amounted to 1,219 million pounds in 1976--an increase of 25 percent from 1975. Other principal types of synthetic elastomers for which U.S. production data are reported separately are isobutylene-isoprene (butyl) rubber, production of which was 277 million pounds³ in 1976, acrylonitrile-butadiene (N-type) rubber, production of which was 166 million pounds, and polychloroprene (Neoprene) rubber, production of which was 383 million pounds³.

Sales of S-type rubber by U.S. producers in 1976 (including its vinylpyridine sub-type) amounted to 1,786 million pounds, a decrease of 18 percent from sales reported for 1975. Sales of solution polymerized butadiene rubber amounted to 413 million pounds, and those of ethylene-propylene rubber to 245 million pounds. Sales of N-type rubber in 1976 amounted to 130 million pounds. Sales of solution polymerized butadiene rubber in 1976 decreased from sales in 1975 by 12 percent, and sales of ethylene-propylene rubber increased 27 percent. Sales of N-type rubber in 1976 were 23 percent above those in 1975.

¹ See also Table 2 which lists these products and indicates the manufacturers of each by code. The codes are identified by company name in table 3.

² Does not include urethane type elastomers.

³ Reported by the Rubber Manufacturers' Association.

Synthetic Elastomers

During 1976 the U.S. synthetic elastomers industry was hampered by 1) the United Rubber Workers (URW) strike against the Big Four tire producers, and 2) a cancer scare which set the National Institute of Occupational Safety and Health (NIOSH) and certain producers to the task of researching potential occupational hazards germane to the rubber industry. Despite these and other developments, overall production of synthetic elastomers was up from 1975, and the outlook for 1977 and beyond is favorable.

Styrene-butadiene rubber workers and leukemia

B.F. Goodrich reported in March 1976 that three employees of its Port Neches, Texas, Styrene-butadiene rubber (SBR) plant had died of leukemia since 1971. A quick check by other SBR producers revealed that several other leukemia-related deaths and illnesses had similarly occurred.

NIOSH began an investigation having the same urgency as its vinyl chloride monomer study. Pinpointing the potential carcinogen in SBR is complicated, however, by the fact that SBR production involves over 200 monomers and rubber-processing chemicals. Two university studies funded by the rubber industry to research occupational diseases have been in progress since 1970, but some producers now have initiated inquiries of their own. The International Institute of Synthetic Rubber Producers (IISRP) is also concentrating a massive factfinding effort on butadiene monomers.

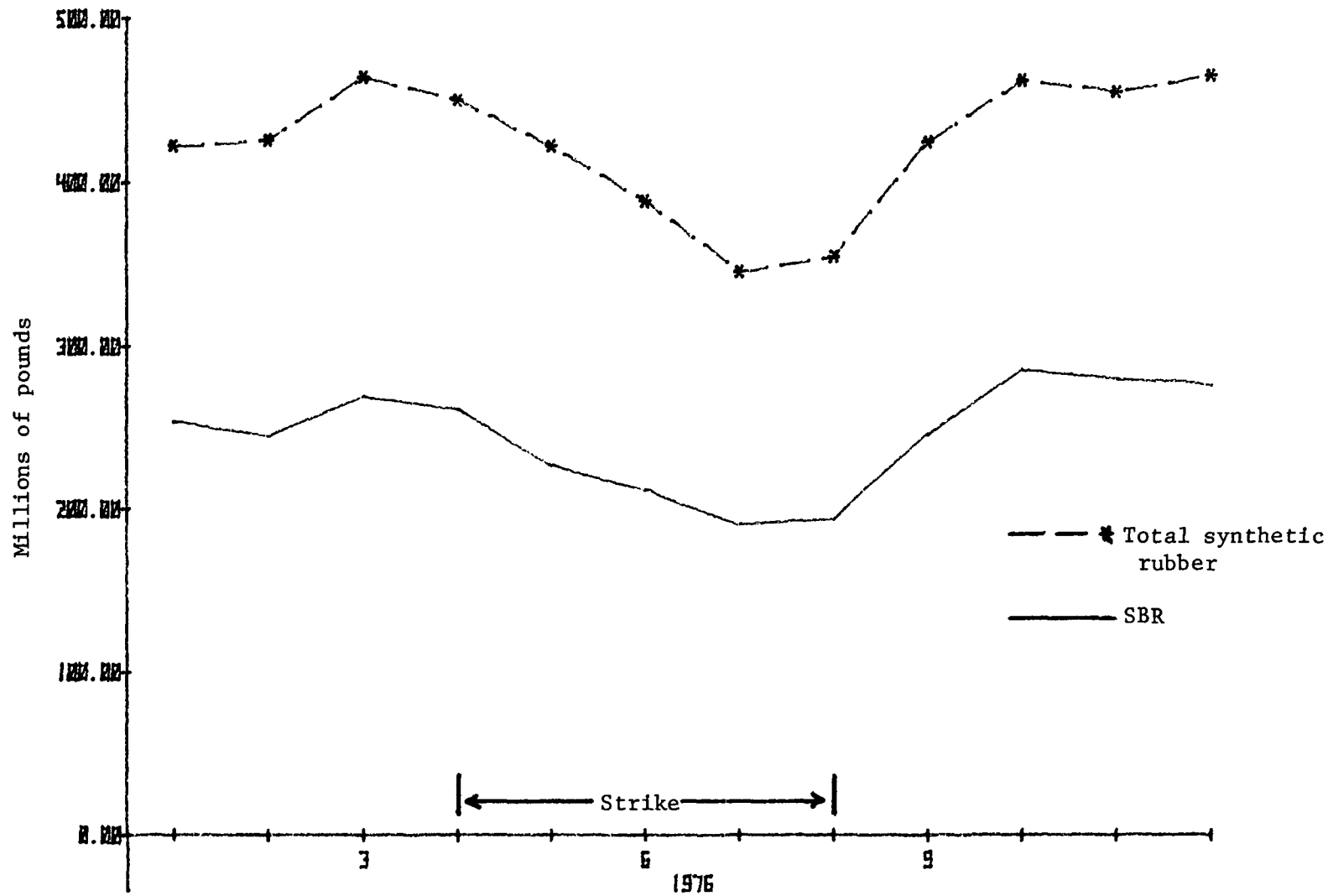
United Rubber Workers strike

Contract negotiations between the URW and the Big Four tire producers broke down in 1976, as they had in 1967, 1970, and 1973. But the 1976 URW strike was to last longer (140 days) than any previous one. The key issues were a cost-of-living escalator clause and wage differentials between tire workers and other rubber-product workers.

The effects of the strike were not immediately felt because tire inventories were initially high (55 million units compared with a normal inventory of 40 to 50 million units), and stocks of the monomers butadiene and styrene were low. Production of the monomers, SBR elastomers, and rubber-processing chemicals continued at a normal pace through April to build supply in anticipation of heavy tire production once the strike was settled.

The strike was not settled as soon as most hoped. As stocks rose, throughout May and August, SBR production dropped 12 to 26 percent (see the following figure). This triggered declines in the demand for, and in the price of, styrene and butadiene monomers.

Synthetic rubber: Monthly U.S. production of total synthetic rubber and styrene-butadiene rubber (SBR), 1976



The strike curbed what could have been a very good year for tire producers. When the strike ended in August, tire inventories had dropped to 20 million units, and at yearend they were about 10 million units short of normal reserves. Sales for the year generally increased 5 to 6 percent over 1975, but after-tax profits fell almost 30 percent for some companies.

While hose and belting generally rebounded from the 1975 recession, flat belt sales (serving high capital expenditure markets such as coal mining) were dampened by the length of the strike. Producers of fibers, tire yarn, and other products related to tire manufacture also reported feeling the impact of the strike.

Production and sales

Production of synthetic elastomers in 1976 amounted to 5.3 billion pounds, up almost 15 percent from 4.6 billion pounds in 1975. The following tabulation shows that all major types of elastomers made a good recovery from 1975:

<u>Type of rubber</u>	<u>Production</u>		<u>Percentage increase</u>
	<u>1975</u> (1,000 pounds)	<u>1976</u> (1,000 pounds)	
SBR-----	2,607,907	2,980,253	14
Butyl-----	182,039	277,685	53
N-type-----	118,767	165,924	40
Polybutadiene-----	655,778	780,756 ^{1/}	19
Polyisoprene-----	135,154	164,115	21
EPDM-----	187,392	303,056	62
Silicone-----	31,221	38,974	25
Styrene-butadiene-			
vinylpyridine-----	29,500	29,832	1
Total synthetic			
rubber-----	4,578,725	5,220,956 ^{1/}	14

However, in the overall perspective, only polybutadiene and EPDM managed to exceed the 1974 levels of production.

Sales of SBR in 1976 amounted to 1,775,333 thousand pounds compared with 2,607,907 thousand pounds in 1975, or a decrease of 32 percent. Sales value of SBR declined 17 percent from \$572 million in 1975 to \$473 million in 1976. Similarly, production and sales of solution-polymerized polybutadiene declined 12 percent and 9 percent, respectively. Changes in sales quantities and values for other synthetic elastomers were as follows:

^{1/} Census data.

<u>Type of rubber</u>	<u>Percentage change in</u>	<u>Percentage change in</u>
	<u>sales quantity:</u>	<u>sales value:</u>
	<u>1976 from 1975</u>	<u>1976 from 1975</u>
Butyl-----	1/	1/
N-type-----	23	32
Polyisoprene-----	1/	1/
EPDM-----	27	39
Silicone-----	39	32
Styrene-butadiene-		
vinylpyridine-----	-35	-34

1/ Withheld to avoid disclosure of company confidential data.

Foreign trade

In synthetic elastomers, the United States maintained a favorable export/import ratio of about 2.3 in 1976 (see figure on p. 206). That ratio has varied no more than 0.3 from the average during 1972-76. However, if the quantity of natural rubber imports is included (the United States does not produce natural rubber, yet it consumes about one-fifth of the world's total, annually), the export/import ratio drops to a less favorable 0.36 for 1976 (see figure on p. 207).

The ratio of imports to consumption of synthetic rubber alone was steady at 4.7 to 5.7 percent during 1972-76. If natural rubber data are considered, the ratio of imports to consumption shows a steady (but gradual) increase from 24.8 percent in 1972 to 30.3 percent in 1976.

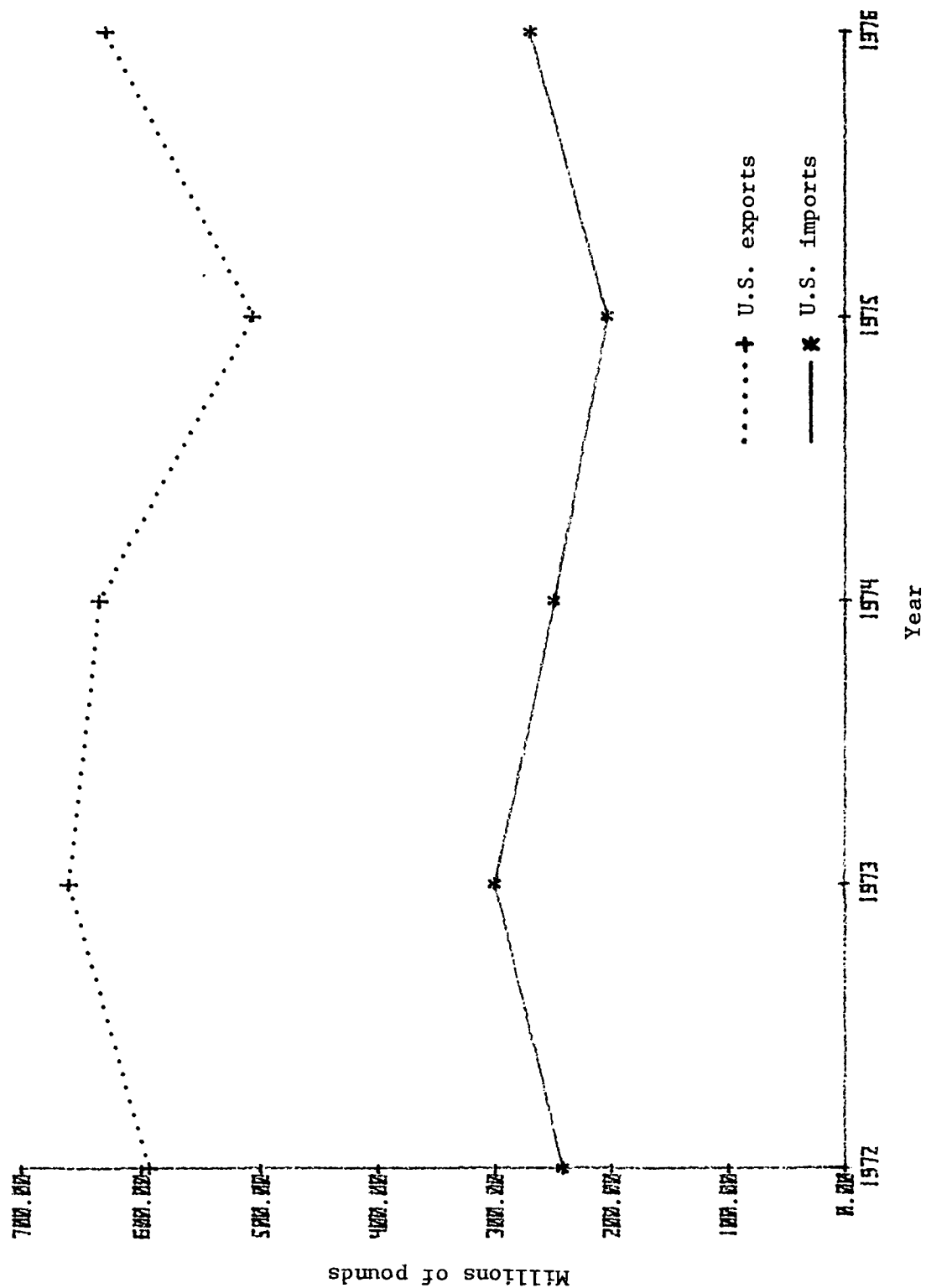
As the U.S. economy was depressed in 1975, so too were U.S. exports of rubber. Export problems included currency devaluations, inflation, raw materials costs, tariff barriers, and transportation costs. These factors, coupled with increased foreign competition and the prospects of little growth in U.S. tire demand, provided strong incentive for U.S. producers to expand their facilities overseas, especially in the developing countries.

World demand and foreign competition

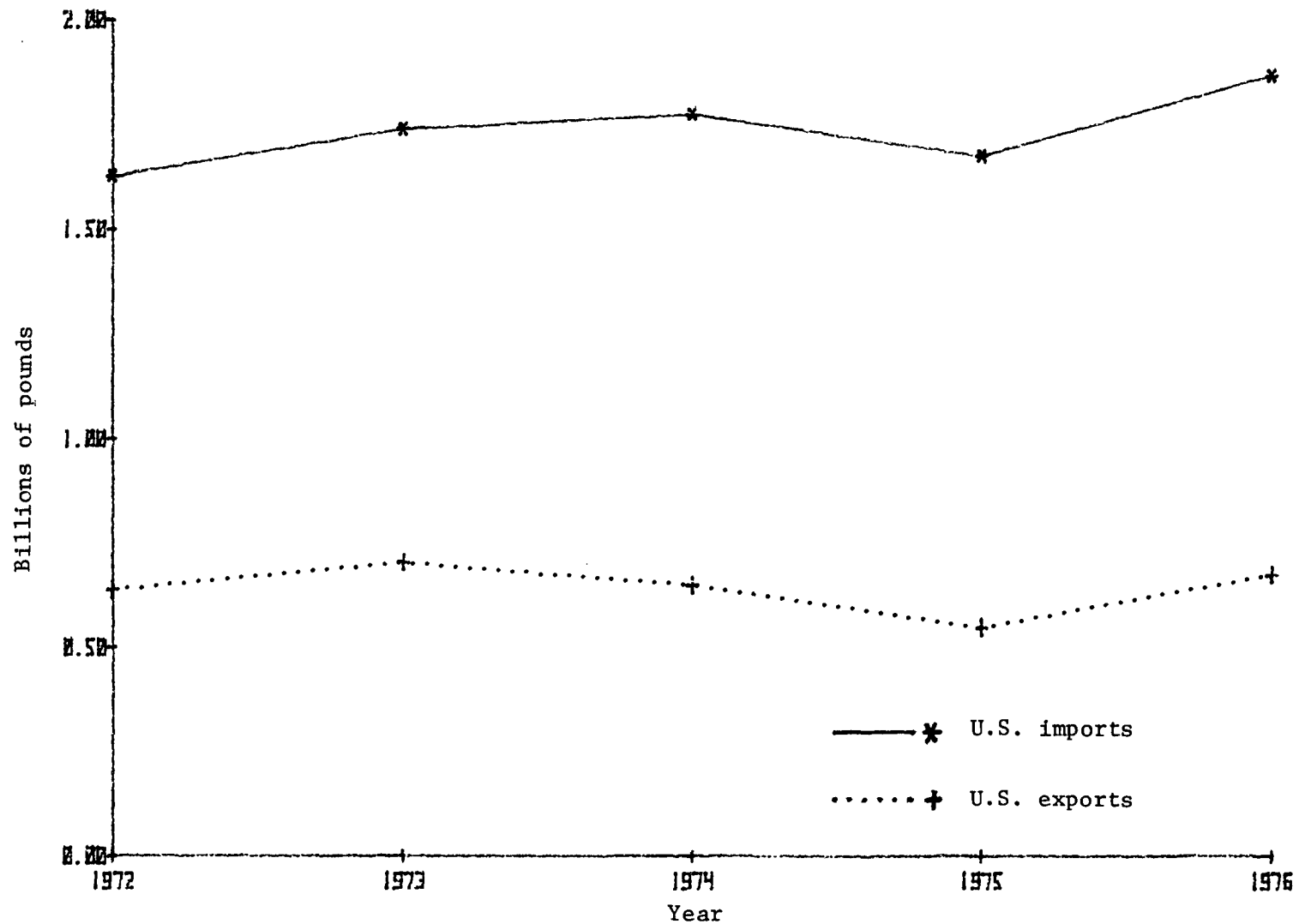
Latin America's automobile consumption in 1980 will be more than double that in 1970. Similarly, Southeast Asia's demand for original-equipment tires will increase at least 50 percent in the same period. Both these regions, along with the Middle East and Africa, are ripe for industrial development, which means that nontire rubber demand (especially for hose and belting) will be strong in the coming decade.

U.S. multinational rubber companies face a number of problems in meeting increasing demand overseas. The biggest question is whether expansion can

Synthetic rubber: U.S. export quantity and U.S. import quantity, 1972-76



Synthetic and natural rubber: U.S. export quantity (including shipments of natural rubber from the U.S. Government stockpile) versus U.S. import quantity, 1972-76



occur fast enough to meet growing demand for U.S. rubber technology. Many countries which are potential sites for new plants or for the expansion of existing facilities are demanding a bigger share of the multinationals' gross receipts. Cheap labor is becoming a scarcity and raw materials costs are increasing. Foreign government red tape also tends to retard expansion of U.S. industry abroad. Meanwhile, Japan and Western Europe are constantly developing newer and better rubber know-how of their own and promise to be strong competition for U.S.-owned companies in foreign markets.

Natural rubber

U.S. consumption of natural rubber (NR) in 1976 was about 1.5 billion pounds, or 25 percent of total U.S. rubber consumption--second only to SBR. Tire production accounted for 65 percent of SBR consumption and 73 percent of NR consumption, and together the two accounted for 77 percent of total rubber consumption by the tire industry.

In years to come the fraction of tire rubber accounted for by NR will probably increase at the expense of SBR. There are two reasons: (1) New radial tread designs for passenger tires are already consuming up to twice the NR per tire used in older designs. Furthermore, the radial designs are being tested for nonpassenger tires as well. (2) Consumption of NR since World War II has been limited by supply, but higher yield agricultural techniques, commercial redevelopment of guayule as a source of NR, and a breakthrough in the battle against South American leaf blight (which wiped out the Brazilian rubber industry at the turn of the century) will contribute to increased future NR availability. World NR production is projected to rise from 3.5 million metric tons, or 32 percent of world rubber consumption, in 1976 to an estimated 10 to 12 million metric tons, or 35 to 40 percent of projected world consumption, by the end of the century.

A significant step was taken in August by the Association of Natural Rubber Producing Countries (ANRPC) toward stabilizing the erratic NR prices prevalent in recent years. Through an international buffer stock and strategic open market purchases, the ANRPC (which accounts for over 90 percent of world NR production) hopes to maintain NR supply in relative balance with demand and thereby make prices more stable and NR more competitive.

Industry outlook: 1977 and beyond

The biggest factor in rubber industry growth in 1977 will be tires. Production and sales of tires have been predicted to break all previous years' records because of increasing demand and the efforts to replenish inventories depleted by the 1976 strike.

Radial tires for automobiles (and for trucks and buses) will gain a larger percentage of the domestic market in 1977. Some producers fear that in the long run the greater mileage life of radials could put a damper on

annual growth; but others agree that most Americans tend to underinflate their tires and usually realize less than half of the 50-percent extra tread life that radials allegedly offer. In any case, foreign tire sources made further inroads into the U.S. market during the 1976 strike, and U.S. producers will have an uphill battle to regain those lost sales.

Nontire synthetic elastomers will see strong growth at least through 1980. Industrial hose markets are projected to grow 5 percent per year with the upswing in production of hydraulic, offshore drilling, and mining equipment and with the recovery of the automobile industry. Rubber hose will also be used as a less expensive alternative to rigid metal piping in more and more applications.

Rubber and reinforced rubber belting have enjoyed tremendous growth since 1974. The coal industry is the major contributing factor--conveyor belting is the most efficient and economical way to handle bulk materials such as coal and other mined products. Sales of belting are expected to climb 8 to 9 percent annually through 1980.

A conservative estimate for growth of U.S. synthetic rubber consumption through 1980 would be about 3 percent annually, barring unusual economic conditions. At that rate U.S. consumption will reach 2.4 billion pounds by 1980. Total U.S. consumption of all rubber could reach over 7 billion pounds by the year 2000. This estimate allows for longrun growth of less than 3 percent, taking into account recessionary periods and other possible (temporary) negative economic influences.

TABLE 1.--ELASTOMERS (SYNTHETIC RUBBER):¹ U.S. PRODUCTION AND SALES, 1976

[Listed below are all elastomers (synthetic rubber) for which reported data on production or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all elastomers for which data on production and/or sales were reported and identifies the manufacturers of each]

ELASTOMERS	PRODUCTION ²	SALES		
		QUANTITY ²	VALUE	UNIT VALUE ³
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Grand total-----	5,385,800	3,710,137	1,529,062	\$0.41
Cyclic-----	3,146,083	1,970,636	560,386	.28
Acyclic-----	2,239,717	1,739,501	968,676	.56
Acrylonitrile-butadiene type (N-type)-----	165,924	129,560	79,663	.61
Butadiene (emulsion polymerized) type-----	16,312	14,101	4,858	.34
Chloroprene type (Neoprene) ⁴-----	...	...	...	...
Isobutylene-isoprene type (Butyl) ⁵-----	...	...	...	...
Silicone type-----	38,974	38,466	115,036	2.99
Stereo elastomers:				
Butadiene (solution polymerized) type-----	751,535	413,133	122,435	.30
Ethylene-propylene type-----	303,056	245,448	111,231	.45
Isoprene type ⁶-----	...	...	...	...
Styrene-butadiene type (S-type)-----	2,980,253	1,775,332	473,446	.27
Styrene-butadiene-vinylpyridine type-----	29,832	10,567	7,308	.69
Urethane type-----	(?)	(?)	(?)	(?)
All other elastomers ⁸ -----	1,099,914	1,088,530	615,085	.57

¹ 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.

² Includes oil content of oil-extended elastomers.

³ Calculated from rounded figures.

⁴ Included in "All other elastomers". The production of polychloroprene rubber in 1976 was reported by the Rubber Manufacturers' Association to be 164,581 metric tons (362,839,000 pounds).

⁵ Included in "All other elastomers". The production of butyl rubber in 1976 was reported by the Rubber Manufacturers' Association to be 125,493 metric tons (276,662,000 pounds).

⁶ Included in "All other elastomers". The production of polyisoprene rubber in 1976 was reported by the Rubber Manufacturers' Association to be 74,428 metric tons (164,084,000 pounds).

⁷ The data on production and sales of urethane elastomers are reported in the section "Plastics and Resin Materials" with urethane plastics and polyols.

⁸ Includes production and sales data for acrylic ester, butyl, chloroprene, epichlorohydrin, fluorinated, isobutylene, isoprenes, and polysulfide elastomers, certain solution elastomers, carboxylated SBR latex, chlorinated rubber, chlorosulfonated polyethylene, thermoplastic rubber, miscellaneous elastomers.

TABLE 2.--ELASTOMERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

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(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "a"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AND "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

ELASTOMERS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C	
BUTADIENE-STYRENE TYPE:	
@BUTADIENE-STYRENE (S-TYPE) - - - - -	ASH, ASY, BFG, CPY, FIR, FRS, GNT, GRD, GYR, PLC, RCI, TUS, USR.
BUTADIENE-STYRENE-ITACONIC ACID- - - - -	ASY.
@BUTADIENE-STYRENE-VINYLPYRIDINE- - - - -	BFG, FIR, FRS, GNT, GYR, MIL, USR.
BUTADIENE-STYRENE TYPE ELASTOMERS, OTHER - - - - -	PLC.
THERMOPLASTIC ELASTOMERS, CYCLIC - - - - -	SHC.
ALL OTHER CYCLIC ELASTOMERS:	
POLYESTER ELASTOMER- - - - -	DUP.
POLYISOPRENE, CYCLIZED - - - - -	WAY.
A C Y C L I C	
POLYACRYLATE ESTER TYPE:	
POLYACRYLATE ESTER, TYPE ELASTOMER-----	ACY, BFG, DUP, TKL.
POLYALKYLENE SULFIDE TYPE:	
POLYALKYLENE SULFIDE, TYPE ELASTOMER-----	TKL.
@BUTADIENE-ACRYLONITRILE TYPE (N-TYPE):	
BUTADIENE-ACRYLONITRILE TYPE (N-TYPE)-----	BFG, CPY, FRS, GYR, RCI, USR.
@POLYBUTADIENE TYPE (EMULSION)-----	BFG, FRS, GYR, TKL, TUS.
POLYCHLOROPRENE TYPE (NEOPRENE):	
POLYCHLOROPRENE TYPE (NEOPRENE)- - - - -	DUF, PTT.
POLYISOBUTYLENE TYPE:	
POLYISOBUTYLENE, TYPE ELASTOMERS- - - - -	ENJ.
ISOBUTYLENE-ISOPRENE TYPE (BUTYL):	
ISOBUTYLENE-ISOPRENE TYPE (BUTYL)- - - - -	CBN, ENJ.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--ELASTOMERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

ELASTOMERS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C Y C L I C--CONTINUED	
PRODUCTS OF NATURAL RUBBER:	
POLYMERIZED CHLORINATED RUBBERS- - - - -	: ICI, X.
@SILICONE TYPE:	
SILICONE TYPE ELASTOMERS - - - - -	: DCC, SPD, SWS.
STEREOISOMER TYPE:	
BUTADIENE-ACRYLIC ACID-ACRYLONITRILE - - - - -	: ASY.
@ETHYLENE-PROPYLENE RUBBER- - - - -	: BFG, CPY, DUP, ENJ, USR.
@POLYBUTADIENE (SOLUTION POLYMERIZED) - - - - -	: ASY, ATR, BFG, PRS, GNT, GYR, PLC.
POLYISOPRENE (SOLUTION POLYMERIZED)- - - - -	: BFG, GYR.
THERMOPLASTIC ELASTOMERS, ACYCLIC- - - - -	: USR.
ALL OTHER ACYCLIC ELASTOMERS:	
CHLOROSULFONATED POLYETHYLENE- - - - -	: DUP.
DEPOLYMERIZED NATURAL RUBBER - - - - -	: HDM.
DEPOLYMERIZED ISOPRENE - - - - -	: HDM.
EPICHLOROHYDRIN RUBBERS- - - - -	: BFG.
FLUORCELASTOMERS - - - - -	: DUP.
HEXAFLUOROPROPENE-VINYLLIDENE FLUORIDE COPOLYMER (FLU : OREL) - - - - -	: MMM.
POLYALKYLENE OXIDE - - - - -	: PRC.

ELASTOMERS

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 3.--ELASTOMERS (SYNTHETIC RUBBER): DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of elastomers manufacturers that reported production or sales to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ACY	American Cyanamid Co.	ICI	ICI United States, Inc., Specialty Chemicals Group
ASH	Ashland Oil, Inc.		
ASY	American Synthetic Rubber Corp.	MIL	Milliken & Co., Milliken Chemical Div.
ATR	Atlantic Richfield Co.	MMM	Minnesota Mining and Manufacturing Co.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Co. Div.	PLC	Phillips Petroleum Co.
		PRC	Products Research & Chemical Corp., Chemical and Sealant Div.
CBN	Cities Service Co., Columbian Group	PTT	Petro-Tex Chemical Corp.
CPY	Copolymer Rubber & Chemical Corp.		
DCC	Dow Corning Corp.	RCI	Reichhold Chemicals, Inc., Reichhold Polymers, Inc.
DUP	E. I. duPont de Nemours & Co., Inc.		
ENJ	Exxon Chemical Co., U.S.A.	SHC	Shell Oil Co., Shell Chemical Co. Div.
		SPD	General Electric Co., Silicone Products Dept.
		SWS	Stauffer Chemical Co., SWS Silicones Div.
	Firestone Tire & Rubber Co.:	TKL	Thiokol Chemical Corp.
FIR	Firestone Plastics Co. Div.	TUS	Texas-U.S. Chemical Co.
FRS	Firestone Synthetic Rubber & Latex Co. Div.		
GNT	General Tire & Rubber Co., Chemical Div.	UCC	Union Carbide Corp.
GRD	W. R. Grace & Co., Polymers & Chemicals Div.	USR	Uniroyal, Inc., Chemical Div.
GYR	Goodyear Tire & Rubber Co.		
		WAY	Philip A. Hunt Chemical Corp., Wayland Chemical Div.
HDM	Hardman, Inc.		
HPC	Hercules, Inc.		

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

PLASTICIZERS

Edmund Cappuccilli and Louis N. DeToro

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 1 presents statistics on U.S. production and sales of plasticizers in as great a detail as is possible without revealing the operations of individual producers.

U.S. production of plasticizers totaled 1,587 million pounds in 1976, an increase of 17.4 percent from the 1,352 million pounds reported for 1975. Sales of plasticizers totaled 1,466 million pounds, valued at \$566 million, in 1976, compared with 1,338 million pounds, valued at \$470 million, in 1975.

Production of cyclic plasticizers in 1976, which consisted chiefly of the esters of phthalic anhydride, phosphoric acid, and trimellitic acid, amounted to 1,186 million pounds, an increase of 14.2 percent from the 1,038 million pounds reported for 1975. Sales of cyclic plasticizers in 1976 totaled 1,111 million pounds, valued at \$360 million, compared with 1,042 million pounds, valued at \$308 million, in 1975. The most important cyclic plasticizer was di(2-ethylhexyl) phthalate, with production of 297 million pounds, in 1976.

Production of acyclic plasticizers in 1976 totaled 402 million pounds, an increase of 28.1 percent from the 313 million pounds reported for 1975. Sales of acyclic plasticizers totaled 355 million pounds, valued at \$206 million, in 1976, compared with 296 million pounds, valued at \$162 million, in 1975. Epoxidized soya oils were the most important acyclic plasticizer in 1976 with production of 91 million pounds.

PLASTICIZERS

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TABLE 1.--PLASTICIZERS:¹ U.S. PRODUCTION AND SALES, 1976

[Listed below are plasticizers for which any reported data on production and/or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists separately all plasticizer chemicals for which data on production and/or sales were reported and identifies the manufacturers of each]

PLASTICIZERS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ²
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Grand total-----	1,587,434	1,465,711	566,265	\$0.39
Benzenoid ³ -----	1,303,772	1,207,225	416,383	.34
Nonbenzenoid-----	283,662	258,486	149,882	.58
PLASTICIZERS, CYCLIC				
Total-----	1,185,909	1,110,869	360,453	.32
Phosphoric acid esters, total-----	74,366	62,159	40,502	.65
Cresyl diphenyl phosphate-----	4,518	3,574	2,326	.65
All other phosphoric acid esters ⁴ -----	70,348	58,585	38,176	.65
Phthalic anhydride esters, total-----	1,042,933	936,560	293,018	.30
Dibutyl phthalate-----	13,702	14,679	5,491	.37
Diethyl phthalate-----	16,135	11,797	4,928	.42
Diisodecyl phthalate-----	143,129	108,755	30,071	.28
Dimerhyl phthalate-----	8,836	8,295	3,053	.37
Diocetyl phthalates, total-----	313,952	393,454	102,989	.26
Di(2-ethylhexyl) phthalate-----	296,739	380,293	99,266	.26
Other diocetyl phthalates-----	17,213	13,161	3,723	.28
Di-tridecyl phthalate-----	10,472	14,312	5,075	.36
n-Hexyl n-decyl phthalate-----	19,840	8,730	2,412	.28
All other phthalic anhydride esters-----	516,867	426,538	138,999	.33
Trimellitic acid esters, total-----	23,080	17,104	8,293	.48
Briiso-octyl trimellitate-----	2,499	943	463	.49
Tri-n-octyl n-decyl trimellitate-----	...	445	276	.62
Tri-n-octyl trimellitate-----	9,279	7,480	3,558	.48
All other trimellitic acid esters-----	11,302	8,236	3,996	.49
All other cyclic plasticizers ⁵ -----	45,030	45,046	18,640	.41
PLASTICIZERS, ACYCLIC				
Total-----	401,525	354,842	205,812	.58
Adipic acid esters, total-----	59,585	57,436	27,016	.47
Di(2-ethylhexyl) adipate-----	39,292	37,698	16,373	.43
Diisodecyl adipate-----	2,045	1,387	904	.48
n-Octyl n-decyl adipate-----	8,366	...	...	...
All other adipic acid esters-----	9,882	17,351	9,739	.55
Complex linear polyesters and polymeric plas- ticizers, total-----	52,877	41,805	29,473	.71
Adipic acid type-----	33,320	25,009	17,270	.69
All other-----	19,557	16,796	12,203	.73
Epoxidized esters, total-----	117,392	109,077	49,953	.46
Epoxidized linseed oils-----	6,361	5,750	4,117	.72
Epoxidized soya oils-----	91,437	83,857	36,604	.44
All other epoxidized esters-----	19,594	19,470	9,232	.47
Isopropyl myristate-----	3,366	3,065	1,595	.52

See footnotes at end of table.

TABLE 1.--PLASTICIZERS:¹ U.S. PRODUCTION AND SALES, 1976--CONTINUED

PLASTICIZERS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ²
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
PLASTICIZERS, ACYCLIC--Continued				
Oleic acid esters, total-----	9,934	9,459	4,165	\$0.44
Butyl oleate-----	1,772	1,751	805	.46
Methyl oleate-----	3,064	2,889	992	.34
Propyl oleates (including n-propyl oleate and isopropyl oleate)-----	570	449	165	.37
All other oleic acid esters-----	4,528	4,370	2,203	.50
Phosphoric acid esters-----	25,708	20,740	14,650	.71
Sebacic acid esters-----	1,705	745	878	1.18
Stearic acid esters, total-----	12,108	11,715	4,632	.40
n-Butyl stearate-----	6,703	6,700	2,278	.34
Isobutyl stearate-----	1,530	...	...	...
All other stearic acid esters-----	3,370	5,015	2,354	.47
All other acyclic plasticizers ⁶ -----	118,850	100,800	73,450	.73

¹ Includes data for compounds used principally (but not exclusively) as primary plasticizers. Does not include clearly defined extenders of secondary plasticizers.

² Calculated from rounded figures.

³ Includes benzenoid products as defined in part 1 of schedule 4 of the Tariff Schedules of the United States Annotated.

⁴ Includes data for dibutyl phenyl phosphate, diphenyl octyl phosphate, tricresyl phosphate and other phosphate esters.

⁵ Includes data for alkylated naphthalene, glycol dibenzoates, isopropylidenediphenoxypropanol, toluenesulfonamides, tetrahydrofurfuryl oleate, and other cyclic plasticizers.

⁶ Includes data for azelaic, citric and acetylcitric, myristic, palmitic, pelargonic, ricinoleic, acetylricinoleic, glyceryl, and glycol esters, and other acyclic plasticizers.

TABLE 2.--PLASTICIZERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "a"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AND "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

PLASTICIZERS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C	
DIETHYLENE GLYCOL DIBENZOATE - - - - -	VEL.
DIPROPANEDIOL DIBENZOATE (DIPROPYLENE GLYCOL DIBENZOATE) E)- - - - -	VEL.
N-ETHYL-PARA-TOLUENESULFONAMIDE- - - - -	MON.
ISOPROPYLDENEDIPHENOXYPROPANOL- - - - -	DOW.
@PHOSPHORIC ACID ESTERS:	
@CRESYL DIPHENYL PHOSPHATE- - - - -	FMP, IMC, MON, SFS.
DIBUTYL PHENYL PHOSPHATE - - - - -	FMP, MON.
DIPHENYL OCTYL PHOSPHATE - - - - -	MON.
TRICRESYL PHOSPHATE- - - - -	FMP, IMC, MON, SFS.
TRIPHENYL PHOSPHATE- - - - -	EK, MON.
@PHTHALIC ANHYDRIDE ESTERS:	
BIS(2-ETHYLHEXYL)TEREPHTHALATE- - - - -	EKT.
BUTYL BENZYL PHTHALATE - - - - -	MON.
BUTYL CYCLOHEXYL PHTHALATE - - - - -	CPS.
BUTYL OCTYL PHTHALATES - - - - -	RCI, USS.
DI(2-BUTOXYETHYL) PHTHALATE- - - - -	HAL.
@DIBUTYL PHTHALATE- - - - -	BAS, EKT, GRH, MON, RCI, SW(E), UCC, USS, WTH.
DICYCLOHEXYL 2-ETHYLHEXYL PHTHALATE- - - - -	GRH.
DICYCLOHEXYL PHTHALATE - - - - -	MON, PFZ.
@DIETHYL PHTHALATE- - - - -	EKT, KP, MON, PFZ.
DI-NORMAL-HEXYL PHTHALATE- - - - -	PFZ, USS.
@DIISODECYL PHTHALATE - - - - -	BAS, CO, ENJ(E), GBH, HN, MON, RCI, RUB, TEK, USS.
DIISONONYL PHTHALATE - - - - -	ENJ(E).
DI(2-METHOXYETHYL) PHTHALATE - - - - -	EKT.
@DIMETHYL PHTHALATE - - - - -	EKT, KP, MON, PFZ, RCI, TCC.

ELASTOMERS

TABLE 2.--PLASTICIZERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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PLASTICIZERS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
@PHTHALIC ANHYDRIDE ESTERS--CONTINUED	
@DIOCTYL PHTHALATES:	
@DI(2-ETHYLHEXYL) PHTHALATE - - - - -	: BAS, BFG, CO, EKT, ENJ(E), GRH, HN, MON, RCI, TEK, : USS.
DIISO-OCTYL PHTHALATE- - - - -	: RCI, USS.
ALL OTHER DIOCTYL PHTHALATES - - - - -	: PFZ, USS, WTH.
DIPHENYL PHTHALATE - - - - -	: MON.
@DI-TRIDECYL PHTHALATE- - - - -	: ENJ(E), GRH, HN, RCI, RUB, TEK, USS.
GLYCOL PHTHALATE ESTERS:	
BUTYL PHTHALYL BUTYL GLYCOLATE - - - - -	: MON.
ALL OTHER GLYCOL PHTHALATE ESTERS- - - - -	: HPC.
@HEXYL NORMAL-DECYL PHTHALATE - - - - -	: BAS, CO, GRH, HN, TEK.
HEXYL ISO-OCTYL PHTHALATE- - - - -	: PFZ.
NORMAL-OCTYL NORMAL-DECYL PHTHALATE- - - - -	: RCI, TEK, USS.
ALL OTHER PHTHALIC ANHYDRIDE ESTERS- - - - -	: ENJ(E), HN, MON.
TETRAHYDROFURFURYL OLEATE- - - - -	: EMR.
TOLUENESULFONAMIDE ORTHO-, PARA-MIXTURES - - - - -	: MON.
@TRIMELLITIC ACID ESTERS:	
TRI(2-ETHYLHEXYL) TRIMELLITATE - - - - -	: GRH, PPL.
TRI-NORMAL-HEXYL NORMAL-DECYL TRIMELLITATE - - - - -	: GRH, MON.
@TRIISO-OCTYL TRIMELLITATE- - - - -	: PFZ, RCI, RUB, USS.
@TRI-NORMAL-OCTYL NORMAL-DECYL TRIMELLITATE - - - - -	: PFZ, RCI, RUB.
@TRIOCTYL TRIMELLITATE- - - - -	: EKT, HN, RUB, USS, WTH.
ALL OTHER TRIMELLITIC ACID ESTERS- - - - -	: ENJ(E), PFZ, TEK, WTH, X.
ALL OTHER CYCLIC PLASTICIZERS- - - - -	: HN, MON, NEV.
A C Y C L I C	
@ADIPIC ACID ESTERS:	
DI(2-(2-BUTOXYETHOXY)ETHYL) ADIPATE- - - - -	: RCI, TKL.
@DI(2-ETHYLHEXYL) ADIPATE - - - - -	: BAS, DA, GRH, HAL, HN, MON, PFZ, PPL, RCI, RH, RUB, : USS, WTH.
DIISOBUTYL ADIPATE - - - - -	: GRH, HAL.
@DIISODECYL ADIPATE - - - - -	: GRH, HN, PFZ, RCI, RH, RUB, USS.
DIISO-OCTYL ADIPATE- - - - -	: HAL, HN, RH.
DIISOPROPYL ADIPATE- - - - -	: SBC, VND.
DI(TRIDECYL) ADIPATE - - - - -	: GRH.
NORMAL-HEXYL NORMAL-DECYL ADIPATE- - - - -	: TEK, USS.
ISO-OCTYL ISODECYL ADIPATE - - - - -	: GRH.

TABLE 2.--PLASTICIZERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PLASTICIZERS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C Y C L I C--CONTINUED	
@ADIPIC ACID ESTERS--CONTINUED	
@NORMAL-OCTYL NORMAL-DECYL ADIPATE-	MON, RCI, RH, USS.
ALL OTHER ADIPIC ACID ESTERS -	RUB, SM, TEK, WTH.
AZELAIC ACID ESTERS:	
DI (2-ETHYLHEXYL) AZELATE -	EKT, EMR, HAL, PFZ, RCI.
DIISO-OCTYL AZELATE- -	EMR.
ALL OTHER AZELAIC ACID ESTERS- -	EMR, HAL, PFZ.
CITRIC AND ACETYLCITRIC ACID ESTERS:	
TRIBUTYL ACETYLCITRATE -	PFZ.
TRIBUTYL CITRATE -	PFZ.
TRIETHYL CITRATE -	PFZ.
ALL OTHER CITRIC AND ACETYLCITRIC ACID ESTERS- -	ICI, PFZ.
@COMPLEX LINEAR POLYESTERS AND POLYMERIC PLASTICIZERS:	
@ADIPIC ACID TYPE COMPLEX LINEAR POLYESTERS AND POLYM	
ERIC PLASTICIZERS -	ASH, GRH, HAL, PFZ, RH, TEK, WTH.
ALL OTHER COMPLEX LINEAR POLYESTERS AND POLYMERIC PL	
ASTICIZERS- -	EKY, EMR, HAL, HN, MON, RCI, RH.
DI (2- (2-BUTOXYETHOXY) ETHYL) METHANE- -	TKL.
@EPOXIDIZED ESTERS:	
BUTYL EPOXYSTEARATES -	UCC, WTC.
@EPOXIDIZED LINSEED OILS- -	ASH, SWT, VIK, WTC.
@EPOXIDIZED SOYA OILS -	ASH, FMP, RH, UCC, VIK, WTC.
2-ETHYLHEXYL EPOXYTALLATES -	UCC.
METHYL EPOXYSTEARATE -	VIK.
OCTYL EPOXYSTEARATES -	WTC.
OCTYL EPOXYTALLATES- -	RH, WTC.
ALL OTHER EPOXIDIZED ESTERS- -	RH, UCC.
GLYCERYL TRIPROPIONATE -	EKT.
LAURIC ACID ESTERS:	
ALL OTHER LAURIC ACID ESTERS -	HAL.
MYRISTIC ACID ESTERS:	
@ISOPROPYL MYRISTATE- -	ARC, TCH, WM, WTH.
ALL OTHER MYRISTIC ACID ESTERS -	SCP, WTH.
@OLEIC ACID ESTERS:	
@BUTYL OLEATE -	ARC, EMR, GRO, HAL, WM, WTH.
DECYL OLEATE -	SCP, VND.
GLYCERYL TRIOLEATE (TRIOLEIN)- -	EMR, GLY, GRO, TCH.

TABLE 2.--PLASTICIZERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PLASTICIZERS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C Y C L I C--CONTINUED	
@OLEIC ACID ESTERS--CONTINUED	
ISOBUTYL OLEATE-	DA.
@METHYL OLEATE-	EFH, EMR, GRO, HUM, TCH.
@PROPYL OLEATES:	
ISOPROPYL OLEATE	EMR, SCP, WM.
NORMAL-PROPYL OLEATE	CHL, EMR, GRO, TCH, WM.
ALL OTHER OLEIC ACID ESTERS-	EMR, HAL, RH, SBC.
PALMITIC ACID ESTERS:	
2-ETHYLHEXYL PALMITATE	VND, WTH.
ISOPROPYL PALMITATE-	ARC, TCH, WM, WTH.
ALL OTHER PALMITIC ACID ESTERS	SCP.
PELARGONIC ACID ESTERS:	
DIETHYLENE GLYCOL DIPELARGONATE (DIETHYLENE GLYCOL D	
INONANOATE)	EMR.
GLYCOL PELARGONATE	EMR.
ISODECYL PELARGONATE	EMR.
NEOPENTYL GLYCOL 2-ETHYL HEXANOL POLYESTER	EKT.
@PHOSPHORIC ACID ESTERS:	
TRI(2-BUTOXYETHYL) PHOSPHATE	FMP.
TRIBUTYL PHOSPHATE	MON.
TRIETHYL PHOSPHATE	EKT.
TRIOCTYL PHOSPHATE	HN, UCC.
ALL OTHER PHOSPHORIC ACID ESTERS	SFS.
RICINOLEIC AND ACETYLRICINOLEIC ACID ESTERS:	
NORMAL-BUTYL ACETYLRICINOLEATE	NTL.
BUTYL RICINOLEATE-	NTL.
GLYCERYL MONORICINOLEATE	NTL.
GLYCERYL TRI (ACETYLRICINOLEATE)-	NTL.
METHYL ACETYLRICINOLEATE	NTL.
METHYL RICINOLEATE	NTL, TCH.
ALL OTHER RICINOLEIC AND ACETYLRICINOLEIC ACID ESTER	
S	RH, TKL.
@SEBACIC ACID ESTERS:	
DIBUTOXYETHYL SEBACATE	HAL.
DIBUTYL SEBACATE	EKT, RH.
DI(2-ETHYLHEXYL) SEBACATE-	GRH, RH.
DIISO-OCTYL SEBACATE	DA.

TABLE 2.--PLASTICIZERS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PLASTICIZERS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C Y C L I C--CONTINUED	
@STEARIC ACID ESTERS:	
@NORMAL-BUTYL STEARATE-	ARC, ASH, CHL, EMR, GRO, TCH, WM, WTH.
DIMETHYLAMMONIUM STEARATE-	RH.
2-ETHYLHEXYL STEARATE-	SCP.
GLYCERYL TRIACETYL STEARATE-	NTL.
HEXADECYL STEARATE -	DA, WM.
@ISOBUTYL STEARATE-	DA, EMR, WM, WTH.
ISOPROPYL STEARATE -	WTH.
ALL OTHER STEARIC ACID ESTERS-	ARC, SBC, SCP, TCH, WM, WTH.
SUCROSE ACETATE ISOBUTYRATE-	ARC, EKT.
TRIETHYLENE GLYCOL DI(CAPRYLATE-CAPRATE) -	HAL, PVO, RUB, WM.
TRIETHYLENE GLYCOL DI(2-ETHYLBUTYRATE) -	UCC.
2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE-	EKX.
ALL OTHER ACYCLIC PLASTICIZERS -	ARC, EMR, PVO, SM, TCH, UCC, WM, WTH, X.

PLASTICIZERS

TABLE 3.--PLASTICIZERS: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production or sales of plasticizers to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of Company
ACC	Amoco Chemicals Corp.	NEV	Neville Chemical Co.
ARC	Armak Co.	NTL	NL Industries, Inc.
ASH	Ashland Oil, Inc., Ashland Chemical Co.	ORO	Chevron Chemical Co.
BAS	BASF Wyandotte Corp.	PFZ	Pfizer, Inc.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Co. Div.	PPL	Pioneer Plastics Div. of LOF Plastics, Inc.
CCA	Interstab Chemical, Inc.	PVO	PVO International, Inc.
CHL	Chemol, Inc.	RCI	Reichhold Chemicals, Inc.
CO	Continental Oil Co.	RH	Rohm & Haas Co.
CPS	CPS Chemical Co.	RUB	Hooker Chemical Corp., Ruco Div.
DA	Diamond Shamrock Corp.	SBC	Scher Brothers, Inc.
DOW	Dow Chemical Co.	SCP	Henkel, Inc.
EFH	E. F. Houghton & Co.	SFS	Stauffer Chemical Co., Specialty Chemical Div.
EK	Eastman Kodak Co.:	SM	Mobil Oil Corp., Mobil Chemical Co. Div., Chemical Coatings Div.
EKT	Tennessee Eastman Co. Div.	SW	Sherwin-Williams Co.
EKX	Texas Eastman Co. Div.	SWT	Unitech Chemical, Inc.
EMR	Emery Industries, Inc.	TCC	Tanatex Chemical Corp.
ENJ	Exxon Chemical Co. U.S.A.	TCH	Emory Industries, Inc., Trylon Div.
FMP	FMC Corp., Industrial Chemical Div.	TEK	Teknor Apex Co.
GLY	Glyco Chemicals, Inc.	TKL	Thiokol Chemical Corp.
GRH	W. R. Grace & Co., Hatco Chemical Div.	UCC	Union Carbide Corp.
GRO	A. Gross & Co., Millmaster Onyx Group, a Kewanee Industry	USS	USS Chemicals Div. of U.S. Steel Corp.
HAL	C. P. Hall Co.	VEL	Velsicol Chemical Corp.
HN	Tenneco Chemicals, Inc.	VIK	Viking Chemical Co.
HPC	Hercules, Inc.	VND	Van Dyk & Co., Inc.
HUM	Kraftco Corp., Humko Plastics Div.	WM	Inolex Corp.
ICI	ICI United States, Inc., Specialty Chemicals Group	WTC	Witco Chemical Co., Inc.
IMC	IMC Chemical Group, Inc.	WTH	Union Carbide Corp., Chemical Div., Dover Plant
KF	Kay-Fries Chemicals, Inc.		
MON	Monsanto Co.		

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

SURFACE-ACTIVE AGENTS

SURFACE-ACTIVE AGENTS

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Edmund Cappuccilli

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 are grouped by ionic class and by chemical class and subclass. All quantities are reported in terms of 100-percent organic surface-active ingredient 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.

Total U.S. production of surface-active agents in 1976 amounted to 4,582 million pounds, or 5.4 percent greater than the 4,349 million pounds reported for 1975. Sales of bulk surface-active agents in 1976 amounted to 2,512 million pounds, valued at \$821 million, compared with sales in 1975 of 2,182 million pounds, valued at \$717 million. In terms of quantity, sales in 1976 were 15.2 percent greater than in 1975; in terms of value, sales in 1976 were 14.5 percent greater than in 1975.

Production of anionic surface-active agents in 1976 amounted to 3,356 million pounds, or 73.2 percent of the total output reported for 1976. Sales of anionics in 1976 amounted to 1,440 million pounds valued at \$317 million.

Production of cationic surface-active agents in 1976 amounted to 252 million pounds, 11.9 percent greater than the 226 million pounds reported in 1975. Nonionic surface-active agents, however, continued to decline in production as only 957 million pounds were reported in 1976; 8.6 percent less than the 1,047 million pounds reported in 1975. Sales in both classes, however, showed increases over 1975. In terms of value, sales increased 12.0 percent for cationic surface-active agents and 17.2 percent for nonionic surface-active agents.

The difference between production and sales reflects inventory changes and captive consumption of soaps and 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., non-ionic alcohol and alkylphenol ethoxylates which may be converted to anionic surface-active agents by phosphation or sulfation.

Surfactants

Although many analysts expected the surfactant industry to improve significantly in 1976, production increased by only 5 percent to 4.6 billion pounds. Sales of surface-active agents, however, increased by 15 percent over the 1975 figures to 2.5 billion pounds. The value of sales for 1976 also increased by 15 percent while, the average unit value remained at \$0.33.

The somewhat disappointing production figures are probably the result of a decrease in consumer demand in 1975 and the buildup of excess inventories which were liquidated in 1976. Some companies also reported a decrease in production in the fourth quarter of 1976 due to severe weather which curtailed production at some plants. This combination of factors, which made 1976 unique in the surfactant industry, are not expected to recur.

Several factors will affect the surfactant industry, and in particular the synthetic detergent industry, for the next several years. Some of the more important ones are the establishment of new markets, environmental or governmental controls, and the introduction of new surfactants into the market.

New markets may occur in the petroleum industry where the high price of crude oil justifies employment of new methods to increase production from old oil fields. Large amounts of sulfonated surfactants and cosurfactants such as ethoxylated alcohols will be employed for a promising process known as micellar flooding of old wells. Approximately 5 to 8 pounds of sulfonates and 1 pound of cosurfactant will be needed to recover one barrel of oil using this method. It has been estimated that between 30 and 40 billion barrels of oil can be recovered by micellar flooding.

Governmental controls on surfactant-containing products will probably increase over the next few years as consumers and Government officials become more aware of the potential hazard of certain products either to the consumer or the environment. The surfactant industry will thus be required to spend more time and research on the potential hazards of new products long before they reach the consumer market. The increased amount of time and research required for new products may cause some existing formulations, which have yet to be marketed, to be modified or terminated because of the increased cost. As a result, the surfactant producers will probably emphasize more research on the development of cheaper processes for existing major surfactants which have been proven to be consumer and environmentally safe. This decrease in basic research on surfactants should lead to fewer new products being introduced in the next several years.

Synthetic detergents

One of the main factors affecting the future of synthetic detergent formulations is the degree of restrictions placed by the U.S. Government

on phosphate content. Recent pressure by environmentalists and consumer groups has resulted in legislation being drafted to effectively ban phosphate-containing detergents in eight States bordering the Great Lakes. If this legislation becomes law, the detergent producers must either reformulate their products to conform with the new restrictions or introduce entirely new products for these States.

Because of the trend away from phosphates in detergents, the heavy-duty liquid detergents, which contain no phosphates, have come into prominence in the past few years. The following is a typical heavy-duty nonphosphate liquid detergent formulation (in percent):

Anionic surfactant (linear alkylbenzenesulfonate-----	10
Nonionic surfactant (alcohol ethoxylate)-----	35
Ethanol-----	10
Triethanolamine-----	5
Water-----	35
Miscellaneous-----	5

As can be seen by this information, approximately 45 percent of the detergent is composed of surface-active agents, chiefly alcohol ethoxylates. This development began about 1965 and has been responsible for the fast growth in the production of alcohol ethoxylates, as follows (in millions of pounds): 1/

	<u>Linear alcohol</u> <u>ethoxylates</u>	<u>Dodecylbenzene</u> <u>sulfonates</u>
1965-----	190	565
1970-----	328	561
1975-----	506	520
1976-----	540	538

The growth in the use of the alcohol ethoxylates should continue as phosphates are phased out of heavy-duty powder detergents.

Another boost for the (higher-priced) alcohol ethoxylates came after the Arab oil embargo when the prices of raw materials for the benzene sulfonates increased at a faster rate than those for the alcohol ethoxylates. This advantage has now run its course; future price increases may actually favor the benzene sulfonates.

Foreign trade and industry

Imports of surfactants and, in particular, synthetic detergent formulations have generally not been increasing substantially during the past few years.

1/ From U.S. International Trade Commission publications.

In 1975, imports of synthetic detergents (TSUS items 405.35 and 466.30) reached their highest level with 5.7 million pounds. However, in the following year, 1976, imports dropped to 5.0 million pounds. This trend seems likely to continue well into 1977.

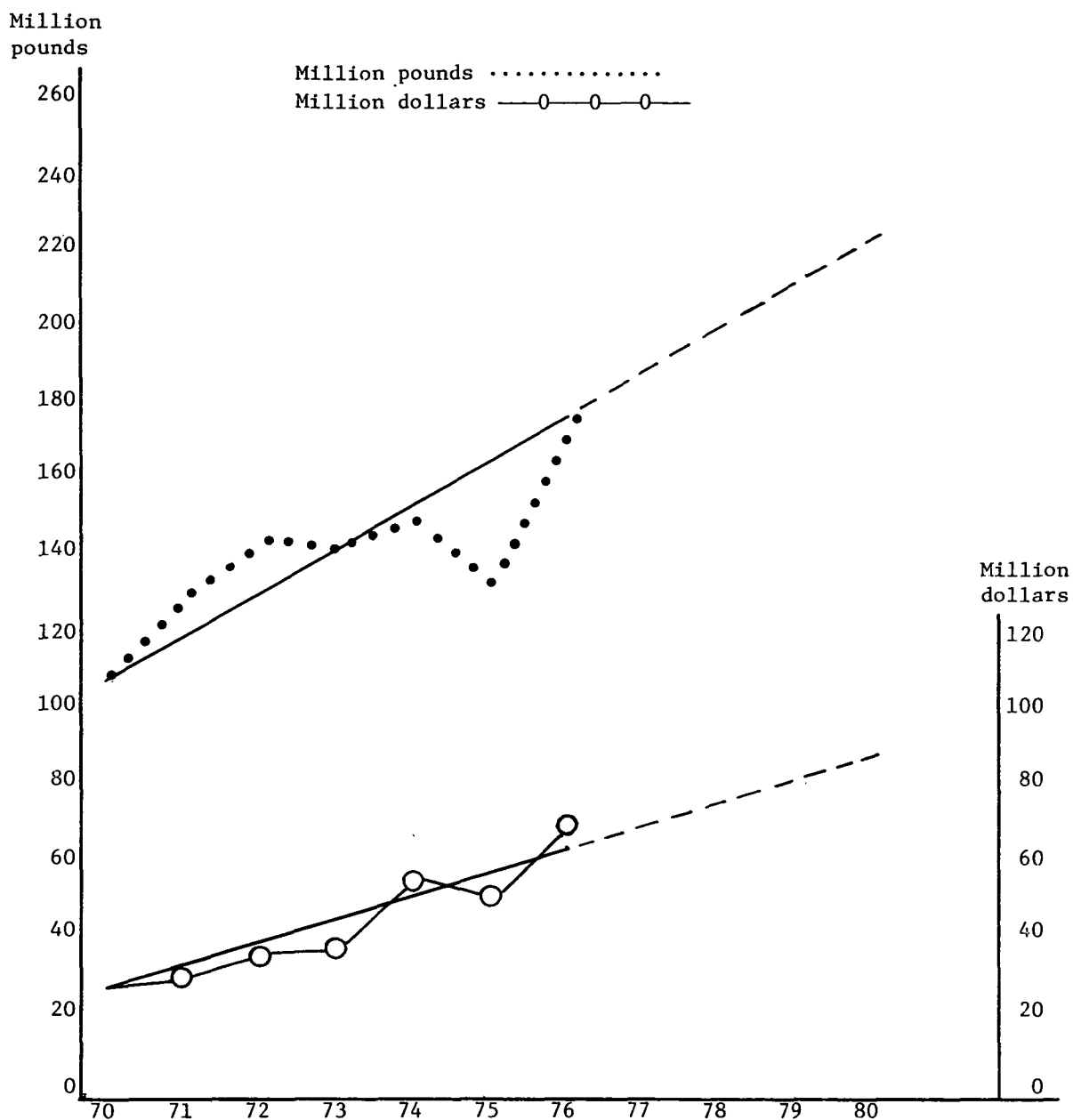
One of the main reasons for this decline is that the U.S. industry supplies virtually all the U.S. market demand at strongly competitive prices. Even in the peak import year, 1975, the import-to-consumption ratio was only 1 percent.

The level of imports is expected to remain in the range of 4 to 7 million pounds for the next several years. Any increase in imports would probably be due to an increased demand for specialty products and not to an increase in overall domestic demand.

Exports, on the other hand, have been increasing over the past few years at approximately 25 percent per year. The following chart projects exports to 1980. The projection is based on the expected increased costs of raw materials, fuel, transportation, wages, and the increasing production of detergents by foreign industries.

Japan is one country that has recovered quite rapidly from the recent economic recession. Their total production and exports of synthetic detergents for 1977 are expected to exceed their previous alltime high production level. Similar situations exist in other major exporting countries, possibly causing increasing competition for the world markets in synthetic detergents in the coming years. These factors are responsible for the expectation that export growth through 1980 will be in the range of 7 to 10 percent per year rather than the 25 percent-per-year level of the recent past.

SYNTHETIC ORGANIC CHEMICALS, 1976
SYNTHETIC DETERGENTS: 1/ U.S. EXPORTS, 1970-80



1/ Schedule B numbers 555.2020, 554.2022, 554.2024, and 554.2026 (data are partially estimated).

Source: Official statistics of the U.S. Department of Commerce.

SURFACE-ACTIVE AGENTS

TABLE 1.--SURFACE-ACTIVE AGENTS: U.S. PRODUCTION AND SALES, 1976

[Listed below are all surface-active agents for which reported data on production or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all surface-active agents for which data on production and/or sales were reported and identifies the manufacturers of each]

SURFACE-ACTIVE AGENTS	PRODUCTION ¹	SALES ²		
		QUANTITY ¹	VALUE	UNIT VALUE ³
	1,000 pounds	1,000 pounds	1,000 dollars	per pound
Grand total-----	4,582,398	2,512,085	821,240	\$0.33
Benzenoid ⁴ -----	1,018,889	475,386	201,571	.42
Nonbenzenoid ⁵ -----	3,563,509	2,036,699	619,669	.30
AMPHOTERIC SURFACE-ACTIVE AGENTS				
Total-----	17,506	17,369	19,641	1.13
Anionic Surface-Active Agents				
Total-----	3,355,799	1,440,067	316,555	.22
Carboxylic acids (and salts thereof), total-----	820,941	146,108	53,789	.37
Amine salts of fatty, rosin, and tall acids-----	1,035	439	404	.92
Carboxylic acids having amide, ester, or ether linkages-----	5,429	4,579	4,270	.93
Potassium and sodium salts of fatty, rosin, and tall acids, total-----	814,477	141,090	49,115	.35
Coconut oil acids, potassium salt-----	8,861	1,272	722	.85
Coconut oil acids, sodium salt-----	151,853	1,619	646	.40
Corn oil acids, potassium salt-----	186	203	132	.65
Mixed vegetable oil acids, potassium salt-----	3,999	3,704	4,364	1.18
Oleic acid, potassium salt-----	2,140	187	80	.43
Oleic acid, sodium salt-----	675	275	152	.55
Tall oil acids, potassium and sodium salts-----	8,838	5,323	2,605	.49
Tallow acids, sodium salt-----	353,397	20,296	5,392	.27
All other-----	284,528	108,211	35,022	.32
Phosphoric and polyphosphoric acid esters (and salts thereof), total-----	31,975	19,124	13,974	.73
Alcohols and phenols, ethoxylated and phosphated, total-----	24,309	13,128	9,345	.71
Mixed linear alcohols, ethoxylated and phosphated-----	3,597	3,149	2,408	.76
Nonylphenol, ethoxylated and phosphated-----	10,660	4,451	2,922	.66
Tridecyl alcohol, ethoxylated and phosphated-----	516	365	284	.78
All other-----	9,536	5,163	3,731	.72
Alcohols, phosphated or polyphosphated-----	7,666	5,996	4,629	.77
Sulfonic acids (and salts thereof), total-----	1,942,049	1,028,352	153,485	.15
Alkylbenzenesulfonates, total-----	647,951	173,854	63,079	.36
Dodecylbenzenesulfonic acid-----	147,789	75,765	22,069	.29
Dodecylbenzenesulfonic acid, calcium salt-----	7,490	10,229	7,477	.73
Dodecylbenzenesulfonic acid, isopropylamine salt-----	3,676	3,851	2,217	.58
Dodecylbenzenesulfonic acid, sodium salt-----	327,451	46,288	15,363	.33
Dodecylbenzenesulfonic acid, triethanolamine salt-----	3,358	3,666	1,505	.41
All other-----	158,187	34,055	14,448	.42
Benzene-, cumene-, toluene-, and xylenesulfonates, total-----	65,822	50,038	12,527	.25
Toluenesulfonic acid, potassium and sodium salts-----	20,473	...	...	...
Xylenesulfonic acid, ammonium salt-----	5,347	5,130	1,404	.27
Xylenesulfonic acid, sodium salt-----	34,602	23,725	6,055	.26
All other-----	5,400	21,183	5,068	.24
Ligninsulfonates, total-----	1,109,760	754,807	36,965	.05
Ligninsulfonic acid, calcium salt-----	532,299	515,319	15,757	.03

See footnotes at end of table.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--SURFACE-ACTIVE AGENTS: U.S. PRODUCTION AND SALES, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	PRODUCTION ¹	SALES ²		
		QUANTITY ¹	VALUE	UNIT VALUE ³
<i>Anionic Surface-Active Agents--Continued</i>				
Sulfonic acids (and salts thereof)--Continued	1,000 pounds	1,000 pounds	1,000 dollars	per pound
Ligninsulfonates--Continued				
Ligninsulfonic acid, sodium salt-----	88,494	89,285	11,477	\$0.13
All other-----	488,967	150,203	9,731	.06
Naphthalenesulfonates-----	8,051	6,782	3,972	.59
Sulfonic acids having amide linkages, total-----	4,607	2,241	2,855	1.27
Sulfosuccinic acid derivatives-----	1,697	1,339	1,434	1.07
Taurine derivatives-----	2,910	902	1,421	1.58
Sulfonic acids having ester or ether linkages, total-----	77,163	26,292	28,919	1.10
Sulfosuccinic acid esters, total-----	14,394	12,180	12,167	1.00
Sulfosuccinic acid, bis(2-ethylhexyl)ester, sodium salt-----	11,855	10,269	10,491	1.02
All other-----	2,539	1,911	1,676	.88
Other sulfonic acids having ester or ether linkages-----	62,769	14,112	16,752	1.19
All other sulfonic acids-----	28,695	14,338	5,168	.36
Sulfuric acid esters (and salts thereof), total-----	...	234,938	90,962	.39
Acids, amides, and esters, sulfated, total-----	17,352	13,269	5,889	.44
Esters of sulfated oleic acid, total-----	4,970	5,013	3,035	.61
Butyl oleate, sulfated, sodium salt-----	1,713	1,706	701	.41
Propyl oleate, sulfated, sodium salt-----	515	510	289	.57
All other-----	2,742	2,797	2,045	.73
Oleic acid, sulfated, disodium salt-----	5,548	5,405	1,838	.34
Other acids, amides, and esters, sulfated-----	6,834	2,851	1,016	.36
Alcohols, sulfated, total-----	...	38,504	29,939	.78
Dodecyl sulfate salts, total-----	55,948	29,803	23,574	.79
Dodecyl sulfate, ammonium salt-----	14,234	6,032	4,190	.69
Dodecyl sulfate, magnesium salt-----	322	310	339	1.10
Dodecyl sulfate, sodium salt-----	17,593	16,471	12,444	.76
Dodecyl sulfate, triethanolamine salt-----	5,555	4,862	3,638	.75
All other-----	18,244	2,128	2,963	1.39
Mixed linear alcohols, sulfated, ammonium salt-----	...	1,163	746	.64
Other alcohols, sulfated-----	...	7,538	5,619	.75
Ethers, sulfated, total-----	294,307	161,646	48,486	.30
Dodecyl alcohol, ethoxylated and sulfated, sodium salt-----	11,962	11,657	8,404	.72
Mixed linear alcohols, ethoxylated and sulfated, ammonium salt-----	144,167	...	...	...
Mixed linear alcohols, ethoxylated and sulfated, sodium salt-----	120,371	24,312	7,504	.31
All other-----	17,807	125,677	32,578	.26
Natural fats and oils, sulfated, total-----	23,595	21,519	6,648	.31
Castor oil, sulfated, sodium salt-----	4,986	4,255	2,008	.47
Cod oil, sulfated, sodium salt-----	1,910	1,849	402	.22
Neat's-foot oil, sulfated, sodium salt-----	2,120	1,581	535	.34
Soybean oil, sulfated, sodium salt-----	656	638	207	.32
Sperm oil, sulfated, sodium salt-----	187	188	75	.40
Tallow, sulfated, sodium salt-----	5,641	5,430	1,162	.21
All other-----	8,095	7,578	2,259	.30
Other anionic surface-active agents ⁶ -----	169,632	11,545	4,345	.38
<i>Cationic surface-Active Agents</i>				
Total-----	252,326	177,928	122,952	.69
Amine Oxides and oxygen-containing amines (except those having amide linkages), total-----	68,752	16,123	12,590	.78
Acyclic, total-----	63,989	13,111	10,019	.76
(Tallow alkyl)amine, ethoxylated-----	2,410	2,490	1,661	.67
All other-----	61,579	10,621	8,358	.79
Cyclic (including imidazoline and oxazoline derivatives), total-----	4,763	3,012	2,571	.85

See footnotes at end of table.

SURFACE-ACTIVE AGENTS

TABLE 1.--SURFACE-ACTIVE AGENTS: U.S. PRODUCTION AND SALES, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	PRODUCTION ¹	SALES ²		
		QUANTITY ¹	VALUE	UNIT VALUE ³
<i>Cationic surface-Active Agents--Continued</i>				
Amine oxides and oxygen-containing amines (except those having amide linkages)--Continued				
Cyclic (including imidazoline and oxazoline derivatives)--Continued	1,000	1,000	1,000	Per
1-(2-Hydroxyethyl)-2-nor(tall oil alkyl)-2-imidazoline-----	844	420	312	\$0.74
All other-----	3,919	2,592	2,259	.87
Amines and amine oxides having amide linkages, total-----	21,353	20,643	16,136	.78
Carboxylic acid - diamine and polyamine condensates, total-----	19,167	18,865	14,116	.75
Tall oil acids - diethylenetriamine and polyalkylenepolyamine condensates-----	11,273	11,276	6,618	.59
All other-----	7,894	7,589	7,498	.99
Other amines and amine oxides having amide linkages-----	2,186	1,778	2,020	1.14
Amines, not containing oxygen (and salts thereof), total-----	65,189	51,809	32,473	.63
Diamines and polyamines, total-----	20,079	16,961	9,706	.57
Imidazoline derivatives-----	1,927	351	430	1.23
N-(9-Octadecenyl)trimethylenediamine-----	2,787	2,630	1,587	.60
All other-----	15,365	13,980	7,689	.55
Primary monoamines, total-----	19,230	19,172	11,945	.62
(Hydrogenated tallow alkyl)amine-----	2,177	2,366	1,303	.55
(Tallow alkyl)amine-----	3,616	...	...	...
All other-----	13,437	16,806	10,642	.63
Secondary and tertiary monoamines, total-----	25,880	15,676	10,822	.69
N,N-Dimethyl(mixed alkyl)amine-----	3,939	4,120	2,873	.70
All other-----	21,941	11,556	7,949	.69
Oxygen-containing quaternary ammonium salts-----	15,088	12,156	8,918	.73
Quaternary ammonium salts, not containing oxygen, total-----	81,944	77,197	52,835	.69
Acyclic, total-----	64,466	62,041	30,213	.49
Bis(hydrogenated tallow alkyl)dimethyl ammonium chloride-----	43,087	41,805	16,996	.41
Trimethyl(tallow alkyl)ammonium chloride-----	1,467	...	...	...
All other-----	19,912	20,236	13,217	.65
Benzenoid, total-----	17,478	15,156	22,622	1.49
Benzyl (coconut oil alkyl)dimethylammonium chloride-----	272	184	191	1.04
Benzyl dimethyl(mixed alkyl)ammonium chloride-----	8,438	7,909	11,023	1.39
Benzyl dimethyloctadecylammonium chloride-----	1,940	...	...	...
All other-----	6,828	7,063	11,408	1.62
<i>Nonionic Surface-Active Agents</i>				
Total-----	956,767	876,721	362,092	.41
Carboxylic acid amides, total-----	78,168	51,953	27,074	.52
Diethanolamine condensates (amine/acid ratio=2/1), total-----	21,259	16,197	8,478	.52
Coconut oil acids-----	11,133	9,305	4,814	.52
Coconut oil and tallow acids-----	2,432	2,027	899	.44
Linoleic acid-----	190	188	192	1.02
Lauric acid-----	335	206	140	.68
Oleic acid-----	1,114	934	468	.50
Stearic acid-----	266	227	161	.71
Tall oil acids-----	243	...	...	...
All other-----	5,546	3,310	1,804	.55
Diethanolamine condensates (other amine/acid ratios), total-----	33,434	28,569	14,872	.52
Coconut oil acids (amine/acid ratio=1/1)-----	19,163	18,443	9,294	.50

See footnotes at end of table.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--SURFACE-ACTIVE AGENTS: U.S. PRODUCTION AND SALES, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	PRODUCTION ¹	SALES ²		
		QUANTITY ¹	VALUE	UNIT VALUE ³
<i>Nonionic Surface-Active Agents--Continued</i>				
Carboxylic acid amides--Continued	1,000	1,000	1,000	per
Diethanolamine condensates (other amino/acid ratios)--Continued	pounds	pounds	dollars	pound
Lauric acid (amine/acid ratio=1/1)	8,493	5,467	3,127	\$0.57
Stearic acid (amine/acid ratio=1/1)-----	546	505	344	.68
All other-----	5,232	4,154	2,107	.51
All other carboxylic acid amides-----	23,475	7,187	3,724	.52
Carboxylic acid esters, total-----	222,480	182,136	105,397	.58
Anhydrosorbitol esters-----	26,413	15,559	10,715	.69
Diethylene glycol esters, total-----	1,377	1,298	755	.58
Diethylene glycol distearate-----	474	407	254	.63
Diethylene glycol monostearate-----	258	245	141	.58
All other-----	645	646	360	.56
Ethoxylated anhydrosorbitol esters, total-----	26,917	25,661	15,970	.62
Ethoxylated anhydrosorbitol monostearate-----	8,436	8,265	4,821	.58
Ethoxylated anhydrosorbitol monooleate-----	5,029	4,955	3,365	.68
All other-----	13,452	12,441	7,784	.62
Ethylene glycol esters-----	3,064	2,961	1,409	.48
Glycerol esters, total-----	85,583	74,939	38,783	.52
Complex glycerol esters-----	2,362	2,578	1,824	.71
Glycerol esters of chemically defined acids, total-----	26,000	25,562	12,011	.47
Glycerol monolaurate-----	60	61	53	.87
Glycerol mono-oleate-----	3,767	3,822	2,489	.65
Glycerol monostearate-----	21,427	20,903	8,662	.41
All other-----	746	776	807	1.04
Glycerol esters of mixed acids, total-----	57,221	46,799	24,948	.53
Glycerol monoester of hydrogenated cottonseed oil acids-----	2,842	...	...	...
Glycerol monoester of coconut oil acids-----	195	195	146	.74
Glycerol monoester of hydrogenated soybean oil acids-----	8,470	6,712	3,956	.59
Glycerol monoester of lard acids-----	3,016	2,010	1,037	.52
All other-----	42,698	37,882	19,809	.52
Natural fats and oils, alkoxylated, total-----	13,863	12,011	6,124	.51
Castor oil, ethoxylated-----	8,132	6,710	3,729	.56
Lanolin, ethoxylated-----	1,375	1,105	570	.52
All other-----	4,356	4,196	1,825	.43
Polyethylene glycol esters, total-----	42,421	32,954	16,729	.51
Polyethylene glycol esters of chemically defined acids, total-----	23,478	18,676	12,047	.65
Polyethylene glycol dilaurate-----	994	969	684	.71
Polyethylene glycol dioleate-----	3,216	1,301	811	.62
Polyethylene glycol distearate-----	3,571	3,430	2,117	.62
Polyethylene glycol monolaurate-----	3,579	3,480	2,288	.66
Polyethylene glycol mono-oleate-----	2,525	2,022	1,116	.55
Polyethylene glycol monostearate-----	8,176	6,232	4,212	.68
All other-----	1,417	1,242	819	.66
Polyethylene glycol esters of mixed acids-----	18,943	14,278	4,682	.33
Propanediol esters, total-----	4,053	3,362	2,365	.70
1,2-Propanediol monolaurate-----	24	25	30	1.19
1,2-Propanediol monostearate-----	2,850	3,001	1,940	.65
All other-----	1,179	336	395	1.18
Other carboxylic acid esters ⁷ -----	18,789	13,391	12,547	.94
Ethers, total-----	652,833	639,712	226,083	.35
Benzenoid ethers, total-----	232,796	201,525	80,893	.40
Dodecylphenol, ethoxylated-----	13,072	13,914	4,425	.32
Nonylphenol, ethoxylated-----	134,126	125,356	44,831	.36
Phenol, ethoxylated-----	2,735	1,975	962	.49
All other-----	82,863	60,280	30,675	.51
Nonbenzenoid ethers, total-----	420,037	438,187	145,190	.33
Linear alcohols, alkoxylated, total-----	354,046	386,263	118,127	.31
Decyl Alcohol, ethoxylated-----	1,831	1,047	517	.49
Dodecyl alcohol, ethoxylated-----	3,571	2,957	1,983	.67

See footnotes at end of table.

SURFACE-ACTIVE AGENTS

TABLE 1.--SURFACE-ACTIVE AGENTS: U.S. PRODUCTION AND SALES, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	PRODUCTION ¹	SALES		
		QUANTITY ¹	VALUE	UNIT VALUE ³
<i>Nonionic Surface-Active Agents--Continued</i>				
Ethers--Continued	1,000	1,000	1,000	Per
Nonbenzenoid ethers--Continued	<i>pound</i>	<i>pound</i>	<i>dollars</i>	<i>pound</i>
Linear alcohols, alkoxyated--Continued				
Hexadecyl alcohol, ethoxylated-----	651	761	666	\$0.87
Mixed linear alcohols, ethoxylated-----	228,282	363,235	105,674	.29
Mixed linear alcohols, ethoxylated and pro-				
poxylated-----	17,441	14,281	6,080	.43
9-Octadecenyl alcohol, ethoxylated-----	944	763	607	.79
Octadecyl alcohol, ethoxylated-----	1,759	894	953	1.07
All other-----	99,567	2,325	1,647	.64
Other ethers and thioethers, total-----	65,991	51,924	27,063	.52
Tridecyl alcohol, ethoxylated-----	8,188	7,111	3,871	.54
All other-----	57,803	44,813	23,192	.52
Other nonionic surface-active agents-----	3,286	2,920	3,538	1.21

¹ All quantities are given in terms of 100 percent organic surface-active ingredient.

² Sales include products sold as bulk surface-active agents only.

³ Calculated from rounded figures.

⁴ 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).

⁵ Includes ligninsulfonates.

⁶ Includes production of "all other" sulfated alcohols and other acids, amides, and esters, sulfated.

⁷ Includes ethoxylated sorbitol esters, polyglycerol esters, and miscellaneous esters.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

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(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AND "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A M P H O T E R I C	
1,1-BIS(CARBOXYETHYL)-2-UNDECYL-IMIDAZOLINE, SODIUM SA : LT- - - - - : MOA.	
1,1-BIS(CARBOXYMETHYL)-2-UNDECYL-2-IMIDAZOLIUM CHLOR : IDE, DISODIUM SALT- - - - - : SCP.	
1,1-BIS(CARBOXYMETHYL)-2-UNDECYL-2-IMIDAZOLIUM HYDRO : XIDE, DISODIUM SALT - - - - - : BRD, MIR.	
(1-CARBOXYHEPTADECYL) TRIMETHYLAMMONIUM HYDROXIDE, INNE : R SALT- - - - - : DUP.	
N-*2-(CARBOXYMETHYLAMINO)ETHYL*-N-(2-HYDROXYETHYL)-COC : ONUT OIL AMIDE, SODIUM SALT - - - - - : WM.	
(CARBOXYMETHYL)*3-(COCONUT OIL AMIDO) PROPYL*DIMETHYLAM : MONIUM CHLORIDE, SODIUM SALT- - - - - : X.	
1-CARBOXYMETHYL-2-HEPTADECYL-1-(2-HYDROXYETHYL)-2-IMID : AZOLIUM HYDROXIDE, SODIUM DERIVATIVE, SODIUM SALT : MIR.	
1-CARBOXYMETHYL-1-(2-HYDROXYETHYL)-2-NOXYL-2-IMIDAZOLI : NIUM HYDROXIDE, SODIUM DERIVATIVE, SODIUM SALT- - - : MIR.	
1-CARBOXYMETHYL-1-(2-HYDROXYETHYL)-2-UNDECYL-2-IMIDAZO : LINIUM HYDROXIDE, SODIUM DERIVATIVE, SODIUM SALT- - : GAF, MIR.	
(1-CARBOXYUNDECYL) TRIMETHYLAMMONIUM HYDROXIDE, INNER S : ALT - - - - - : PFZ.	
N-(COCONUT OIL ALKYL)-BETA-ALANINE, PARTIAL SODIUM SAL : T - - - - - : GNM.	
N-(COCONUT OIL ALKYL)-BETA-ALANINE, SODIUM SALT- - - : GNM.	
N-DODECYL-3-IMINODIPROPIONIC ACID, DISODIUM SALT - - - : GNM.	
N-(DODECYL AND TETRADECYL)-BETA-ALANINE- - - - - : GNM.	

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A M P H O T E R I C - C O N T I N U E D	
HEPTADECYLMETHYLBENZIMIDAZOLINESULFONIC ACID, SODIUM SALT - - - - - : CGY (E). 1-(2-HYDROXYETHYL)-2-HEPTYL-3-CARBOXYETHYL-IMIDAZOLINE : MOA. ,SODIUM SALT- - - - - : MOA. 1-(2-HYDROXYETHYL)-2-UNDECYL-3-CARBOXYETHYLIMIDAZOLINE : MOA. ,SODIUM SALT- - - - - : MOA. MIXED ACYCLIC PRIMARY AMINES, ETHOXYLATED AND SULFATED : DUP, RH. , SODIUM SALT - - - - - : DUP, RH. OLEIC ACID-ETHYLENEDIAMINE CONDENSATE, PROPOXYLATED AND : S. D SULFATED, SODIUM SALT - - - - - : X. POLYPEPTIDE AMMONIUM SALT- - - - - : X. POLYPEPTIDE ETHYL ESTER- - - - - : X. POLYPEPTIDE, SODIUM SALT - - - - - : X. N-(TALLOW ALKYL)-3-IMINODIPROPIONIC ACID, DISODIUM SALT : GNM. T - - - - - : ARC, DUP, SBC, SCP, TCH. AMPHOTERIC SURFACE-ACTIVE AGENTS, ALL OTHER- - - - - :	
A N I O N I C	
@CARBOXYLIC ACIDS (AND SALTS THEREOF): @AMINE SALTS OF FATTY, ROSIN, AND TALL OIL ACIDS: COCONUT OIL ACIDS, DIETHANCLAMINE SALT - - - - - : SOP. COCONUT OIL ACIDS, ETHANOLAMINE SALT - - - - - : SBP. MIXED FATTY ACIDS, ETHANOLAMINE SALT - - - - - : SBP. OLEIC ACID, BUTYLAMINE SALT- - - - - : DYS. OLEIC ACID, DIETHYLAMINE SALT- - - - - : WTC. OLEIC ACID, TRIETHANOLAMINE SALT - - - - - : PEK. STEARIC ACID, N,N,N',N'-TETRAKIS (2-HYDROXYETHYL)-ETHYLENEDIAMINE SALT- - - - - : ICI. STEARIC ACID, TRIETHANOLAMINE SALT - - - - - : GLY. TALLOW ACIDS, ETHANOLAMINE SALT- - - - - : SBP. TALLOW ACIDS, TRIETHANOLAMINE SALT - - - - - : SBP. AMINE SALTS OF FATTY, ROSIN, AND TALL OIL ACIDS, ALL OTHER - - - - - : GLY, PEK, WM. @CARBOXYLIC ACIDS HAVING AMIDE, ESTER, OR ETHER LINKAGES: N-(COCONUT OIL ACYL) POLYPEPTIDE, SODIUM SALT - - - : X.	

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A N I O N I C - C O N T I N U E D	
@CARBOXYLIC ACIDS HAVING AMIDE, ESTER, OR ETHER LINKAGES--CONTINUED	
N-(COCONUT OIL ACYL)POLYPEPTIDE, TRIETHANOLAMINE S	
ALT - - - - -	: X.
N-(COCONUT OIL ACYL)SARCOSINE- - - - -	: HMP.
N-(COCONUT OIL ACYL)SARCOSINE, SODIUM SALT - - -	: HMP.
N-LAUROYLSARCOSINE - - - - -	: HMP.
N-LAUROYLSARCOSINE, SODIUM SALT- - - - -	: CP, HMP, ONX.
N-(MIXED ALKYL SULFONYL)GLYCINE, SODIUM SALT- - -	: GAF.
N-OLEOYLPOLYPEPTIDE, SODIUM SALT - - - - -	: LMI, X.
N-OLEOYLSARCOSINE- - - - -	: HMP.
CARBOXYLIC ACIDS WITH AMIDE, ESTER OR ETHER LINKAG	
E, ALL OTHER- - - - -	: BRD, CHP, HMP, X.
@POTASSIUM AND SODIUM SALTS OF FATTY, ROSIN, AND	
TALL OIL ACIDS:	
ANIMAL GREASE, SODIUM SALT - - - - -	: NMC.
CASTOR OIL ACIDS, POTASSIUM SALT - - - - -	: NTL, SEA.
CASTOR OIL ACIDS, SODIUM SALT- - - - -	: HEW.
COCONUT OIL ACIDS AND OLEIC ACID, POTASSIUM SALT -	: DYS.
@COCONUT OIL ACIDS, POTASSIUM SALT- - - - -	: AES, CON, DA, DYS, ESS, GRC, GRL, HEW, HNT, NMC, PCH, PEK, PG, PNK, SOP.
@COCONUT OIL ACIDS, SODIUM SALT - - - - -	: AGP, BSW, CON, CP, GRC, HEW, JRG, LEV, NMC, NPR, PG.
COCONUT AND TALL OIL ACIDS, POTASSIUM SALT - - -	: DYS.
@CORN OIL ACIDS, POTASSIUM SALT - - - - -	: GRC, HNT, NMC.
CORN OIL ACIDS, SODIUM SALT- - - - -	: GRC, NMC.
FISH OIL ACIDS, SODIUM SALT- - - - -	: DA.
LAURIC ACID, POTASSIUM SALT- - - - -	: GAF.
@MIXED VEGETABLE FATTY ACIDS, POTASSIUM SALT- - -	: AES, GRC, GRL, LUR(E), PCH, QCP, SLC.
@OLEIC ACID, POTASSIUM SALT - - - - -	: AES, DA, HNT, PG, USR, WBG.
@OLEIC ACID, SODIUM SALT- - - - -	: BSW, DA, LUR(E), NMC, USR, WBG, WTC.
OLIVE OIL ACIDS, SODIUM SALT - - - - -	: HNT.
PALM OIL ACIDS, SODIUM SALT- - - - -	: HEW, LUR(E), NMC.
PALMITIC AND STEARIC ACIDS, POTASSIUM SALT - - -	: HEW.
PALMITIC AND STEARIC ACIDS, SODIUM SALT- - - - -	: HEW.
ROSIN ACIDS, POTASSIUM SALT- - - - -	: X.
ROSIN ACIDS, SODIUM SALT - - - - -	: FER, SLM, X.
SOYBEAN OIL ACIDS, POTASSIUM SALT- - - - -	: PEK, PNK.
SOYBEAN OIL ACIDS, SODIUM SALT - - - - -	: NMC.
STEARIC ACID, POTASSIUM SALT - - - - -	: CON, DA, USR, WTC.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A N I O N I C - C O N T I N U E D	
POTASSIUM AND SODIUM SALTS OF FATTY, ROSIN, AND TALL OIL ACIDS--CONTINUED	
STEARIC ACID, SODIUM SALT- - - - -	JRG, WTC.
@TALL OIL ACIDS, POTASSIUM AND SODIUM SALTS:	
TALL OIL ACIDS, POTASSIUM SALT - - - - -	AES, ASY, CON, DAN, DYS, ESS, GRC, HNT, PEK, PNK, SOP, K.
TALL OIL ACIDS, SODIUM SALT- - - - -	ASY, CON, GRC, NMC, SOP, UNP, X.
TALLOW ACIDS, POTASSIUM SALT - - - - -	AES, AGP, ASY, DYS, PG, USR.
@TALLOW ACIDS, SODIUM SALT- - - - -	ASY, BSW, CON, CP, GRC, HEW, JRG, LEV, LUR(E), NMC, NPR, PG, PRX.
POTASSIUM AND SODIUM SALTS OF FATTY, ROSIN, AND TA LL OIL ACIDS, ALL OTHER - - - - -	NMC, PEK.
OTHER CARBOXYLIC ACIDS:	
CARBOXYLIC ACIDS, ALL OTHER- - - - -	PG, SCP, USR.
@PHOSPHORIC AND POLYPHOSPHORIC ACID ESTERS (AND SALTS THEREOF):	
@ALCOHOLS AND PHENOLS, ETHOXYLATED AND PHOSPHATED:	
DINONYLPHENOL, ETHOXYLATED AND PHOSPHATED- - - - -	GAF, MOA, TCH, WAY.
DODECYL ALCOHOL, ETHOXYLATED AND PHOSPHATED- - - - -	GAF.
DODECYLPHENOL, ETHOXYLATED AND PHOSPHATED- - - - -	ARL, GAF.
2-ETHYLHEXANOL, ETHOXYLATED AND PHOSPHATED - - - - -	WAY.
HEXYLPHENOL, ETHOXYLATED AND PHOSPHATED- - - - -	CRT.
@MIXED LINEAR ALCOHOLS, ETHOXYLATED AND PHOSPHATED	BAS, CEL, CHP, CRT, CST, CTL, GAF, MOA, MRA, SCP, TCC, TCH, WTC.
@NONYLPHENOL, ETHOXYLATED AND PHOSPHATED- - - - -	ARL, AZS, CTL, DEX, GAF, MOA, NLC, SCP, SOP, TCC, WAY, WTC.
9-OCTADECENYL ALCOHOL, ETHOXYLATED AND PHOSPHATED	GAF.
OCTYLPHENOL, ETHOXYLATED AND PHOSPHATED- - - - -	RH.
PHENOL, ETHOXYLATED AND PHOSPHATED - - - - -	GAF, MOA, TCH, WTC, X.
POLYHYDRIC ALCOHOL, ETHOXYLATED AND PHOSPHATED - - - - -	NLC, SCP.
POLYPROPYLENE GLYCOL, PHOSPHATED - - - - -	LUR(E).
@TRIDECYL ALCOHOL, ETHOXYLATED AND PHOSPHATED - - - - -	DAN, GAF, MIL, SNW, WTC.
ALCOHOLS AND PHENOLS, ALKOXYLATED AND PHOSPHATED O	
R POLYPHOSPHATED, ALL OTHER - - - - -	BAS, CHP, GAF, TCH, WTC.
@ALCOHOLS, PHOSPHATED OR POLYPHOSPHATED:	
BUTYL PHOSPHATE, POTASSIUM SALT- - - - -	DUP.
DECYL, DODECYL AND OCTYL PHOSPHATE, MORPHOLINE SAL	
T - - - - -	DUP.
2-ETHYLHEXYL PHOSPHATE, SODIUM SALT- - - - -	CHP.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A N I O N I C - C O N T I N U E D	
@PHOSPHORIC AND POLYPHOSPHORIC ACID ESTERS (AND SALTS THEREOF)--CONTINUED	
@ALCOHOLS, PHOSPHATED OR POLYPHOSPHATED--CONTINUED	
2-ETHYLHEXYL POLYPHOSPHATE - - - - -	X.
2-ETHYLHEXYL POLYPHOSPHATE, SODIUM SALT- - - - -	X.
HEXYL PHOSPHATE- - - - -	ICI, SPS.
HEXYL PHOSPHATE, POTASSIUM SALT- - - - -	ICI.
HEXYL POLYPHOSPHATE, POTASSIUM SALT- - - - -	DEX.
MIXED ALKYL PHOSPHATE- - - - -	DUP, SPS.
MIXED ALKYL PHOSPHATE, DIETHANOLAMINE SALT - - - - -	DUP.
OCTYL PHOSPHATE, ALKYLAMINE SALT - - - - -	DUP, NLC, SCP.
9-OCTADECENYL PHOSPHATE- - - - -	DUP(E).
OCTYL DECYL PHOSPHATE- - - - -	X.
OCTYL PHOSPHATE- - - - -	SCP.
OCTYL POLYPHOSPHATE- - - - -	DEX.
OCTYL POLYPHOSPHATE, POTASSIUM SALT, - - - - -	DEX, SNW.
PHOSPHATED AND POLYPHOSPHATED ALCOHOLS, ALL OTHER- - - - -	BRD, MIL.
OTHER PHOSPHORIC AND POLYPHOSPHORIC ACID ESTERS:	
GLYCEROL MONOESTER OF MIXED FATTY ACIDS, PHOSPHATE - - - - -	QCP, WTC.
D - - - - -	
@SULFONIC ACIDS (AND SALTS THEREOF):	
@ALKYLBENZENESULFONATES:	
DODECYLBENZENESULFONATES:	
@DODECYLBENZENESULFONIC ACID- - - - -	CO, CRT, CTL, EMK(E), HLI, LAK, LEV, MON, PIL, PLX, PRX, RCD, TCI, TEN, WTC.
DODECYLBENZENESULFONIC ACID, AMMONIUM SALT - - - - -	HLI, STP.
DODECYLBENZENESULFONIC ACID, BUTYLAMINE SALT - - - - -	WTC.
@DODECYLBENZENESULFONIC ACID, CALCIUM SALT- - - - -	ICI, NLC, RCD, RH, STP, TMH, WTC.
DODECYLBENZENESULFONIC ACID, DIMETHYLAMINE SALT - - - - -	PIL.
DODECYLBENZENESULFONIC ACID, ETHYLENEDIAMINE SAL - - - - -	
T - - - - -	ICI.
@DODECYLBENZENESULFONIC ACID, ISOPROPYLAMINE SALT - - - - -	CIN, CTL, ICI, MRV, RCD, STP, TCH, WTC.
DODECYLBENZENESULFONIC ACID, (MIXED ALKYL) AMINE - - - - -	
SALT- - - - -	ECC.
DODECYLBENZENESULFONIC ACID, POTASSIUM SALT- - - - -	STP.
@DODECYLBENZENESULFONIC ACID, SODIUM SALT - - - - -	AAC, ATR, AZS, BLA, CEL, CO, CP, CRT, CTL, DEP, DUP, ECC, HLI, LEV, NMC, PEK, PG, PIL, PLX, PRX, RCD, SOP, STP, TEN.
DODECYLBENZENESULFONIC ACID, STRONTIUM SALT- - - - -	HLI.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A N I O N I C - C O N T I N U E D	
@SULFONIC ACIDS (AND SALTS THEREOF)--CONTINUED	
@ALKYLBENZENESULFONATES--CONTINUED	
DODECYLBENZENESULFONATES--CONTINUED	
@DODECYLBENZENESULFONIC ACID, TRIETHANOLAMINE SAL	
T - - - - -	: AAC, ARL, ATR, CIN, CTL, ESS, PIL, RCD, SOP, WTC.
DODECYLBENZENE SULFONATES, ALL OTHER - - - - -	: WTC.
OTHER ALKYLBENZENESULFONATES:	
PENTADECYLBENZENESULFONIC ACID, POTASSIUM SALT -	: STP.
TRIDECYLBENZENESULFONIC ACID - - - - -	: RCD.
TRIDECYLBENZENESULFONIC ACID, SODIUM SALT- - - -	: BLA, CP, NPR, PG, RCD, WTC.
UNDECYLBENZENE SULFONIC ACID - - - - -	: SCP.
UNDECYLBENZENE SULFONIC ACID, SODIUM SALT- - - -	: WTC.
UNDECYLBENZENE SULFONIC ACID, TRIETHANOLAMINE SA	
LT- - - - -	: SCP, WTC.
ALKYLBENZENE SULFONATES, ALL OTHER - - - - -	: SCP, USR, WTC.
@BENZENE-, CUMENE-, TOLUENE-, AND XYLENESULFONATES:	
CUMENESULFONIC ACID, AMMONIUM SALT - - - - -	: NES, WTC.
CUMENESULFONIC ACID, SODIUM SALT - - - - -	: NES, WTC.
@TOLUENESULFONIC ACID, POTASSIUM AND SODIUM SALTS:	
TOLUENESULFONIC ACID - - - - -	: NES, SCP, STP.
TOLUENESULFONIC ACID, SODIUM SALT- - - - -	: CO, NES, PG, STP, WTC.
@XYLENESULFONIC ACID, AMMONIUM SALT - - - - -	: CO, NES, SCP, STP, WTC.
@XYLENESULFONIC ACID, SODIUM SALT - - - - -	: CO, NES, PIL, SCP, SDC, STP, WTC.
BENZENE-, CUMENE-, TOLUENE-, AND XYLENESULFONATES,	
ALL OTHER- - - - -	: WTC.
@LIGNINSULFONATES:	
LIGNINSULFONIC ACID, AMMONIUM SALT - - - - -	: CRZ, PG, SPA.
@LIGNINSULFONIC ACID, CALCIUM SALT- - - - -	: CRZ, CWP, LKY(E), MAR, PSP.
LIGNINSULFONIC ACID, CHROMIUM SALT - - - - -	: MAR, PSP, RAY.
LIGNINSULFONIC ACID, IRON SALT - - - - -	: CRZ, PSP.
LIGNINSULFONIC ACID, MAGNESIUM SALT- - - - -	: CWP.
LIGNINSULFONIC ACID, MIXED SALT- - - - -	: SPA.
LIGNINSULFONIC ACID, POTASSIUM SALT- - - - -	: SPA.
@LIGNINSULFONIC ACID, SODIUM SALT - - - - -	: CRZ, MAR, PSP, RAY, SPA, WVA.
LIGNINSULFONIC ACID, ZINC SALT	
- - - - -	: PSP.
@NAPHTHALENESULFONATES:	
BUTYLNAPHTHALENESULFONIC ACID- - - - -	: DA.
BUTYLNAPHTHALENESULFONIC ACID, SODIUM SALT - - - -	: DA, ECC.
DIBUTYLNAPHTHALENESULFONIC ACID- - - - -	: GAP.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
AN I O N I C - C O N T I N U E D	
@NAPHTHALENESULFONATES--CONTINUED	
DIISOPROPYLNAPHTHALENESULFONIC ACID, SODIUM SALT -	DA, DUP.
DIPENTYLNAPHTHALENESULFONIC ACID, (MIXED ALKYL) AMI NE SALT -	NLC.
ISOPROPYLNAPHTHALENESULFONIC ACID- - - - -	DUP(E) .
METHYLENEBIS(2-NAPHTHALENESULFONIC ACID), SODIUM S ALT - - - - -	DUP.
METHYLNAPHTHALENESULFONIC ACID, SODIUM SALT- - - -	DA.
METHYLNONYLNAPHTHALENESULFONIC ACID, SODIUM SALT -	UDI.
TETRAHYDRONAPHTHALENESULFONIC ACID, SODIUM SALT- -	DUP.
NAPHTHALENESULFONATES, ALL OTHER - - - - -	CGY(E) , DUP.
@SULFONIC ACIDS HAVING AMIDE LINKAGES:	
@SULFOSUCCINAMIC ACID DERIVATIVES:	
N-(1,2-DICARBOXYETHYL)-N-OCTADECYLSULFOSUCCINAMI C ACID, TETRASODIUM SALT- - - - -	ACY, MOA.
N-OCTADECYLSULFOSUCCINAMIC ACID, DISODIUM SALT -	ACY.
N-(OLEOXYLOXYISOPROPYL)SULFOSUCCINAMIC ACID - - -	WTC.
SULFOSUCCINAMIC ACID DERIVATIVES, ALL OTHER- - -	ARD, SBC.
@TAURINE DERIVATIVES:	
N-(COCONUT OIL ACYL)-N-METHYLTAURINE, SODIUM SAL T - - - - -	GAF, TNI.
N-CYCLOHEXYL-N-PALMITOYLTAURINE, SODIUM SALT - -	GAF.
N-METHYL-N-OLEOYLTAURINE, SODIUM SALT- - - - -	GAF, HRT, MRA.
N-METHYL-N-PALMITOYLTAURINE, SODIUM SALT - - - -	GAF.
N-METHYL-N-(TALL OIL ACYL)TAURINE, SODIUM SALT -	CRT, GAF, X.
@SULFONIC ACIDS HAVING ESTER OR ETHER LINKAGES:	
@SULFOSUCCINIC ACID ESTERS:	
SULFOSUCCINIC ACID-BIS(DIISOBUTYL)ESTER, SODIUM SALT- - - - -	MOA.
SULFOSUCCINIC ACID, BIS(2,6-DIMETHYL-4-HEPTYL)ES TER, SODIUM SALT- - - - -	DAN, GAF, MOA.
@SULFOSUCCINIC ACID, BIS(2-ETHYLHEXYL)ESTER, SODI UM SALT - - - - -	ACY, CGY(E) , CHP, CRT, DA, DAN, ECC, EMK(E) , H&T, MCP, MOA, PC(E) , RH, SCO, WTC.
SULFOSUCCINIC ACID, DIHEXYL ESTER, SODIUM SALT -	ACY, MOA.
SULFOSUCCINIC ACID, DIPENTYL ESTER, SODIUM SALT	ACY.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A N I O N I C - C O N T I N U E D	
@SULFONIC ACIDS HAVING ESTER OR ETHER LINKAGES--CON.	
@SULFOSUCCINIC ACID ESTERS--CONTINUED	
SULFOSUCCINIC ACID, DITRIDECYL ESTER, SODIUM SAL	
T	ACY, MOA.
SULFOSUCCINIC ACID ESTERS, ALL OTHER	ARD, HDG, LAK, SCP.
ALL OTHER SULFONIC ACIDS HAVING ESTER OR ETHER	
LINKAGES:	
COCONUT OIL ACIDS, 2-SULFOETHYL ESTER, SODIUM SA	
LT-	GAP, LEV, X.
DODECYLDIPHENYLOXIDEDISULFONIC ACID, DISODIUM SA	
LT-	DOW.
GLYCEROL MONOSTEARATE SULFOACETATE, SODIUM SALT	WTC.
ISO-OCTYPHENOL, ETHOXYLATED AND SULFONATED, SODI	
UM SALT	RH.
NORMAL-OCTYPHENOL, ETHOXYLATED AND SULFONATED,	
SODIUM SALT	CRT.
SULFONIC ACID WITH ESTER LINKAGES, ALL OTHER	STP.
SULFONIC ACIDS WITH ETHER LINKAGES, ALL OTHER-	PG, WTC.
OTHER SULFONIC ACIDS:	
BUTYLHYDROXYBIPHENYLSULFONIC ACID-	RBC.
MIXED ALKANE SULFONIC ACID, SODIUM SALT-	CCI, DUP, QCP.
PETROLEUMSULFONIC ACID, WATER SOLUBLE (ACID LAYER)	
, SODIUM SALT	WTC.
SULFOSUCCINIC ACID-HALF ESTER (COCONUT MONOISOPROP	
ANOL)AMIDE, DISODIUM SALT	MOA.
SULFONIC ACIDS, ALL OTHER-	ARD, LAK, SCP, SLM, STP, USR, WTC.
@SULFURIC ACID ESTERS (AND SALTS THEREOF):	
@ACIDS, AMIDES, AND ESTERS, SULFATED:	
COCONUT OIL ACIDS-ETHANOLAMINE SALT, SULFATED,POTA	
SSIUM SALT-	DEX, EMK(E).
CARBOXYLIC ACID ESTERS (EXCEPT NATURAL PATS AND	
OILS), SULFATED:	
@ESTERS OF SULFATED OLEIC ACID:	
2-BUTOXYETHYL OLEATE, SULFATED, SODIUM SALT-	S.
@BUTYL OLEATE, SULFATED, SODIUM SALT-	AKS, CIN, CRT, ICI, MCP, MRV, PC(E).
BUTYL AND PROPYL OLEATE, SULFATED, SODIUM SALT	
-	MCP.
GLYCEROL TRIOLEATE, SULFATED, SODIUM SALT-	MRV.
ISOBUTYL OLEATE, SULFATED, SODIUM SALT	CHP, DA.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
AN I O N I C - C O N T I N U E D	
@ESTERS OF SULFATED OLEIC ACID--CONTINUED	
ISOPROPYL OLEATE, SULFATED, SODIUM - - - - -	CRT, DEX, HRT.
METHYL OLEATE, SULFATED, SODIUM SALT - - - - -	AZS, DUP, ICI.
@PROPYL OLEATE, SULFATED, SODIUM SALT - - - - -	ACY, AKS, CHP, MRV.
ESTERS OF SULFATED OLEIC ACID, ALL OTHER - - - - -	CHP.
OTHER SULFATED ESTERS:	
GLYCEROL MONOESTER OF COCONUT OIL ACIDS, SULFA	
TED, SODIUM SALT- - - - -	CP.
SULFATED ESTERS, ALL OTHER - - - - -	DA, DUP.
OTHER SULFURIC ACID ESTERS:	
MIXED FATTY ACIDS, SULFATED, POTASSIUM SALT- - - - -	SCO.
OLEIC ACID, SULFATED, DISODIUM SALT- - - - -	ACT, DA, GAF, TEN.
SULFURIC ACID ESTERS, ALL OTHER- - - - -	SLM.
TALL OIL, SULFATED, SODIUM SALT- - - - -	ACT, APX, BAO, CHP, CRT, DA, ICI, KAL, SEA, WHI, WHW.
@ALCOHOLS, SULFATED:	
COCONUT AND SPERM OIL ALKYL SULFATE, SODIUM SALT - - - - -	DA.
DECYL AND OCTYL SULFATE, SODIUM SALT - - - - -	TCH.
DECYL SULFATE, SODIUM SALT - - - - -	CTL, HLI, SCP.
@DODECYLSULFATE SALTS:	
DODECYL SULFATE, 2-AMINO-2-METHYLPROPANOL SALT - - - - -	DUP (E).
@DODECYL SULFATE, AMMONIUM SALT - - - - -	AAC, CTL, EMK (E), HLI, JRG, ONX, SCP, STP, TCH, TNI.
DODECYL SULFATE, DIETHANOLAMINE SALT - - - - -	DUP, JRG, SCP, STP, TCH.
DODECYL SULFATE, N,N-DIETHYLCYCLOHEXYLAMINE SALT - - - - -	DUP.
DODECYL SULFATE, ISOPROPANOLAMINE SALT - - - - -	JRG, TCH.
@DODECYL SULFATE, MAGNESIUM SALT- - - - -	AAC, HLI, ONX, STP.
DODECYL SULFATE, POTASSIUM SALT- - - - -	PG.
@DODECYL SULFATE, SODIUM SALT - - - - -	AAC, CTL, DUP, HLI, JRG, ONX, SCP, STP, TCH.
@DODECYL SULFATE, TRIETHANOLAMINE SALT- - - - -	AAC, CTL, ONX, SCP, STP, TCH.
2-ETHYLHEXYL SULFATE, SODIUM SALT- - - - -	AAC, SCP, TCH, UCC (E).
7-ETHYL-2-METHYL-4-UNDECYL SULFATE, SODIUM SALT- - - - -	UCC (E).
HEXADECYL SULFATE, SODIUM SALT - - - - -	AAC.
HEXYL SULFATE, POTASSIUM SALT- - - - -	DEX.
MIXED LINEAR ALCOHOLS, SULFATED, TRIETHANOLAMINE S	
ALT - - - - -	LAK, PG, RCD, SCP.
MIXED LINEAR ALCOHOLS, SULFATED, ALKYLAMINE SALT - - - - -	DUP.
@MIXED LINEAR ALCOHOLS, SULFATED, AMMONIUM SALT - - - - -	LAK, NTL, PG, RCD, S, SCP, UCC (E).

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A N I O N I C - C O N T I N U E D	
@ALCOHOLS, SULFATED--CONTINUED	
MIXED LINEAR ALCOHOLS, SULFATED, SODIUM SALT - - -	: DUP, LAK, PG, RCD, SCP, WTC.
NONYL SULFATE, SODIUM SALT - - - - -	: TEN.
OCTYL SULFATE, SODIUM SALT - - - - -	: AAC, APX, DUP.
TRIDECYL SULFATE, SODIUM SALT - - - - -	: AAC, SCP.
LINEAR ALCOHOLS, SULFATED, ALL OTHER - - - - -	:
@ETHERS, SULFATED:	
ALKYLPHENOLS, ETHOXYLATED AND SULFATED:	
1-NAPHTHOL, ETHOXYLATED AND SULFATED, SODIUM SALT - - -	:
T - - - - -	: TCH.
NONYLPHENOL, ETHOXYLATED AND SULFATED, AMMONIUM SALT - - -	: GAP, HLI, MOA, STP, WTC.
NONYLPHENOL, ETHOXYLATED AND SULFATED, SODIUM SALT - - -	:
LT - - - - -	: CRT, GAP.
OCTYLPHENOL, ETHOXYLATED AND SULFATED, SODIUM SALT - - -	:
LT - - - - -	: RH.
DECYL ALCOHOL, PROPOXYLATED AND SULFATED, SODIUM SALT - - -	: APX.
DODECYL ALCOHOL, ETHOXYLATED AND SULFATED, AMMONIUM SALT - - -	: AAC, AKS, CTL, HLI, STP.
@DODECYL ALCOHOL, ETHOXYLATED AND SULFATED, SODIUM SALT - - -	: AAC, CTL, HLI, ONX, SCP, STP, TCH.
DODECYL AND TETRADECYL ALCOHOLS, ETHOXYLATED AND SULFATED, AMMONIUM SALT - - -	: LEV.
HEXYL ALCOHOL, PROPOXYLATED AND SULFATED, SODIUM SALT - - -	: APX.
@MIXED LINEAR ALCOHOLS, ETHOXYLATED AND SULFATED, AMMONIUM SALT - - -	: CO, LAK, MOA, PG, PIL, RCD, SCP, SHC, STP, WTC.
@MIXED LINEAR ALCOHOLS, ETHOXYLATED AND SULFATED, SODIUM SALT - - -	: CO, DA, DUP, GAP, HLI, LAK, LEV, PG, PIL, RCD, SCP, SHC, STP, TCI, WTC.
TRIDECYL ALCOHOL, ETHOXYLATED AND SULFATED, SODIUM SALT - - -	: AAC.
SULFATED ETHERS, ALL OTHER - - - - -	: ARC, PG, WTC.
@NATURAL FATS AND OILS, SULFATED:	
@CASTOR OIL, SULFATED, SODIUM SALT - - - - -	: ACT, ACY, AKS, APX, ARL, BAO, CRT, DA, DEX, GAP, HRT, ICI, KAL, LEA, LUR(E), MRV, S, SCO, SCP, SLM, WHW.
COCONUT OIL, SULFATED, SODIUM SALT - - - - -	: BAO, DA, LUR(E).

SURFACE-ACTIVE AGENTS

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A N I O N I C - C O N T I N U E D	
@NATURAL FATS AND OILS, SULFATED--CONTINUED	
@COD OIL, SULFATED, SODIUM SALT - - - - -	: ACT, BAO, SEA, WHI, WHW.
GREASE, OTHER THAN WOOL, SULFATED, SODIUM SALT - -	: SEA, WHI.
HERRING OIL, SULFATED, SODIUM SALT - - - - -	: ACT, SEA, SLM, WHW.
LARD, SULFATED, SODIUM SALT - - - - -	: CRT, WAW, WHW.
MIXED FISH OILS, SULFATED, SODIUM SALT - - - - -	: ACT, MRD, SLM.
MIXED VEGETABLE OILS, SULFATED, SODIUM SALT - - - -	: LUR(E).
MUSTARD SEED OIL, SULFATED, SODIUM SALT - - - - -	: DA.
@NEAT'S FOOT OIL, SULFATED, SODIUM SALT - - - - -	: ACT, ARC, BAO, DA, MRD, PC(E), SEA, SLM.
PEANUT OIL, SULFATED, SODIUM SALT - - - - -	: LUR(E), SEA.
PECAN OIL, SULFATED, SODIUM SALT - - - - -	: CRT.
@SOYBEAN OIL, SULFATED, SODIUM SALT - - - - -	: ACT, HRT, ONX, SEA, WHW.
@SPERM OIL, SULFATED, SODIUM SALT - - - - -	: DA, ONX, WHI, WHW.
@TALLOW, SULFATED, SODIUM SALT - - - - -	: ACT, ACY, AZS, DA, ECC, LUR(E), PC(E), SID, SLM, SOS, : WHI.
OTHER ANIONIC SURFACE-ACTIVE AGENTS:	
FATTY ACID LACTOLATES, MIXED SALTS - - - - -	: BFP.
LIGNIN, SODIUM SALT - - - - -	: WVA.
MIXED LINEAR OLEFIN SULFONATE - - - - -	: CP, NLC.
POLYETHYLENE-VINYL ALCOHOL COPOLYMER, POTASSIUM SALT	: NLC.
TRIDECYL ALCOHOL, ETHOXYLATED AND CARBONATED, SODIUM	:
SALT - - - - -	: S.
ANIONIC SURFACE-ACTIVE AGENTS, ALL OTHER - - - - -	: S, SLM.
C A T I O N I C	
@AMINE OXIDES AND OXYGEN-CONTAINING AMINES (EXCEPT THOSE HAVING AMIDE LINKAGES):	
@ACYCLIC:	
N,N-BIS(2-HYDROXYETHYL) (COCONUT OIL ALKYL) AMINE - -	: ARC.
N,N-BIS(2-HYDROXYETHYL) OCTADECYLAMINE - - - - -	: ARC.
N,N-BIS(2-HYDROXYETHYL) (TALLOW ALKYL) AMINE - - -	: ARC.
(COCONUT OIL ALKYL) AMINE, ETHOXYLATED - - - - -	: ARC, BRD, GAP, ICI, NLC.
(COCONUT OIL ALKYL) AMINE, ETHOXYLATED, MALEATE - -	: SDH.
(COCONUT OIL ALKYL) AMINE, ETHOXYLATED, OLEATE - -	: DUP.
N,N-DIMETHYL DODECYLAMINE OXIDE - - - - -	: PG.
N,N-DIMETHYLHEXADECYLAMINE OXIDE - - - - -	: ONX.
(HYDROGENATED TALLOW ALKYL) AMINE, ETHOXYLATED - -	: TCH.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C A T I O N I C - C O N T I N U E D	
@AMINE OXIDES AND OXYGEN-CONTAINING AMINES (EXCEPT THOSE HAVING AMIDE LINKAGES)--CONTINUED	
@ACYCLIC--CONTINUED	
N-(2-HYDROXYETHYL)-N,N',N'-TRIS(2-HYDROXYPROPYL)-E	
THYLENEDIAMINE-	NLC.
(MIXED ALKYL) AMINE, ETHOXYLATED-	GAP, ICI, RH.
(9-OCTADECENYL) AMINE, ETHOXYLATED-	ARC, TCH.
OCTADECYLAMINE, ETHOXYLATED-	ARC, TCH.
POLYETHYLENEPOLYAMINE, ALKOXYLATED-	NLC.
(SOYBEAN OIL ALKYL) AMINE, ETHOXYLATED-	ARC.
@ (TALLOW ALKYL) AMINE, ETHOXYLATED-	ARC, DUP, GAP, TCH.
TALLOW ALKYL AMINE, SULFATED, ETHOXYLATED-	DUP.
N-(TALLOW ALKYL) TRIMETHYLENEDIAMINE, ETHOXYLATED-	ARC, TCH.
N,N,N',N'-TETRAKIS(2-HYDROXYETHYL) ETHYLENEDIAMINE	NLC.
N,N,N'-TETRAKIS(2-HYDROXYPROPYL) ETHYLENEDIAMINE DIO	
LEATE, METHYL SULFATE-	DUP.
N,N,N',N'-TETRAKIS(2-HYDROXYPROPYL) ETHYLENEDIAMINE	
, PROPOXYLATED AND ETHOXYLATED-	ARC.
AMINE OXIDES AND OXYGEN-CONTAINING AMINES (EXCEPT	
THOSE WITH AMIDE LINKAGES), ACYCLIC, ALL OTHER	ARC, BRD, DUP, FIN, GAP, MIL, PG, TCH.
@CYCLIC:	
HEPTADECENYLAMINE, ETHOXYLATED-	DA.
2-(8-HEPTADECENYL)-4,4-BIS(HYDROXYMETHYL)-2-OXAZOL	
INE-	IMC(E).
2-(8-HEPTADECENYL)-4-HYDROXYMETHYL-4-METHYL-2-OXAZ	
OLINE-	BRD, IMC(E).
2-HEPTADECYL-1-(2-HYDROXYETHYL)-2-IMIDAZOLINE-	CHP.
1-(2-HYDROXYETHYL)-2-HEPTADECYL-3-CARBOXYETHYLIMID	
AZOLINE-	MOA.
1-(2-HYDROXYETHYL)-2-UNDECYL-3-CARBOXYETHYLIMIDAZO	
LINE-	MOA.
1-(2-HYDROXYETHYL)-2-HEPTADECYL-2-IMIDAZOLINE-	SNW.
1-(2-HYDROXYETHYL)-2-NONYL-2-IMIDAZOLINE-	BRD, MOA, SCP.
1-(2-HYDROXYETHYL)-2-NOR(COCONUT OIL ALKYL)-2-IMID	
AZOLINE-	GAP, MOA, SCP.
@1-(2-HYDROXYETHYL)-2-NOR(TALL OIL ALKYL)-2-IMIDAZO	
LINE-	BRD, HDG, MOA, NLC, TCH.
LIGNIN AMINES-	WVA.
ROSIN AMINE, ETHOXYLATED-	HPC.
META-TOLUIDINE, ETHOXYLATED-	MIL.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C A T I O N I C - C O N T I N U E D	
@CYCLIC--CONTINUED	
@AMINE OXIDES AND OXYGEN-CONTAINING AMINES (EXCEPT THOSE HAVING AMINE LINKAGES), CYCLIC, ALL OTHER	CGY (E), TCH.
@AMINES AND AMINE OXIDES HAVING AMIDE LINKAGES:	
@CARBOXYLIC ACID - DIAMINE AND POLYAMINE CONDENSATES:	
COCONUT OIL ACIDS-N,N-DIMETHYLTRIMETHYLENEDIAMINE CONDENSATE-	JRG, SCP.
MIXED FATTY ACIDS-POLYALKYLENEPOLYAMINE CONDENSATE	GRD, NLC, QCP, TCH.
OLEIC ACID-DIETHYLENETRIAMINE CONDENSATE - - - -	AKS, ICI.
OLEIC ACID-N,N-DIMETHYLTRIMETHYLENEDIAMINE CONDENS ATE - - - -	CCW.
OLEIC ACID-ETHYLENEDIAMINE CONDENSATE, MONOETHOXYL ATED- - - -	CLD, DEX, SOC, TNA (E).
PELARGONIC ACID-TETRAETHYLENEPENTAMINE CONDENSATE	ICI.
STEARIC ACID-N,N-DIETHYLETHYLENEDIAMINE CONDENSATE	S.
STEARIC ACID-DIETHYLENETRIAMINE CONDENSATE - - - -	AKS, CHP, S, STC.
STEARIC ACID-DIETHYLENETRIAMINE CONDENSATE, POLYET HOXYLATED - - - -	APX.
STEARIC ACID-ETHYLENEDIAMINE CONDENSATE, MONOETHOX YLATED- - - -	CST, DA, DEX, ICI, MRV, S, SLC.
STEARIC ACID-ETHYLENEDIAMINE CONDENSATE, POLYETHOX YLATED- - - -	ICI.
STEARIC ACID-TETRAETHYLENEPENTAMINE CONDENSATE - -	ONX.
@TALL OIL ACIDS-DIETHYLENETRIAMINE AND POLYALKYLE POLYAMINE CONDENSATE:	
TALL OIL ACIDS-DIETHYLENETRIAMINE CONDENSATE - -	AZS, NCW, NLC, SCP.
TALL OIL ACIDS-POLYALKYLENEPOLYAMINE CONDENSATE-	ARC, AZS, QCP, SCP.
CARBOXYLIC ACID-DIAMINE AND POLYAMINE CONDENSATES	
ALL OTHER - - - -	ICI, SNW, STC.
OTHER AMINES AND AMINE OXIDES HAVING AMIDE LINKAGES:	
3-LAURAMIDO-N,N-DIMETHYLPROPYLAMINE OXIDE- - - -	SNW.
STEARIC ACID,DIETHANOLAMINE CONDENSATE, METHYL SUL FATE- - - -	DUP.
AMINES AND AMINE OXIDES HAVING AMIDE LINKAGES, ALL OTHER- - - -	HLI, SCP.
@AMINES, NOT CONTAINING OXYGEN (AND SALTS THEREOF):	
AMINE SALTS:	
(COCONUT OIL ALKYL) AMINE ACETATE - - - -	ARC.
(HYDROGENATED TALLOW ALKYL) AMINE ACETATE - - - -	ARC.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C A T I O N I C - C O N T I N U E D	
@AMINES, NOT CONTAINING OXYGEN (AND SALTS THEREOF)--CON.	
AMINE SALTS--CONTINUED	
(9-OCTADECENYL)AMINE ACETATE - - - - -	ARC, GNM.
(TALLOW ALKYL)AMINE ACETATE- - - - -	ARC.
N-(TALLOW ALKYL)TRIMETHYLENEDIAMINE ACETATE- - - - -	ARC, ASH.
N-(TALLOW ALKYL)TRIMETHYLENEDIAMINE OLEATE - - - - -	ARC, ASH.
AMINE SALTS (NOT CONTAINING OXYGEN), ALL OTHER - - - - -	ARC, SM.
@DIAMINES AND POLYAMINES:	
@IMIDAZOLINE DERIVATIVES:	
1-(2-AMINOETHYL)-2-NOR (TALL OIL ALKYL)-2-IMIDAZO	
LINE- - - - -	AZS, SCP.
N-(DOCOSYL AND EICOSYL) TRIMETHYLENEDIAMINE - - - - -	ENO.
2-HEPTADECYL-2-IMIDAZOLINE - - - - -	SCO.
1-*3-(2-AMINOETHYLNAPHTH)-1-YL*-2-(8-HEPTA-	
DECENYL)-2-IMIDAZOLINE- - - - -	NLC.
N-(COCONUT OIL ALKYL) TRIMETHYLENEDIAMINE - - - - -	ARC, ENO, GNM.
N-DODECYLDIETHYLENETRIAMINE- - - - -	ARC.
N-(MIXED ALKYL) POLYETHYLENEPOLYAMINE - - - - -	ARC, BAS, CCW, SNW.
@N-(9-OCTADECENYL) TRIMETHYLENEDIAMINE - - - - -	ARC, ASH, GNM.
N-(SOYBEAN OIL ALKYL) TRIMETHYLENEDIAMINE - - - - -	ENO.
N-(TALLOW - ALKYL) DIPROPYLENETRIAMINE- - - - -	GNM.
N-(TALLOW ALKYL) TRIMETHYLENEDIAMINE- - - - -	ARC, ASH, ENO, GNM.
DIAMINES AND POLYAMINES, ALL OTHER - - - - -	STC.
@PRIMARY MONOAMINES:	
(COCONUT OIL ALKYL)AMINE - - - - -	ARC, ASH, ENO, GNM.
(DOCOSYL AND EICOSYL)AMINE - - - - -	ENO.
DODECYLAMINE - - - - -	ARC, ASH, GNM.
HEXADECYLAMINE - - - - -	ARC.
@(HYDROGENATED TALLOW ALKYL)AMINE - - - - -	ARC, ASH, ENO, GNM.
(MIXED ALKYL)AMINE - - - - -	ARC.
(MIXED TERT-ALKYL)AMINE- - - - -	ARC.
9-OCTADECENYLAMINE - - - - -	ARC, ASH, ENO, GNM.
OCTADECYLAMINE - - - - -	ARC, ASH, ENO.
OCTYLAMINE - - - - -	ARC.
(SOYBEAN OIL ALKYL)AMINE - - - - -	ARC, ENO.
(TALL OIL ALKYL)AMINE- - - - -	GNM.
@(TALLOW ALKYL)AMINE- - - - -	ASH, ENO, GNM, X.
@SECONDARY AND TERTIARY MONOAMINES:	

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C A T I O N I C - C O N T I N U E D	
@AMINES, NOT CONTAINING OXYGEN (AND SALTS THEROF)--CON.	
@SECONDARY AND TERTIARY MONOAMINES--CONTINUED	
BIS(COCONUT OIL ALKYL)AMINE- - - - -	: ARC.
BIS(HYDROGENATED TALLOW ALKYL)AMINE- - - - -	: ARC, ASH.
N,N-DIMETHYL(COCONUT OIL ALKYL)AMINE - - - - -	: ARC, BRD, ENO.
N,N-DIMETHYLDECYLAMINE - - - - -	: BRD.
N,N-DIMETHYLDODECYLAMINE - - - - -	: ARC, BRD.
N,N-DIMETHYLHEXADECYLAMINE - - - - -	: ARC, BRD.
N,N-DIMETHYL(HYDROGENATED TALLOW ALKYL)AMINE - - -	: ARC, ASH, ENO.
@N,N-DIMETHYL(MIXED ALKYL)AMINE - - - - -	: ARC, BRD, ENO, ONX.
N,N-DIMETHYLOCTADECYLAMINE - - - - -	: ARC, BRD, ENO, ONX.
N,N-DIMETHYLOCTYLAMINE - - - - -	: BRD.
N,N-DIMETHYL(SOYBEAN OIL ALKYL)AMINE - - - - -	: ARC, ENO.
N,N-DIMETHYLTETRADECYLAMINE - - - - -	: ARC, BRD.
N-METHYLBIS(COCONUT OIL ALKYL)AMINE- - - - -	: ENO.
N-METHYLBIS(HYDROGENATED TALLOW ALKYL)AMINE- - -	: ENO, GNM.
TRISODECYLAMINE - - - - -	: GNM.
TRILAURYLAMINE - - - - -	: GNM.
TRIOCTYLAMINE- - - - -	: GNM.
SECONDARY AND TERTIARY MONOAMINES, ALL OTHER - - -	: ARC.
@OXYGEN-CONTAINING QUATERNARY AMMONIUM SALTS:	
(2-AMINOETHYL)ETHYL(HYDROGENATED TALLOW ALKYL)(2-HYD	
ROXYETHYL)AMMONIUM ETHYL SULFATE- - - - -	: LUR(E).
BENZYL(COCONUT OIL ALKYL)BIS(2-HYDROXYETHYL)AMMONIUM	
CHLORIDE - - - - -	: NLC, SCP.
BENZYL(COCONUT OIL ALKYL,ETHOXYLATED)DIMETHYLAMMONIU	
M CHLORIDE- - - - -	: DUP, GAF, SCP.
1-BENZYL-1-(2-HYDROXYETHYL)-2-NOR(TALL OIL ALKYL)-2-	
IMIDAZOLINE - - - - -	: MOA, NLC.
BENZYL(TALLOW ALKYL)BIS(2-HYDROXYETHYL)AMMONIUM CHLO	
RIDE- - - - -	: DUP.
BIS(2-HYDROXYETHYL, ETHOXYLATED)METHYL(9-OCTADECENYL	
)-AMMONIUM CHLORIDE - - - - -	: ARC.
BIS(2-HYDROXYETHYL, ETHOXYLATED)METHYLOCTADECYLAMMON	
IUM CHLORIDE- - - - -	: ARC.
(COCONUT OIL ALKYL)BIS(2-HYDROXYETHYL, ETHOXYLATED)-	
METHYLAMMONIUM CHLORIDE - - - - -	: ARC.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C A T I O N I C - C O N T I N U E D	
@ OXYGEN-CONTAINING QUATERNARY AMMONIUM SALTS--CON.	
(ETHOXYBENZYL)DIMETHYL(OCTYLPHENOXY)AMMONIUM CHLORID:	
E - - - - -	RH.
(ETHOXYBENZYL)DIMETHYL(OCTYLTOLYLOXY)AMMONIUM CHLORI:	
DE- - - - -	RH.
1-ETHYL-2-(8-HEPTADECENYL)-1-(2-HYDROXYETHYL)-2-IMID:	
AZOLINIUM ETHYL SULFATE - - - - -	ICI.
N-ETHYL-N-HEXADECYLMORPHOLINIUM ETHYL SULFATE- - - -	BRD, ICI.
N-ETHYL-N-(SOYBEAN OIL ALKYL)MORPHOLINIUM ETHYL SULF:	
ATE - - - - -	ICI.
(2-HYDROXYETHYL)DIMETHYL(3-STEARAMIDOPROPYL)AMMONIUM:	
DIHYDROGEN PHOSPHATE - - - - -	ACY.
(2-HYDROXYETHYL)DIMETHYL(3-STEARAMIDOPROPYL)AMMONIUM:	
NITRATE- - - - -	ACY.
(3-LAURAMIDOPROPYL)TRIMETHYLAMMONIUM METHYL SULFATE:	ACY.
2-(2-LAUROYLOXYETHYL)CARBAMOYL-1-METHYLPYRIDINIUM CH:	
LORIDE- - - - -	WTC.
1-METHYL-2-(2-STEAROYLOXYETHYL)CARBAMOYLPYRIDINIUM C:	
HLORIDE - - - - -	WTC.
OXYGEN-CONTAINING QUATERNARY AMMONIUM SALTS (EXCEPT:	
THOSE HAVING AMIDE LINKAGES), ALL OTHER - - - - -	AAC, ARC, CGY, HLI, ICI.
QUATERNARY AMMONIUM SALTS HAVING AMIDE LINKAGES, ALL:	
OTHER- - - - -	MRV, TCH, X.
@ QUATERNARY AMMONIUM SALTS, NOT CONTAINING OXYGEN:	
@ ACYCLIC:	
BIS(COCONUT OIL ALKYL)DIMETHYLAMMONIUM CHLORIDE- - -	ARC, ASH, ENO, GNM.
BIS(COCONUT OIL ALKYL)DIMETHYL-AMMONIUM NITRATE- - -	ARC.
@ BIS (HYDROGENATED TALLOW ALKYL)DIMETHYLAMMONIUM CHL:	
ORIDE - - - - -	ARC, ASH, ENO, GNM.
(COCONUT OIL ALKYL)TRIMETHYLAMMONIUM CHLORIDE- - -	ARC.
DIDECYLDIMETHYLAMMONIUM CHLORIDE - - - - -	BRD.
DIMETHYLBIS(SOYBEAN OIL ALKYL)AMMONIUM CHLORIDE- - -	ARC.
DIMETHYLDIOCTADECYLAMMONIUM CHORIDE- - - - -	ASH.
DODECYLTRIMETHYLAMMONIUM BROMIDE - - - - -	DUP(E).
DODECYLTRIMETHYLAMMONIUM CHLORIDE- - - - -	ARC, GNM.
ETHYLDIMETHYL(MIXED ALKYL)AMMONIUM ETHYL SULFATE - -	DEX, JOR, TCC.
ETHYLDIMETHYL(9-OCTADECENYL)AMMONIUM BROMIDE - - -	ONX.
ETHYLHEXADECYLDIMETHYLAMMONIUM BROMIDE - - - - -	FIN.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C A T I O N I C - C O N T I N U E D	
@QUATERNARY AMMONIUM SALTS, NOT CONTAINING OXYGEN--CON.	
@ACYCLIC--CONTINUED	
HEXADECYLTRIMETHYLAMMONIUM BROMIDE - - - - -	: FIN.
HEXADECYLTRIMETHYLAMMONIUM CHLORIDE- - - - -	: ARC, BRD.
HEXADECYLTRIMETHYLAMMONIUM PARA-TOLUENESULFONATE -	: FIN.
METHYLTRIOCTYLAMMONIUM CHLORIDE- - - - -	: GNM.
(MIXED LINEAR ALKYL) TRIMETHYL AMMONIUM BROMIDE - -	: DUP.
N,N,N',N'-PENTAMETHYL-N-(TALLOW ALKYL)TRIMETHYL	:
ENE-BIS*AMMONIUM CHLORIDE*- - - - -	: ARC, GNM.
TRIMETHYL(MIXED ALKYL)AMMONIUM CHLORIDE- - - - -	: NLC.
TRIMETHYLOCTADECYLAMMONIUM CHLORIDE- - - - -	: ARC.
TRIMETHYL(SOYBEAN OIL ALKYL)AMMONIUM CHLORIDE- - -	: ARC.
@TRIMETHYL(TALLOW ALKYL)AMMONIUM CHLORIDE - - - - -	: ARC, ASH, GNM.
TRIMETHYLTETRADECYLAMMONIUM BROMIDE- - - - -	: FIN, ICI.
QUATERNARY AMMONIUM SALTS, NOT CONTAINING OXYGEN,	:
ACYCLIC, ALL OTHER- - - - -	: BRD, X.
@BENZENOID:	
@BENZYL(COCONUT OIL ALKYL)DIMETHYLAMMONIUM CHLORIDE	: ARC, CIN, CRT, DEP, ENO, LUR(E).
@BENZYLDIMETHYL(MIXED ALKYL)AMMONIUM CHLORIDE - - -	: AAC, BRD, FIN, ONX, RH, SDH.
BENZYLDIMETHYL(TALLOW ALKYL)AMMONIUM CHLORIDE	:
- - - - -	: ENO.
@BENZYLDIMETHYLOCTADECYLAMMONIUM CHLORIDE - - - - -	: FIN, HLI, ONX, RH, SCP, SNW, TNI.
BENZYLDIMETHYLTETRADECYLAMMONIUM CHLORIDE- - - - -	: SDH.
BENZYLDODECYLDIMETHYLAMMONIUM CHLORIDE - - - - -	: ONX.
BENZYL(HYDROGENATED TALLOW ALKYL)DIMETHYLAMMONIUM	:
CHLORIDE- - - - -	: ENO.
1-BENZYLPIRIDINIUM CHLORIDE- - - - -	: DEP.
BENZYLTRIMETHYLAMMONIUM CHLORIDE - - - - -	: CIN, CRT, SNW, TCC.
(3,4-DICHLOROBENZYL)DODECYLDIMETHYLAMMONIUM CHLORI	:
DE- - - - -	: ONX.
(DODECYLBENZYL) TRIETHYLAMMONIUM CHLORIDE - - - - -	: PC(E).
2-DODECYLISOQUINOLINIUM BROMIDE- - - - -	: ONX.
(DODECYLMETHYLBENZYL) TRIMETHYLAMMONIUM CHLORIDE- -	: RH.
1-DODECYLPYRIDINIUM CHLORIDE - - - - -	: DAN, X.
(ETHYLBENZYL) DIMETHYL(MIXED ALKYL) AMMONIUM CHLORID	:
E - - - - -	: BRD.
1-(MIXED ALKYL) QUINOLINIUM ETHYL SULFATE - - - - -	: DEX.

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TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C A T I O N I C - C O N T I N U E D	
@QUATERNARY AMMONIUM SALTS, NOT CONTAINING OXYGEN--CON.	
@BENZENOID--CONTINUED	
QUATERNARY AMMONIUM SALTS NOT CONTAINING OXYGEN, C	
YCLIC, ALL OTHER-	CCL, PIN, ICI, SCP.
OTHER CATIONIC SURFACE-ACTIVE AGENTS:	
MIXED SUBSTITUTED OXIMES	
TALLOW AMINE, ETHOXYLATED AND PROPOXYLATED, METHYL S	GMM.
ULFATE-	DUP.
TALLOW AMINE, ETHOXYLATED, QUATERNARY AMMONIUM SALT	DUP.
CATIONIC SURFACE-ACTIVE AGENTS, ALL OTHER-	APX, WTC.
N O N I O N I C	
@CARBOXYLIC ACID AMIDES:	
@DIETHANOLAMINE CONDENSATES (AMINE/ACID RATIO = 2/1):	
CAPRIC ACID-	SCP, TCH.
CASTOR OIL ACIDS-	CGY, CLI, NTL, PC(E).
@COCONUT OIL ACIDS-	ACT, AKS, ARD, ARL, AZS, BRD, BSW, CCL, CIN, CLI, CRT,
	CTL, DA, DEP, ECC, HRT, KNP, LUR(E), MCP, MOA, MRV,
	PC(E), PEK, PG, PVO, RCD, SBC, SCP, STP, TCH, VAL,
	VND, WTC, X.
@COCONUT OIL AND TALLOW ACIDS-	AZS, CLI, ESS, MOA, PG, SCP, UNN.
@LAURIC ACID-	BRD, CLI, DA, HRT, MOA, SOS.
LAURIC AND MYRISTIC ACIDS-	HRT, MOA, PG, RCD, SBC, STP, TCH.
@LINOLEIC ACID-	HRT, KNP, VND.
@OLEIC ACID-	CCW, CLI, EMR, PVO, SBC, SCP, STP, TCH.
PELARGONIC ACID-	TCH.
SOYBEAN OIL ACIDS-	MOA.
@STEARIC ACID-	CLI, CTL, ONX, SCO, VAL.
@TALL OIL ACIDS-	MOA, SOS, WTC.
TALLOW ACIDS-	HRT, SOS.
DIETHANOLAMINE CONDENSATES (AMINE/ACID = 2/1), AL	
L OTHER-	SCP.
@DIETHANOLAMINE CONDENSATES (AMINE/ACID RATIO = 1/1):	
CAPRIC ACID-	MOA.
@COCONUT OIL ACIDS-	ARD, AZS, CGY, CHP, CLI, CON, CTL, DA, HLI, JRG, MOA,
	MRV, ONX, PIL, SBC, SCP, STP, TCC, WTC.
ISOSTEARIC ACID-	MOA.
@LAURIC ACID-	ARD, AZS, CLI, EPH, HLI, LEV, MOA, ONX, SBC, SCP, TCH.
LAURIC AND MYRISTIC ACID-	CLI, SBC, SCP.

SURFACE-ACTIVE AGENTS

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TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC - CONTINUED	
@CARBOXYLIC ACID AMIDES--CONTINUED	
@DIETHANOLAMINE CONDENSATES (AMINE/ACID RATIO = 1/1)--CONTINUED	
LINOLEIC ACID-	EMK (E), SBC.
MYRISTIC ACID-	MOA.
OLEIC ACID -	EPH, HLI, SBC.
PALMITIC AND STEARIC ACIDS -	MOA.
SOYBEAN OIL ACIDS-	MOA.
@STEARIC ACID -	AZS, CGY, CHP, ECC, EPH, MRV, VPC.
TALL OIL ACIDS -	ECC, EPH.
TALLOW ACIDS -	EPH, MOA, RPC, TCH.
DIETHANOLAMINE CONDENSATES, AMINE/ACID RATIO=1/1,	
ALL OTHER -	HLI, STP.
ALL OTHER CARBOXYLIC ACID AMIDES:	
ALKANOLAMINE CONDENSATES, ALL OTHER-	SBC, TCH.
CARBOXYLIC ACID-ALKANOLAMINE CONDENSATE, ALKOXYLAT	
ED, ALL OTHER -	PG.
CARBOXYLIC ACID-DIAMINE AND POLYAMINE CONDENSATE,	
ALL OTHER -	HUM.
COCONUT OIL ACIDS (AMINE/ACID RATIO=14/1) -	JRG.
COCONUT OIL ACIDS (AMINE/ACID RATIO=2/1) -	STP, TCH, VND.
COCONUT OIL ACIDS (AMINE/ACID RATIO=1/1) -	ARD, HLI, HUM, MOA, PG, SCP, STP, WTC.
COCONUT OIL ACIDS-ETHANOLAMINE CONDENSATE, ETHOXYL	
ATED-	STP.
DIETHANOLAMINE CONDENSATES, ALL OTHER -	ORO.
ETHANOLAMINE CONDENSATES, ALL OTHER-	EPH.
ISOPROPANOLAMINE CONDENSATES, ALL OTHER-	EPH, SBC, WTC.
LAURIC ACID - ETHANOLAMINE CONDENSATE -	MOA.
LAURIC ACID - ISOPROPANOLAMINE CONDENSATE -	CLI, MOA, SNW.
LAURIC AND MYRISTIC ACIDS - ETHANOLAMINE CONDENSATE -	MOA, SCP.
LAURIC AND MYRISTIC ACIDS - ISOPROPANOLAMINE	
CONDENSATE -	LEV.
OLEIC ACID-ETHANOLAMINE CONDENSATE, ETHOXYLATED-	DA, GAP.
PALMITIC ACID-DIETHANOLAMINE CONDENSATE, ALKOXYLAT	
ED-	ROB.
STEARIC ACID-ETHANOLAMINE CONDENSATE (AMINE/ACID RATIO=2/1):	CLI, ECC.
STEARIC ACID-ETHANOLAMINE CONDENSATE (AMINE/ACID RATIO=1/1):	HAL, MOA, SBC, VND, WTC.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NON I O N I C - C O N T I N U E D	
@CARBOXYLIC ACID AMIDES--CONTINUED	
@ALL OTHER CARBOXYLIC ACID AMIDES--CONTINUED	
STEARIC ACID (RATIO = 1/2) - - - - -	WTC.
STEARIC ACID-ETHYLENEDIAMINE CONDENSATE (AMINE/ACID: RATIO=1/2) - - - - -	DA.
@CARBOXYLIC ACID ESTERS:	
@ANHYDROSORBITOL ESTERS:	
ANHYDROSORBITOL DIOLEATE - - - - -	ICI.
ANHYDROSORBITOL MONOESTER OF TALL OIL ACIDS- - - - -	HDG, ICI.
ANHYDROSORBITOL MONOLAURATE- - - - -	AAC, GLY, HDG, ICI, TCH.
ANHYDROSORBITOL MONO-OLEATE- - - - -	GLY, HDG, ICI, TCH.
ANHYDROSORBITOL MONOPALMITATE- - - - -	GLY, ICI, TCH.
ANHYDROSORBITOL MONOSTEARATE - - - - -	GLY, ICI, PVO, TCH.
ANHYDROSORBITOL SESQUIOLEATE - - - - -	GLY, TCH.
ANHYDROSORBITOL TRIESTER OF TALL OIL ACIDS - - - - -	GLY.
ANHYDROSORBITOL TRIOLEATE- - - - -	GLY, ICI, TCH.
ANHYDROSORBITOL TRISTEARATE- - - - -	AAC, GLY, ICI, PVO, TCH.
ANHYDROSORBITOL ESTERS, ALL OTHER- - - - -	CHP, ICI.
@DIETHYLENE GLYCOL ESTERS:	
@DIETHYLENE GLYCOL DISTEARATE - - - - -	ARC, GLY, VAL.
DIETHYLENE GLYCOL MONOESTER OF COCONUT OIL ACIDS - - - - -	DA.
DIETHYLENE GLYCOL MONOLAURATE- - - - -	ECC, GLY, HAL, WM.
DIETHYLENE GLYCOL MONO-OLEATE- - - - -	ARC, HAL.
DIETHYLENE GLYCOL MONORICINOLEATE- - - - -	DA.
@DIETHYLENE GLYCOL MONOSTEARATE - - - - -	ARC, CHP, CLI, HAL, HDG, VND.
DIETHYLENE GLYCOL SESQUIESTER OF TALL OIL ACIDS- - - - -	ECC.
DIETHYLENE GLYCOL SESQUILAURATE- - - - -	ARC, GLY.
DIETHYLENE GLYCOL SESQUISTEARATE - - - - -	WTC.
@ETHOXYLATED ANHYDROSORBITOL ESTERS:	
ETHOXYLATED ANHYDROSORBITOL MONOLAURATE- - - - -	AAC, GLY, HDG, ICI, MIL, PVO, TCH.
@ETHOXYLATED ANHYDROSORBITOL MONO-OLEATE- - - - -	AAC, EMR, GLY, HDG, ICI, PVO, TCH.
ETHOXYLATED ANHYDROSORBITOL MONOPALMITATE- - - - -	AAC, ICI.
@ETHOXYLATED ANHYDROSORBITOL MONOSTEARATE - - - - -	AAC, EKT, GLY, HDG, ICI, PVO, TCH.
ETHOXYLATED ANHYDROSORBITOL TRIESTER OF TALL OIL A - - - - -	
CIDS- - - - -	GLY, ICI.
ETHOXYLATED ANHYDROSORBITOL TRIOLEATE- - - - -	AAC, GLY, ICI, TCH.
ETHOXYLATED ANHYDROSORBITOL TRISTEARATE- - - - -	AAC, GLY, HDG, ICI, TCH.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC - CONTINUED	
@CARBOXYLIC ACID ESTERS--CONTINUED	
ETHOXYLATED SORBITOL ESTERS:	
ETHOXYLATED SORBITOL BEESWAX ESTER - - - - -	ICI.
ETHOXYLATED SORBITOL HEXAESTER OF TALL OIL ACIDS -	TCH.
ETHOXYLATED SORBITOL HEXAOLEATE- - - - -	ICI, TCH.
ETHOXYLATED SORBITOL LANOLIN ESTER - - - - -	ICI.
ETHOXYLATED SORBITOL MONO-OLEATE - - - - -	ICI.
ETHOXYLATED SORBITOL PENTALAURATE- - - - -	ICI.
ETHOXYLATED SORBITOL TETRAESTER OF LAURIC AND OLEI C ACIDS - - - - -	ICI.
ETHOXYLATED SORBITOL TETRAOLEATE - - - - -	ICI.
ETHOXYLATED SORBITOL ESTERS, ALL OTHER - - - - -	ICI.
@ETHYLENE GLYCOL ESTERS:	
ETHYLENE GLYCOL DISTEARATE - - - - -	ARC, EMR, HAL, HUM, TCH, WM.
ETHYLENE GLYCOL MONOSTEARATE - - - - -	ARC, CLI, GLY, HAL, HDG, KNP, TCH, VND, WM.
@GLYCEROL ESTERS:	
@COMPLEX GLYCEROL ESTERS:	
GLYCEROL DIACETYLTARTRATE MONOSTEARATE - - - - -	WTC.
GLYCEROL MONOESTER OF MIXED FATTY ACIDS, SUCCINY LATED - - - - -	EKT.
COMPLEX GLYCEROL ESTERS, ALL OTHER - - - - -	GLY, SCP, WM.
@GLYCEROL ESTERS OF CHEMICALLY DEFINED ACIDS:	
GLYCEROL DILAURATE - - - - -	VND.
GLYCEROL DIOLEATE- - - - -	ARC, HAL, X.
GLYCEROL DISTEARATE- - - - -	APX.
GLYCEROL MONOCAPRYLATE - - - - -	ARC, PVO.
@GLYCEROL MONOLAURATE - - - - -	ARC, GLY, HAL.
@GLYCEROL MONO-OLEATE - - - - -	ARC, CCW, EMR, GLY, GRO, HAL, HDG, PVO, TCH, WM, WTC.
GLYCEROL MONORICINOLEATE - - - - -	GLY, HDG.
@GLYCEROL MONOSTEARATE- - - - -	ARC, ASH, BLS, CHL, CIN, EMR, GLY, GRO, HAL, HRT, PVO, TCH, VND, WM, WTC.
GLYCEROL ESTERS OF CHEMICALLY DEFINED ACIDS, ALL OTHER- - - - -	ARC.
@GLYCEROL ESTERS OF MIXED ACIDS:	
@GLYCEROL MONOESTER OF COCONUT OIL ACIDS- - - - -	GLY, PVO, WTC.
GLYCEROL MONOESTER OF COTTONSEED OIL ACIDS - - -	EKT.
@GLYCEROL MONOESTER OF HYDROGENATED COTTONSEED OI L ACIDS - - - - -	EKT, LEV, WM.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC - CONTINUED	
@CARBOXYLIC ACID ESTERS--CONTINUED	
@GLYCEROL ESTERS--CONTINUED.	
@GLYCEROL ESTERS OF MIXED ACIDS--CONTINUED	
@GLYCEROL MONOESTER OF HYDROGENATED SOYBEAN OIL A	
CIDS- - - - -	: BFP, EKT, GLD, PVO, TCH, WTC.
@GLYCEROL MONOESTER OF LARD ACIDS - - - - -	: EKT, GLY, PVO.
GLYCEROL MONOESTER OF PALM OIL ACIDS - - - - -	: EKT.
GLYCEROL MONOESTER OF PEANUT OIL ACIDS - - - - -	: GLD.
GLYCEROL MONOESTER OF SAFFLOWER OIL ACIDS- - - - -	: EKT.
GLYCEROL MONOESTER OF TALL OIL ACIDS - - - - -	: EKT, FER, WTC.
GLYCEROL MONOESTER OF TALLOW ACIDS - - - - -	: BFP.
GLYCEROL MONOESTER OF MIXED VEGETABLE OIL ACIDS -	: BFP, EKT, LEV.
GLYCEROL SESQUIESTER OF HYDROGENATED TALLOW ACID :	
S - - - - -	: JRG.
GLYCEROL ESTERS OF MIXED ACIDS, ALL OTHER- - - - -	: GLD, ICI, PG, SLM, TCH, WTC.
@NATURAL FATS AND OILS, ETHOXYLATED:	
@CASTOR OIL, ETHOXYLATED- - - - -	: AAC, DA, GAP, ICI, MIL, NLC, NTL, PVO, TCH, TMH.
CORN OIL, ETHOXYLATED- - - - -	: TCH.
HYDROGENATED CASTOR OIL, ETHOXYLATED - - - - -	: DA, ICI, TCH.
@LANOLIN, ETHOXYLATED - - - - -	: AAC, CRD, CRN, ICI, MIL, TCH.
OLEIC ACID, ETHOXYLATED- - - - -	: TMH.
TALL OIL ACIDS, ETHOXYLATED- - - - -	: DA, JCC, TCH.
NATURAL FATS AND OILS, ETHOXYLATED, ALL OTHER- - -	: ARC, MIL, TCH.
@POLYETHYLENE GLYCOL ESTERS:	
@POLYETHYLENE GLYCOL ESTERS OF CHEMICALLY DEFINED	
ACIDS:	
@POLYETHYLENE GLYCOL DILAURATE- - - - -	: ARC, DA, GLY, HAL, TCH, WM.
@POLYETHYLENE GLYCOL DIOLEATE - - - - -	: ARC, BRD, CGY, CLD, EPF, GLY, HAL, SLC, TCH, VND, WM.
@POLYETHYLENE GLYCOL DISTEARATE - - - - -	: ARC, CHP, GLY, HAL, HDG, SBC, TCH.
@POLYETHYLENE GLYCOL MONOLAURATE- - - - -	: ARC, BRD, CGY, DA, EPF, EMR, GLY, HAL, ICI, TCH, WM.
@POLYETHYLENE GLYCOL MONO-OLEATE- - - - -	: ARC, BRD, CCA, CIN, CLD, CRT, DA, DEX, EPF, GAP, GLY, : HAL, HDG, MRV, ONX, SCP, TCH, WM.
POLYETHYLENE GLYCOL MONOPALMITATE- - - - -	: ICI, KNP.
@POLYETHYLENE GLYCOL MONOSTEARATE - - - - -	: ARC, ARL, CGY, CHP, CIN, CRT, DA, DEP, EPF, EMR, GAP, : GLY, HAL, HRT, ICI, PC(E), PVO, SLC, SOS, TCH, WM, : WTC.
POLYETHYLENE GLYCOL MONOTALLATE- - - - -	: FER.
POLYETHYLENE GLYCOL SESQUIOLEATE - - - - -	: EPF, TCH, WTC.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC - CONTINUED	
@POLYETHYLENE GLYCOL ESTERS OF CHEMICALLY DEFINED ACIDS--CONTINUED	
POLYETHYLENE GLYCOL ESTERS OF CHEMICALLY DEFINED ACIDS, ALL OTHER - - - - -	EPH, ICI, TCH.
@POLYETHYLENE GLYCOL ESTERS OF MIXED ACIDS:	
POLYETHYLENE GLYCOL DIESTER OF TALL OIL ACIDS- -	EPH, NLC.
POLYETHYLENE GLYCOL MONOESTER OF SOYBEAN OIL ACI DS- - - - -	GLY, TCH.
POLYETHYLENE GLYCOL MONOESTER OF TALL OIL ACIDS	TCH.
POLYETHYLENE GLYCOL MONOESTER OF TALL OIL ACIDS, ETHOXYLATED- - - - -	NLC.
POLYETHYLENE GLYCOL SESQUIESTER OF COCONUT OIL A CIDS- - - - -	ARC, GLY, MRT(E), STC, VND, WTC.
POLYETHYLENE GLYCOL SESQUIESTER OF ROSIN ACIDS -	HPC.
POLYETHYLENE GLYCOL SESQUIESTER OF TALL OIL ACID S - - - - -	ARC, AZS, ICI, SLM, SOS.
POLYETHYLENE GLYCOL SESQUIESTER OF TALLOW ACIDS	ARC.
POLYETHYLENE GLYCOL ESTERS OF MIXED ACIDS, ALL O THER- - - - -	ECC, EPH, GLD, ICI, MCP, TCH.
POLYGLYCEROL ESTERS:	
POLYGLYCEROL DISTEARATE- - - - -	GLY.
POLYGLYCEROL MONO-OLEATE - - - - -	HDG, PVO, VND, WTC.
POLYGLYCEROL MONOSTEARATE- - - - -	PVO, TCH.
POLYGLYCEROL ESTERS, ALL OTHER - - - - -	GLD, PVO, TCH, WTC.
@PROPANEDIOL ESTERS:	
1,2-PROPANEDIOL DIOLEATE - - - - -	X.
1,3-PROPANEDIOL MONOESTER OF COCONUT OIL ACIDS - -	GLY, WM.
@1,2-PROPANEDIOL MONOLAURATE- - - - -	ARC, PVO, SBC.
1,2-PROPANEDIOL MONO-OLEATE- - - - -	HAL.
@1,2-PROPANEDIOL MONOSTEARATE - - - - -	ARC, EPH, EKT, GLY, HAL, ICI, TCH, WM, WTC.
1,2-PROPANEDIOL SESQUIESTER OF HYDROGENATED TALLOW ACIDS- - - - -	JRG.
PROPANEDIOL ESTERS, ALL OTHER- - - - -	PVO, TCH.
OTHER CARBOXYLIC ACID ESTERS:	
CETYL PALMITATE- - - - -	ROB.
DI-ISOBUTYLENE MALEATE - - - - -	RH.
ETHOXYLATED 1,2-PROPANEDIOL MONOSTEARATE - - - -	ICI.
LAURIC ACID ESTER OF GLYCEROL AND ETHOXYLATED NONY LPHENOL - - - - -	TCC.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC - CONTINUED	
OTHER CARBOXYLIC ACID ESTERS--CONTINUED	
METHYLGLUCOSIDE LAURATE-	HDG.
PENTAERYTHRITOL STEARATE -	VAL.
POLYALKYLENE GLYCOL ADIPATE-	NLC.
CARBOXYLIC ACID ESTERS, ALL OTHER-	ARC, CCW, HDG, STC, TCH.
@ETHERS:	
@BENZENOID ETHERS:	
ALKYLPHENOL-FORMALDEHYDE CONDENSATES, ALKOXYLATED,	
ALL OTHER-	AAC.
DIISOBUTYLPHENOL, ETHOXYLATED-	GAF.
DINONYLPHENOL, ETHOXYLATED -	GAF, JCC, TCH.
@DODECYLPHENOL, ETHOXYLATED -	DA, GAF, MON, TCH, TMH.
ISO-OCTYLPHENOL, ETHOXYLATED -	AAC, DA, RH.
(MIXED ALKYL) PHENOL, ETHOXYLATED -	MIL, RH, TCH.
(MIXED ALKYL) PHENOL, ETHOXYLATED, BUTYL ETHER-	NTL.
(MIXED ALKYL) PHENOL-FORMALDEHYDE -	ARC, NLC.
(MIXED ALKYL) PHENOXYPOLY (ETHYLENEOXY) ETHYL CHLORID :	
E -	GAF.
@NONYLPHENOL, ETHOXYLATED -	AZS, DA, EMR, GAF, HDG, ICI, JCC, MIL, MON, NLC, OMC,
	RE, STP, TCH, TMH, UCC, WTC.
NONYLPHENOL-FORMALDEHYDE, ALKOXYLATED-	NLC.
NONYLPHENOXYPOLY (ETHYLENEOXY) ETHYL IODIDE-	GAF.
NORMAL-OCTYLPHENOL, ETHOXYLATED-	TCH, TMH.
TERT-OCTYLPHENOL-FORMALDEHYDE, ETHOXYLATED -	ARC, DA, SDW.
@PHENOL, ETHOXYLATED-	DA, GAF, ICI, TCH, UCC, WTC.
TETRADECYLPHENOL ETHOXYLATED -	ORO.
TRIDECYLPHENOL, ETHOXYLATED-	TCH.
XYLENOL, ETHOXYLATED -	NLC.
BENZENOID ETHER, ALL OTHER -	DA, EPH.
@NONBENZENOID ETHERS:	
@LINEAR ALCOHOLS, ALKOXYLATED:	
DECYL ALCOHOL,ETHOXYLATED-	GAF, ICI, TCH, VPC, WTC.
DECYLOXYPOLY (ETHYLENEOXY) ETHYL CHLORIDE-	GAF.
@DODECYL ALCOHOL, ETHOXYLATED -	AAC, DUP(E), GAF, HDG, ICI, MIL.
@HEXADECYL ALCOHOL, ETHOXYLATED -	AAC, EMR, ICI, TCH.
@OCTADECYL ALCOHOL, ETHOXYLATED -	CRD, DUP, GAF, HDG, ICI, TCH, VPC.
@9-OCTADECENYL ALCOHOL, ETHOXYLATED -	AAC, GAF, ICI, TCH.

TABLE 2.--SURFACE-ACTIVE AGENTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

SURFACE-ACTIVE AGENTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
NONIONIC - CONTINUED	
@NONBENZENOID ETHERS--CONTINUED	
@LINEAR ALCOHOLS, ALKOXYLATED--CONTINUED	
OLEYL ALCOHOL, ETHOXYLATED - - - - -	CRN.
WOOL WAX ALCOHOLS, ETHOXYLATED	
- - - - -	CRD.
COCONUT OIL ALCOHOL, ETHOXYLATED - - - - -	GLY, JCC, VPC.
DECYL AND OCTYL ALCOHOLS, ETHOXYLATED-	GAF.
@MIXED LINEAR ALCOHOLS, ETHOXYLATED AND PROPOXYLATE	
D - - - - -	BAS, DUP, JCC, STP, TCH, UCC, WTC.
@MIXED LINEAR ALCOHOLS, ETHOXYLATED - - - - -	AAC, BAS, CO, DUP, GAF, HDG, JCC, NLC, RH, SHC, STP, TCH, UCC, WTC.
PRIMARY ALCOHOLS, ETHOXYLATED- - - - -	RH.
TALLOW ALCOHOL, ETHOXYLATED- - - - -	AAC, JCC.
LINEAR ALCOHOLS, ALKOXYLATED, ALL OTHER- - - - -	GAF, GLY, ICI, TCH.
@OTHER ETHERS AND THIOETHERS:	
CORN STARCH, PROPOXYLATED- - - - -	VAL.
TERT-DODECYL MERCAPTAN, ETHOXYLATED- - - - -	AAC.
GLUCOSIDE, ETHOXYLATED - - - - -	RH.
GLYCERINE, ALKOXYLATED - - - - -	NLC.
ISODECYL ALCOHOL, ETHOXYLATED- - - - -	TCH.
MIXED ALCOHOLS, ETHOXYLATED- - - - -	CRN, PVO.
POLY(MIXED ETHYLENE, PROPYLENE) GLYCOL-	BAS, NLC, UCC.
POLYOXYALKYLENE GLYCOLS, ALKOXYLATED - - - - -	NLC.
POLYPROPYLENE GLYCOL, ETHOXYLATED- - - - -	NLC, WTC.
TRIDECYL ALCOHOL, ETHOXYLATED- - - - -	AAC, DUP, GAF, ICI, JCC, MIL, MON, NLC, OMC, TCH, TMH.
TRIDECYL ALCOHOL, PROPOXYLATED AND ETHOXYLATED - - - - -	JCC.
TRIMETHYLHEPTANOL, ETHOXYLATED - - - - -	TCH.
TRIMETHYLNONYL ALCOHOL, ETHOXYLATED- - - - -	HDG, UCC.
TRIMETHYLOLPROPANE, ALKOXYLATED- - - - -	BAS, HDG.
ETHERS AND THIOETHERS, ALL OTHER - - - - -	GLY, TCH.
OTHER NONIONIC SURFACE-ACTIVE AGENTS:	
OCTYL PHOSPHATE, ETHOXYLATED - - - - -	DUP.
TRI(CASTOR OIL ALKYL)PHOSPHATE - - - - -	GLY.
TRIMETHYLALPROPANE, ETHOXYLATED- - - - -	DUP.
NONIONIC SURFACE-ACTIVE AGENTS, ALL OTHER- - - - -	AIP, CHP, ICI, MIL.

TABLE 3.--SURFACE-ACTIVE AGENTS: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production or sales of surface-active agents to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
AAC	Alcolac Chemical Corp.	EKT	Eastman Kodak Co., Tennessee Eastman Co. Div.
ACT	Arthur C. Trask Co.	EMK	Emkay Chemical Co.
ACY	American Cyanamid Co.	EMR	Emery Industries, Inc.
AES	Penetone Corp.	ENO	Enenco, Inc.
AGP	Armour-Dial, Inc.	ESS	Essential Chemicals Corp.
AIP	Air Products & Chemicals, Inc.		
AKS	Arkansas Co., Inc.	FER	Ferro Corp., Keil Chemical Div.
APX	Apex Chemical Co., Inc.	FIN	Hexcel Corp., Fine Organics Div.
ARC	Armak Co.		
ARD	Ardmore Chemical Co.	GAF	GAF Corp., Chemical Div.
ARL	Arol Chemical Products Co.	GLD	SCM Corp., Durkee Div.
ASH	Ashland Oil, Inc., Ashland Chemical Co.	GLY	Glyco Chemicals, Inc.
ASY	American Synthetic Rubber Corp.	GNM	General Mills Chemicals, Inc.
ATR	Atlantic Richfield Co., ARCO Chemical Co.	GRC	Chemed Corp., Dubois Chemicals Div.
AZS	AZS Corp., AZ Products Co. Div.	GRD	W.R. Grace & Co., Polymer & Chemicals Div.
		GRL	Chemed Co., Vestal Laboratories, Inc.
BAO	Bayoil Co., Inc.	GRO	A. Gross & Co., Millmaster Onyx Group, Kewanee Industries, Inc.
BAS	BASF Wyandotte Corp.		
BFP	Breddo Food Products Co., Inc.	HAL	C.P. Hall Co.
BLA	Astor Products, Inc., Blue Arrow Div.	HDG	Hodag Chemical Corp.
BLS	Life Savers, Inc.	HEW	Hewitt Soap Co., Inc.
BRD	Lonza, Inc.	HK	Hooker Chemicals & Plastics Corp.
BSW	Original Bradford Soap Works, Inc.	HLI	Haag Laboratories, Inc.
		HMP	W.R. Grace & Co., Organic Chemicals Div.
CCA	Interstab Chemical, Inc.	HNT	Huntington Laboratories, Inc.
CCL	Catawba-Charlab, Inc.	HPC	Hercules, Inc.
CCW	Cincinnati Milacron Chemicals, Inc.	HRT	Hart Products Corp.
CEL	Celanese Corp., Celanese Coatings & Specialties Co., Wica Plant	HUM	Kraft, Inc., Humko Products Div.
CGY	Ciba-Geigy Corp.		
CHL	Chemol, Inc.	ICI	ICI United States, Inc., Specialty Chemicals Group
CHP	C.H. Patrick & Co., Inc.	IMC	IMC Chemical Group, Inc.
CIN	Cindet Chemicals, Inc.		
CLD	Colloids, Inc.	JCC	Jefferson Chemical Co., Inc.
CLI	Clintwood Chemical Co.	JOR	Jordan Chemical Co.
CO	Continental Oil Co.	JRG	Andrew Jergens Co.
CON	Concord Chemical Co., Inc.		
CP	Colgate-Palmolive Co.	KAL	Pathan Chemical Co.
CRD	Croda, Inc.	KNP	Knapp Products, Inc.
CRN	CPC International, Inc., Amerchol		
CRT	Crest Chemical Corp.	LAK	Lakeway Chemicals, Inc.
CRZ	Crown Zellerbach Corp., Chemical Products Div.	LEA	Leatex Chemical Co.
CST	Charles S. Tanner Co.	LEV	Lever Brothers Co.
CTL	Continental Chemical Co.	LIL	Eli Lilly & Co.
CWP	Consolidated Papers, Inc.	LKY	Lake States Div. of St. Regis Paper Co.
		LMI	North American Chemical Co.
DA	Diamond Shamrock Corp.	LUR	Laurel Products Corp.
DAN	Dan River, Inc.		
DEP	DePaul Chemical Co., Inc.	MAR	American Can Co., Wood Chemicals Div.
DEX	Dexter Chemical Corp.	MCP	Moretex Chemical Products, Inc.
DOW	Dow Chemical Co.	MIL	Milliken & Co., Milliken Chemical Div.
DUP	E.I. duPont de Nemours & Co., Inc.	MIR	Miranol Chemical Co., Inc.
DYS	Davies-Young Co.	MOA	Mona Industries, Inc.
		MON	Monsanto Co.
ECC	Eastern Color & Chemical Co.		
EFH	E.F. Houghton & Co.		

SYNTHETIC ORGANIC CHEMICAL, 1976

TABLE 3.--SURFACE-ACTIVE AGENTS: DIRECTORY OF MANUFACTURERS, 1976--CONTINUED

Code	Name of company	Code	Name of company
MRA	Bostik South, Inc.	SEA	Seaboard Chemicals, Inc.
MRD	Marden-Wild Corp.	SFS	Stauffer Chemical Co., Specialty Div.
MRT	Morton Chemical Co. Div. of Morton Norwich Products, Inc.	SHC	Shell Oil Co., Shell Chemical Co. Div.
MRV	Marlowe-Van Loan Corp.	SID	George F. Siddall Co., Inc.
		SLC	Soluol Chemical Co., Inc.
NCW	Nostrup Chemical Works, Inc.	SLM	Salem Oil & Grease Co.
NES	Nease Chemical Co., Inc.	SM	Mobil Oil Corp., Mobil Chemical Co., Chemical Coatings Div.
NLC	Nalco Chemical Co.	SNW	Sun Chemical Corp., Chemicals Div.
NMC	National Milling & Chemical Co., Inc.	SOC	Standard Oil Co. of California, Chevron Chemical Co.
NPR	Safeway Stores, Inc.	SOP	Southern Chemical Products Co., Inc.
NTL	NL Industries, Inc.	SOS	Southern Sizing Co.
NW	Northwestern Chemical Co.	SPA	Scott Paper Co.
OMC	Olin Corp.	STC	American Hoechst Corp., Sou-Tex Works
ONX	Millmaster Onyx Corp., Onyx Chemical Co.	STP	Stepan Chemical Co.
ORO	Chevron Chemical Co.	TCC	Tanatex Chemical Corp.
PC	Proctor Chemical Co., Inc.	TCH	Emery Industries, Inc., Trylon Div.
PCH	Peerless Chemical Co.	TCI	Texize Chemical Co.
PEK	Peck's Products Co.	TEN	Cities Service Co., Copperhill Operations
PFZ	Pfizer, Inc.	TMH	Thompson-Hayward Chemical Co.
PG	Procter & Gamble Co. and Procter & Gamble Paper Products Co.	TNA	Ethyl Corp.
PIL	Pilot Chemical Co.	TNI	The Gillette Co., Chemical Div.
PLX	Plex Chemical Corp.	TXC	Tex Chem. Co.
PNX	Murphy-Phoenix Co.		
PRX	Purex Corp.	UCC	Union Carbide Corp.
PSP	Georgia-Pacific Corp., Bellingham Div.	UDI	Petrochemicals Co., Inc.
PVO	PVO International, Inc.	UNN	United Chemical Corp. of Norwood
		UNP	United Chemical Products Corp.
QCP	Quaker Chemical Corp.	USR	Uniroyal, Inc., Chemical Div.
RAY	ITT Rayonier, Inc.	VAL	Valchem
RBC	Fike Chemicals, Inc.	VND	Van Dyk & Co., Inc.
RCD	Richardson Co., Organic Chemical Div.	VPC	Mobay Chemical Corp., Verona Div.
RH	Rohm & Haas Co.		
ROB	Robeco Chemicals, Inc.	WAW	W.A. Wood Co.
RPC	Millmaster Onyx Corp., Refined-Onyx Div.	WAY	Philip A. Hunt Chemical Corp., Organic Chemical Div.
S	Sandoz, Inc., Sandoz Colors & Chemical Div.	WBG	White & Bagley Co.
SBC	Scher Bros. Inc.	WHI	White & Hodges, Inc.
SBP	Sugar Beet Products Co.	WHW	Whittemore-Wright Co., Inc.
SCO	Scholler Bros., Inc.	WM	Inolex Corp.
SCP	Henkel, Inc.	WTC	Witco Chemical Co., Inc.
SDC	Martin-Marietta Corp., Sodyeco Div.	WVA	Westvaco Corp., Chemicals Div., Polychemicals Dept.
SDH	Sterling Drug, Inc.:		
SDW	Hilton-Davis Chemical Div.		
	Winthrop Laboratories Div.		

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

PESTICIDES AND RELATED PRODUCTS

PESTICIDES AND RELATED PRODUCTS

Edmund Cappuccilli

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 thus exclude such materials as diluents, emulsifiers, and wetting agents.

U.S. production of pesticides and related products in 1976 amounted to 1,364 million pounds--14.9 percent less than the 1,603 million pounds reported for 1975 (table 1).¹ Sales in 1976 were 1,193 million pounds, a decrease of 10.2 percent, as compared with 1,328 million pounds reported in 1975; the value of sales was \$2,410 million in 1976, compared with \$2,366 million in 1975--a small increase of 1.8 percent.

The output of cyclic pesticides and related products amounted to 940 million pounds in 1976--21.4 percent less than the 1,196 million pounds produced in 1975. Sales in 1976 were 839 million pounds, valued at \$1,844 million, compared with 965 million pounds, valued at \$1,891 million in 1975. Production of acyclic pesticides and related products in 1976 amounted to 424 million pounds, compared with 407 million pounds reported for 1975, an increase of 4.3 percent. Sales in 1976 were 354 million pounds, a decrease of about 2.6 percent, as compared with 363 million pounds reported in 1975; the value of sales was \$566 million in 1976, compared with \$475 million in 1975--an increase of 19.1 percent.

¹ See also table 2 which lists these products and identifies the manufacturers by codes. These codes are given in table 3.

Pesticides

In 1976, while other sectors of the chemical industry were rebounding from the recession of 1975, the production of synthetic organic pesticides decreased by approximately 15 percent. The quantity of sales also declined from the 1975 figures by 10 percent. The value of sales, however, remained at its 1975 level as the average unit value for pesticides increased from \$1.78 in 1975 to \$2.02 in 1976.

Weather conditions in various parts of the country and surplus inventories in the hands of both distributors and consumers are the causal factors behind the declines in production and in the quantity of sales. These factors, which depressed the industry in 1976, were temporary, and the statistics for 1977 should show improvement. The value of sales in 1976 (and 1977) has shown signs of slowing down as compared with previous years' increases. In 1974 and 1975, increases were approximately 32 percent per year while the unit values went from \$1.33 to \$1.78. These earlier increases were attributed principally to higher costs for fuel, labor, transportation, and raw materials which were often in short supply.

Herbicides

Herbicides were again the leading class of pesticides produced in the United States in 1976, accounting for approximately 50 percent of the total pesticides production as compared with 49 percent of the total in 1975. Herbicides' share of the total pesticide market in 1976 had earlier been estimated by industry to be much larger than 50 percent because of increased planting of certain crops in 1976. However, drought conditions in the Midwest and the West coupled with the price resistance of farmers all but eliminated the predicated larger increase. Production of most types of herbicides has been increasing over the past few years; however, for one class, the phenoxyacetic acids and their derivatives, production has been slowly declining. The main products in the group are 2,4-dichlorophenoxyacetic acid (2,4-D), 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), and their derivatives. In 1970, 10 companies were actively producing approximately 60 million pounds of these herbicides for consumption both here and abroad. By 1976, only seven companies were producing approximately the same amount of these herbicides while the total production of herbicides had increased from 404 million pounds in 1970 to over 800 million pounds in 1976. The two major reasons for the lack of growth of the phenoxyacetic acid herbicides are the increased use in the recent years of newer herbicides (e.g., triazine and urea-derivative herbicides), increased environmental controls, and greater competition by foreign pesticide producers.

Insecticides

The most significant trend in the production of insecticides in recent years has been the decrease of the organochlorine insecticides

(e.g., DDT) and the rise in the production of the organophosphorous insecticides (e.g., methyl parathion). This trend is illustrated in the following graph. The decline in the output of the organochlorine-type of insecticides can be attributed to two major factors: (1) a decrease in product effectiveness, and (2) an increase in regulations by the Environmental Protection Agency (EPA). With regard to product effectiveness, it has become apparent that insects exposed to a certain insecticide over a long period of time begin to develop immunity to that insecticide. The use of alternate products, such as organophosphorus insecticides, every other year decreases the degree of immunity.

In 1972, the EPA banned the use of DDT in the United States except in cases of extreme infestation. Since then, that agency has banned or severely limited the use of several other chlorinated insecticides, among them aldrin, chlordane, dieldrin, heptachlor, and mirex. Additional organochlorine insecticides are under investigation by the EPA for possible restriction in the near future. Further restrictions and controls will decrease the production of organochlorine insecticides still further in the next few years.

The production of organophosphorous insecticides surpassed the production of organochlorine insecticides for the first time in 1975 as pesticides producers began to increase production of alternative insecticides for farm use to replace aldrin and dieldrin, which were banned in 1974. The production of other insecticides, mainly the organophosphorous compounds, should increase rapidly over the next several years.

Imports and foreign industry

During the past few years, imports of benzenoid pesticides (TSUS item 405.15) have increased at a dramatic rate. In 1975, 50.4 million pounds of pesticides were imported into the United States. This was a 78-percent increase over 1974 when only 28.3 million pounds were imported. In 1976, benzenoid pesticide imports amounted to 62.1 million pounds, an increase of 23 percent over 1975, and they accounted for 7 percent of domestic consumption.

A sharp decline in the level of domestic inventories of pesticides in 1974 was a major reason for the large increase in imports of pesticides in 1975 over 1974. This drop in inventories was attributed to the oil embargo which led to raw material shortages and a resultant slowdown in the production of pesticides. Inventories were more than restored in 1975. The unit values and prices of imports have also increased, owing to an increase in demand as well as increases in the costs of transportation and fuel. The following table shows the increase in the value of imported benzenoid pesticides which occurred between 1974 and 1975. The 1975 value

of \$97.1 million was 127 percent over the 1974 value. The value of imports in 1976 amounted to \$128.8 million, an increase of 33 percent over that in 1975. It is expected that future increases in the value of pesticides will average about 10 to 15 percent per year.

For the past few years, imports of pesticides into the United States have come principally from four countries: Japan, Switzerland, the United Kingdom, and West Germany. As shown in the following table, these four countries have annually accounted for well over half of the imports under TSUS item 405.15 during the period 1973-76. From 1973 to 1975, United Kingdom producers annually allocated a large share of their expenditures to pesticide research and development. These producers have two distinct advantages over their U.S. counterparts in the area of research and development of new pesticides. First, it costs considerably less in the United Kingdom to develop a new pesticide than in the United States; approximately 50 percent less in some cases. Second, the United Kingdom has a more favorable working relationship between government and industry concerning the registration of new pesticides for public use. In addition, their firms aggressively market their new pesticide products in all the world markets, especially in the United States.

It does not seem likely that the growth of production and sale of pesticides in the future will match the gains of the past. Increasing pesticide prices caused by rising costs of raw materials, research, and Government registration will probably keep sales from rising at their previous rate. However, increased food production for both domestic and foreign markets and increased exports of pesticides to foreign markets should provide the industry with moderate growth in the near future.

PESTICIDES AND RELATED PRODUCTS

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U.S. Imports of pesticides, 1/ 1973-76

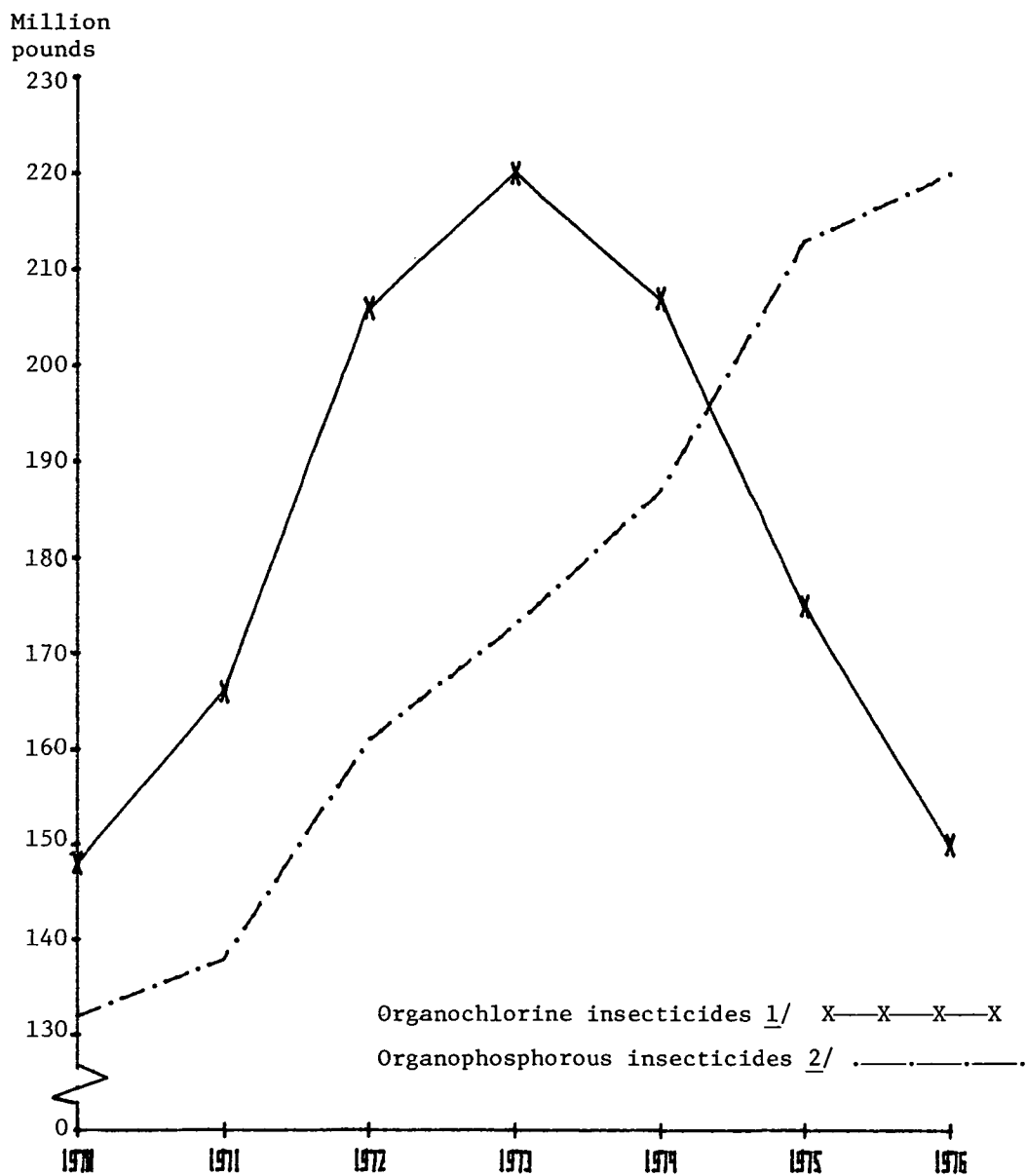
Principal sources of imports

	Source	1973	1974	1975	1976
Quantity (in 1,000 lbs)	United Kingdom	15,381	16,759	17,587	12,988
	West Germany	2,962	3,125	7,362	15,732
	Japan	3,634	2,293	3,922	5,613
	Switzerland	1,337	1,131	6,388	10,885
	Canada	987	1,793	4,842	2,289
	All other countries	<u>4,550</u>	<u>3,241</u>	<u>10,315</u>	<u>14,607</u>
	Total imports	28,851	28,342	50,416	62,114
Value (in \$1,000)	United Kingdom	17,121	22,197	29,493	19,904
	West Germany	5,138	7,327	20,035	48,643
	Japan	3,936	3,210	6,323	10,599
	Switzerland	3,136	2,244	14,618	26,060
	Canada	1,011	1,728	5,043	3,383
	All other countries	<u>4,526</u>	<u>6,032</u>	<u>21,615</u>	<u>20,244</u>
	Total imports	34,868	42,738	97,127	128,833
Avg. unit value	United Kingdom	1.11	1.33	1.68	1.53
	West Germany	1.73	2.35	2.72	3.09
	Japan	1.08	1.40	1.61	1.89
	Switzerland	2.35	1.98	2.29	2.39
	Canada	1.02	.96	1.04	1.48
	All other countries	<u>1.00</u>	<u>1.86</u>	<u>2.10</u>	<u>1.39</u>
	Total imports	1.21	1.51	1.93	2.07

1/ TSUS item 405.15 only.

Source: Official statistics of the U.S. Department of Commerce.

ORGANOCHLORINE INSECTICIDES AND ORGANOPHOSPHOROUS INSECTICIDES:
U.S. PRODUCTION, 1970-76



1/ Includes aldrin, chlordan, DDT, dieldrin, endrin, heptachlor, and others.

2/ Includes acephate, diazinon, fonofos, methyl parathion, parathion, phorate, and others.

Source: Compiled from data contained in various U.S. International Trade Commission publications.

Note: Data are partially estimated.

PESTICIDES AND RELATED PRODUCTS

TABLE 1.--PESTICIDES AND RELATED PRODUCTS: U.S. PRODUCTION AND SALES, 1976

[Listed below are all pesticides and related products for which any reported data on production or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all pesticides and related products for which data on production and/or sales were reported and identifies the manufacturers of each]

PESTICIDES AND RELATED PRODUCTS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Grand total-----	1,364,391	1,192,604	2,410,134	\$2.02
Benzenoid-----	750,170	642,592	1,401,613	2.18
Nonbenzenoid-----	614,221	550,012	1,008,521	1.83
PESTICIDES AND RELATED PRODUCTS, CYCLIC				
Total-----	940,263	838,814	1,843,896	2.20
Fungicides, total-----	109,635	99,442	120,021	1.21
Naphthenic acid, copper salt-----	906	895	585	.65
Pentachlorophenol (PCP)-----	43,868	43,796	16,128	.37
Phenylmercuric acetate (PMA)-----	172	141	1,022	7.26
All other cyclic fungicides ² -----	64,689	54,610	102,286	1.87
Herbicides and plant growth regulators, total-----	511,560	445,348	1,233,941	2.77
2,4-Dichlorophenoxyacetic acid, dimethylamine salt--	15,699	14,203	16,273	1.15
2,4-Dichlorophenoxyacetic acid, iso-octyl ester-----	8,361	3,022	2,763	.91
Plant growth regulators, total-----	7,522	7,759	19,070	2.46
1,2-Dihydro-3,6-pyridazinedione (Maleic hydrazide)	3,822	...	...	...
All other plant growth regulators-----	3,700	7,759	19,070	2.46
All other cyclic herbicides ³ -----	479,978	420,364	1,195,835	2.85
Insecticides and rodenticides, total-----	319,068	294,024	489,934	1.67
Organophosphorus insecticides ⁴ -----	114,325	98,162	210,561	2.15
Toxaphene(chlorinated camphene)-----	42,164	47,919	20,745	.43
All other cyclic insecticides and rodenticides ⁵ -----	162,579	147,943	258,628	1.75
PESTICIDES AND RELATED PRODUCTS, ACYCLIC				
Total-----	424,128	353,790	566,238	1.60
Fungicides, total-----	32,627	33,347	32,934	.99
Dithiocarbamic acid salts ⁶ -----	30,975	31,888	28,719	.90
All other acyclic fungicides ⁷ -----	1,652	1,459	4,215	2.89
Herbicides and plant growth regulators ⁸ -----	144,485	112,384	215,453	1.92
Insecticides, rodenticides, soil conditioners and fumigants, total-----	247,016	208,059	317,851	1.53
Methyl bromide (Bromomethane)-----	35,856	35,844	16,454	.46
S-Methyl-N-[(methylcarbamoyl)oxy] thioacetimidate (Methomyl)-----	14,328	...	...	...
Organophosphorus insecticides ⁹ -----	75,554	61,253	170,750	2.79
Trichloronitromethane (Chloropicrin)-----	6,423	5,773	2,865	.50
All other acyclic insecticides, rodenticides, soil conditioners and fumigants ¹⁰ -----	114,855	105,189	127,782	1.21

See footnotes on following page.

SYNTHETIC ORGANIC CHEMICALS, 1976

Footnotes for Table 1

- ¹ Calculated from rounded figures.
- ² Includes benomyl, captafol, captan, chlorothalonil, dinocap, DMTT, folpet, pentachloronitrobenzene, sodium pentachlorophenate, 2,4,5-trichlorophenol salts, all other phenylmercury compounds, and others.
- ³ Includes alachlor, atrazine, barban, benefin, bensulide, 2,4-D acid (esters and salts), 2,4-DB, dicamba, dimethylurea compounds, dinitrophenol compounds, isopropyl phenylcarbamates (IPC and CIPC), MCPA, molinate, NPA, picloram, propanil, silvex and its esters, 2,4,5-T acid (esters and salts), triazines, trifluralin, uracils, and others.
- ⁴ Includes carbophenothion, diazinon, dioxathion, fensulfothion, methyl parathion, parathion, ronnel, and other phosphorothioates and phosphorodithioates, and others.
- ⁵ Includes carbaryl, carbofuran, chlorinated insecticides (BHC + lindane, chlordan, chlorobenzilate, DDT, dicofol, endosulfan, endrin, heptachlor, methoxychlor, and others), insect attractants, DEET and other insect repellents, small amounts of rodenticides, piperonyl butoxide and other synergists, and others.
- ⁶ Includes ferbam, maneb, nabam, PETD, and zineb, plus the remaining dithiocarbamates which are used chiefly as fungicides.
- ⁷ Includes dodine, and others.
- ⁸ Includes cacodylic acid, CDAA, dalapon, methanearsonic acid salts, sodium TCA, thiocarbamates, thiolcarbamates, and organophosphorus herbicides, and others.
- ⁹ Includes dichlorvos, disulfoton, ethion, malathion, monocrotophos, naled, phorate, and other organophosphorus insecticides.
- ¹⁰ Includes DBCP, soil conditioners and fumigants, aldicarb, 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.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AND "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C	
@FUNGICIDES:	
2,6-BIS(DIMETHYLAMINOMETHYL) CYCLOHEXANONE- - - - -	: MRK.
1,4-DICHLORO-2,5-DIMETHOXYBENZENE- - - - -	: DUP.
1,2-DIHYDRO-6-ETHOXY-2,2,4-TRIMETHYLQUINOLINE (ETH : OXYQUIN)- - - - -	: MON.
5-ETHOXY-3-(TRICHLOROMETHYL)-1,2,4-THIADIAZOLE - - -	: OMC, VNC.
HEXAHYDRO-1,3,5-TRIETHYL-S-TRIAZINE- - - - -	: CHG.
MERCAPTOBENZOTHAZOLE, ZINC SALT - - - - -	: VNC.
METHYL-1-(BUTYL CARBAMOYL)-2-BENZIMIDAZOLECARBAMATE (: BENOMYL)- - - - -	: DUP.
2-(1-METHYL-NORMAL-HEPTYL)-4,6-DINITROPHENYL CROTONA : TE- - - - -	: RH.
3-(2-METHYLPYPERIDINO) PROPYL 3,4-DICHLOROBENZOATE : (PIPERALIN)- - - - -	: LIL.
@NAPHTHENIC ACID, COPPER SALT- - - - -	: CCA, MCI, TRO, WTC, X.
PENTACHLORONITROBENZENE- - - - -	: OMC, OTC(E).
@PENTACHLOROPHENOL- - - - -	: DOW, PRO, MON, RCI.
PENTACHLOROPHENOL, POTASSIUM SALT- - - - -	: NLC.
PENTACHLOROPHENOL, SODIUM SALT- - - - -	: DOW.
8-QUINOLINOL(8-HYDROXYQUINOLINE), COPPER SALT - - -	: ASH, X.
CIS-N*(1,1,2,2-TETRACHLOROETHYL) THIO*-1-CYCLOHEXENE : -1,2-DICARBOXIMIDE (CAPTAFOL)- - - - -	: ORO.
2,4,5,6-TETRACHLOROISOPHTHALONITRILE - - - - -	: DA.
TETRAHYDRO-3,5-DIMETHYL-2H-1,3,5-THIADIAZINE-2-THION : E - - - - -	: MRK, VCC.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S.PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
@FUNGICIDES--CONTINUED	
MERCURY FUNGICIDES:	
@PHENYLMERCURIC ACETATE (PMA)-----	CLY, MRK, TRO.
PHENYLMERCURIC AMMONIUM ACETATE- - - - -	TRO.
PHENYLMERCURIC OLEATE- - - - -	TRO.
PHENYLMERCURIC PROPIONATE- - - - -	MRK.
N-TRICHLOROMETHYLTHIO-4-CYCLOHEXENE-1,2-DICARBOXIMID E - - - - -	SFA, SPC, X.
N-TRICHLOROMETHYLTHIOPHTHALAMIDE - - - - -	SFA, SPC.
2,4,5-TRICHLOROPHENOL ACID AND SALTS:	
2,4,5-TRICHLOROPHENOL- - - - -	DOW.
2,4,5-TRICHLOROPHENOL, SODIUM SALT- - - - -	DOW, GAP.
2,4,5-TRICHLOROPHENOL, POTASSIUM SALT- - - - -	NLC.
1,3,5-TRI(2-ISOPROPANOL)-5-TRIAZINE- - - - -	EFH.
CYCLIC FUNGICIDES, ALL OTHER-----	X.
@HERBICIDES AND PLANT GROWTH REGULATORS:	
3-AMINO-2,5-DICHLOROBENZOIC ACID, AMMONIUM SALT (2, 5-DICHLORO-3-AMINOBENZOIC ACID, AMMONIUM SALT - -	AMC, GAP.
4-AMINO-6-(1,1-DIMETHYLETHYL)-3-(METHYLTHIO)-1,2,4-T RIAZIN-5-(4H)-ONE - - - - -	CFG.
4-AMINO-3,5,6-TRICHLOROPICOLINIC ACID (PICLORAM)----	DOW.
2,4-BIS (ISOPROPYLAMINO)-6-(METHYLTHIO)-S-TRIAZINE (PROMETRYN)- - - - -	CGY.
4,6-BIS (ISOPROPYLAMINO)-2-METHOXY-S-TRIAZINE (PROME TON)- - - - -	CGY.
5-BROMO-3-SEC-BUTYL-6-METHYLURACIL (BROMOCIL)-----	DUP.
2-(TERT-BUTYLAMINO)-4-CHLORO-6-(ETHYLAMINO)-S-TRIAZI NE- - - - -	CGY.
2-(TERT-BUTYLAMINO)-4-ETHYLAMINO-6-METHOXY-S-TRIAZIN E - - - - -	CGY.
2-(TERT-BUTYLAMINO)-4-ETHYLAMINO-6-METHYLTHIO-S-TRIA ZINE- - - - -	CGY.
N-SEC-BUTYL-4-TERT-BUTYL-2,6-DINITROANILINE- - - - -	AMC.
3-TERT-BUTYL-5-CHLORO-6-METHYLURACIL - - - - -	DUP.
N-BUTYL-N-ETHYL-ALPHA, ALPHA, ALPHA-TRIFLUORO-2,6-DINI TRO-PARA-TOLUIDINE- - - - -	LIL.
2-BUTYNYL-4-CHLORO-META-CHLORCCARBANILATE- - - - -	GOC.
2-CHLORO-4,6-BIS (ETHYLAMINO)-S-TRIAZINE- - - - -	CGY.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
@HERBICIDES AND PLANT GROWTH REGULATORS--CONTINUED	
2-CHLORO-4,6-BIS(ISOPROPYLAMINO)-2-TRIAZINE (PROPA ZINE)	CGY.
2-CHLORO-2',6'-DIETHYL-N-(NORMAL-BUTOXYMETHYL) ACETAN ILIDE	MON.
2-CHLORO-2',6'-DIETHYL-N-(METHOXYMETHYL) ACETANILIDE (ALACHLOR)	MON.
2-CHLORO-4-ETHYLAMINO-6-ISOPROPYLAMINO-S-TRIAZINE (ATRAZINE)	CGY, VTC.
2-(4-CHLORO-6-(ETHYLAMINO)-S-TRIAZIN-2-YLAMINO)-2-ME THYLPROPIONITRILE	CGY, SHC, VTC.
N-(2-CHLOROETHYL)-ALPHA, ALPHA, ALPHA-TRIFLUORO-2,6-DI NITRO-N-PROPYL-PARA-TOLUIDINE	BAS.
2-CHLORO-N-ISOPROPYLACETANILIDE	DOW, MON.
4-CHLORO-5-(METHYLAMINO)-2-(ALPHA, ALPHA, ALPHA-TRIF LUORO-META-TOLYL)-3-(2H)-PYRIDAZINONE (NORFLURAZ ON)	S.
4-(4-CHLORO-2-METHYLPHENOXY) BUTYRIC ACID	RDA.
3-(PARA-CHLOROPHENYL)-1,1-DIMETHYLUREA	DUP.
3-CYCLOHEXYL-6-(DIMETHYLAMINO)-1-METHYL-1,3,5-TRIAZI NE-2,4-(1H,3H)-DIONE	DUP.
N-(CYCLOPROPYLMETHYL)-ALPHA, ALPHA, ALPHA-TRIFLUORO-2, 6-DINITRO-N-PROPYL-P-TOLUIDINE	CGY.
3,6-DICHLORO-2-ANISIC ACID	VEL.
4-(2,4-DICHLOROPHENOXY) BUTYRIC ACID	RDA.
4-(2,4-DICHLOROPHENOXY) BUTYRIC ACID, ISO-OCTYL ESTER	RDA.
3-(3,4-DICHLOROPHENYL)-1,1-DIMETHYLUREA	DUP.
3-(3,4-DICHLOROPHENYL)-1-METHOXY-1-METHYLUREA (LIN URON)	DUP.
2,4-DICHLOROPHENYL PARA-NITROPHENYL ETHER	RH.
3',4'-DICHLOROPROPIONANILIDE (PROPANIL)	EGR, RH.
N4,N4'-DIETHYL-ALPHA, ALPHA, ALPHA-TRIFLUORO-3,5-DINI TROLUENE-2,4-DIAMINE (DINITROAMINE)	X.
S-(O,O-DIISOPROPYL PHOSPHORODITHIOATE) ESTER OF N-(A LPHA-MERCAPTOETHYL) BENZENESULFONAMIDE (BENSULIDE)	SFA.
N,N-DIMETHYL-2,2-DIPHENYLACETAMIDE	CWN.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
@HERBICIDES AND PLANT GROWTH REGULATORS--CONTINUED	
1,2-DIMETHYL-3,5-DIPHENYL-1H-PYRAZOLIUM METHYL SULFA TE-	LAK.
N- (1,1-DIMETHYL-2-PROPYNYL) -3,5-DICHLOROBENZAMIDE (: PRONAMIDE) -	RH.
DIMETHYL-2,3,5,6-TETRACHLOROTEREPTHALATE- - - - -	DA.
DINITROBUTYLPHENOL - - - - -	DOW, FMN, VTC.
DINITROBUTYLPHENOL, AMMONIUM SALT - - - - -	DOW.
DINITROBUTYLPHENOL, TRIETHANOLAMINE SALT- - - - -	DOW, VTC.
DINITROCRESOL, SODIUM SALT- - - - -	FMN.
5-ETHYL CYCLOHEXYLETHYLTHIOCARBAMATE - - - - -	SFA.
2- (ETHYLAMINO) -4- (ISOPROPYLAMINO) -6- (METHYLTHIO) -S-T RIAZINE (AMETRYNE) - - - - -	CGY.
S-ETHYL-HEXAHYDRO-1H-AZEPINE-1-CARBOTHIOATE (MOLINAT E) - - - - -	SFA.
N- (1-ETHYLPROPYL) -3,4-DIMETHYL-2,6-DINITROBENZENAMIN E - - - - -	X.
2-ETHYLTHIO-4,6-BIS (ISOPROPYLAMINO) -S-TRIAZINE - - -	CGY.
3-ISOPROPYL-1H-2,1,3-BENZOTHIADIAZIN-4 (3H) -ONE 2,2-D IOXIDE- - - - -	BAS.
ISOPROPYL N- (3-CHLOROPHENYL) CARBAMATE- - - - -	PPG.
ISOPROPYL N-PHENYLCARBAMATE- - - - -	PPG.
1- (2-METHYLCYCLOHEXYL) -3-PHENYLUREA- - - - -	DUP.
METHYL 5- (2',4'-DICHLOROPHENOXY) -2-NITROBENZOATE - -	RDA, SM.
4- (METHYLSULFONYL) -2,6-DINITRO-N,N-DIPROPYLANILINE (NITRALIN) - - - - -	SHC.
1-NAPHTHYLPHTHALAMIC ACID- - - - -	USR.
7-OXABICYCLO-2.2.1*-HEPTANE-2,3-DICARBOXYLIC ACID, D ISODIUM SALT- - - - -	PAS.
PHENOXYACETIC ACID DERIVATIVES:	
4-CHLORO-2-METHYLPHENOXYACETIC ACID- - - - -	CLY, RDA, RIV, TMH.
4-CHLORO-2-METHYLPHENOXYACETIC ACID, DIMETHYLAMINE : SALT - - - - -	RDA.
4-CHLORO-2-METHYLPHENOXYACETIC ACID, ISO-OCTYL EST : ER- - - - -	RDA.
2,4-DICHLOROPHENOXYACETIC ACID - - - - -	DOW, RDA.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
@HERBICIDES AND PLANT GROWTH REGULATORS--CONTINUED	
PHENOXYACETIC ACID DERIVATIVES--CONTINUED	
2,4-DICHLOROPHENOXYACETIC ACID, ESTERS AND SALTS:	
2,4-DICHLOROPHENOXYACETIC ACID, BUTOXY ETHANOL E	
STER- - - - -	DOW.
2,4-DICHLOROPHENOXYACETIC ACID, BUTOXY POLYPROPYLE	
NEGLYCOL ESTER- - - - -	DOW.
2,4-DICHLOROPHENOXYACETIC ACID, NORMAL-BUTYL ESTE	
R - - - - -	RIV.
2,4-DICHLOROPHENOXYACETIC ACID, SEC-BUTYL ESTER -	DOW.
@2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SAL	
T - - - - -	DOW, RDA, RIV, TMH.
2,4-DICHLOROPHENOXYACETIC ACID, ETHANOLAMINE AND	
ISOPROPANOLAMINE SALTS- - - - -	DOW.
2,4-DICHLOROPHENOXYACETIC ACID, ISOBUTYL ESTER -	RDA.
@2,4-DICHLOROPHENOXYACETIC ACID, ISO-OCTYL ESTER -	DOW, RDA, RIV, TMH.
2,4-DICHLOROPHENOXYACETIC ACID, SODIUM SALT - - -	DOW.
2,4,5-TRICHLOROPHENOXYACETIC ACID, ESTERS AND SALTS	
2,4,5-TRICHLOROPHENOXYACETIC ACID, BUTOXY ETHANO	
L ESTER - - - - -	DOW.
2,4,5-TRICHLOROPHENOXYACETIC ACID, BUTOXY POLYPROP	
YLENEGLYCOL ESTER - - - - -	DOW.
2,4,5-TRICHLOROPHENOXYACETIC ACID, SEC-BUTYL EST	
ER- - - - -	DOW.
2,4,5-TRICHLOROPHENOXYACETIC ACID, ISO-OCTYL ESTE	
R - - - - -	DOW, RIV, TMH.
2,4,5-TRICHLOROPHENOXYACETIC ACID, TRIETHYLAMINE	
SALT-----	DOW.
@PLANT GROWTH REGULATORS:	
2-CHLORO-6-(TRICHLOROMETHYL)PYRIDINE-----	DOW, GAF.
2,4-DICHLOROBENZYLTRIBUTYLPHOSPHONIUM CHLORIDE----	SM.
@1,2-DIHYDRO-3,6-PYRIDAZINEDIONE (MALIC HYDRAZIDE)-	ACY, ASL, CHP, FMT, USR.
GIBBERELIC ACID-----	ABB, MRK.
3-INDOLEBUTYRIC ACID-----	ARA, MRK.
1-NAPHTHALENEACETAMIDE-----	AMC.
1-NAPHTHALENEACETIC ACID-----	GNW.
1-NAPHTHALENEACETIC ACID, SODIUM SALT-----	BKL, GNW.
PLANT GROWTH REGULATORS, CYCLIC, ALL OTHER-----	MMM, USR.
2-(2,4,5-TRICHLOROPHENOXY) PROPIONIC ACID - - - - -	TMH.
2-(2,4,5-TRICHLOROPHENOXY) PROPIONIC ACID, 2-BUTOXYPO	
LYPROPYLENE ESTER - - - - -	DOW.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
2-(2,4,5-TRICHLOROPHENOXY) PROFIONIC ACID, DIMETHYLAM E SALT-	RIV.
2-(2,4,5-TRICHLOROPHENOXY) PROFIONIC ACID, ISO-OCTYL ESTER -	RIV.
ALPHA,ALPHA,ALPHA-TRIFLUORO-2,6-DINITRO-N,N-DIPROPYL -PARA-TOLUIDINE (TRIFLURALIN)-----	LIL.
CYCLIC HERBICIDES, ALL OTHER -	MMM, VEL, X.
INSECT ATTRACTANTS AND REPELLENTS:	
TERT-BUTYL 4(OR 5)-CHLORO-2-METHYLCYCLOHEXANECARBOXY LATE-----	UOP.
N,N-DIETHYLTOLUAMIDE (DEET)-----	PFZ.
DI-NORMAL-PROPYLSOCINCHOMERONATE-----	MGK.
INSECTICIDES:	
3-(SEC-AMYLPHENYL)-N-METHYLCARBAMATE - - - - -	X (E) .
BACILLUS THURINGIENSIS - - - - -	ABB, S.
(5-BENZYL-3-FURYL) METHYL-2,2-DIMETHYL-3-(2-METHYLPRO PENYL) CYCLOPROPANE CARBOXYLATE- - - - -	PEN.
2,3,4,5-DELTA2/-BUTENYLENE-TETRAHYDROFURFURAL- - - -	ORO, PLC.
CHLORINATED INSECTICIDES:	
ORTHO-CHLOROPHENYL-N-METHYLCARBAMATE - - - - -	OTC (E) .
PARA-CHLOROPHENYL 2,4,5-TRICHLOROPHENYL SULFONE (TETRADIFON) - - - - -	FMN.
1,1-DICHLORO-2,2-BIS (PARA-ETHYLPHENYL) ETHANE - - -	CHF, RH.
4,4'-DICHLORO-ALPHA-TRICHLOROMETHYLBENZHYDROL (D ICOPOL) - - - - -	RH.
ETHYL 4,4'-DICHLOROBENZILATE - - - - -	CGY.
HEPTACHLORO-TETRAHYDRO-ENDO-METHANOINDENE (HEPTA CHLOR) - - - - -	VEL.
1,2,3,4,5,6-HEXACHLOROCYCLOHEXANE (BENZENE HEXACH LORIDE) - - - - -	X.
1,2,3,4,5,6-HEXACHLOROCYCLOHEXANE, 100% GAMMA ISOME R - (LINDANE) - - - - -	X.
HEXACHLORO-EPOXYOCTAHYDRO-ENDO, ENDO-DIMETHANOPHTHAL ENE - - - - -	VEL.
HEXACHLORO-HEXAHYDRO-METHANO-BENZODIOXATHIEPIN 3-O XIDE - - - - -	X.
OCTACHLOROHEXAHYDRO-4,7-METHANOINDENE- - - - -	VEL.
@TOXAPHENE (CHLORINATED CAMPHENE)-----	HN, HPC, VTC.
1,1,1-TRICHLORO-2,2-BIS (PARA-CHLOROETHANE) (DDT) - - - - -	MTO.
1,1,1-TRICHLORO-2,2-BIS (PARA-METHOXYPHENYL) ETHANE (METHOXYCHLOR) - - - - -	CHF, DUP.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
INSECTICIDES--CONTINUED	
DISTANNOXANE, HEXAKIS (BETA,BETA-DIMETHYL-PHENETHYL)-	SHC.
META-(1-ETHYLPROPYL) PHENY METHYLCARBAMATE-	ORO.
1-NAPHTHYL N-METHYLCARBAMATE -	UCC.
@ORGANOPHOSPHORUS INSECTICIDES:	
O-(4-BROMO-2,5-DICHLOROPHENYL)-O-METHYL PHENYLPHOS	
PHONOTHIOATE-	VEL.
4-TERT-BUTYL-2-CHLOROPHENYL METHYL METHYLPHOSPHORA	
MIDATE-	DOW.
S-*(PARA-CHLOROPHENYL) THIC*METHYL* O,O-DIETHYL PH	
OSPHORODITHIOATE-	SFA.
2-CHLORO-1-(2,4,5-TRICHLOROPHENYL) VINYL DIMETHYL P	
HOSPHATE-	SHC.
O-(2,4-DICHLOROPHENYL) O-ETHYL S-PROPYL PHOSPHOROD	
ITHIOATE-	CHG.
2-(DIETHOXYPHOSPHINYLMINO-4-METHYL-1,3-DITHIOLANE	ACY, X.
O,O-DIETHYL O-(2-ISOPROPYL-4-METHYL-6-PYRIMIDINYL)	
PHOSPHOROTHIOATE (DIAZINON)-	CGY.
O,O-DIETHYL O-*4-(METHYLSULFINYL) PHENYL* PHOSPHORO	
THIOATE -	CHG.
O, O*-DIETHYL-O*-PYRAZINYL PHOSPHORODITHIDATE-	ACY.
O,O-DIETHYL O-(PARA-NITROPHENYL) PHOSPHOROTHIOATE	
(PARATHION) -	MON.
O,O-DIETHYL O-3,5,6-TRICHLORO-2-PYRIDYL PHOSPHOROT	
HIOATE-	DOW.
O,O-DIMETHYL O-*4-(METHYLTHIO)-META-TOLYL*-PHOSPHO	
ROTHIOATE -	CHG.
O,O-DIMETHYL O-(PARA-NITROPHENYL) PHOSPHOROTHIOATE	
(METHYL PARATHION) -	AMP, MON, SFA, VTC.
O,O-DIMETHYL S*4-OXO-1,2,3-BENZOTRIAZIN-3-(4H)-YLM	
ETHYL*PHOSPHORODITHIOATE-	CHG.
O,O-DIMETHYL S-PHTHALIMIDOMETHYL PHOSPHORODITHIOAT	
E -	SFA.
O,O-DIMETHYL O-(2,4,5-TRICHLOROPHENYL) PHOSPHOROTHI	
OATE-	DOW.
2,3-PARA-DIOXANEDITHIOL S,S-BIS-(O,O-DIETHYL PHOSP	
HORODITHIOATE -	HPC.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S.PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
C Y C L I C--CONTINUED	
@ORGANOPHOSPHORUS INSECTICIDE--CONTINUED	
O-ETHYL O-*4-(METHYLTHIO) PHENYL* S-PROPYL PHOSPHOR ODITHIOATE-	CHG.
O-ETHYL O-(PARA-NITROPHENYL) PHENYLPHOSPHONOTHIOATE (EPN)-	SFA, VEL.
O-ETHYL O-(2,4,5-TRICHLOROPHENYL) ETHYL PHOSPHONOTH IOATE -	CHG.
2-IMINO-1,3-DITHIOLANE, DIHYDROGEN SULFATE - - -	ACY.
0,0,0',0'-TETRAMETHYL-0,0'-THIODI-PARA-PHENYLENE PHOSPHOROTHIOATE-----	ACY.
ALL OTHER CYCLIC INSECTICIDES-----	ACN, FMN, HPC, KF, OTC, S, USR, X, X, X.
NEMATOCIDES:	
O,O-DIETHYL O-(2,4-DICHLOROPHENYL) PHOSPHOROTHIOATE (DICHLOFENTHION) - - - - -	SM.
RODENTICIDES:	
2-DIPHENYLACETYL-1,3-INDANDIONE AND SODIUM SALT- - -	NES.
2-PIVALOYL-1,3-INDANDIONE- - - - -	PIC.
N-(3-PYRIDYLMETHYL)-N'-(PARA-NITROPHENYL) UREA- - -	CWN.
RODENTICIDES, CYCLIC, ALL OTHER - - - - -	X.
SYNERGISTS:	
ALPHA-*2-(2-NORMAL-BUTOXYETHOXY)-ETHOXY*-4.5-METHYLE NEDIOXY-2-PROPYLTOLUENE (PIPERONYL BUTOXIDE)-----	ALP, FMN.
N-(2-ETHYLHEXYL) BICYCLO(2.2.1)-5-HEPTENE-2,3-DICARBO XIMIDE- - - - -	MGK.
BENZYL BROMOACETATE- - - - -	MRK.
4-BROMOACETOXYMETHYL-N-DIOXOLINE - - - - -	EPH.
A C Y C L I C	
@FUNGICIDES:	
BIS-1,4-BROMOACETOXY-2-BUTENE- - - - -	VIN.
CHLOROMETHOXYPROPYLMERCURIC ACETATE- - - - -	TRO.
@DITHIOCARBAMIC ACID FUNGICIDES:	
DIMETHYLDITHIOCARBAMIC ACID, FERRIC SALT- - - - -	FMN.
DIMETHYLDITHIOCARBAMIC ACID, MANGANESE SALT - - - -	FMN.
ETHYLENE BIS(DITHIOCARBAMIC ACID), DIAMMONIUM SALT	RBC.
ETHYLENE BIS(DITHIOCARBAMIC ACID), DISODIUM SALT (NABAM) - - - - -	ALC, RH, USR.

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C Y C L I C--CONTINUED	
@FUNGICIDES--CONTINUED	
ETHYLENE BIS(DITHIOCARBAMIC ACID), MANGANESE SALT (MANEB) - - - - -	DUP, RH.
ETHYLENE BIS(DITHIOCARBAMIC ACID), MANGANESE SALT WITH ZINC IONS- - - - -	RH.
ETHYLENE BIS(DITHIOCARBAMIC ACID), ZINC AND MANGAN ESE SALTS - - - - -	DUP.
ETHYLENE BIS(DITHIOCARBAMIC ACID), ZINC SALT (ZIN EB) - - - - -	PMN, RH.
POLYETHYLENETHIURAM DISULFIDE- - - - -	PMN.
NORMAL-DODECYLGUANIDINE- - - - -	ACY, MRK.
METHYLENE BIS(THIOCYANATE)- - - - -	MRK.
ACYCLIC FUNGICIDES, ALL OTHER- - - - -	VCC.
@HERBICIDES AND PLANT GROWTH REGULATORS:	
N,N-BIS(PHOSPHONOMETHYL)GLYCINE- - - - -	MON.
2-CHLOROALLYL DIETHYLDITHIOCARBAMATE - - - - -	MON.
2-CHLORO-N,N-DIALLYLACETAMIDE- - - - -	MON.
2-CHLOROETHYLTRIMETHYL AMMONIUM CHLORIDE - - - - -	ACY.
2,2-DICHLOROPROPIONIC ACID, SODIUM SALT (DALAPON) - - - - -	DOW.
DIMETHYLARSINIC ACID (CACODYLIC ACID)- - - - -	ASL.
ETHYL CARBAMOYLPHOSPHONATE, AMMONIUM SALT- - - - -	DUP.
S-ETHYL DIPROPYLTHIOCARBAMATE- - - - -	SFA.
S-ETHYLDIISOBUTYLTHIOCARBAMATE - - - - -	SFA.
ETHYL XANTHOGEN DISULFIDE- - - - -	RBC.
METHANEARSONIC ACID, DISODIUM SALT (DSMA) - - - - -	ASL, CLY, VIN.
METHANEARSONIC ACID, DODECYL- AND OCTYL- AMMONIUM SAL TS- - - - -	CLY.
METHANEARSONIC ACID, MONOSODIUM SALT (MSMA) - - - - -	AST, DA.
N-(PHOSPHONOMETHYL)GLYCINE, ISOPROPYLAMINE SALT- - - - -	MON.
PLANT GROWTH REGULATORS:	
SUCCINIC ACID, 2,2-DIMETHYLHYDRAZIDE - - - - -	USR.
S-PROPYL BUTYLETHYLTHIOCARBAMATE - - - - -	SFA.
S-PROPYL DIPROPYLTHIOCARBAMATE - - - - -	SFA.
S,S,S-TRIBUTYL PHOSPHOROTRITHIOATE - - - - -	PLC.
TRIBUTYL PHOSPHOROTRITHIOATE - - - - -	SM.
TRICHLOROACETIC ACID, SODIUM SALT (TCA) - - - - -	DOW.
5-(2,3,3-TRICHLOROALLYL) DIISOPROPYLTHIOLCARBAMATE (: TRIALATE)- - - - -	MON.
ACYCLIC HERBICIDES, ALL OTHER- - - - -	LIL, S.
@INSECTICIDES:	
2-(2-BUTOXYETHOXY)ETHYL THIOCYANATE- - - - -	RH.
METHYL N',N'-DIMETHYL-N-(METHYLCARBAMOYL) OXY*-1-THI OOXAMIDATE- - - - -	DUP.

PESTICIDES AND RELATED PRODUCTS

TABLE 2.--PESTICIDES AND RELATED PRODUCTS FOR WHICH U.S.PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

PESTICIDES AND RELATED PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
A C Y C L I C--CONTINUED	
INSECTICIDES--CONTINUED	
@S-METHYL-N-*(METHYLCARBAMOYL) OXY*THIOACETIMIDATE (METHOMYL)-	DUP, EGR, SHC.
2-METHYL-2-(METHYLTHIO) PROPIONALDEHYDE O-(METHYLCARBAMOYL) OXIME	CGY, SHC, UCC.
@ORGANOPHOSPHORUS INSECTICIDES:	
S-*1, 2-BIS (ETHOXYCARBONYL) ETHYL*O,O-DIMETHYL PHOSPHORODITHIOATE	ACY.
2-CARBOMETHOXY-1-PROPEN-2YL DIMETHYL PHOSPHATE	SHC.
1, 2-DIEROMO-2, 2-DICHLOROETHYL DIMETHYL PHOSPHATE (NALED)	SHC.
O,O-DIETHYL S-*2-(ETHYLTHIO) ETHYL* PHOSPHORODITHIOATE	CHG.
O,O-DIETHYL S-*(ETHYLTHIO) METHYL* PHOSPHORODITHIOATE	ACY, CHG, X.
O,O-DIETHYL O-*2-(ETHYLTHIO) ETHYL* PHOSPHOROTHIOATE	CHG.
3-(DIMETHOXYPHOSPHINYLOXY)-N,N-DIMETHYL-CIS-CROTONAMIDE	SHC.
O,S-DIMETHYLACETYLPHOSPHORAMIDOTHIOATE	ORO.
O,O-DIMETHYL-O-2,2-DICHLOROVINYL PHOSPHATE (DDVP)	SHC.
DIMETHYL PHOSPHATE OF 3-HYDROXY-N-METHYL-CIS-CROTONAMIDE	SHC.
O,S-DIMETHYL PHOSPHORAMIDOTHIOATE	CHG.
O,O-DIMETHYL PHOSPHOROCHLORIDOTHIOATE	CHG.
S-*2-(ETHYLSULFINYL) ETHYL*O,O-DIMETHYL PHOSPHOROTHIOATE	CHG.
O,O,O',O'-TETRAETHYL S,S'-METHYLENE BIS-PHOSPHORODITHIOATE	PMN.
O,O,O,O-TETRA-NORMAL-PROPYLDITHIOPYROPHOSPHATE	SFA.
RODENTICIDES:	
2-HYDROXYETHYL NORMAL-OCTYL SULFIDE	PLC.
RODENTICIDES, ACYCLIC, ALL OTHER	PLC.
SODIUM FLUOROACETATE	RBC.
SOIL CONDITIONERS:	
POLYACRYLONITRILE, HYDROLYZED, SODIUM SALT	ACY.
SOIL FUMIGANTS:	
1, 2-DIBROMO-3-CHLOROPROPANE	DOW, SHC, VEL.
1, 3-DICHLOROPROPENE	DOW.
1, 3-DICHLOROPROPENE, 1, 2-DICHLOROPROPANE	SHC.
O-ETHYL S,S-DIPROPYL PHOSPHORODITHIOATE	SM.
@METHYL BROMIDE (BROMOMETHANE)	AMP, DOW, GTL, VEL.
N-METHYLDITHIOCARBAMIC ACID, SODIUM SALT	SFA.
@TRICHLORONITROMETHANE (CHLOROPICRIN)	DOW, IMC, NLD.
SOIL FUMIGANTS, ETC., ALL OTHER	MRT(E).
ACYCLIC PESTICIDES AND RELATED PRODUCTS, ALL OTHER	MRK, NLC, TRO.

PESTICIDES AND RELATED PRODUCTS

TABLE 3.--PESTICIDES AND RELATED PRODUCTS: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers of pesticides and related products that reported production or sales to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
ABB	Abbott Laboratories	MGK	McLaughlin, Gormley & King Co.
ACN	Allied Chemical Corp., Agricultural Dept.	MMM	Minnesota Mining & Manufacturing Co.
ACY	American Cyanamid Co.	MON	Monsanto Co.
ALC	Alco Chemical Corp.	MOT	Motomco, Inc.
ALP	Alpha Laboratories, Inc.	MRK	Merck & Co., Inc.
AMC	Amchem Products, Inc. Div. of Rorer-Amchem, Inc.	MRT	Morton Chemical Co., Div. of Morton Norwich Products, Inc.
AMP	Kerr-McGee Chemical Corp.	MTO	Montrose Chemical Corp. of California
ARA	Arapahoe Chemical, Inc. Sub. of Syntex Corp. (U.S.A.)	NES	Nease Chemical Co., Inc.
ASH	Ashland Oil, Inc., Ashland Chemical Co.	NLC	Nalco Chemical Co.
ASL	Ansul Chemical Co.	NLO	Niklor Chemical Co.
BKL	Kewanee Industries, Inc., Millmaster Chemical Co. Div.	OMC	Olin Corp.
BKM	Buckman Labs., Inc.	ORO	Chevron Chemical Co.
CCA	Interstab Chemical, Inc.	OTC	Story Chemical Corp.
CGY	Ciba-Geigy Corp., Agricultural Div.	PAS	Pennwalt Corp.
CHF	Chemical Formulators, Inc.	PCW	Pfister Chemical, Inc.
CHG	Mobay Chemical Corp., Chemagro Agricultural Div.	PD	Parke, Davis & Co. Sub of Warner-Lambert Co.
CLY	W. A. Cleary Corp.	PEN	CPC International, Inc., Penick Div.
CWN	Upjohn Co., Fine Chemical Div.	PFZ	Pfizer, Inc.
DA	Diamond Shamrock Corp.	PIC	Pierce Organics, Inc.
DOW	Dow Chemical Co.	PLC	Phillips Petroleum Co.
DUP	E. I. duPont de Nemours & Co., Inc.	PPG	PPG Industries, Inc.
EFH	E. F. Houghton & Co.	RBC	Fike Chemicals, Inc.
EGR	Eagle River Chemical Corp.	RCI	Reichhold Chemicals, Inc.
FER	Ferro Corp., Ferro Chemical Div.	RDA	Rhodia, Inc.
FMN	FMC Corp., Agricultural Chemical Div.	RH	Rohm & Haas Co.
FMT	Fairmount Chemical Co.	RIV	Riverdale Chemical Co.
FRO	Vulcan Materials Co., Chemical Div.	S	Sandoz Inc., Crop Protection Dept.
GAF	GAF Corp., Chemical Div.	SDC	Martin-Marietta Corp., Sodyeco Div.
GNW	Greenwood Chemical Co.	SFA	Stauffer Chemical Co.: Agricultural Div.
GOC	Gulf Oil Corp., Gulf Oil Chemical Co. - U.S.	SFC	Calhio Chemicals, Inc. Div.
GTH	Guth Chemical Co.	SHC	Shell Oil Co., Shell Chemical Co. Div.
GTL	Great Lakes Chemical Corp.	SM	Mobil Oil Corp., Mobil Chemical Co., Phosphorus Div.
HK	Hooker Chemicals & Plastics Corp.	TMH	Thompson-Hayward Chemical Co.
HN	Tenneco Chemicals, Inc.	TRO	Troy Chemical Corp.
HPC	Hercules, Inc.	UCC	Union Carbide Corp.
IMC	JMC Chemical Group, Inc.	UOP	UOP, Inc., UOP Chemical Div.
KF	Kay-Fries Chemicals, Inc.	USR	Uniroyal, Inc., Chemical Div.
LAK	Lakeway Chemicals, Inc.	VCC	Vinings Chemical Co.
LIL	Eli Lilly & Co.	VEL	Velsicol Chemical Corp.
MAL	Mallinckrodt Chemical Works	VIN	Vineland Chemical Co.
MCI	Mooney Chemical Corp.	VNC	Vanderbilt Chemical Corp.
		VTC	Vicksburg Chemical Co. Div. of Vertac Consolidated
		WTC	Witco Chemical Co., Inc.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the appendix.

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS

K. James O'Connor, Jr. and Thomas O'Connell

The Miscellaneous Chemicals section was extensively revised in 1976 to incorporate the proposed suggestions of an industry task force. Because there is a radical shift in the composition of this section as well as in many of the subgroups within this section, the 1976 data are not strictly comparable with previous reports. Production of the end-use groups contained within other sections generally increased over 1975 levels paralleling the organic sector as a whole. This section incorporates those end-use groups which are not readily classifiable within the prior sections of this report. Both cyclic and acyclic chemicals now fall with this section.

In 1976, the production of miscellaneous end-use chemicals exceeded 15.8 billion pounds. Sales in 1976 reached 9.2 billion pounds, valued at \$2.3 billion. Polymers for fibers and urea collectively accounted for 84 percent of the 1976 production of these miscellaneous end-use chemicals. Urea, alone, accounted for 71 percent of the 1976 sales quantity of these chemicals although in terms of value it accounted for only 17 percent of the total value of merchant sales.

Production of gasoline additives for 1976 totalled 1.1 billion pounds. Sales exceeded 931 million pounds, valued at \$736 million. The future growth of the lead additive portion of this market is seriously threatened by pending environmental legislation governing its use.

Methanol

Methanol production rebounds in 1976

In 1976, methanol ranked 20th among the 50 most important U.S. industrial chemicals with production in excess of 6.2 billion pounds. This volume represented a significant increase of 21.6 percent over the 1975 level of 5.2 billion pounds, a figure which reflected the doldrums that industrial chemical producers faced in the recession of 1975. Despite this encouraging increase in the 1976 production of methanol, it, nonetheless, lagged 1973 and 1974 output figures and remained slightly below the recent trend line shown in figure 1. On a more optimistic note, methanol fared better in 1976 than the organic chemicals sector as a whole, which registered an overall increase of 18 percent in production over the 1975 level.

Moderate growth of 5 to 6 percent projected for methanol

Industry sources are projecting, amid considerable speculation, that methanol production for nonfuel use will expand at a moderate rate of 5 to 6 percent a year for the remainder of this decade and into the early 1980's. These projections are predicated to some extent on the level of new housing starts reaching 1.5 to 2.0 million a year for the remainder of the decade. The correlation between methanol and the number of housing starts stems from methanol's major end use as an adhesive in the production of plywood and particle board, products which are sensitive to changes in the rate of new housing construction. On this score, methanol producers have reason to be encouraged with the renewed activity in the housing sector in recent months. In 1976, total new housing starts numbered 1.55 million, 32 percent more than in 1975. Through the first quarter of 1977, the 370,000 recorded new housing starts are well ahead of the 283,000 recorded in the first quarter of 1976 and dramatically ahead of the 194,000 recorded in the first quarter of 1975. ^{1/} Despite this upward trend, producers remain guarded in their projections, in that a sustained surge in housing construction will be largely dependent upon the Nation's ability to contain its inflation rate and to maintain a prime rate low enough to encourage new housing.

The 5 to 6 percent projected growth rate is also dependent upon the producers' ability to achieve moderate growth in methanol's other multiple commercial markets, such as the polyester fiber and solvent markets.

Domestic capacity expected to keep pace with projected demand through 1980

There is a general consensus among industry experts that new capacity additions scheduled for completion by 1980 will keep pace with projected

^{1/} U.S. Department of Commerce, Survey of Current Business, November 1976 (vol. 56, No. 11) and May 1977 (vol. 57, No. 5).

demand requirements. By 1980, U.S. capacity for methanol production is projected to reach 11 billion to 12 billion pounds a year, representing a 20-percent increase over current capacity levels. DuPont, alone, is scheduled to place a new plant with a capacity of 1.3 billion pounds a year on stream by 1980.

Domestic demand estimates, excluding methanol produced for fuel use, border on 8 billion pounds a year for 1980, representing an increase of 5 to 6 percent a year in the domestic demand for methanol.

Methanol may make inroads into new markets

There is continued speculation as to whether methanol will make new inroads into two potentially significant markets; one for clean-burning automotive fuel and the other for an intermediate in the production of a synthetic food source--single-cell protein.

In recent years methanol has undergone considerable testing for use in automotive fuel applications, the results of which have not to date been encouraging. However, testing continues, and industry sources forecast that if a breakthrough occurs, there will be a dramatic shift in the composition of the industry away from traditional chemical producers and toward the oil producers and refiners. The reason for this possible shift is that methanol (a primary chemical feedstock) is derived directly from natural gas, and is very close in the vertical chain to traditional oil producers' and refiners' markets. It must be pointed out, however, that such a breakthrough and consequential shift in production is certainly not expected over the short term and is questionable on a cost/performance basis over the long term.

The outlook is unclear for methanol's use as an intermediate in the production of single-cell protein, a product which is still very much in its experimental stages. The benefits of single-cell protein in alleviating some of the world's nutritional needs are potentially great, and one would expect significant markets to open for this product if technical and commercial difficulties can be overcome. Although inconclusive, current research indicates a leaning away from methanol as an intermediate in the production of single-cell protein in favor of ethanol.

Methanol imports on the rise

Imports of methanol for nonfuel use reached a record high of 277 million pounds valued at \$8.5 million, in 1976, representing nearly a 150-percent increase by volume over the 1975 level. These imports supplied approximately 4 to 5 percent of domestic demand in 1976, or more than twice as much as in any other year in this decade; more than 70 percent come from Canada. Imperial Chemical Industries and Alberta Gas Chemicals are believed to be the major exporting companies to the United States.

According to Public Law 93-482, enacted October 26, 1974, methanol can be imported into the United States under TSUS item 427.96 free of duty (col. 1 rate) for fuel use or for use in producing synthetic natural gas. In 1976, 6.9 million pounds of methanol valued at \$289,000 entered the United States under this category, a significant increase over the 3,700 pounds of methanol imported under this category in 1975.

Imports of methanol under the nonfuel use category in the first quarter of 1977 were substantially higher than those in the first quarter of 1976, indicating that imports are continuing their rising trend. Imports through the first quarter of 1977 reached 79 million pounds, compared with 53 million pounds imported through the first quarter of 1976. There were no imports of methanol for fuel use recorded in the first quarter of 1977.

Exports increase 22 percent over the 1975 level

Exports of methanol, both natural and synthetic, increased from 458 million pounds, valued at \$16.8 million, in 1975 to 561 million pounds, valued at \$23.2 million in 1976. There is no indication of fundamental changes in the composition of U.S. export markets for methanol.

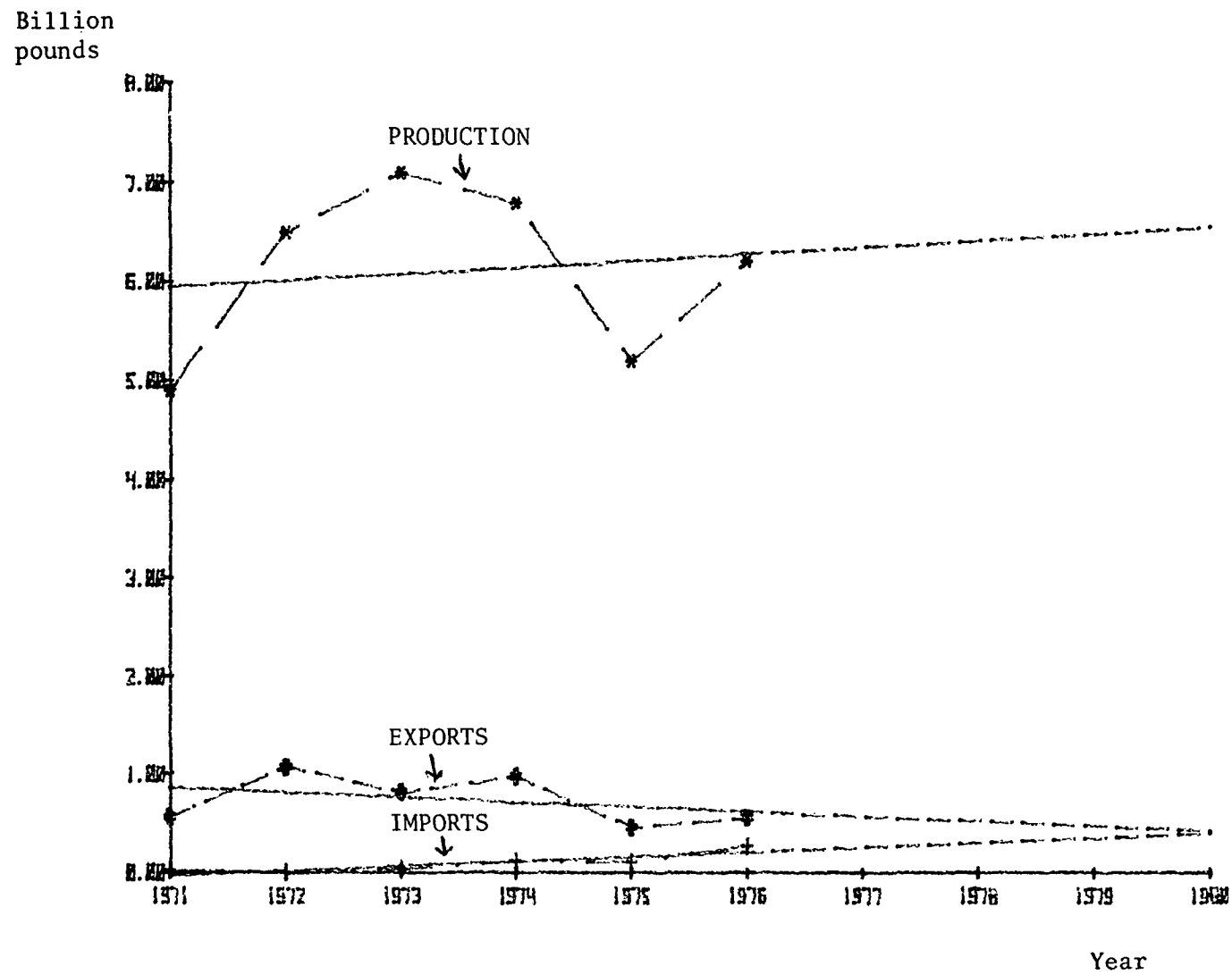
The international outlook for methanol through 1980's is unclear

There is little question that the chief determinant in the future competitiveness of world methanol producers will be raw material costs. The most economic technology, the Imperial Chemical Industries process, is readily licensable, and as such is no longer a crucial variable in establishing a nation's comparative advantage vis-a-vis other producing nations. Labor cost differences are not likely to be major determinants in the competitiveness of methanol producers, given the facts that the labor input in methanol production is low and that these differences in labor costs have equilibrated in recent years. Thus, it would seem that the future competitiveness of world methanol producers will greatly depend upon their ability to secure an adequate long-term raw material supply at a competitive price.

Given this determinant, all eyes are directed toward the announced plant construction in the Middle East, which, if it materializes could substantially alter established trading patterns not only in methanol but in many other commodity chemicals as well. There are, however, a number of indeterminate factors which may well mitigate the raw material cost advantages that these oil-rich nations currently enjoy. Their construction and distribution costs are presently much higher than those in the developed nations. In addition, these oil-rich nations may well decide to upgrade the commodity chemicals with low unit costs into intermediate and end-use products with higher unit values; the trade impact would then be felt in those sectors.

Figure 1.--Methanol: United States Production, Exports, and Imports, 1971-76

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MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS

TABLE 1.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS: U.S. PRODUCTION AND SALES, 1976

[Listed below are all miscellaneous end-use chemicals and chemical products for which any reported data on production and/or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists alphabetically all miscellaneous end-use chemicals and chemical products on which data on production and/or sales were reported and identifies the manufacturers of each]

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds	1,000 pounds	1,000 dollars	per pound
Grand total-----	15,851,080	9,159,570	2,251,127	\$0.25
Chelating agents, nitriloacid and salts, total-----	151,043	125,114	59,223	.47
(Diethylenetrinitrilo)pentaacetic acid, penta- sodium salt-----	...	2,821	2,146	.76
(Ethylenedinitrilo)tetraacetic acid, tetrasodium salt-----	49,637	32,701	20,598	.63
(N-Hydroxyethylethylenedinitrilo)triacetic acid, trisodium salt-----	4,791	3,349	2,868	.86
All other-----	96,615	86,243	33,611	.40
Enzymes-----	(²)	(²)	33,904	...
Flotation reagents-----	5,568	...	...	...
Gasoline additives, total ³ -----	1,050,995	931,211	735,589	.79
N,N'-Di-sec-butyl-p-phenyldiamine-----	2,715	2,259	3,247	1.44
N,N'-Diisopropyl-p-phenylenediamine-----	1,178	1,067	2,139	2.00
Ethylenedibromide-----	201,080	148,516	41,942	.28
Tetraethyl lead-----	363,775	409,641	364,056	.89
All other gasoline additives-----	482,247	369,728	324,205	.87
Lubricating oil and grease additives, total-----	1,100,255	557,430	182,847	.33
Oil soluble petroleum sulfonate, calcium salt-----	234,316	138,805	37,657	.27
Oil soluble petroleum sulfonate, sodium salt-----	104,119	101,623	21,802	.21
All other lubricating oil and grease additives-----	761,820	317,002	123,388	.39
Paint driers, naphthenic acid salts, total ^{4,5} -----	11,336	11,151	8,322	.75
Calcium naphthenate-----	842	802	419	.52
Cobalt naphthenate-----	2,901	2,938	3,497	1.19
Lead naphthenate-----	4,629	4,629	2,217	.48
Manganese naphthenate-----	1,003	985	599	.61
Zinc naphthenate-----	980	885	435	.49
All other-----	981	912	1,155	1.27
Polymers for fibers, total-----	⁶ 5,082,003	⁶ 766,809	⁶ 574,230	.75
Nylon 6 and 6/6-----	1,634,132	...	...	...
Polyacrylonitrile and acrylonitrile copolymers-----	⁶ 551,961	...	...	...
Polyethylene terephthalate-----	1,988,132	205,852	86,179	.42
All other polymers for fiber-----	907,778	560,957	488,051	.87
Polymers, water soluble, total-----	⁶ 185,312	⁶ 161,018	⁶ 164,766	1.02
Cellulose ethers and esters, total-----	⁶ 115,294	⁶ 99,256	⁶ 101,250	1.02
Polyacrylamide-----	41,507	36,829	41,479	1.13
Polyacrylic acid salts, total-----	17,302	16,265	9,596	.59
Sodium polyacrylate-----	6,783	...	...	...
All other polyacrylic acid salts-----	10,519	16,265	9,596	.59
All other water soluble polymers-----	11,209	8,668	12,441	1.44
Tanning materials, synthetic-----	59,468	54,541	22,365	.41
Urea, total-----	8,161,726	6,524,000	376,363	.06
In feed compounds-----	490,378	421,679	26,585	.06
In liquid fertilizer-----	2,268,234	2,175,599	99,973	.05
In solid fertilizer-----	4,176,474	3,500,481	217,588	.06
In plastics-----	392,636	298,360	24,526	.08
All other-----	834,004	127,881	7,691	.06
All other miscellaneous end-use chemicals and chem- ical products ⁷ -----	43,374	28,296	93,518	3.30

See footnotes on following page.

SYNTHETIC ORGANIC CHEMICALS, 1976

Footnotes for Table 1

- ¹ Calculated from rounded figures.
- ² Not available.
- ³ Statistics exclude production and sales of tricresyl phosphate. Statistics on tricresyl phosphate are given with the section on "Plasticizers."
- ⁴ Quantities are given on the basis of solid naphthenate.
- ⁵ Statistics exclude production and sales of copper naphthenate. Statistics for copper naphthenate are given in the section on "Pesticides and Related Products."
- ⁶ Greater than 10 percent of this total is data which were estimated. It was necessary to estimate these data because one or more manufacturers of the compounds failed to supply the U.S. International Trade Commission with their data in sufficient time for its inclusion in this report. Such manufacturers are presumed to have continued production of the compound in question in 1976, therefore the volume of production and sales has been estimated by the USITC staff members.
- ⁷ Includes all other items listed in table 2 which are not individually publishable or publishable as groups.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)

@CHELATING AGENTS, NITRILACIDS AND SALTS:	
(DIETHYLENETRINITRIL) PENTAACETIC ACID - - - - -	HMP.
(DIETHYLENETRINITRIL) PENTAACETIC ACID, MONOSODIUM HYDROGEN FERRIC SALT - - - - -	CGY (E) .
@(DIETHYLENETRINITRIL) PENTAACETIC ACID, PENTASODIUM SALT - - - - -	CGY (E) , DAN, DOW, HMP.
(DIETHYLENETRINITRIL) PENTAACETIC ACID, SODIUM SALT - - - - -	CGY (E) , RPC.
N,N-DIHYDROXYETHYLGLYCINE, SODIUM SALT - - - - -	DAN, DOW, HMP.
ETHANOLDIGLYCINE, DISODIUM SALT - - - - -	HMP.
(ETHYLENEDINITRIL) TETRAACETIC (ETHYLENEDIAMINETETRAACETIC ACID) (EDTA) - - - - -	DOW, HMP.
(ETHYLENEDINITRIL) TETRAACETIC ACID, CALCIUM DISODIUM SALT - - - - -	CGY (E) , DOW.
(ETHYLENEDINITRIL) TETRAACETIC ACID, DIAMMONIUM SALT - - - - -	DOW, HMP.
(ETHYLENEDINITRIL) TETRAACETIC ACID, DIPOTASSIUM ZINC SALT - - - - -	HMP.
(ETHYLENEDINITRIL) TETRAACETIC ACID, DISODIUM SALT - - - - -	DOW, HMP.
(ETHYLENEDINITRIL) TETRAACETIC ACID, DISODIUM COPPER SALT, DIHYDRATE - - - - -	CGY (E) , HMP.
(ETHYLENEDINITRIL) TETRAACETIC ACID, DISODIUM ZINC SALT, DIHYDRATE - - - - -	HMP.
(ETHYLENEDINITRIL) TETRAACETIC ACID, MANGANESE SALT - - - - -	HMP.
(ETHYLENEDINITRIL) TETRAACETIC ACID, MONOAMMONIUM FERRIC SALT - - - - -	HMP.
(ETHYLENEDINITRIL) TETRAACETIC ACID, MONOSODIUM IRON SALT - - - - -	HMP.
(ETHYLENEDINITRIL) TETRAACETIC ACID, TETRAAMMONIUM SALT - - - - -	DOW.
(ETHYLENEDINITRIL) TETRAACETIC ACID, TETRAPOTASSIUM SALT - - - - -	CGY (E) , HMP.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@CHELATING AGENTS, NITRILACIDS AND SALTS--CONTINUED	
@(ETHYLENEDINITRIL) TETRAACETIC ACID, TETRASODIUM SALT	: CGY(E), CRT, DAN, DOW, HMP, JOR, RPC.
(ETHYLENEDINITRIL) TETRAACETIC ACID, TRISODIUM SALT - -	: HME.
(N-HYDROXYETHYLETHYLENEDINITRIL) TRIACETIC ACID - - -	: HMP.
(N-HYDROXYETHYLETHYLENEDINITRIL) TRIACETIC ACID, IRON	: HMP.
SALT - - - - -	: HMP.
(N-HYDROXYETHYLETHYLENEDINITRIL) TRIACETIC ACID, MAGNE	: HMP.
SIUM SALT - - - - -	: HMP.
@(N-HYDROXYETHYLETHYLENEDINITRIL) TRIACETIC ACID, TRISO	: CRT, DAN, DOW, HMP, RPC.
DIUM SALT - - - - -	: HMP.
IMINODIACETIC ACID, DISODIUM SALT - - - - -	: HMP, MON.
NITRILOTRIACETIC ACID - - - - -	: HMP.
NITRILOTRIACETIC ACID, DISODIUM SALT - - - - -	: HMP.
NITRILOTRIACETIC ACID, TRISODIUM SALT - - - - -	: HMP.
@CHELATING AGENTS, NITRILACIDS AND SALTS, ALL OTHER - -	: CGY(E), DOW.
CHEMICAL INDICATORS - - - - -	: EK, FIN, GFS, NLC.
CHEMICAL REAGENTS - - - - -	: EK, GFS, RSA, UCC.
@ENZYMES:	
HYDROLYTIC ENZYMES:	
AMYLASES:	
AMYLASES, ALL OTHER - - - - -	: BAX, MLS, PFZ, RH, X.
PROTEASES:	
BROMELAIN - - - - -	: DOL.
FICIN - - - - -	: PFZ.
PAPAIN - - - - -	: PEN(E), PFZ.
PEPSIN - - - - -	: CHH, PFZ, X.
RENNIN - - - - -	: CHH, PFZ.
PROTEASES, ALL OTHER - - - - -	: BAX, MLS, PFZ, PIC, PMP, X.
HYDROLYTIC ENZYMES INCLUDING PECTIC ENZYMES AND LIPA	: BAX, JFR, MLS, PFN, PMP, RH, WBC, X.
SE, ALL OTHER - - - - -	: DLI.
NON-HYDROLYTIC ENZYMES:	
GLUCOSE OXIDASE - - - - -	: MLS, OMS, PLB.
NONHYDROLYTIC ENZYMES - - - - -	: DLI.
@PLOTATION REAGENTS:	
PHOSPHORODITHIOATES (DITHIOPHOSPHATES):	
DICRESYLPHOSPHORODITHIOIC ACID - - - - -	: ACY.
DICRESYLPHOSPHORODITHIOIC ACID, AMMONIUM SALT - - -	: ACY.
DICRESYLPHOSPHORODITHIOIC ACID, SODIUM SALT - - -	: KCU.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
PHOTOGRAPHIC CHEMICALS:	
N-2- (4-AMINO-N-ETHYL-META-TOLUIDINO) ETHYL METHANE-SULFONAMIDE - - - - -	X.
2- (4-AMINO-N-ETHYL-META-TOLUIDINO) ETHYL SULFATE - - - - -	X.
3-AMINO-1,2,4-TRIAZOLE - - - - -	FMT.
BENZOTRIAZOLE- - - - -	FMT.
CATECHOL - - - - -	CRZ.
3-CHLORO-4-DIETHYLAMINO BENZENEDIAZONIUM CHLORIDE (PARA-DIAZO-2-CHLORO-N,N-DIETHYLANILINE)-ZINC CHLORIDE - - - - -	ESA, FMT.
4-DIAZO-3,5-DIETHOXYTHIOCRESOL SALTS - - - - -	FMT.
2,5-DIETHOXY-4-MORPHOLINO BENZENEDIAZONIUM CHLORIDE - - - - -	ALL, ESA.
P-DIETHYLAMINO BENZENEDIAZONIUM CHLORIDE (P-DIAZO-N,N-DIETHYLANILINE)-ZINC CHLORIDE- - - - -	ESA, FMT, WAY.
N,N-DIETHYL-P-PHENYLENEDIAMINE HYDROCHLORIDE - - - - -	EKT.
N,N-DIETHYLTOLUENE-2,5-DIAMINE, MONOHYDROCHLORIDE- - - - -	EKT, WAY.
P-DIMETHYLAMINO BENZENEDIAZONIUM CHLORIDE (P-DIAZO-N,N-DIMETHYLANILINE)-ZINC CHLORIDE- - - - -	ESA, FMT.
PARA-DIPHENYLAMINEDIAZONIUM SULFATE- - - - -	FMT.
PARA-(N-ETHYLBENZIMIDO) BENZENEDIAZONIUM CHLORIDE (PARA-DIAZO-N-BENZYL-N-ETHYLANILINE)-ZINC CHLORIDE - - - - -	FMT.
PARA-*(2-HYDROXYETHYL) AMINO* BENZENEDIAZONIUM CHLORIDE (PARA-DIAZO-N-ETHYL-N-HYDROXYETHYLANILINE)-ZINC CHLORIDE - - - - -	ESA, FMT, WAY.
N-ETHYL-N-HYDROXYETHYL-PARA-PHENYLENEDIAMINE SULFATE - - - - -	WAY.
HYDROQUINONE - - - - -	EKT.
PARA-*(2-HYDROXYETHYL) METHYLAMINO* BENZENEDIAZONIUM CHLORIDE (PARA-DIAZO-N-HYDROXYETHYL-N-METHYLANILINE)-ZINC CHLORIDE- - - - -	ESA, FMT.
4-METHOXY-1-NAPHTHOL - - - - -	X.
PARA-METHYLAMINOPHENOL SULFATE - - - - -	EK.
5-METHYLBENZOTRIAZOLE- - - - -	EK.
6-NITROBENZIMIDAZOLE - - - - -	EK, FMT.
PHENYL-5-MERCAPTOTETRAZOLE - - - - -	FMT.
1-PHENYL-3-PYRAZOLIDONE- - - - -	CGY(E).
1- (2,4,6-TRICHLOROPHENYL)-3-PARA-NITROANILINO-2-PYRAZOLIN-5-ONE - - - - -	X.
PHOTOGRAPHIC CHEMICALS, ALL OTHER- - - - -	EK, ESA, FIN, FMT, HST, MIL, WAY, X, X.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)

@POLYMERS FOR FIBERS:	:
CELLULOSE ACETATE- - - - -	: CEL, DUP, EKT.
NYLON 6 (POLYMER FOR FIBER, ONLY)	:
- - - - -	: ALF, PRF.
NYLON 6/6- - - - -	: DUP, FND, MON.
@POLYACRYLONITRILE AND ACRYLONITRILE COPOLYMERS - - - -	: DUP, MON.
@POLYETHYLENE TEREPHTHALATE - - - - -	: DUP, EK, EKT, FND, GYR.
@POLYMERS FOR FIBERS, ALL OTHER - - - - -	: BKL, DUP, EK, EKT, PRF, MON, SKP.
@POLYMERS, WATER SOLUBLE:	:
@CELLULOSE ETHERS AND ESTERS:	:
HYDROXYETHYLCELLULOSE- - - - -	: UCC.
METHYLCELLULOSE- - - - -	: DOW.
SODIUM CARBOXYMETHYLCELLULOSE (100%) - - - - -	: BUK, WMP.
CELLULOSE ETHERS AND ESTERS, ALL OTHER - - - - -	: DOW.
DEXTRAN- - - - -	: PHR.
@POLYACRYLAMIDE - - - - -	: ACY, CEL(E), DOW, HPC, MRK, NLC.
@POLYACRYLIC ACID SALTS:	:
AMMONIUM POLYACRYLATE- - - - -	: BFG.
@SODIUM POLYACRYLATE- - - - -	: ALC, BFG, DA, NLC, RH, STC.
@POLYACRYLIC ACID SALTS, ALL OTHER- - - - -	: ACY, BFG, NLC.
POLYETHYLENEIMINE- - - - -	: DOW.
POLYMETHACRYLIC ACID, SODIUM SALT- - - - -	: GRD, NLC.
1-VINYL-2-PYRROLIDINONE, POLYMERS- - - - -	: DAN, GAF.
@POLYMERS, WATER SOLUBLE, ALL OTHER - - - - -	: GAF.
RARE SUGARS:	:
RARE SUGARS- - - - -	: PFN.
SILICONE GREASES - - - - -	: DCC, SPD, SWS.
@TANNING MATERIALS, SYNTHETIC:	:
HYDROXYTOLUENESULFONIC ACID, FORMALDEHYDE CONDENSATE	:
(CRESOL-FORMALDEHYDE SULFONATE), SODIUM SALT - - -	: DA.
1-NAPHTHALENESULFONIC ACID, FORMALDEHYDE CONDENSATE AND	:
SALT - - - - -	: DA.
2-NAPHTHALENESULFONIC ACID, FORMALDEHYDE CONDENSATE AN	:
D SALT- - - - -	: AKS, GRD, RH.
1-PHENOL-2-SULFONIC ACID, FORMALDEHYDE CONDENSATE (PH	:
ENOL-FORMALDEHYDE, SULFONATED) - - - - -	: RH.
TANNING MATERIALS, SYNTHETIC, ALL OTHER- - - - -	: CGY(E), DA, MIL, UCC.

TABLE 2.--MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS	MANUFACTURERS IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
TEXTILE CHEMICALS, OTHER THAN SURFACE-ACTIVE AGENTS:	
DIMETHYLDIHYDROXYETHYLENE UREA- - - - -	: CHP, DAN.
2,2',4,4'-TETRAHYDROXYBENZOPHENONE - - - - -	: GAP.
TRI(BEHENOYLOXYMETHYL)TRIMETHOXYMETHYLMELAMINE - - - - -	: DUP.
TEXTILE CHEMICALS, OTHER THAN SURFACE ACTIVE AGENTS, A :	
LL OTHER- - - - -	: DAN, GAP, HDG.
UREA, BY END-USE MARKETS:	
UREA, PRIMARY SOLUTION (REPORT ON 100% UREA-CONTENT B :	
ASIS) - - - - -	: ACN, ACS, ACY(E), AGY, AKL, APD, ARM, BIC, BOR, CFA, : CHN, CNC, COL, DUP, FCA, PTX, GPI, HKY, HN, HPC, JDC, : MSC, OMC, PLC, PPC, SAG, SMP, SNI, SOH, TER, VLN, WLC, : WYC.
UREA IN COMPOUNDS OR MIXTURES (100% BASIS):	
@UREA IN FEED COMPOUNDS - - - - -	: ACN, AGY, APD, BIC, FMS, PTX, JDC, MSC, PPC, SNI, SOH, : TER, VLN, WYC.
@UREA IN LIQUID FERTILIZER- - - - -	: ACN, AGY, AKL, APD, ARM, CFA, CHN, CNC, FCA, FMS, PTX, : GPI, HKY, HN, HPC, JDC, MSC, PLC, PPC, SAG, SMP, SNI, : SOH, TER, VLN, WLC, WYC.
UREA LIQUOR- - - - -	: TER.
@UREA IN PLASTICS - - - - -	: ACS, FMS, MSC, OMC, SOH.
@UREA IN SOLID FERTILIZER - - - - -	: ACN, ACS, AGY, APD, BIC, CFA, COL, FMS, PTX, HN, HPC, : JDC, MSC, OMC, PPC, SOH, TER, VLN, WLC, WYC.
@UREA IN COMPOUNDS AND MIXTURES (100% BASIS), ALL OTH :	
ER- - - - -	: ACS, ACY(E), BOR, DUP, JDC, PFN, SOH, WYC.

SYNTHETIC ORGANIC CHEMICALS, 1975

TABLE 3.--MISCELLANEOUS END-USE CHEMICAL AND CHEMICAL PRODUCTS: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production or sales of miscellaneous end-use chemicals and chemical products to the U.S. International Trade Commission for 1976 are listed below in the order of their identification code as used in table 2]

Code	Name of company	Code	Name of company
ACN	Allied Chemical Corp.:	FRF	Firestone Tire & Rubber Co., Firestone
ACS	Agricultural Div.		Synthetic Fibers Co.
ACY	Specialty Chemicals Div.	GAF	GAF Corp., Chemical Div.
AGY	American Cyanamid Co.	GCC	W. R. Grace & Co., Agricultural Chem. Group
AIP	Agway, Inc., Olean Nitrogen Complex	GFS	G. Frederick Smith Chemical Co.
AKL	Air Products & Chemicals, Inc.	GLY	Glyco Chemicals, Inc.
ALF	Gardiner Big River, Inc.	GPI	Goodpasture, Inc.
ALL	Allied Chemical Corp., Fibers Div.	GRD	W. R. Grace & Co., Polymers & Chemicals Div.
ALX	Alliance Chemical, Inc.	GYR	Goodyear Tire & Rubber Co.
ALX	Alox Corp.		
AMB	American Bio-Synthetic Corp.	HDC.	Hodag Chemical Corp.
APD	Atlas Powder Co. Subsidiary of Tyler	HK	Hooker Chemicals & Plastic Corp.:
ASH	Corp.	HKD	Durez Div.
	Ashland Oil, Inc., Ashland Chemical Co.	HKY	Hawkeye Chemical Co.
BAS	BASF Wyandotte Corp.	HMP	W. R. Grace & Co., Organic Chemicals Div.
BAX	Baxter Laboratories, Inc.	HN	Tenneco Chemicals, Inc.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical	HPC	Hercules, Inc.
	Co. Div.		
BIC	Baker Industries, Inc.	JDC	Nipak, Inc.
BOR	Borden Co., Borden Chemical Div.	JFR	George A. Jeffrey's & Co., Inc.
BUK	Buckeye Cellulose Corp.	JOR	Jordan Chemical Co.
CCA	Interstab Chemical, Inc.	KCU	Kennecott Copper Corp., Utah Copper Div.
CCW	Cincinnati Milacron Chemicals, Inc.		
CEL	Celanese Corp.:	MCI	Mooney Chemicals, Inc.
	Celanese Fibers Co.	MIL	Milliken & Co., Milliken Chemical Div.
CFA	Cooperative Farm Chemicals Association	MLS	Miles Laboratories, Inc., Marschall Div.
CGY	Ciba-Geigy Corp. and Pharmaceutical Div.	MON	Monsanto Co.
CHH	CHR. Hansen's Laboratory, Inc.	MOR	Marathon Morco, Co.
CHN	N-Ren Corp., Cherokee Nitrogen Div.	MRK	Merck & Co., Inc.
CNC	Columbia Nitrogen Corp.	MSC	Mississippi Chemical Corp.
CRN	CPC International, Inc., Amerchol		
CRT	Crest Chemical Corp.	NEP	Nepera Chemical Co.
		NLC	Nalco Chemical Co.
DA	Diamond Shamrock Corp.	NTL	NL Industries, Inc.
DAN	Dan River, Inc.		
DCC	Dow Corning Corp.	OMC	Olin Corp.
DLI	Dawe's Laboratories, Inc.	OMS	E. R. Squibb & Sons, Inc.
DOL	Castle & Cooke, Inc., Castle & Cooke	ORO	Chevron Chemical Co.
	Foods, Hawaii Region	OXC	Oxochem Enterprises
DOW	Dow Chemical Co.		
DUP	E. I. DuPont de Nemours & Co., Inc.	PAR	Pennzoil Co., Penneco Div.
		PAS	Pennwalt Corp.
EK	Eastman Kodak Co.:	PD	Parke, Davis & Co. Sub of Warner-Lambert
EKT	Tennessee Eastman Co. Div.		Co.
ENJ	Exxon Chemical Co. U.S.A.	PEN	CPC International, Inc., S. B. Penick Div.
ESA	East Shore Chemical Co., Inc.	PFN	Pfanstiehl Laboratories, Inc.
		PFZ	Pfizer, Inc. & Pfizer Pharmaceuticals, Inc.
FER	Ferro Corp.:	PHR	Pharmachem Corp.
	Ferro Chemical Div.	PIC	Pierce Chemical, Inc.
	Keil Chemical Div.	PLB	P-L Biochemicals, Inc.
FIN	Hexcel Corp., Fine Organics Div.	PLC	Phillips Petroleum Co.
	FMC Corp.:	PMP	Premier Malt Products, Inc.
FMP	Industrial Chemical Div.	PPC	Premier Petrochemical Co.
FMS	First Mississippi Corp.	PPG	Pittsburgh Plate Glass Co.
FMT	Fairmount Chemical Co., Inc.		
FND	Fiber Industries, Inc.	RBC	Fike Chemicals, Inc.
		RH	Rohm & Haas Co.
		RPC	Millmaster Onyx Corp., Refined-Onyx Div.

MISCELLANEOUS END-USE CHEMICALS AND CHEMICAL PRODUCTS

TABLE 3.--MISCELLANEOUS END-USE CHEMICAL AND CHEMICAL PRODUCTS: DIRECTORY OF MANUFACTURERS, 1976--CONTINUED

Code	Name of company	Code	Name of company
RSA	R.S.A. Corp.	TRI	Triad Chemicals
SAG	Swift Agricultural Chemicals	TRO	Troy Chemical Corp.
SHC	Shell Oil Co., Shell Chemical Co. Div.	TVA	Tennessee Valley Authority
SM	Mobil Oil Corp., Chemical Co.: Chemical Coatings Div.	TX	Texaco, Inc.
SMP	J.R. Simplot Co., Minerals & Chemical Div.	UPM	UOP, Inc.
SNI	Kaiser Aluminum & Chemical Corp., Kaiser Agricultural Chemicals Div.	USR	Uniroyal, Inc., Chemical Div.
SOC	Standard Oil Co. of California, Chevron Chemical Co.	VLN	Valley Nitrogen Producers, Inc.
SOH	Vistron Corp.	VND	Van Dyk & Co., Inc.
SPD	General Electric Co., Silicone Products Dept.	WAG	West Agro Chemical, Inc.
SW	Sherwin-Williams Co.	WAY	Phillip A. Hunt Chemical Corp., Organic Chemical Div.
SWS	Stauffer Chemical Co., SWS Silicones Div.	WBC	Worthington Biochemical Corp.
TCC	Tanatex Chemical Corp.	WBG	White & Bagley Co.
TER	Terra Chemicals International, Inc.	WLC	Agrico Chemical Co.
TNA	Ethyl Corp.	WMP	Essex Group, Inc.
		WTC	Witco Chemical Co., Inc.
		WTH	Union Carbide Corp., Chemical Div., Dover Plant
		WYC	Wycon Chemical Co.
		ZGL	Carolina Processing Corp.

Note.--Complete names and addresses of the above reporting companies are listed in Table 1 of the Appendix.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

K. James O'Connor, Jr. and Thomas O'Connell

This section is extensively revised from that of previous years. Many of these changes reflect suggestions proposed by an industry task force. For this reason, the data contained within this section are not generally comparable with the data from previous years. Several large volume items such as urea and polymers for fiber were moved to the section entitled Miscellaneous End-Use Chemicals and Chemical Products.

The term miscellaneous chemicals as it is used here comprises those synthetic organic products that are not included in the use groups covered by the other sections of this report. They include products that are employed in a great variety of uses. The number of chemicals used extensively for only one purpose is not large. Among the products covered are those used for refrigerants, aerosols, solvents, and a wide range of chemical intermediates.

U.S. production of miscellaneous cyclic and acyclic chemicals in 1976 amounted to 83.5 billion pounds. U.S. sales for 1976 totaled 33.9 billion pounds valued at \$7.1 billion. Production of miscellaneous cyclic chemicals comprised only 5 percent of this section's total production.

The most important group among the miscellaneous acyclic chemicals was the halogenated hydrocarbons. U.S. production for this group in 1976 reached 20.8 billion pounds or 25 percent of this section's total production. U.S. sales for this group amounted to 8.8 billion pounds valued at \$1.4 billion. Other important groups were the monohydric unsubstituted alcohols with production of 14.3 billion pounds, the aldehydes with a total production of 8.3 billion pounds, and the nitrogenous compounds with production of 7.6 billion pounds.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 1.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: U.S. PRODUCTION AND SALES, 1976

[Listed below are all miscellaneous chemicals for which any reported data on production or sales may be published. (Leaders (...)) are used where the reported data are accepted in confidence and may not be published or where no data were reported.) Table 2 lists all miscellaneous chemicals for which data on production and/or sales were reported and identifies the manufacturers of each]

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Grand total-----	83,553,062	33,911,741	7,136,673	\$0.20
MISCELLANEOUS CHEMICALS, CYCLIC				
Total-----	3,881,178	1,803,010	682,150	.38
Benzoic acid, sodium salt-----	14,197	12,727	6,444	.51
Benzoyl peroxide-----	8,841	8,536	15,005	1.76
Benzyl alcohol-----	8,636	7,394	4,884	.66
tert-Butyl peroxybenzoate-----	1,690	1,579	2,752	1.74
Caprolactam-----	779,659	...	...	...
2,6-Di-tert-butyl-p-cresol (BHT):				
Food grade-----	8,862	8,046	6,711	.83
Tech. grade-----	10,947	10,909	9,700	.89
Dioxane (1,4-Diethylene oxide)-----	14,873	5,654	4,070	.72
Hexamethylenetetramine, tech. grade-----	47,102	...	...	...
p-Hydroxybenzoic acid, methyl ester-----	797	713	1,726	2.42
p-Hydroxybenzoic acid, propyl ester-----	192	231	620	2.68
2-Hydroxy-4-methoxybenzophenone-----	530	487	1,522	3.13
Maleic anhydride-----	263,968	201,775	64,454	.32
α-Pinene-----	...	5,300	724	.14
β-Pinene-----	25,366	2,757	828	.30
Tall oil salts, total ² -----	1,992	1,909	1,561	.82
Calcium tallate-----	123	124	68	.55
Lead tallate-----	317	293	142	.48
Tall oil salts, all other-----	1,552	1,492	1,351	.91
All other miscellaneous cyclic chemicals-----	2,693,526	1,534,993	561,149	.37
MISCELLANEOUS CHEMICALS, ACYCLIC				
Total-----	79,671,884	32,108,731	6,454,523	.20
Nitrogenous Compounds				
Total ³ -----	7,555,682	1,922,663	744,053	.39
Amides-----	294,762	102,854	62,361	.61
Amines, total-----	1,777,299	415,658	227,511	.55
Butylamines-----	49,585	43,202	21,192	.49
Ethylamines:				
Diethylamine-----	13,897	8,320	4,865	.58
Ethylamine, mono-----	36,806	...	...	...
1,6-Hexanediamine (Hexamethylenediamine)-----	855,965	...	...	...
Isopropylamine, mono-----	33,353	37,417	13,388	.36
Methylamines: Dimethylamine-----	...	43,229	13,233	.31
All other-----	787,693	283,490	174,833	.62
2-(2-Aminoethylamino)ethanol (Aminoethylethanol-amine)-----	...	10,789	7,862	.73
Ethanolamines, total-----	286,224	260,175	87,652	.34
2-Aminoethanol (Monoethanolamine)-----	92,992	82,814	27,364	.33
2,2'-Aminodiethanol (Diethanolamine)-----	88,568	81,487	27,433	.34
2,2',2''-Nitrilotriethanol (Triethanolamine)-----	104,664	95,874	32,855	.34

See footnotes at end of table.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: U.S. PRODUCTION
AND SALES, 1976--CONTINUED

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
MISCELLANEOUS CHEMICALS, ACYCLIC--Continued				
<i>Nitrogenous Compounds--Continued</i>				
Hexamethylenediammonium adipate-----	732,409	...	...	...
Nitriles, total-----	3,171,053	690,761	166,755	\$0.24
Acrylonitrile-----	1,517,830	600,987	147,144	.24
Nitriles, all other-----	1,653,223	89,774	19,611	.22
All other nitrogenous compounds-----	1,293,935	442,426	191,912	.43
<i>Acids, Acyl Halides, and Anhydrides</i>				
Total-----	6,725,256	1,360,648	394,388	.29
Acetic acid, synthetic, 100%-----	2,463,342	544,419	70,429	.13
Acetic anhydride, 100%-----	1,506,050	178,021	36,145	.20
Acrylic acid-----	256,331	35,881	11,313	.32
Adipic acid-----	1,280,907	101,703	52,166	.51
Fumaric acid-----	33,765	30,583	12,748	.42
Lauroyl chloride-----	2,041	...	...	...
Polyacrylic acid-----	2,452	1,656	1,405	.85
Propionic acid-----	76,102	39,266	7,111	.18
All other acids, acyl halides, and anhydrides-----	1,104,266	429,119	203,071	.47
<i>Salts of Organic Acids</i>				
Total-----	369,437	254,270	137,190	.54
Acetic acid salts, total-----	23,998	20,661	10,592	.51
Barium acetate-----	...	28	42	1.48
Zinc acetate-----	116	208	301	1.45
Zirconium acetate-----	91	...	...	...
All other-----	23,791	20,425	10,249	.50
2-Ethylhexanoic acid (α -Ethylcaproic acid) salts, total-----	16,420	14,873	15,377	1.03
Calcium 2-ethylhexanoate-----	2,524	1,863	1,096	.59
Cobalt 2-ethylhexanoate-----	4,413	3,893	5,333	1.37
Lead 2-ethylhexanoate-----	2,595	2,499	1,275	.51
Manganese 2-ethylhexanoate-----	990	959	569	.59
Zinc 2-ethylhexanoate-----	1,491	1,466	1,008	.69
Zirconium 2-ethylhexanoate-----	2,606	2,417	2,811	1.16
All other-----	1,801	1,776	3,285	1.85
Maleic acid salts-----	465	1,473	1,474	1.00
Oleic acid salts-----	496	501	668	1.33
Stearic acid salts, total ^a -----	80,723	81,016	47,642	.59
Aluminum distearate-----	2,419	2,426	1,691	.70
Aluminum tristearate-----	...	290	201	.69
Barium stearate-----	1,001	1,005	675	.67
Calcium stearate-----	45,545	45,873	23,420	.51
Cobalt stearate-----	362	351	475	1.35
Lead stearate-----	1,254	1,133	712	.63
Magnesium stearate-----	5,530	5,292	3,761	.71
Zinc stearate-----	22,254	22,484	15,117	.67
All other-----	2,358	2,162	1,590	.74
Tartaric acid salts-----	388	...	...	...
All other salts of organic acids-----	246,947	135,746	61,437	.45

See footnotes at end of table.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 1.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: U.S. PRODUCTION
AND SALES, 1976--CONTINUED

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
MISCELLANEOUS CHEMICALS, ACYCLIC--Continued				
Aldehydes	1,000 pounds	1,000 pounds	1,000 dollars	Per pound
Total-----	8,278,682	1,906,575	160,480	\$0.08
Butyraldehyde-----	749,116	...	...	...
Formaldehyde (37% by weight)-----	5,449,322	1,471,772	76,095	.05
Isobutyraldehyde-----	372,071	2,127	325	.15
All other-----	1,708,173	432,676	84,060	.19
Ketones				
Total-----	2,907,416	2,176,338	343,399	.16
Acetone, total-----	1,868,979	1,391,485	181,450	.13
From cumene-----	1,189,516	851,479	106,546	.12
From isopropyl alcohol-----	679,463	540,006	74,904	.14
2-Butanone (Methyl ethyl ketone)-----	428,146	414,638	78,452	.19
4-Hydroxy-4-methyl-2-pentanone (Diacetone alcohol)-----	...	44,990	10,761	.24
4-Methyl-2-pentanone (Methyl isobutyl ketone)-----	197,537	150,929	36,043	.24
All other-----	412,754	174,296	36,693	.21
Alcohols, Monohydric, Unsubstituted				
Total-----	14,252,696	6,864,146	876,096	.13
Alcohols, C ₁₁ or lower, unmixed, total-----	13,305,619	6,335,798	707,727	.11
Butyl alcohols:				
n-Butyl alcohol (n-Propylcarbinol)-----	625,277	344,366	64,729	.19
Isobutyl alcohol (Isopropylcarbinol)-----	174,789	139,403	20,458	.15
Ethyl alcohol, synthetic ⁵ -----	1,496,311	889,992	152,631	.17
2-Ethyl-1-hexanol-----	450,206	338,411	70,391	.21
Isopropyl alcohol-----	1,935,846	⁶ 961,327	⁶ 131,669	.14
Methanol, synthetic-----	6,242,241	2,132,994	125,587	.06
Propyl alcohol (Propanol)-----	134,247	97,932	21,772	.22
All other-----	2,246,702	1,431,373	120,490	.08
Alcohols, C ₁₂ and higher, unmixed, total-----	299,724	145,869	41,296	.28
Mixtures of alcohols, total-----	647,353	382,479	127,073	.33
Esters of Monohydric Alcohols				
Total-----	3,659,498	1,956,978	546,997	.28
n-Butyl acetate, unmixed-----	112,508	98,409	22,375	.23
Butyl acrylate-----	205,284	114,673	38,262	.33
Dibutyl maleate-----	7,903	6,900	2,627	.38
Di(2-ethyl-1-hexyl) maleate-----	863	377	154	.41
Dilauryl-3,3'-thiodipropionate-----	2,207	1,950	2,198	1.13
Ethyl acetate (85%)-----	215,552	193,664	36,380	.19
Ethyl acrylate-----	295,129	135,464	37,927	.28
2-Ethyl-1-hexyl acrylate-----	44,027	42,165	16,190	.38
Phosphorus acid esters, not elsewhere specified-----	59,200	52,853	42,155	.80
Propyl acetate-----	42,811	40,886	9,923	.24
Vinyl acetate-----	1,480,647	711,518	129,054	.18
All other-----	1,193,367	558,119	209,752	.38
Polyhydric Alcohols ⁷				
Total-----	4,630,310	3,528,318	843,992	.24
Ethylene glycol-----	3,334,587	2,525,135	495,332	.20
Glycerol, synthetic only-----	157,733	147,632	68,955	.47

Footnotes at end of table.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: U.S. PRODUCTION
AND SALES, 1976--CONTINUED

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
MISCELLANEOUS CHEMICALS, ACYCLIC--Continued				
<i>Polyhydric Alcohols--Continued</i>	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 dollars</i>	<i>Per pound</i>
Pentaerythritol-----	105,167	⁶ 104,256	⁶ 43,698	\$0.42
Propylene glycol-----	516,932	469,850	122,390	.26
Sorbitol (70% by weight)-----	195,474	135,405	48,630	.36
All other-----	320,417	146,040	64,987	.44
<i>Polyhydric Alcohol Esters</i>				
Total-----	104,124	97,668	42,785	.44
Ethylene glycol diacrylate-----	349	...	...	...
Trimethylolpropane triacrylate-----	499	...	...	...
All other-----	102,776	97,688	42,785	.44
<i>Polyhydric Alcohol Ethers</i>				
Total-----	1,409,730	1,139,677	323,023	.28
2-Butoxyethanol-----	100,128	138,531	37,987	.27
2-(2-Butoxyethoxy)ethanol (Diethylene glycol monobutyl ether)-----	31,318	24,982	7,445	.30
Diethylene glycol-----	276,076	186,600	32,488	.17
Dipropylene glycol-----	49,615	42,705	11,283	.26
2-Ethoxyethanol-----	193,169	108,636	27,417	.25
2-(2-Ethoxyethoxy)ethanol (Diethylene glycol monoethyl ethers)-----	34,790	26,455	7,209	.27
2-[2-(2-Ethoxyethoxy)ethoxy]ethanol (Triethylene glycol monoethyl ether)-----	16,031	...	...	...
2-Methoxyethanol (Ethylene glycol monomethyl ether)-----	87,611	90,577	22,933	.25
2-(2-Methoxyethoxy)ethanol (Diethylene glycol monomethyl ether)-----	10,110	9,149	2,561	.28
2-[2-(2-Methoxyethoxy)ethoxy]ethanol (Triethylene glycol monomethyl ether)-----	20,538	...	...	...
Polyethylene glycol-----	91,741	91,267	33,773	.57
Polypropylene glycol-----	38,335	26,220	9,446	.36
Tetraethylene glycol-----	13,663	12,457	5,022	.40
All other-----	441,605	382,098	125,459	.33
<i>Halogenated Hydrocarbons</i>				
Total-----	20,790,916	8,786,869	1,401,708	.16
Carbon tetrachloride-----	856,804	459,024	60,344	.13
Chlorinated paraffins, total-----	75,949	68,536	20,040	.29
35%-64% chlorine-----	60,210	55,428	14,942	.27
Other-----	15,739	13,108	5,098	.39
Chloroethane (Ethyl chloride)-----	669,216	316,612	36,847	.12
Chloroform-----	291,855	265,400	42,240	.16
Chloromethane (Methyl chloride)-----	377,672	184,443	25,930	.14
1,2-Dichloroethane (Ethylene dichloride)-----	8,041,846	1,360,980	109,993	.08
Dichloromethane (Methylene chloride)-----	537,729	500,295	86,004	.17
1,2-Dichloropropane (Propylene dichloride)-----	71,040	42,995	2,470	.06
Fluorinated hydrocarbons, total-----	1,000,356	...	...	...
Chlorodifluoromethane (F-22)-----	169,753	125,842	88,775	.71
Dichlorodifluoromethane (F-12)-----	393,001	371,036	151,386	.41
Trichlorofluoromethane (F-11)-----	256,111	239,372	81,635	.34
All other fluorinated hydrocarbons-----	181,491	...	...	...

See footnotes at end of table.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 1.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: U.S. PRODUCTION
AND SALES, 1976--CONTINUED

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS	PRODUCTION	SALES		
		QUANTITY	VALUE	UNIT VALUE ¹
MISCELLANEOUS CHEMICALS, ACYCLIC--Continued				
<i>Halogenated Hydrocarbons--Continued</i>	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 dollars</i>	<i>Per pound</i>
Tetrachloroethylene (Perchloroethylene)-----	668,930	572,470	83,347	\$0.15
1,1,1-Trichloroethane (Methyl chloroform)-----	631,255	614,863	113,769	.19
Trichloroethylene-----	315,496	298,476	46,042	.15
Vinyl chloride, monomer (Chloroethylene)-----	5,676,895	3,118,464	314,842	.10
All other halogenated hydrocarbons-----	1,575,873	248,061	138,044	.56
<i>All Other Miscellaneous Acyclic Chemicals</i>				
Total-----	8,988,137	2,114,581	640,412	.30
2-Butanone peroxide-----	6,350	6,157	6,515	1.06
tert-Butyl peroxide (Di-tert-butyl peroxide)-----	2,669	2,526	2,394	.95
Carbon disulfide-----	507,926	394,205	26,529	.07
Epoxides, ethers, and acetals, total-----	6,600,816	1,425,049	321,768	.23
Ethylene oxide-----	4,184,258	439,443	111,663	.25
Propylene oxide-----	1,823,222	...	...	...
All other epoxides, ethers, and acetals-----	593,336	985,606	210,105	.21
Organo-silicon compounds, total-----	188,272	107,722	160,930	1.49
Phosgene (Carbonyl chloride)-----	814,302	...	...	...
Sodium methoxide (Sodium methylate)-----	13,997	14,745	5,753	.39
All other-----	853,805	164,177	116,523	.71

¹ Calculated from rounded figures.² Quantities are given on the basis of solid naphthenate, tallate, or linoleate content.³ Statistics exclude production and sales of fatty amines. Statistics on fatty amines are given with "Surface-Active Agents."⁴ Statistics exclude production and sales of potassium and sodium stearates. Statistics on these stearates are included with "Surface-Active Agents."⁵ Statistics on production of ethyl alcohol from natural sources by fermentation are issued by the Department of the Treasury, Bureau of Alcohol, Tobacco, and Firearms.⁶ Greater than 10 percent of this total is data which were estimated. It was necessary to estimate these data because one or more manufacturers of the compounds failed to supply the U.S. International Trade Commission with their data in sufficient time for its inclusion in this report. Such manufacturers are presumed to have continued production of the compound in question in 1977, therefore the volume of production and sales has been estimated by the USITC staff members.⁷ Some polyols which are used as intermediates for urethanes have been included with "Plastics and Resin Materials."

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976

(CHEMICALS FOR WHICH SEPARATE STATISTICS ARE GIVEN IN TABLE 1 ARE MARKED BELOW WITH A "@"; CHEMICALS NOT SO MARKED DO NOT APPEAR IN TABLE 1 BECAUSE THE REPORTED DATA ARE ACCEPTED IN CONFIDENCE AND MAY NOT BE PUBLISHED. MANUFACTURERS' IDENTIFICATION CODES SHOWN BELOW ARE TAKEN FROM TABLE 3. AN "X" SIGNIFIES THAT THE MANUFACTURER DID NOT CONSENT TO HIS IDENTIFICATION WITH THE DESIGNATED PRODUCT. COMPANY IDENTIFICATION CODES WHICH ARE FOLLOWED BY AN "(E)" ARE SO LABELED BECAUSE THE COMPANY FAILED TO SUPPLY THE U. S. INTERNATIONAL TRADE COMMISSION WITH THEIR DATA IN SUFFICIENT TIME FOR ITS INCLUSION IN THIS REPORT. THE COMPANY IS PRESUMED TO HAVE CONTINUED PRODUCTION OF THE COMPOUND IN QUESTION IN 1976 AND THE VOLUME OF PRODUCTION AND SALES HAS BEEN ESTIMATED BY THE USITC STAFF MEMBERS)

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MISCELLANEOUS CHEMICALS, CYCLIC:	
6-ACETOXY-2,4-DIMETHYL-1,3-DIOXANE - - - - -	: GIV.
AMYL PARA-DIMETHYLAMINOBENZOATE- - - - -	: VND.
BENZOIC ACID SALTS:	:
@SODIUM BENZOATE- - - - -	: HN, MON, PFZ.
BENZOIC ACID SALTS, ALL OTHER- - - - -	: EK, VEL.
PARA-BENZOQUINONE- - - - -	: EKT.
BENZOTHAZOLE- - - - -	: ACY, RCI.
BENZOTRIAZOLE, SUBSTITUTED - - - - -	: CGY(E).
@BENZOYL PEROXIDE - - - - -	: AZT, CAD, NOC, WTC, WTL.
@BENZYL ALCOHOL - - - - -	: MNR, SFS, UOP, VEL.
BIS (2,4-DICHLOROBENZOYL) PEROXIDE- - - - -	: CAD, WTL.
BORON FLUORIDE - PHENOL COMPLEX- - - - -	: ACS.
N-BROMOSUCCINIMIDE - - - - -	: ARA.
BUTYL BENZOATE - - - - -	: CPS, PFZ, TCC, VEL.
2 (AND 3) -TERT-BUTYL-4-METHOXYPHENOL (BHA)- - - - -	: EKT.
@TERT-BUTYL PEROXYBENZOATE- - - - -	: AZT, CAD, NOC, WTC.
4-TERT-BUTYLPYROCATECHOL - - - - -	: BKL, DOW.
CAMPHENE - - - - -	: GLD, HPC, NCI.
@CAPROLACTAM- - - - -	: ALF, CNP, DBC.
CELLULOSE ACETATE PHTHALATE- - - - -	: UCC, X.
CENTRALITE-1 - - - - -	: OTC(E).
1-(3-CHLOROALLY)-3,5,7-TRIAZA-1-AZONIA ADAMANTANE CHLO RIDE- - - - -	: DOW.
CUMENE HYDROPEROXIDE - - - - -	: ACS, CLK, RCI.
CYANURIC ACID- - - - -	: FMB.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MISCELLANEOUS CHEMICALS, CYCLIC--CONTINUED	
CYCLOHEXANONE PEROXIDE - - - - -	NOC.
CYCLOHEXENE-1,2-DICARBOXYLIC ACID (TETRAHYDROPHTHALIC ACID), DISUBSTITUTED, POLYESTER SALTS:	
CYCLOHEXENE-1,2-DICARBOXYLIC ACID (TETRAHYDROPHTHALIC ACID, DISUBSTITUTED, POLYESTER SALTS, ALL OTHER	OTC(E).
1,4-CYCLOHEXYLENEDIMETHANOL- - - - -	EKT.
CYCLOPROPANE - - - - -	OH.
DECABROMOBIPHENYL OR ETHER - - - - -	DOW, FIN.
DECAHYDRONAPHTHALENE - - - - -	DUP.
DEHYDROACETIC ACID OR SODIUM SALT- - - - -	EKT, GAN.
DIAZODINITROPHENOL - - - - -	HPC.
2,5-DI (BENZOYL PEROXY)-2,5-DIMETHYLHEXANE- - - - -	WTL.
@2,6-DI-TERT-BUTYL-PARA-CRESOL, (BHT), FOOD GRADE - - -	ASH, KPT, SHC, USR.
@2,6-DI-TERT-BUTYL-PARA-CRESOL, (BHT), TECHNICAL GRADE	ASH, KPT, SHC, USR.
2,5-DI-TERT-BUTYLHYDROQUINONE- - - - -	EKT.
1,3-DICHLORO-5,5-DIMETHYLHYDANTOIN - - - - -	GLY.
DICHLORO-S-TRIAZINE-2,4,6 (1H,3H,5H) TRIONE (DICHLORO	
ISOCYANURIC ACIDS AND SALTS)- - - - -	FMB.
4,4'-DICHLORO-3-(TRIFLUOROMETHYL) CABANILIDE- - - - -	CGY(E).
DICYCLOHEXYLAMMONIUM NITRITE - - - - -	OMC.
2-,5-DIHYDROTHIOPHENE-1,1-DIOXIDE (SULFOLENE) - - - -	WTC.
2,2'-DIHYDROXY-4,4'-DIMETHOXYBENZOPHENONE- - - - -	GAP.
2,2'-DIHYDROXY-4-METHOXYBENZOPHENONE - - - - -	ACY.
DIIDOMETHYL-PARA-TOLYL SULPHONE - - - - -	ABB.
DIKETENES- - - - -	FMP(E).
PARA-DIMETHOXYBENZENE (DIMETHYL ETHER OF HYDROQUINON	
E)- - - - -	ASL, EKT.
4,4-DINITROCARBANILIDE-4,6-DIMETHYL-2-PYRIMIDOL- - - -	MRK.
@DIOXANE- - - - -	CPS, DOW, FER, UCC.
1,3-DIOXOLANE- - - - -	FER.
4-(DODECYLOXY)-2-HYDROXYBENZOPHENONE - - - - -	DUP, EKT.
1,2-EPOXY-3-PHENOXYPROPANE - - - - -	X.
ETHYL CELLULOSE PHTHALATE- - - - -	EK.
ETHYLENE IMINE, MONOMER- - - - -	DOW.
2-ETHYLHEXYL BENZOATE- - - - -	TCC.
2-ETHYLHEXYL-PARA-DIMETHYLAMINO BENZOATE- - - - -	EVN, VND.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MISCELLANEOUS CHEMICALS, CYCLIC--CONTINUED	
ETHYLIDINE NORBORNENE-	UCC.
4-ETHYLMORPHOLINE-	UCC.
PURAN DERIVATIVES:	
2-PURALDEHYDE-	QKO.
TETRAHYDROFURFURYL ALCOHOL -	QKO.
GALLIC ACID, TECH. -	HSB, MAL.
GLYCERYL PARA-AMINOBENZOATE-	VND.
@HEXAMETHYLENETETRAMINE, TECH.-	BOR, HKD, HN, PLS.
HOMOMENTHYL SALICYLATE -	NEO.
HYDRINDANTIN -	HEX (E) .
HYDROXYBENZOIC ACID, BENZYL ESTER-	RSA.
PARA-HYDROXYBENZOIC ACID, BUTYL ESTER-	HN.
PARA-HYDROXYBENZOIC ACID, ETHYL ESTER-	HN.
@PARA-HYDROXYBENZOIC ACID, METHYL ESTER -	ARS, HN, LEM.
@PARA-HYDROXYBENZOIC ACID, PROPYL ESTER -	ARS, HN, LEM.
2-HYDROXY-4-METHOXYBENZOPHENONE-	ACY, GAP, GLY.
2-HYDROXY-4-METHOXY-5-SULFOBENZOPHENONE TRIHYDRATE -	ACY.
2-(2-HYDROXY-5-TERT-OCTYLPHENYL) BENZOTRIAZOLE-	ACY.
ISOPROPYL-ORTHO-CRESOLS-	CP, UCC.
LACTONES:	
BUTYROLACTONE-	GAP.
GLUCONO-DELTA-LACTONE-	PFZ.
@MALEIC ANHYDRIDE -	HN, KPT, MON, PTT, RCI, USS.
PARA-MENTHANE-	HPC.
8-PARA-MENTHYL HYDROPEROXIDE -	HPC.
PARA-METHOXYBENZYLIDENEMALONIC ACID, DIETHYL AND DIMET	
HYL ESTERS-	ACY.
PARA-METHOXYBENZYLIDENEMALONIC ACID, DIMETHYL ESTER-	ACY.
4-METHOXYPHENOL-	ARS, ASL, EKT.
2,2'-METHYLENEBIS*4-CHLOROPHENOL*-	GIV.
2,2'-METHYLENEBIS*3,4,6-TRICHLOROPHENOL* (HEXACHLORO	
PHENE)-	GIV.
METHYL GALLATE -	HSB.
4-METHYLMORPHOLINE -	JCC, UCC.
1-METHYL-2-PYROLIDONE, MONOMER-	GAF.
MIXTURE OF PARA- AND ORTHO-AMYL DIMETHYLAMINOBENZOATE	EVN, VND.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MISCELLANEOUS CHEMICALS, CYCLIC--CONTINUED	
MORPHOLINE - - - - -	: DOW, JCC, UCC.
MORPHOLINE SALT OF PARA-TOLUENE SULFONIC ACID- - - - -	: AMB.
PHENOTHIAZINE- - - - -	: WAG.
2-PHENOXYETHANOL (ETHYLENE GLYCOL MONOPHENYL ETHER)- - - - -	: DOW, TCH.
2-(2-PHENOXYETHOXY)ETHANOL (DIETHYLENE GLYCOL PHENYL ETHER) - - - - -	: DOW.
PHENYL MERCURIC BORATE - - - - -	: TRO.
PHTHALIC ACID, LEAD SALT, (DIBASIC)- - - - -	: NTL.
PICRAMIC ACID, SODIUM SALT - - - - -	: SDC.
@ALPHA-PINENE - - - - -	: ARZ, CBY, NCI.
@BETA-PINENE- - - - -	: ARZ, CBY, HPC, NCI.
PINENE SULFATE - - - - -	: HPC.
PINENE, WOOD - - - - -	: HPC.
POLY-4-(2-ACRYLOXYETHOXY)-2-HYDROXY BENZOPHENEONE- - - - -	: ACY.
PROPYL GALLATE - - - - -	: EKT, HSH.
PYROGALLOL - - - - -	: HSH, MAL.
2-PYRROLIDONE (2-PYRROLIDINONE)- - - - -	: MRK.
RESORCINOL MONOBENZOATE- - - - -	: EKT.
ROSIN ACID SALTS:	
CALCIUM RESINATE - - - - -	: CBY.
CALCIUM ZINC RESINATE- - - - -	: CBY.
ROSIN ACID SALTS, ALL OTHER- - - - -	: HPC.
SALICYLANILIDE - - - - -	: PCW.
SALICYLIC ACID, LEAD SALT- - - - -	: NTL.
STYRENE OXIDE- - - - -	: UCC.
SUCCINIC ANHYDRIDE - - - - -	: ACS, ORO.
TALL OIL, CHEMICALLY MODIFIED- - - - -	: FOC, X.
TALL OIL SALTS (LINOLEIC-ROSIN ACID SALTS):	
CALCIUM MANGANESE TALLATE- - - - -	: MCI.
@CALCIUM TALLATE- - - - -	: CCA, HN, MCI.
COBALT TALLATE - - - - -	: CCA, HN, MCI, SHP.
@LEAD MANGANESE TALLATE - - - - -	: MCI.
LEAD TALLATE - - - - -	: CCA, HN, MCI.
MANGANESE TALLATE- - - - -	: HN, MCI.
TRI(OXYALUMINUM ISOPROPOXIDE)- - - - -	: KCH.
TRI(OXYALUMINUM TALLATE) - - - - -	: KCH.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MISCELLANEOUS CHEMICALS, CYCLIC--CONTINUED	
TALL OIL SALTS (LINOLEIC-ROSIN ACID SALTS)--CONTINUED	
ZINC TALLATE	MCI.
TALL OIL SALTS, ALL OTHER (LINOLEIC-ROSIN ACID SALTS)	ZGL.
TANNIC ACID, TECHNICAL	HSH.
TANNIC ACID, U.S.P.	HSH, MAL.
TERPINE HYDROCARBONS, MONOCYCLIC (SOLVENOL)	GLD, NCI.
TETRABIS(METHYLENE-3-(3',5'-DI-TERT-BUTYL-4'-HYDROXYPHENOL)PROPIONATE)METHANE	EK.
2,3,5,6-TETRACHLORO-4-(METHYLSULFONYL) PYRIDINE	DOW.
1,2,3,4-TETRAHYDRONAPHTHALENE	DUF.
TETRAHYDROTHIOPHENE	PAS.
1,3,6,8-TETRANITROCARBAZOLE	SDC.
TETRAPHENYL TIN	X.
TETRAPHENYL TIN CHLORIDE	X.
TETRAPHENYL TIN HYDROXIDE	X.
2,2'-THIOBIS(4-OCTYLPHENOLATE)-NORMAL-BUTYLAMINE NICKEL SALT	ACY.
THIOPHENE	PAS.
TRIALLYL CYANURATE	ACY.
3,4,4'-TRICHLOROCARBANILIDE	MON.
1,3,5-TRICHLORO-5-TRIAZINE-2,4,6-(1H,3H,5H) TRIONE (TRICHLOROISOCYANURIC ACID)	MON.
1,2,3-TRIKETOHYDRINDENE HYDRATE	PIC.
3,5,5-TRIMETHYL-2-CYCLOHEXENE-1-ONE	GCC, MSC.
2,4,6-TRINITRORESORCINOL AND LEAD DERIVATIVE	REM.
5-TRIOXANE	MSC.
TRIPHENYL PHOSPHITE	GCC, MON, MSC.
1-VINYL-2-PYRROLIDINONE, MONOMER	GAF.
1-VINYL-2-PYRROLIDINONE-OTHER COPOLYMERS	GAF.
1-VINYL-2-PYRROLIDINONE-VINYL ACETATE COPOLYMER	GAF, UCC.
@CYCLIC CHEMICALS, ALL OTHER	ACY, ALB, ALD, AMB, ARA, ABS, AZT, CGY(E), DOW, EK, EKI, ENJ(E), FIN, FMP(E), FMT, GAF, GIV, GTL, HPC, JCC, MIL, MON, PAS, PD, PIC, PLC, SAL, SM, TNI, TRO, UCC, UPJ, VTC, WAY, WTL, X, X, X(E).

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MISCELLANEOUS CHEMICALS, ACYCLIC:	
NITROGENOUS COMPOUNDS:	
ACETAMIDOETHANOL (N-ACETYL-ETHANOLAMINE) - - - - -	SBC.
ACETONE SEMICARBAZONE- - - - -	NOR.
1-ALLYL-3-(2-HYDROXYETHYL)-2-THIOUREA- - - - -	FMT.
AMIDES:	
ACETAMIDE- - - - -	ACS.
ACRYLAMIDE MONOMER - - - - -	FMT, NLC.
1,1'-AZOBISFORMAMIDE - - - - -	NPI, USR.
N,N-BIS(2,2-ACETAMIDE) GLYCINE- - - - -	HMP.
CHLORO-N-(2-HYDROXYETHYL) ACETAMIDE - - - - -	KP.
N,N-DIETHYLDODECANAMIDE- - - - -	EK.
N,N-DIMETHYLACETAMIDE- - - - -	DUP.
3-DIMETHYLFORMAMIDE- - - - -	AIP, DUP.
ERUCAMIDE- - - - -	ASH, FIN.
ERUCAMIDE - LAURAMIDE- - - - -	FIN.
N,N'-ETHYLENEBIS(STEARAMIDE) - - - - -	CCW.
FORMAMIDE- - - - -	DUF.
HEXAMETHYL PHOSPHORIC TRIAMIDE - - - - -	DUP.
12-HYDROXYSTEARAMINE - - - - -	CCW.
METHACRYLAMIDE - - - - -	DUP.
N,N'-METHYLENEBIS (ACRYLAMIDE) - - - - -	ACY.
OLEAMIDE - - - - -	ARC, FIN, GLY.
OLEOYL PALMITAMIDE- - - - -	FIN.
STEARAMIDE (OCTADECANE AMIDE)- - - - -	ARC, FIN, GLY.
STEARYLERUCAMIDE - - - - -	FIN.
TALLOW AMIDE, HYDROGENATED - - - - -	ARC.
AMIDES, ALL OTHER- - - - -	ACY, ALB, ARS, FIN, HAL, KP, UPJ, VGC.
AMINES:	
ALLYLAMINES- - - - -	SHC.
AMINE POLYMERS - - - - -	X.
BIS-HEXAMETHYLENE TRIAMINE AMINE - - - - -	DUP.
BUTYLAMINES:	
NORMAL BUTYLAMINE, MONO- - - - -	PAS, VGC.
SEC-BUTYLAMINE, MONO - - - - -	PAS.
TERT-BUTYLAMINE, MONO- - - - -	MON.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MISCELLANEOUS CHEMICALS, ACYCLIC--CONTINUED	
@BUTYLAMINES--Continued	
DI-NORMAL-BUTYLAMINE - - - - -	PAS, VGC.
DIISOBUTYLAMINE- - - - -	AIP, VGC.
TRI-NORMAL-BUTYLAMINE- - - - -	PAS, VGC.
NORMAL-BUTYLETHYLAMINE - - - - -	PAS, VGC.
DIETHYLENETRIAMINE - - - - -	DOW, UCC.
DIISOPROPYLAMINE - - - - -	PAS, UCC, VGC.
DIMETHYLAMINOPROPYLAMINE - - - - -	JCC.
ETHYLAMINES:	
@DIETHYLAMINE - - - - -	AIP, PAS, UCC, VGC.
@ETHYLAMINE, MONO- - - - -	AIP, PAS, UCC, VGC.
TRIETHYLAMINE- - - - -	PAS, UCC.
ETHYLENEDIAMINE- - - - -	DOW, UCC.
(2-ETHYLHEXYL) AMINE, MONO- - - - -	VGC.
@1,6-HEXANEDIAMINE (HEXAMETHYLENEDIAMINE) - - - - -	CEL, DUP, ELP, MON.
3,3'-IMINOBISPROPYLAMINE - - - - -	JCC.
@ISOPROPYL AMINE, MONO- - - - -	AIP, PAS, UCC, VGC.
METHYLAMINES:	
@DIMETHYLAMINE- - - - -	AIP, DUP, GAF.
DIMETHYLAMINE SULFATE- - - - -	GLY, RH.
METHYLAMINE, MONO- - - - -	AIP, DUP, GAF.
TRIMETHYL AMINE- - - - -	AIP, DUP, GAF.
NORMAL OCTYLAMINE, MONO- - - - -	VGC.
PENTAETHYLENEHEXAMINE- - - - -	UCC.
PENTYLAMINES (AMYLAMINES):	
DIPENTYLAMINE- - - - -	PAS.
PENTYLAMINE, MONO- - - - -	PAS.
1,3-PROPANEDIAMINE - - - - -	JCC.
PROPYLAMINES:	
DIPROPYLAMINE- - - - -	AIP, VGC.
PROPYLAMINE, MONO- - - - -	AIP, PAS, VGC.
TRIPROPYLAMINE - - - - -	PAS, VGC.
TETRAETHYLENE PENTAMINE- - - - -	DOW, UCC.
N,N,N',N'-TETRAMETHYL-1,3-BUTANEDIAMINE- - - - -	UCC.
TETRAMETHYLETHYLENEDIAMINE - - - - -	BOR, RH.
TRIETHYLENETETRAMINE - - - - -	DOW, UCC.
AMINES, ALL OTHER- - - - -	AAC, ABB, ALB, BAS, DOW, EK, JCC, NLC, ONX, RH, UCC,

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MISCELLANEOUS CHEMICALS, ACYCLIC--CONTINUED	, VGC, WAY, X, X.
2-AMINO-1-BUTANOL	IMC.
1-AMINOETHANOL	BOR.
AMINOETHOXYETHANOL	JCC.
@ 2-(2-AMINOETHYLAMINO) ETHANOL (AMINOETHYLETHANOLAMIN E)	BOR, DOW, HDG, UCC.
AMINOETHYL MERCAPTOACETATE (MONOETHANOLAMINE THIOGL YCOLATE)	EVN.
2-AMINO-2-ETHYL-1,3-PROPANEDIOL	IMC.
2-AMINO-2-(HYDROXYMETHYL)-1,3-PROPANEDIOL *TRIS(HYD ROXYMETHYL)AMINOMETHANE*	IMC.
2-AMINO-2-METHYL-1,3-PROPANEDIOL	IMC.
2-AMINO-2-METHYL-1-PROPANOL	IMC.
N-BIS(HYDROXYETHYL) AMINO ALKANOL	VAL.
1,3-BIS(HYDROXYMETHYL)UREA	GLY.
BISPERFLUORO ALKYL PHOSPHATE, AMMONIUM SALT	DUP.
BISPERFLUORO ALKYL PHOSPHATE DIETHANOL AMINE SALT	DUP.
BIURET (CARBAMYL UREA)	DOW.
1-BUTYL-3-ETHYL-2-THIOUREA	PAS.
BUTYL ISOCYANATE	OTC (E), UPJ.
CHLOROCHOLINE CHLORIDE	ACY.
2-CHLORO-N,N-DIETHYLETHYLAMINE HYDROCHLORIDE	VEL.
2-CHLORO-N,N-DIMETHYLETHYLAMINE (DIMETHYLAMINO ETHY L CHLORIDE) HYDROCHLORIDE	SK, VEL.
2-CHLORO-N,N-DIMETHYLPROPYLAMINE HYDROCHLORIDE	VEL.
3-CHLORO-N,N-DIMETHYLPROPYLAMINE HYDROCHLORIDE	SK, VEL.
2-CHLOROTRIETHYLAMINE HYDROCHLORIDE	CGY.
CHOLINE BASE	RH.
COCONUT OIL ACID - AMMONIUM CONDENSATE	MIL.
CYANOACETIC ACID	KF.
DIBUTYL AMINES (TALLOW PATTY QUATRARINES)	NTL.
2-DIBUTYLAMINOETHANOL	PAS.
1,3-DIBUTYL-2-THIOUREA	PAS.
1,4-DICYANOBUTENE	DUP.
DIETHYLAMINOETHANETHIOL HCL	EVN.
2-DIETHYLAMINOETHANOL (N,N-DIETHYLETHANOLAMINE)	PAS, UCC.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MISCELLANEOUS CHEMICALS, ACYCLIC--CONTINUED	
2-(2-DIETHYLAMINOETHOXY)ETHANOL- - - - -	: CPS.
2-DIETHYLAMINOETHYL METHACRYLATE - - - - -	: DUP.
DIETHYLHYDROXYLAMINE - - - - -	: PAS.
1,3-DIETHYL-2-THIOUREA - - - - -	: PAS, RBC.
2-DIISOPROPYLAMINOETHANOL (N,N-DIISOPROPYLETHANOLA MINE) - - - - -	: PAS.
DIMETHYLAMINOETHYL ACRYLATE - - - - -	: CPS.
2-DIISOPROPYLAMINOETHYL METHACRYLATE - - - - -	: X.
2-DIMETHYLAMINOETHANETHIOL HYDROCHLORIDE - - - - -	: EVN.
2-DIMETHYLAMINOETHANOL (N,N-DIMETHYLETHANOLAMINE)- - - - -	: AAC, PAS, UCC.
DIMETHYLAMINOETHYL METHACRYLATE- - - - -	: AAC, CPS.
DIMETHYLAMINO-2-PROPANOL - - - - -	: PAS.
3-DIMETHYLAMINOPROPYL CHLORIDE - - - - -	: PFZ.
1,1-DIMETHYLHYDRAZINE- - - - -	: FMP(E).
DIMETHYL ISOCYANATE- - - - -	: GNM.
ETHANOLAMINES:	
@2,2'-AMINODIETHANOL- - - - -	: DOW, JCC, OMC, UCC.
@2-AMINOETHANOL - - - - -	: DOW, GLY, JCC, OMC, UCC.
@2,2',2''-NITRILOTRIETHANOL - - - - -	: DOW, JCC, OMC, UCC.
2-ETHYLAMINOETHANOL- - - - -	: PAS, UCC.
ETHYLCYANOACETATE- - - - -	: KP.
FORMAMIDINE DISULFIDE DIHYDROCHLORIDE- - - - -	: WAY.
GLYCINE- - - - -	: CHT.
GLYCINE ETHYL ESTER HYDROCHLORIDE- - - - -	: SFS.
4-GUANYL-1-NITROSOGUANYL-1-TETRAZENE - - - - -	: REM.
HEXAMETHYLENEDIAMMONIUM ADIPATE- - - - -	: CEL, DUP, MON.
HYDROXYALKYLAMINO GLUCONAMIDE- - - - -	: VND.
ISOPROPANOLAMINES:	
1-AMINO-2-PROPANOL - - - - -	: DOW, UCC.
1,1'-IMINODI-2-PROPANOL- - - - -	: DOW.
1,1',1''-NITRILOTRI-2-PROPANOL (TRIISOPROPANOLAMI NE) - - - - -	: DOW.
2-ISOPROPYL AMINOETHANOL - - - - -	: PAS.
ISOPROPYL ETHYLTHIONOCARBAMATE - - - - -	: DOW.
KETIMINE, TETRAFUNCTIONAL- - - - -	: GNM.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MISCELLANEOUS CHEMICALS, ACYCLIC--CONTINUED	
3-METHOXYPROPYLAMINE - - - - -	: JCC.
2-METHYLAMINOETHANOL - - - - -	: PAS, UCC.
METHYL CARBAMATE - - - - -	: BKL.
METHYL CYANOACETATE- - - - -	: KF.
METHYL ALPHA-CYANOACRYLATE - - - - -	: EKT.
2, 2'- (METHYLIMINO) DIETHANOL - - - - -	: PAS, UCC.
METHYL ISOCYANATE- - - - -	: UCC.
N-METHYLTAURINE- - - - -	: GAP.
MONOETHANOLAMINE SULFITE - - - - -	: EVN.
NITRATED LARD OIL- - - - -	: SM.
NITRILES:	
ACETONITRILE - - - - -	: DUP, EKX, MON, SOH (E).
@ ACRYLONITRILE, MONOMER - - - - -	: ACY, DUP, MON, SOH (E).
ADIPONITRILE - - - - -	: DUP, ELP, MON.
2, 2'-AZOBIS*2-METHYLPROPIONITRILE* (AZOBISISOBUTYRONITRILE)- - - - -	: DUP.
NORMAL-BUTYRONITRILE - - - - -	: EKX.
COCONITRILE- - - - -	: ASH.
3-DIMETHYLAMINOPROPIONITRILE - - - - -	: ACY.
3-ETHOXYPROPIONITRILE- - - - -	: DIX.
GLYCOLONITRILE - - - - -	: KF.
HYDRACRYLONITRILE- - - - -	: TKL.
ISOBUTYRONITRILE - - - - -	: EKX.
LACTONITRILE - - - - -	: MON.
METHACRYLONITRILE- - - - -	: DOW.
METHYL ISOBUTYL KETONE AMINONITRILE- - - - -	: HMP.
2-METHYLLACTONITRILE - - - - -	: DUP, MON, RH.
2-PENTENENITRILE - - - - -	: DUP.
STEARONITRILE (OCTADECANE NITRILE) - - - - -	: ARC, ASH.
TALLOW NITRILE - - - - -	: ASH.
TALLOW NITRILE, HYDROGENATED - - - - -	: ASH.
3, 3'-THIODIPROPIONITRILE - - - - -	: ACY, EVN.
NITRILES, ALL OTHER- - - - -	: ABB, ASH, KF.
NITROETHANE- - - - -	: IMC.
NITROMETHANE - - - - -	: IMC.
1-NITROPROPANE - - - - -	: IMC.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MISCELLANEOUS CHEMICALS, ACYCLIC--CONTINUED	
2-NITROPROPANE - - - - -	: IMC.
OCTADECYL ISOCYANATE - - - - -	: MOB(E), UPJ.
PENTAERYTHRITOL TETRANITRATE - - - - -	: DUP, HPC.
PENTYLNITRATE (AMYL NITRATE) - - - - -	: TNA(E).
NORMAL-PROPYL CARBAMATE- - - - -	: BKL.
PROPYLISOCYANATE - - - - -	: OTC(E).
SARCOSINE- - - - -	: CGY(E), HMP.
SEMICARBAZIDE HYDROCHLORIDE- - - - -	: FMT.
N,N,N',N'-TETRAKIS(2-HYDROXYPROPYL)ETHYLENEDIAMINE - - - - -	: BAS.
TETRAMETHYLAMMONIUM CHLORIDE - - - - -	: RSA.
TETRAMETHYLGUANIDINE - - - - -	: ACY.
THIOACETAMIDE- - - - -	: RBC.
THIOSEMICARBAZIDE- - - - -	: ACY.
NITROGENOUS COMPOUNDS, ACYCLIC, ALL OTHER- - - - -	: AAC, AAC, ACS, ARC, BME, CHP, CPS, CWN, DAN, DUP, EK, : , EK, HMP, INC, JCC, MOB(E), NLC, OTC(E), PAS, RH, : RSA, SCP, SNW(E), STC, TKL, USR, VAL, VEL, WAY, WYC : X, X, X, X, X.
ACIDS, ACID ANHYDRIDES, AND ACYL HALIDES:	
ACETIC ACID, 100%:	
ACETIC ACID, RECOVERED - - - - -	: CEL, EKT, MON, RDA, UCC.
@ACETIC ACID, SYNTHETIC - - - - -	: BOR, CEL, EKT, FMP, MON, PUB(E), UCC.
@ACETIC ANHYDRIDE, 100%:	
ACETIC ANHYDRIDE FROM ACETALDEHYDE - - - - -	: EKT.
ACETIC ANHYDRIDE FROM ACETIC ACID, OTHER THAN RECO- VERED, BY THE VAPOR-PHASE PROCESS - - - - -	: CEL, UCC.
ACETIC ANHYDRIDE FROM ACETIC ACID, RECOVERED, BY V- APOR PHASEPROCESS - - - - -	: AV, CEL.
@ACRYLIC ACID - - - - -	: CEL, DBC, UCC.
@ADIPIC ACID- - - - -	: ALF, CEL, DUP, MON, NLC.
AZELAIC ACID - - - - -	: EMR(E).
TERT-BUTYL PEROXYMALEIC ACID - - - - -	: WTC.
BUTYRIC ACID - - - - -	: CEL, EKT.
BUTYRIC ANHYDRIDE- - - - -	: CCL, EKT.
CASTOR OIL FATTY ACIDS, DEHYDRATED - - - - -	: DA, NTL.
CHLOROACETIC ACID, MONO- - - - -	: BUK, DOW, PFZ.
CHLOROACETYL CHLORIDE- - - - -	: DOW.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACIDS, ACID ANHYDRIDES, AND ACYL HALIDES--CONTINUED	
CITRIC ACID-	MLS, PFZ.
CROTONIC ACID-	EKT.
DECANOYL CHLORIDE-	WTL.
2,2-DICHLOROPROPANOIC ACID	DOW.
DIMER ACID	UPM.
DI-NORMAL-PROPYLACETIC ACID-	ARA.
DI-NORMAL-PROPYLACETYL CHLORIDE-	ARA.
DITHIODIPROPIONIC ACID	EVN.
DODECANEDIOIC ACID	DUP.
DODECENYLSUCCINIC ANHYDRIDE-	ACS, DIX, HMY.
DODECYLSUCCINIC ANHYDRIDE-	DIX, HN.
ETHANEDISULFONIC ACID-	SK.
2-ETHYL BUTYRIC ACID (DIETHYLACETIC ACID)	UCC.
2-ETHYLHEXANOIC ACID	EKT, UCC.
2-ETHYLHEXANOYL CHLORIDE	AZT, WTL.
FORMIC ACID, 90%	CEL, UCC.
@FUMARIC ACID	HN, MON, PFZ, USS.
GLUCONIC ACID, TECHNICAL	PFZ.
GLUTARIC ANHYDRIDE	UCC.
GLYCOLIC ACID-	DUP.
NORMAL-HEXADECENYLSUCCINIC ANHYDRIDE	HMY.
ISETHIONIC ACID-	GAF, WTC.
ISOASCORBIC ACID (ERYTHORBIC ACID)	MRK, PFZ.
ISOBUTYRIC ACID-	EKY.
ISOBUTYRIC ANHYDRIDE	EKT.
ISOBUTYRYL CHLORIDE-	WTL.
ISO-OCTADECENYLSUCCINIC ANHYDRIDE-	HMY.
ITACONIC ACID-	PFZ.
2-KETO-D-GLUCONIC ACID	MRK.
LACTIC ACID:	
LACTIC ACID, EDIBLE, 100%-	CLN, MON.
LACTIC ACID, TECHNICAL, 100%	MON.
@LAUROYL CHLORIDE	GAF, ONY, UOP, WTL.
MALEIC ACID-	ACS, PFN, PFZ.
MALIC ACID	ACS.
MERCAPTOACETIC ACID-	EVN.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ACIDS, ACID ANHYDRIDES, AND ACYL HALIDES--CONTINUED	
3-MERCAPTOPROPIONIC ACID - - - - -	: EVN.
MERCAPTOSUCCINIC ACID- - - - -	: EVN.
METHACRYLIC ACID - - - - -	: DUP, RH.
METHANESULFONIC ACID - - - - -	: EK, PAS.
METHANESULFONYL CHLORIDE - - - - -	: PAS.
NEODECANOYL CHLORIDE - - - - -	: ENJ(E), WTL.
NEOPENTANOIC ACID- - - - -	: ENJ(E).
NONANOIC ACID- - - - -	: BMR(E), GIV.
NONENYLSUCCINIC ANHYDRIDE- - - - -	: HMY.
OCTANOYL CHLORIDE- - - - -	: X.
OCTENYLSUCCINIC ANHYDRIDE- - - - -	: HMY.
OLEIC ACID - - - - -	: ASH.
OLEOYL CHLORIDE- - - - -	: GAF, HRT.
OXALIC ACID- - - - -	: ACS, PFZ.
PALMITOYL CHLORIDE - - - - -	: GAF, PD.
PEROXYACETIC ACID- - - - -	: FMB, UCC.
PIVALOYL CHLORIDE- - - - -	: AZT, WTL.
@ POLYACRYLIC ACID - - - - -	: BFG, DA, RH, TKL, X.
@ PROPIONIC ACID - - - - -	: CEL, EKT, IMC, UCC.
PROPIONIC ANHYDRIDE- - - - -	: EKT.
SEBACOYL CHLORIDE- - - - -	: WTL.
SEBATIC ACID - - - - -	: BAS, WTH.
STEAROYL CHLORIDE- - - - -	: EK, RH, UOP.
SUCCINIC ACID- - - - -	: ACS.
THIOACETIC ACID- - - - -	: EVN.
THIODIGLYCOLIC ACID- - - - -	: EVN.
3,3'-THIODIPROPIONIC ACID- - - - -	: CCW, EVN.
THIODISUCCINIC ACID- - - - -	: EVN.
THIOLACTIC ACID- - - - -	: EVN.
TRICHLOROACETIC ACID - - - - -	: DOW.
VALERIC ACID - - - - -	: UCC.
ACIDS, ACID ANHYDRIDES, AND ACYL HALIDES, ALL OTHER	: ARA, BFG, DOW, EK, ENJ(E), PIC, TX, WAY, WTL, X.
SALTS OF ORGANIC ACIDS:	:
ACETIC ACID SALTS:	:
ALUMINUM ACETATE - - - - -	: ACY, UCC.
AMMONIUM ACETATE - - - - -	: ACS, BKC, MAL.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
SALTS OF ORGANIC ACIDS--CONTINUED	
ACETIC ACID SALTS--CONTINUED	
@BARIUM ACETATE - - - - -	: ACS, BKC, MAL.
CALCIUM ACETATE- - - - -	: ACS, MAL.
COBALT ACETATE - - - - -	: HSH, SHP, UCC.
COPPER ACETATE - - - - -	: ACS, BKC.
LEAD ACETATE - - - - -	: ACS, BKC, MAL.
LEAD SUBACETATE- - - - -	: BKC.
LEAD TETRAACETATE- - - - -	: ARA.
MAGNESIUM ACETATE- - - - -	: BKC, SHP.
MANGANESE ACETATE- - - - -	: HSH, SHP.
MERCURIC ACETATE - - - - -	: MAL.
NICKEL ACETATE - - - - -	: BKC, HSH, SHP.
POTASSIUM ACETATE- - - - -	: ACS, BKC, MAL, UCC.
SODIUM ACETATE - - - - -	: ACS, BKC, CHP, DAN, EKT, MAL, UCC.
SODIUM ALLYL SULFONATES- - - - -	: IOC.
SODIUM DIACETATE - - - - -	: UCC.
@ZINC ACETATE - - - - -	: ACS, BKC, MAL, UCC.
@ZIRCONIUM ACETATE- - - - -	: HSH, SNW(E), TZC.
ADIPIC ACID, AMMONIUM SALT - - - - -	: ASH, ELP.
CHLOROACETIC ACID, SODIUM SALT - - - - -	: DOW.
CITRIC ACID SALTS:	
AMMONIUM CITRATE - - - - -	: MAL, PFZ.
CALCIUM CITRATE- - - - -	: PFZ.
FERRIC AMMONIUM CITRATE- - - - -	: PFZ.
POTASSIUM CITRATE- - - - -	: MLS, PFZ.
SODIUM CITRATE - - - - -	: MLS, PFZ.
2-ETHYLHEXANOIC ACID (ALPHA-ETHYLCAPROIC ACID) SALTS :	
ALUMINUM 2-ETHYLHEXANOATE- - - - -	: NOC, WTC.
BARIUM 2-ETHYLHEXANOATE- - - - -	: CCA.
CADMIUM 2-ETHYLHEXANOATE - - - - -	: CCA.
@CALCIUM 2-ETHYLHEXANOATE - - - - -	: CCA, HN, MCI, SW(E), TRO, WTC, X.
@COBALT 2-ETHYLHEXANOATE- - - - -	: CCA, HN, MCI, SW(E), TRO, WTC, X.
COPPER 2-ETHYLHEXANOATE- - - - -	: CCA.
IRON 2-ETHYLHEXANOATE- - - - -	: CCA, HN.
@LEAD 2-ETHYLHEXANOATE- - - - -	: CCA, HN, MCI, NTL, TRO, WTC, X.
@MANGANESE 2-ETHYLHEXANOATE - - - - -	: CCA, HN, MCI, TRO, X.
NICKEL 2-ETHYLHEXANOATE- - - - -	: MCI, WTC.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
SALTS OF ORGANIC ACIDS--CONTINUED	
2-ETHYLHEXANOIC ACID (ALPHA-ETHYLCAPROIC ACID) SALTS--	
CONTINUED	
POTASSIUM 2-ETHYLHEXANOATE - - - - -	CCA, MCI.
RARE EARTHS 2-ETHYLHEXANOATE - - - - -	CCA, MCI.
STANNOUS 2-ETHYLHEXANOATE- - - - -	WTC, X.
@ZINC 2-ETHYLHEXANOATE- - - - -	CCA, HN, MCI, SW(E), SYP(E), WTC, X.
@ZIRCONIUM 2-ETHYLHEXANOATE - - - - -	CCA, HN, MCI, TRO, WTC, X.
2-ETHYLHEXANOIC ACID SALTS, ALL OTHER- - - - -	MCI.
FORMIC ACID SALTS:	
CHROMIC FORMATE- - - - -	GAF.
LEAD FORMATE - - - - -	NTL.
NICKEL FORMATE - - - - -	SHP.
SODIUM FORMATE, REFINED- - - - -	BKC.
SODIUM FORMATE, TECHNICAL- - - - -	CEL, PNA.
FORMIC ACID SALTS, ALL OTHER - - - - -	RSA.
FUMARIC ACID, LEAD SALT- - - - -	NTL.
GLUCOHEPTANOIC ACID SALTS:	
CALCIUM GLUCOHEPTANOATE- - - - -	PFN.
SODIUM GLUCOHEPTANOATE - - - - -	HMP, PFN.
GLUCONIC ACID SALTS:	
SODIUM GLUCONATE - - - - -	GPR(E), PFZ, SFI.
HUMIC ACIDS, SODIUM SALTS- - - - -	NLC.
ISOASCORBIC ACID, SODIUM SALT (SODIUM ERYTHORBATE) - - - - -	MRK, PFZ.
LACTIC ACID SALTS:	
SODIUM LACTATE - - - - -	MAL, PFN.
LANOLIN ACID, BARIUM SALT- - - - -	CRN.
LAURIC ACID SALTS:	
LAURIC ACID, BARIUM-CADMIUM SALT - - - - -	X.
LAURIC ACID SALTS, ALL OTHER - - - - -	UCC, X.
LINOLEIC ACID SALTS:	
CALCIUM LINOLEATE- - - - -	CCA, SHP.
LEAD LINOLEATE - - - - -	SHP.
MANGANESE LINOLEATE- - - - -	SHP.
@MALEIC ACID SALTS:	
MALEIC ACID, DIBUTYLtin SALT - - - - -	X.
MALEIC ACID, TRIBASIC LEAD SALT- - - - -	NTL.
MALEIC ACID SALTS, ALL OTHER - - - - -	MET, WTL.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
MERCAPTOACETIC ACID (THIOGLYCOLIC ACID) SALTS:	
AMMONIUM MERCAPTOACETATE - - - - -	CCA, EVN.
CALCIUM MERCAPTOACETATE- - - - -	CCA, EVN.
POTASSIUM MERCAPTOACETATE- - - - -	EVN.
SODIUM MERCAPTOACETATE - - - - -	EVN.
MERCAPTOACETIC ACID (THIOGLYCOLIC ACID) SALTS, ALL:	
OTHER- - - - -	CCA.
NEODECANOIC ACID SALTS:	
CADMIUM NEODECANOATE - - - - -	BKL, CCA.
CALCIUM NEODECANOATE - - - - -	CCA, MCI.
COBALT NEODECANOATE- - - - -	MCI, SHP.
LEAD-COBALT NEODECANOATE - - - - -	MCI.
LEAD NEODECANOATE- - - - -	MCI.
LITHIUM NEODECANOATE - - - - -	MCI.
MANGANESE NEODECANOATE - - - - -	MCI.
ZINC NEODECANOATE- - - - -	CCA, SHP.
ZIRCONIUM NEODECANOATE - - - - -	MCI.
NEODECANOIC ACID SALTS, ALL OTHER- - - - -	CCA.
OCTANOIC-ACID (CAPRYLIC ACID) SALTS:	
ALUMINUM OCTANOATE - - - - -	DA.
STANNOUS OCTANOATE - - - - -	X.
OCTANOIC ACID (CAPRYLIC ACID) SALTS, ALL OTHER - - - - -	X.
OLEIC ACID SALTS:	
COPPER OLEATE- - - - -	WTC.
LEAD OLEATE- - - - -	NOC.
STANNOUS OLEATE- - - - -	X.
OLEIC ACID SALTS, ALL OTHER- - - - -	HAL, SHP.
OXALIC ACID SALTS:	
AMMONIUM OXALATE - - - - -	ACS.
FERRIC OXALATE - - - - -	SHP.
POTASSIUM OXALATE- - - - -	BKC.
SODIUM OXALATE - - - - -	BKC.
PALMITIC ACID SALTS:	
ALUMINUM PALMITATE - - - - -	DA.
PHOSPHORODITHIOIC ACID SALTS (DITHIOPHOSPHATES) :	
SODIUM DI-SEC-BUTYL PHOSPHORODITHIOATE - - - - -	ACY.
SODIUM DI-SEC-BUTYL/DIETHYL PHOSPHORODITHIOATE - - - - -	ACY.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
PHOSPHORODITHIOIC ACID SALTS (DITHIOPHOSPHATES)--CON'T:	
SODIUM DIETHYL PHOSPHORODITHIOATE- - - - -	: ACY.
SODIUM DIHEXYL PHOSPHORODITHIOATE- - - - -	: ACY.
SODIUM DIISOPROPYL PHOSPHORODITHIOATE- - - - -	: ACY.
PHOSPHORODITHIOIC ACID SALTS (DITHIOPHOSPHATES), AL :	
L OTHER - - - - -	: ACY.
PROPIONIC ACID SALTS:	
CALCIUM PROPIONATE - - - - -	: HFT, PFZ.
POLYFLUOROALKYL THIOPROPIONIC ACID, LITHIUM SALT -	: DUP.
SODIUM PROPIONATE- - - - -	: HFT, PFZ.
PROPIONIC ACID SALTS, ALL OTHER- - - - -	: EW.
RICINOLEIC ACID SALTS:	
CALCIUM RICINOLEATE- - - - -	: NTL.
LITHIUM RICINOLEATE- - - - -	: NTL.
SODIUM ETHYLOXALACETATE- - - - -	: FMP(E) .
SODIUM GLYCOLATE - - - - -	: SAL.
SODIUM SORBITOL BORATE - - - - -	: ICI.
STEARIC ACID SALTS:	
ALUMINUM STEARATES:	
@ALUMINUM DISTEARATE- - - - -	: DA, NOC, PEN(E), SYP, WTC.
ALUMINUM MONOSTEARATE- - - - -	: DA, NOC, SYP, WTC.
@ALUMINUM TRISTEARATE - - - - -	: DA, NOC, PEN(E), SYP, WTC.
AMMONIUM STEARATE- - - - -	: DA.
@BARIUM STEARATE- - - - -	: DA, NOC, PEN(E), SYP, WTC.
CADMIUM STEARATE - - - - -	: SYP, WTC.
@CALCIUM STEARATE - - - - -	: DA, FER, HN, MAL, NOC, PEN(E), SYP, WTC, X.
@COBALT STEARATE- - - - -	: SHP, WTC, X.
FERRIC STEARATE- - - - -	: SHP, WTC.
@LEAD STEARATE- - - - -	: NTL, WTC, X.
LITHIUM STEARATE - - - - -	: DA, NOC, PEN(E), WTC.
@MAGNESIUM STEARATE - - - - -	: DA, MAL, NOC, PEN(E), SYP, WTC.
@NICKEL STEARATE- - - - -	: WTC.
@ZINC STEARATE- - - - -	: DA, HN, MAL, NOC, PEN(E), PLS, SYP, WTC, X.
STEARIC ACID SALTS, ALL OTHER- - - - -	: NOC, NTL, SNW(E), WTC.
SUCCINIC ACID, SODIUM SALT - - - - -	: MAL.
TARTARIC ACID SALTS:	
ANTIMONY POTASSIUM TARTRATE- - - - -	: HSH, PFZ.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@TARTARIC ACID SALTS--CONTINUED	
POTASSIUM BITARTRATE - - - - -	ACY.
POTASSIUM SODIUM TARTRATE - - - - -	PFZ.
XANTHIC ACID SALTS:	
POTASSIUM AMYLXANTHATE - - - - -	DOW.
POTASSIUM ETHYLXANTHATE - - - - -	DOW.
POTASSIUM ISOPROPYLXANTHATE - - - - -	BAS.
POTASSIUM PENTYLXANTHATE - - - - -	ACY.
SODIUM NORMAL-BUTYLXANTHATE - - - - -	KCC.
SODIUM SEC-BUTYLXANTHATE - - - - -	DOW.
SODIUM ETHYLXANTHATE - - - - -	DOW.
SODIUM ISOBUTYLXANTHATE - - - - -	DOW.
SODIUM ISOPROPYLXANTHATE - - - - -	DOW.
XANTHIC ACID SALTS, ALL OTHER - - - - -	DOW.
SALTS OF ORGANIC ACIDS, ALL OTHER - - - - -	CCA, DA, HSH, MCI, NPI, TCH, UCC, UOP, WTC.
ALDEHYDES:	
ACETALDEHYDE - - - - -	CEL, EKX, PUB(E), SHC, UCC.
ACROLEIN - - - - -	SHC, UCC.
@BUTYRALDEHYDE - - - - -	CEL, EKX, UCC.
CHLORAL - - - - -	DA, MTO.
CROTONALDEHYDE - - - - -	EKT.
2-ETHYLBUTYRALDEHYDE - - - - -	UCC.
2-ETHYLHEXANAL (ALPHA-ETHYLCAPROALDEHYDE) - - - - -	EKX.
@FORMALDEHYDE (37% BY WEIGHT) - - - - -	AMP, BOR, CBD, CEL, DUP, GAP, GOC, GP, HKD, HN, HPC, IMC, MON, RCI, SKO, UCC.
GLUTARALDEHYDE - - - - -	UCC.
GLYOXAL - - - - -	ACY, UCC.
ISOBUTYRALDEHYDE - - - - -	CEL, DBC, EKX, UCC.
@ISOPENTALDEHYDE, MIXED ISOMERS - - - - -	UCC.
METHACROLEIN - - - - -	RDA.
2-METHYLVALERALDEHYDE - - - - -	UCC.
PROPIONALDEHYDE - - - - -	EKX, UCC.
VALERALDEHYDE (PENTANAL) - - - - -	UCC.
ALDEHYDES, ACYCLIC, ALL OTHER - - - - -	EKT, UCC, X.
KETONES:	
ACETONE:	
@ACETONE FROM CUMENE - - - - -	ACS, CLK, DOW, GP, GYR, MON, SOC, UCC, USS.

MISCELLANEOUS CYCLIC ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
KETONES--CONTINUED	
ACETONE--CONTINUED	
ACETONE FROM ISOPROPYL - - - - -	DIX, EKT, ENJ(E), SHC, UCC.
ACETONE, ALL OTHER - - - - -	OCC.
ACETONE, CRUDE - - - - -	BAL.
@2-BUTANONE - - - - -	CEL, DIX, ENJ(E), SHC, UCC.
CHLORO-2-PROPANONE - - - - -	EK.
DIISOPROPYL KETONE - - - - -	EKX.
2-HEPTANONE- - - - -	EKT.
3-HEPTANONE- - - - -	UCC.
2,5-HEXANEDIONE (ACETONYLACETONE) - - - - -	ARS.
@4-HYDROXY-4-METHYL-2-PENTANONE - - - - -	CEL, SHC, UCC.
ISOVALERONE- - - - -	UCC.
LACTIDE- - - - -	CLN.
4-METHOXY-4-METHYL-2-PENTANONE - - - - -	SHC.
5-METHYL-2-HEXANONE (METHYL ISOAMYL KETONE) - - - - -	EKT.
@4-METHYL-2-PENTANONE - - - - -	EKT, ENJ(E), SHC, UCC.
@4-METHYL-3-PENTEN-2-ONE- - - - -	ENJ(E), SHC, UCC.
2-OCTANONE - - - - -	WTH.
2,4-PENTANEDIONE - - - - -	UCC.
@3-PENTANONE- - - - -	HEX, ORT, UCC.
PSEUDOIONONE - - - - -	GLD, RDA.
KETONES, ALL OTHER - - - - -	ABB, ARC, MRK, SHC, UCC.
@ALCOHOLS, MONOHYDRIC, UNSUBSTITUTED:	
@ALCOHOLS, C11 OR LOWER, UNMIXED (95% OR MORE PURE):	
ALLYL ALCOHOL- - - - -	FMP, SHC.
AMYL ALCOHOLS:	
2-METHYL-1-BUTANOL - - - - -	UCC.
1-PENTANOL - - - - -	UCC.
@BUTYL ALCOHOLS:	
@NORMAL-BUTYL ALCOHOL - - - - -	CEL, CO, DBC, EKX, GAP, OXO, SHC, TNA(E), UCC.
SEC-BUTYL ALCOHOL- - - - -	ENJ(E), SHC.
TERT-BUTYL ALCOHOL - - - - -	SHC, X.
@ISOBUTYL ALCOHOL - - - - -	CEL, DBC, EKX, OXO, SHC, UCC.
1H, 1H, 11H-EICOSAFLUORO-1-UNDECANOL - - - - -	DUP.
@ETHYL ALCOHOL, SYNTHETIC ONLY- - - - -	EKX, ENJ(E), PUB(E), SHC, UCC, USI.
@2-ETHYL-1-HEXANOL- - - - -	DBC, EKX, GLY, OXO, SHC, UCC.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ALCOHOLS, MONOHYDRIC, UNSUBSTITUTED--CONTINUED	
ALCOHOLS, C11 OR LOWER, UNMIXED (95% OR MORE PURE)-- CONTINUED	
2-ETHYL-4-METHYL-1-PENTANOL- - - - -	: EKY, GLY.
NORMAL-HEPTYL ALCOHOL- - - - -	: EKY.
NORMAL-HEXYL ALCOHOL - - - - -	: CO, ENJ(E), TNA(E), UCC.
ISO-OCTYL ALCOHOL- - - - -	: ENJ(E), USS.
@ISOPROPYL ALCOHOL- - - - -	: ATR, ENJ(E), SHC, UCC.
@METHANOL, SYNTHETIC ONLY - - - - -	: AIE, ATR(E), BOR, CEL, DUP, GLY, GP, GYR, HN, HPC, ICI, : IMC(E), MON, RH, UCC.
2-METHYL-1-PENTANOL- - - - -	: UCC.
1-OCTANOL- - - - -	: CO.
2-OCTANOL- - - - -	: WTH.
@PROPYL ALCOHOL - - - - -	: CEL, EKY, UCC.
2-PROPYN-1-OL (PROPARGYL ALCOHOL)- - - - -	: GAF.
@ALCOHOLS, UNMIXED C11 OR LOWER, ALL OTHER- - - - -	: ENJ(E), SHC, UCC.
@ALCOHOLS C12 OR HIGHER, UNMIXED (95% OR MORE PURE):	
DODECYL ALCOHOL- - - - -	: CO.
1-HEXADECANOL- - - - -	: CO, PG.
HEXADODECYL ALCOHOL- - - - -	: CO.
ISODECYL ALCOHOL - - - - -	: ENJ(E), USS.
ISOHEXADECANOL - - - - -	: ENJ(E).
1-OCTADECANOL- - - - -	: CO, PG.
CIS-9-OCTADECEN-1-OL - - - - -	: ASH.
1-TETRADECANOL - - - - -	: CO, UCC.
1-TRIDECANOL - - - - -	: ENJ(E).
ALCOHOLS, UNMIXED C12 OR HIGHER, ALL OTHER - - - - -	: SCP.
@MIXTURES OF ALCOHOLS:	
ALCOHOL MIXTURES, ALL OTHER- - - - -	: CO(E), CPS, EKY, ENJ(E), NCI, PG, PUB(E), SHC, TNA(E), : UCC.
@ESTERS OF MONOHYDRIC ALCOHOLS:	
ACRYLIC MONOMERS, MIXED- - - - -	: RH.
ALLYL METHACRYLATE - - - - -	: GLY, JCC, SAB(E).
AMYL ACETATES:	
AMYL ACETATE - - - - -	: UCC.
BUTYL ACETATES:	
@NORMAL-BUTYL ACETATE - - - - -	: CEL, EKT, PUB(E), UCC.
SECONDARY-BUTYL ACETATE- - - - -	: PUB(E).
ISOBUTYL ACETATE - - - - -	: CEL, EKY, UCC.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ESTERS OF MONOHYDRIC ALCOHOLS--CONTINUED	
BUTYL ACETATES--CONTINUED	
@BUTYL ACRYLATE - - - - -	CEL, DBC, RH, UCC.
N-BUTYL CHLOROPFORMATE- - - - -	CTN.
SEC-BUTYL CHLOROPFORMATE- - - - -	CTN, WTL.
BUTYL LACTATE- - - - -	CPS.
BUTYL MALEATE- - - - -	TCH.
BUTYL MERCAPTOPROPIONATE - - - - -	EVN.
BUTYL METHACRYLATE - - - - -	RH, X.
TERT-BUTYL PEROXYACETATE - - - - -	AZT, WTL.
TERT-BUTYL PEROXY-2-ETHYLHEXANOATE - - - - -	AZT, WTC.
TERT-BUTYL PEROXYISOBUTYRATE - - - - -	AZT, WTL.
TERT-BUTYL PEROXYISOPROPYLCARBONATE- - - - -	WTL.
TERT-BUTYL PEROXYNEODECANOATE- - - - -	USS, WTC, WTL.
TERT-BUTYL PEROXYPIVALATE- - - - -	AZT, WTC.
BUTYL STEARATE - - - - -	CHP.
CETYL LACTATE- - - - -	SBC, VND.
DIALLYL MALEATE- - - - -	FMP (E).
DIBUTYL FUMARATE - - - - -	RCI.
@DIBUTYL MALEATE- - - - -	HN, MON, RCI, USS.
DIETHYL CARBONATE- - - - -	CTN, FMP (E).
DIETHYL CHLOROPHOSPHATE- - - - -	SFA.
DIETHYL (ETHOXYMETHYLENE) MALONATE - - - - -	KF.
DI (2-ETHYL-1-HEXYL) CHLOROPFORMATE- - - - -	WTL.
@DI (2-ETHYL-1-HEXYL) MALEATE- - - - -	CHP, DAN, HRT, RUB.
DI (2-ETHYL-1-HEXYL) PEROXYDICARBONATE- - - - -	WTL.
DIETHYL MALEATE- - - - -	ACY.
DIETHYL MALONATE - - - - -	KF.
DIETHYL METHYLMALONATE - - - - -	SFS.
DIETHYL OXALATE (ETHYL OXALATE)- - - - -	FMP (E), PFZ.
DIISOBUTYL MALEATE - - - - -	RUB, WTL.
DIISO-NORMAL MALEATE - - - - -	RUB.
DIISOPROPYL PEROXYDICARBONATE (ISOPROPYL PERCARBONATE) TE) - - - - -	PPG.
DILAURYL-3,3'-THIODIPROPIONATE - - - - -	ACY, CCW, EVN.
DIMETHYL CARBONATE - - - - -	CTN.
DIMETHYL MALEATE - - - - -	AAC.
DIMETHYL MALONATE- - - - -	KF.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ESTERS OF MONOHYDRIC ALCOHOLS--CONTINUED	
BUTYL ACETATES--CONTINUED	
DIOCTYL MALEATE-	: RCI, USS.
DISTEARYL-3,3'-THIODIPROPIONATE-	: ACY, EVN.
DITHIOBIS(STEARYL PROPIONATE)-	: EVN.
DITRIDECYL MALEATE - - - - -	: EFH, RUB.
DI (TRIDECYL)-3,3'-THIODIPROPIONATE - - - - -	: ACY, EVN.
2-ETHOXYETHYL ACETATE-	: EKY.
@ETHYL ACETATE- - - - -	: CEL, EKT, EKY, ENJ(E), MON, PUB(E), UCC.
ETHYL ACETOACETATE - - - - -	: EKT.
@ETHYL ACRYLATE - - - - -	: CEL, DBC, RH, UCC.
ETHYL-2-BROMOPROPIONATE- - - - -	: ARA.
ETHYL CHLOROACETATE- - - - -	: DOW.
ETHYL CHLOROFORMATE- - - - -	: CTN, EMR(E), FMP(E).
ETHYL CHLOROTHIOFORMATE - - - - -	: SFA.
ETHYLENE CARBONATE - - - - -	: JCC.
2-ETHYL-1-HEXYL ACETATE- - - - -	: EKT, UCC.
@2-ETHYL-1-HEXYL ACRYLATE - - - - -	: CEL, DBC, UCC.
2-ETHYLHEXYL CHLOROFORMATE - - - - -	: CTN.
2-ETHYL-1-HEXYL METHACRYLATE - - - - -	: DUF.
ETHYL SILICATE - - - - -	: AAC.
FATTY ACID ESTERS, NOT INCLUDED WITH PLASTICIZERS OR	
SURFACE ACTIVE AGENTS:	
BUTYL PALMITATE- - - - -	: TKL.
ISOPROPYL LINOLEATE- - - - -	: VND.
METHYL ESTERS OF TALLOW- - - - -	: FER.
METHYL 12-HYDROXYSTEARATE- - - - -	: NTL, WTH.
METHYL STEARATE- - - - -	: CHL.
FATTY ACID ESTERS, NOT INCLUDED WITH PLASTICIZERS	
SURFACE-ACTIVE AGENTS, ALL OTHER-	
HEXYL ACETATE- - - - -	: CCW, CHP, CRN, FER, HPC, HUM, UCC, USO, WTC.
ISOBUTYL ACRYLATE- - - - -	: CPS.
ISOBUTYL CHLOROFORMATE - - - - -	: UCC.
ISOBUTYL ISOBUTYRATE - - - - -	: CTN, OTC(E).
ISODECYL THIOLGLYCOLATE - - - - -	: EKY.
ISO-OCTYL MERCAPTOACETATE- - - - -	: EVN.
ISO-OCTYL-3-MERCAPTOPROPIONATE - - - - -	: CCW, EVN.
ISOPROPYL ACETATE- - - - -	: EVN.
	: EKT, ENJ(E), UCC.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

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MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ESTERS OF MONOHYDRIC ALCOHOLS--CONTINUED	
BUTYL ACETATES--CONTINUED	
ISOPROPYL CHLOROFORMATE-	CTN, PPG, WTL.
ISOSTEARYL NEOPENTANOATE	
LAURYL LACTATE - - - - -	VND.
LAURYL METHACRYLATE- - - - -	VND.
MENTHALLYLIDENE DIACETATE- - - - -	RH, X.
(MIXED ALKYL) METHACRYLATE MONOMER- - - - -	RDA.
METHYL ACETATE - - - - -	DUP.
METHYL ACETOACETATE- - - - -	GRD, PUB (E), UCC.
METHYL ACRYLATE, MONOMER - - - - -	EKT.
METHYL BORATE- - - - -	CEL, RH.
METHYL CHLOROACETATE - - - - -	SFS.
METHYL CHLOROFORMATE - - - - -	DOW.
METHYL FORMATE - - - - -	CTN.
METHYL METHACRYLATE, MONOMER - - - - -	CEL, DUP.
METHYL SULFATE - - - - -	ACY, DUP, RH.
METHYL THIOGLYCOLATE - - - - -	DUP.
MYRISTAL MYRISTATE - - - - -	EVN.
MYRISTYL LACTATE - - - - -	VND.
OCTADECYL-3-MERCAPTOPROPIONATE - - - - -	VND.
@PHOSPHORUS ACID ESTERS:	
BIS(2-ETHYLHEXYL) HYDROGEN PHOSPHATE - - - - -	EVN.
BUTYL ACID PHOSPHATE - - - - -	SM, UCC.
DIBUTYL HYDROGEN PHOSPHITE - - - - -	SM.
DIDODECYL HYDROGEN PHOSPHATE - - - - -	SM.
DIETHYL HYDROGEN PHOSPHITE - - - - -	DUP.
DIETHYL PHOSPHOROCHLORODITHIONATE- - - - -	SM.
DIMETHYL HYDROGEN PHOSPHITE- - - - -	SFA.
DIMETHYL PHOSPHOROCHLORODITHIONATE - - - - -	SM.
DIOLEYL HYDROGEN PHOSPHITE - - - - -	SM.
2-ETHYLHEXYL AMMONIUM ISOCTYL PHOSPHATE - - - - -	SM.
2-ETHYLHEXYL AMMONIUM TRIDECYLPHOSPHATE- - - - -	DUP.
2-ETHYLHEXYL HYDROGEN PHOSPHATE- - - - -	DUP.
ISO-OCTYL HYDROGEN PHOSPHATE - - - - -	SM.
METHYL DIHYDROGEN PHOSPHATE- - - - -	SM, X.
	HK.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@ PHOSPHORUS ACID ESTERS--CONTINUED	
TRIALKYL PHOSPHITE - - - - -	: MCB(E).
TRIBUTYL PHOSPHATE - - - - -	: FMP(E), SPS.
TRIETHYL PHOSPHITE - - - - -	: SFA, SPS, SM.
TRIISO-OCTYL PHOSPHITE - - - - -	: SM.
TRIISOPROPYL PHOSPHITE - - - - -	: SM.
TRIMETHYL PHOSPHITE - - - - -	: SFA, SPS, SM.
TRIS (2-CHLOROETHYL) PHOSPHITE - - - - -	: SM.
TRIS (2,3-DIBROMOPROPYL) PHOSPHATE - - - - -	: DOW, VEL.
TRIS (2-ETHYLHEXYL) PHOSPHITE - - - - -	: SM.
PHOSPHORUS ACID ESTERS, ALL OTHER - - - - -	: HN, MIL, SM.
@ PROPYL ACETATE - - - - -	: CEL, EKT, UCC.
PROPYLENE CARBONATE - - - - -	: JCC.
STEARYL METHACRYLATE - - - - -	: RH, TX.
TETRAETHYL ORTHOSILICATE (TETRAETHYL SILICATE) - - - - -	: UCC.
TETRAETHYL SILICATE, CONDENSED - - - - -	: UCC.
TETRAOCTYL ORTHOSILICATE - - - - -	: MON.
TITANIC ACID ESTERS:	
BIS-2-BIS-2-HYDROXYETHYL AMINO ETHYL DIISOPROPYL T	:
ITANATE - - - - -	: DUP.
DIISOPROPYL BIS (1-METHYL-3-OXO-1-BUTENYL) TITANATE - - - - -	: DUP.
2-ETHYL-1,3-HEXANEDIOL TITANATE - - - - -	: DUP.
POLYDIBUTYL TITANATE - - - - -	: DUP.
TETRABUTYL TITANATE - - - - -	: DUP.
TETRAISOPROPYL TITANATE - - - - -	: DUP.
TETRAKIS (2-ETHYLHEXYL) TITANATE - - - - -	: DUP.
TRIETHYL ORTHOACETATE - - - - -	: KP.
TRIETHYL ORTHOFORMATE - - - - -	: KP.
TRIETHYL ORTHOPROPIONATE - - - - -	: KP.
TRIISODECYL ORTHOFORMATE - - - - -	: KP.
TRIMETHYL ORTHOFORMATE - - - - -	: KP.
@ VINYL ACETATE, MONOMER - - - - -	: BOR, CEL, DUP, NSC, UCC, USI.
@ MONOHYDRIC ALCOHOL ESTERS, ALL OTHER - - - - -	: ABB, CTN, DAN, EKT, EMR(E), FER, GLD, MHI, PPG, TKL, : UCC, VIK, WTL.
POLYHYDRIC ALCOHOLS:	
2,2-BIS (BROMOMETHYL)-1,3-PROPANEDIOL - - - - -	: DOW.
1,4-BUTANEDIOL - - - - -	: BAS, DUP, GAF.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
POLYHYDRIC ALCOHOLS--CONTINUED	
2-BUTENE-1,4-DIOL - - - - -	: CEL, GAF.
2-BUTYNE-1,4-DIOL - - - - -	: GAF.
2,2-DIMETHYL-1,3-PROPANEDIOL - - - - -	: EKY.
@ETHYLENE GLYCOL - - - - -	: BAS, CAU, CEL, DIX, DOW, EKY, JCC, NWP, OMC, PPG, SHC, : UCC.
2-ETHYL-1,3-HEXANEDIOL - - - - -	: UCC.
2-ETHYL-2-(HYDROXYMETHYL)-1,3-PROPANEDIOL (TRIMETHYL OLPROPANE) - - - - -	: CEL.
@GLYCEROL, SYNTHETIC ONLY - - - - -	: DOW, FMP, SHC.
1,6-HEXANEDIOL - - - - -	: CEL.
MANNITOL - - - - -	: ICI.
2-METHYL-2,4-PENTANEDIOL - - - - -	: SHC.
@PENTAERYTHRITOL - - - - -	: CEL, HPC, IMC(E), PNA.
1,5-PENTANEDIOL - - - - -	: UCC.
@PROPYLENE GLYCOL - - - - -	: DOW, JCC, OCC, OMC, UCC.
@SORBITOL (70% BY WEIGHT) - - - - -	: BRD, ICI, MRK, PFZ.
2,2,4-TRIMETHYL-1,3-PENTANEDIOL - - - - -	: EKY.
POLYHYDRIC ALCOHOLS, ALL OTHER - - - - -	: GAF, GLY, JCC, UCC.
ESTERS AND ETHERS OF POLYHYDRIC ALCOHOLS:	
POLYHYDRIC ALCOHOL ESTERS:	
1,3-BUTANEDIOL DIMETHACRYLATE - - - - -	: SAR(E).
2-(2-BUTOXYETHOXY)ETHYL ACETATE - - - - -	: EKT.
DIETHYLENE GLYCOL, BORATED - - - - -	: GLY.
DIETHYLENE GLYCOL CHLOROFORMATE - - - - -	: PPG.
2-(2-ETHOXYETHOXY)ETHYL ACETATE - - - - -	: EKT.
@ETHYLENE GLYCOL DIACETATE - - - - -	: CPS, EKT, UCC.
ETHYLENE GLYCOL DIMERCAPTOACETATE - - - - -	: EVN.
ETHYLENE GLYCOL DIMETHACRYLATE - - - - -	: SAR(E).
GLYCERYL DIACETATE (DIACETIN) - - - - -	: ARC, HAL.
GLYCERYL MONOACETATE - - - - -	: ARC, HAL.
GLYCERYL MONOTHIOGLYCOLATE - - - - -	: EVN.
GLYCERYL TRIACETATE - - - - -	: EKT, UCC.
1,6-HEXANEDIOL DIACRYLATE - - - - -	: CEL, SAR.
HEXYLENE GLYCOL DIACETATE - - - - -	: UCC.
HYDROXYETHYL ACRYLATE - - - - -	: DOW.
HYDROXYPROPYL ACRYLATE - - - - -	: DOW.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED, IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
ESTERS AND ETHERS OF POLYHYDRIC ALCOHOLS--CONTINUED	
POLYHYDRIC ALCOHOL ESTERS--CONTINUED	
HYDROXYPROPYL METHACRYLATE - - - - -	: RH.
LANOLIN ALCOHOL ACETATE- - - - -	: CRN.
PENTAERYTHRITOL TETRAACRYLATE- - - - -	: CEL, SAR, UCC.
PENTAERYTHRITOL TETRAKIS (3-MERCAPTOPROPIONATE)- - - - -	: EVN.
POLYETHYLENE GLYCOL DIMETHACRYLATE - - - - -	: SAR(E).
SUCROSE OCTA-ACETATE - - - - -	: HPT, PD.
2-SULFOETHYL METHACRYLATE- - - - -	: DOW.
TETRAETHYLENE GLYCOL DIACRYLATE- - - - -	: CEL, TKL.
TETRAETHYLENE GLYCOL DIMETHACRYLATE- - - - -	: SAR(E).
TRIETHYLENE GLYCOL DIACRYLATE- - - - -	: EKK, TKL.
TRIETHYLENE GLYCOL DIMETHACRYLATE- - - - -	: SAR(E).
@TRIMETHYLOLPROPANE TRIACRYLATE - - - - -	: CEL, SAR, TKL.
TRIMETHYLOLPROPANE TRI(3-MERCAPTOPROPIONATE) - - - - -	: EVN.
POLYHYDRIC ALCOHOL ESTERS, ALL OTHER - - - - -	: CCW, CEL, SAR, TKL, UCC, USB.
POLYHYDRIC ALCOHOL ETHERS:	
BIS(2-ETHOXYETHYL)ETHER (DIETHYLENE GLYCOL DIETHYL ETHER)- - - - -	: UCC.
BIS(HYDROXYETHYL)ETHER BUTYNE-2-1,3-DIOL- - - - -	: GAF.
BIS*2-(2-METHOXYETHOXY)ETHYL* ETHER (TETRAETHYLENE GLYCOL DIMETHYL ETHER) - - - - -	: ASL.
BIS(2-METHOXYETHYL)ETHER (DIETHYLENE GLYCOL DIMETHYL ETHER)- - - - -	: ASL.
@2-BUTOXYETHANOL- - - - -	: DOW, EKK, JCC, OMC, SHC, UCC.
@2-(2-BUTOXYETHOXY)ETHANOL (DIETHYLENE GLYCOL MONOBUTYL ETHER)- - - - -	: DOW, EKK, JCC, OMC, SHC, UCC.
2-*2-(2-BUTOXYETHOXY)ETHOXY*ETHANOL (TRIETHYLENE GLYCOL MONOBUTYL ETHER) - - - - -	: DOW, OMC, UCC.
1-BUTOXYETHOXY-2-PROPANOL- - - - -	: UCC.
@DIETHYLENE GLYCOL- - - - -	: BAS, CEL, DIX, DOW, EKK, JCC, NWP, OMC, PPG, SHC, UCC.
DIMETHOXYETHANE- - - - -	: ASL.
@DIPROPYLENE GLYCOL - - - - -	: DOW, JCC, OCC, OMC, UCC.
@2-ETHOXYETHANOL- - - - -	: DOW, EKK, JCC, OMC, SHC, UCC.
@2-(2-ETHOXYETHOXY)ETHANOL (DIETHYLENE GLYCOL MONOETHYL ETHER)- - - - -	: DOW, EKK, JCC, OMC, SHC, UCC.
@2-*2-(2-ETHOXYETHOXY)ETHOXY*ETHANOL (TRIETHYLENE GLYCOL MONOETHYL ETHER) - - - - -	: DOW, OMC, UCC.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
POLYHYDRIC ALCOHOL ETHERS--CONTINUED	
2-*2-(HEXYLOXY)ETHOXY*ETHANOL- - - - -	: UCC.
ISOBUTOXYETHANOL - - - - -	: UCC.
1-ISOBUTOXY-2-PROPANOL (PROPYLENE GLYCOL ISOBUTYL ETHER) - - - - -	: DOW.
@2-METHOXYETHANOL (ETHYLENE GLYCOL MONOMETHYL ETHE R) - - - - -	: DOW, JCC, OMC, PPG, SHC, UCC.
@2-(2-METHOXYETHOXY)ETHANOL (DIETHYLENE GLYCOL MONO METHYL ETHER) - - - - -	: DOW, JCC, OMC, PPG, SHC, UCC.
@2-*2-(2-METHOXYETHOXY)ETHOXY*ETHANOL (TRIETHYLENE GLYCOL MONOMETHYL ETHER) - - - - -	: DOW, OMC, UCC.
2-(2-METHOXYETHOXY)ETHYL-2-METHOXYETHYL ETHER (TR IETHYLENE GLYCOL DIMETHYL ETHER) - - - - -	: ASL.
METHOXYPOLYETHYLENE GLYCOL - - - - -	: DUP, UCC.
1-METHOXY-2-PROPANOL - - - - -	: DOW.
3-(3-METHOXYPROPOXY)PROPANOL - - - - -	: DOW.
3-*3-(3-METHOXYPROPOXY)PROPOXY*PROPANOL- - - - -	: DOW, DUP.
PARAFORMALDEHYDE - - - - -	: CEL, HN.
POLYBUTYLENE GLYCOL- - - - -	: NLC.
@POLYETHYLENE GLYCOL- - - - -	: BAS, CAU, DA, DOW, DUP, HDG, JCC, OMC, TCH, UCC.
POLYPROPOXY ETHERS:	
POLYPROPOXYBUTYL ETHER - - - - -	: BAS, DA.
POLYPROPOXY ETHERS, ALL OTHER- - - - -	: JCC, TNI, UCC.
POLYGLYCOLS, ETHYLENE GLYCOL AND GLYCOL ETHER, MIX ED- - - - -	: DOW, UCC.
@POLYPROPYLENE GLYCOL - - - - -	: BAS, DOW, HDG, JCC, OMC, UCC.
POLYTETRAMETHYLENE GLYCOL ETHER- - - - -	: DUP, QKO.
PROPYLENE GLYCOL, MIXED ETHERS - - - - -	: BAS, DOW, JCC.
SORBITOL, ETHOXYLATED- - - - -	: GLY, ICI, TCH.
SORBITOL, PROPOXYLATED - - - - -	: ICI.
@TETRAETHYLENE GLYCOL - - - - -	: DOW, EKX, OMC, UCC.
1,1,3,3-TETRAMETHOXYPROPANE- - - - -	: KF.
TRIETHYLENE GLYCOL - - - - -	: CEL, DOW, EKX, JCC, NWP, OMC, PPG, SHC, UCC.
TRIPROPYLENE GLYCOL- - - - -	: DOW, HDG, UCC.
POLYHYDRIC ALCOHOL ETHERS, ALL OTHER - - - - -	: CRN, EKX, SBC, TCH, UCC.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@HALOGENATED HYDROCARBONS:	
BROMINATED (INCLUDING BROMOCHLORINATED) HYDROCARBONS:	
BROMOCHLOROMETHANE - - - - -	DOW.
1-BROMO-3-CHLOROPROPANE (TRIMETHYLENECHLOROBROMID E) - - - - -	VEL.
BROMOETHANE (ETHYL BROMIDE) - - - - -	DOW, GTL, VEL.
1-BROMO-OCTADECANE - - - - -	DUP, HMY.
1-BROMOPENTANE - - - - -	HMY.
BROMOTRICHLOROMETHANE - - - - -	VEL.
DIBROMOETHANE - - - - -	DOW.
1,1,2,2-TETRABROMOETHANE - - - - -	DOW.
BROMINATED (INCLUDING BROMOCHLORINATED) HYDROCARBO NS, ALL OTHER - - - - -	GTL, HMY, VEL.
CHLORINATED (NOT OTHERWISE HALOGENATED) HYDROCARBONS:	
@CARBON TETRACHLORIDE - - - - -	ACS, DA, DOW, DUP, FMB, PRO, SPI, TNA(E).
@CHLORINATED PARAFFINS (C10-C30):	
CHLORINATED PARAFFINS, LESS THAN 35% CHLORINE- - -	HK.
@CHLORINATED PARAFFINS, 35-64% CHLORINE - - - -	CCH, DA, DVC, FER, ICI, NEV.
CHLORINATED PARAFFINS, 65% OR MORE CHLORINE- - -	DA, DVC, NEV.
1-CHLOROBUTANE - - - - -	PUB(E), UCC.
@CHLOROETHANE (ETHYL CHLORIDE)- - - - -	AME, DOW, DUP, PPG, SHC, TNA(E).
@CHLOROPORM - - - - -	ACS, DA, DOW, PRO, SPI.
@CHLOROMETHANE (METHYL CHLORIDE)- - - - -	ACS, CO, DCC, DOW, DUP, SPI, TNA(E), UCC.
1-CHLORO-3-METHYL-2-BUTENE - - - - -	RDA.
3-CHLORO-2-METHYL-1-PROPENE (METHALLYL CHLORIDE) - -	FMP(E).
3-CHLOROPROPENE- - - - -	DOW, SHC.
2,2-DICHLOROACETYL CHLORIDE- - - - -	RDA.
DICHLOROBUTADIENE- - - - -	DUE.
1,4-DICHLOROBUTENE - - - - -	DUP, PTT.
@1,2-DICHLOROETHANE (ETHYLENE DICHLORIDE- - - - -	ACS, AME, BAS, BFG, CO, DA, DOW, PRO, OMC, PPG, SHC, TNA(E), UCC.
@DICHLOROMETHANE (METHYLENE CHLORIDE) - - - - -	ACS, DA, DOW, PRO, SPI.
@1,2-DICHLOROPROPANE- - - - -	BAS, DOW, JCC, OMC.
2,3-DICHLOROPROPENE- - - - -	DOW.
1,1,2,2-TETRACHLOROETHANE (ACETYLENE TETRACHLORID E) - - - - -	HK.
@TETRACHLOROETHYLENE (PERCHLOROETHYLENE)- - - - -	DA, DOW, DUP, PRO, HK, PPG, SPI, TNA(E). PRO.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
@HALOGENATED HYDROCARBONS--CONTINUED	
CHLORINATED (NOT OTHERWISE HALOGENATED) HYDROCARBONS-- CONTINUED	
1,1,1-TRICHLOROETHANE (METHYL CHLOROFORM) - - - - -	DOW, FRO, PPG, TNA(E).
1,1,2-TRICHLOROETHANE - - - - -	DOW.
@TRICHLOROETHYLENE - - - - -	DA, DOW, HK, PPG, TNA(E).
1,2,3-TRICHLOROPROPANE - - - - -	DOW, SHC.
1,2,3-TRICHLOROPROPENE - - - - -	DOW.
@VINYL CHLORIDE, MONOMER - - - - -	ACS, AME, BFG, CO, DOW, MNO, PPG, SHC, TNA(E).
VINYLDENE CHLORIDE, MONOMER (1,1-DICHLOROETHYLENE) E) - - - - -	DOW.
@CHLORINATED (NOT OTHERWISE HALOGENATED) HYDROCARBO NS, ALL OTHER - - - - -	DUP, TNA(E).
@FLUORINATED (INCLUDING OTHER FLUOROHALOGENATED) HYDROCARBONS:	
2-BROMO-2-CHLORO-1,1,1-TRIFLUOROETHANE - - - - -	ICI.
BROMOTRIFLUOROMETHANE - - - - -	DUP.
1-CHLORO-1,1-DIFLUOROETHANE - - - - -	DUP, PAS.
@CHLORODIFLUOROMETHANE (F-22) - - - - -	ACS, DUP, KAI, PAS, RCN, UCC.
CHLOROPENTAFLUOROETHANE - - - - -	DUP.
CHLOROTRIFLUOROETHYLENE - - - - -	ACS, MMM.
CHLOROTRIFLUOROMETHANE - - - - -	X.
1,2-DIBROMO-1,1,2,2-TETRAFLUOROETHANE - - - - -	DUP.
@DICHLORODIFLUOROMETHANE (F-12) - - - - -	ACS, DUP, KAI, PAS, RCN, UCC.
DICHLOROTETRAFLUOROETHANE - - - - -	ACS, DUP, PAS.
1,1-DIFLUOROETHANE - - - - -	ACS, DUP.
DIFLUOROTETRACHLOROETHANE - - - - -	X.
HEXAFLUOROPROPYLENE, - - - - -	DUP.
1-IODOPERFLUOROHEXANE - - - - -	DUP.
TETRAFLUOROETHYLENE, MONOMER - - - - -	ACS, DUP.
TETRAFLUOROMETHANE - - - - -	DUP.
@TRICHLOROFLUOROMETHANE (F-11) - - - - -	ACS, DUP, KAI, PAS, RCN, UCC.
TRICHLOROTRIFLUOROETHANE - - - - -	ACS, DUP.
VINYL FLUORIDE, MONOMER - - - - -	X.
VINYLDENE FLUORIDE, MONOMER - - - - -	PAS, X.
@FLUORINATED (INCLUDING OTHER FLUOROHALOGENATED) HY DROCARBONS, ALL OTHER - - - - -	DUP, ICI, PAS.
IODINATED (NOT OTHERWISE HALOGENATED) HYDROCARBONS:	
DIIODOMETHANE - - - - -	FMT, NTB.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
IODINATED (NOT OTHERWISE HALOGENATED) HYDROCARBONS-- CONTINUED	
IODOETHANE - - - - -	FMT.
IODOFORM - - - - -	NTB.
IODOMETHANE - - - - -	RSA.
@ OTHER MISCELLANEOUS ACYCLIC CHEMICALS:	
ACETYL PEROXIDE - - - - -	WTL.
ALUMINUM ISOPROPOXIDE - - - - -	CHT, KCH.
@ 2-BUTANONE PEROXIDE - - - - -	CAD, NOC, WTC, WTL.
TERT-BUTYL HYDROPEROXIDE - - - - -	CAD, RCI, WTC, WTL.
@ TERT-BUTYL PEROXIDE - - - - -	CAD, NOC, SHC, WTC, WTL.
CADMIUM BENZOATE - - - - -	SYP (E).
@ CARBON DISULFIDE - - - - -	ACS, FMB, PAS, PPG, SFI.
2-CHLOROETHANOL - - - - -	UCC.
DECANOYL PEROXIDE - - - - -	WTC, WTL.
2,3-DIBROMOPROPANOL - - - - -	GTL, VEL.
2,5-DIMETHYL-2,5-BIS(2-ETHYL-1-HEXANOYL PEROXY) HEXA NE - - - - -	WTC.
2,5-DIMETHYL-2,5-DI(TERT-BUTYLPEROXY) HEXANE - - - - -	WTL.
2,5-DIMETHYL-2,5-DI(TERT-BUTYLPEROXY) HEXYNE-3 - - - - -	WTL.
@ EPOXIDES, ETHERS, AND ACETALS:	
1-(ALLYLOXY)-2,3-EPOXYPROPANE (ALLYL GLYCIDYL ETH ER) - - - - -	AAC.
BIS(2-CHLOROETHOXY) METHANE - - - - -	TKL.
BIS(2-CHLOROETHYL) ETHER - - - - -	DOW.
BIS(2-CHLORO-1-METHYLETHYL) ETHER (DICHLOROISOPROP YL ETHER) - - - - -	DOW.
BUTYLENE OXIDE - - - - -	DOW.
BUTYL VINYL ETHER - - - - -	GAF, PUB (E).
2-CHLOROETHYL VINYL ETHER - - - - -	AAC.
CHLOROMETHYL METHYL ETHER - - - - -	RH.
2,2-DICHLORO-1,1-DIFLUOROETHYL METHYL ETHER - - - - -	DOW.
DIMERCAPTODIETHYL ETHER - - - - -	EVN.
EPICHLOROHYDRIN - - - - -	DOW, SHC.
@ ETHYLENE OXIDE - - - - -	BAS, CAU, CEL, DOW, EKX, JCC, NWP, OMC, PPG, SHC, SNO, UCC.
ETHYL ETHER, ABSOLUTE - - - - -	EKX, MAL, USI.
ETHYL ETHER, TECH. - - - - -	ENJ (E), PUB (E), UCC, USI.
ETHYL ETHER, U.S.P. - - - - -	MAL, USI.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
OTHER MISCELLANEOUS ACYCLIC CHEMICALS--CONTINUED	
@EPOXIDES, ETHERS, AND ACETALS--CONTINUED	
ETHYL VINYL ETHER-	: GAF.
GLYCIDOL -	: DIX.
ISOBUTYL VINYL ETHER -	: GAF.
ISOPROPYL ETHER -	: ENJ(E), SHC, UCC.
METHYLAL -	: CEL.
METHYL VINYL ETHER -	: GAF.
@PROPYLENE OXIDE-	: BAS, DOW, JCC, OCC, OMC.
@EPOXIDES, ETHERS, ACETALS, ALL OTHER -	: DA, GAF, PG, UCC.
FATS AND OILS, CHEMICALLY MODIFIED:	
HYDROGENATED TALLOW GLYCERALDEHYDES-	: CHL.
STEARIC ACID GLYCERIDES AND OXIDIZED STEARIC ACID GLYCERIDES-	: SDW.
FATS AND OILS, CHEMICALLY MODIFIED, ALL OTHER-	: DOM, SDW.
GLUTARALDEHYDE BIS(SODIUM BISULFITE) -	: BK, FMT.
NORMAL-HEXADECYL DISULFIDE -	: PAS.
HYDROCARBONS:	
NORMAL-DECANE-	: HMY, PLC.
2,5-DIMETHYLHEXA-2,4-DIENE -	: SFS.
NORMAL-DODECANE-	: HMY.
HEXADECANE -	: HMY.
MYRCENE-	: IFF, NCI.
NORMAL-NONANE	: PLC.
NORMAL-OCTADECANE	: HMY.
NORMAL-OCTANE-	: HMY, PLC.
HYDROCARBONS, ALL OTHER-	: CBY, HMY, OCC, UCC.
LAUROYL PEROXIDE -	: WTC, WTL.
2-MERCAPTOETHANOL -	: PLC.
METHYL SULFIDE -	: CRZ, PAS, TCH.
METHYL SULFOXIDE (DIMETHYL SULFOXIDE) -	: CRZ.
ORGANO-ALUMINUM COMPOUNDS:	
DIETHYLALUMINUM CHLORIDE -	: TNA(E), TSA.
DIETHYLALUMINUM IODIDE -	: TSA.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
OTHER MISCELLANEOUS ACYCLIC CHEMICALS--CONTINUED	
ORGANO-ALUMINUM COMPOUNDS--CONTINUED	
DIISOBUTYLALUMINUM CHLORIDE- - - - -	: TNA (E) , TSA.
DIISOBUTYLALUMINUM HYDRIDE - - - - -	: TSA.
ETHYLALUMINUM DICHLORIDE - - - - -	: TNA (E) , TSA.
ETHYLALUMINUM SESQUICHLORIDE - - - - -	: TNA (E) , TSA.
ISOPROPENYLALUMINUM- - - - -	: TSA.
METHYLALUMINUM SESQUICHLORIDE- - - - -	: TNA (E) .
SODIUM ALUMINUM CHLOROHYDROXYLACTATE - - - - -	: REH.
SODIUM ALUMINUM HYDROXYLACTATE - - - - -	: REH.
TRIETHYLALUMINUM - - - - -	: TNA (E) , TSA.
TRIISOBUTYLALUMINUM- - - - -	: TNA (E) , TSA.
ORGANO-ALUMINUM COMPOUNDS, ALL OTHER - - - - -	: TSA.
ORGANO-BORON COMPOUNDS:	:
BORON FLUORIDE - ETHYL ETHER COMPLEX - - - - -	: ACS.
ORGANO-BORON COMPOUNDS, ALL OTHER- - - - -	: ACS, APO, TSA.
ORGANO-LITHIUM COMPOUNDS:	:
NORMAL-BUTYLLITHIUM- - - - -	: FTE.
SEC-BUTYLLITHIUM - - - - -	: FTE.
ORGANO-LITHIUM COMPOUNDS, ALL OTHER- - - - -	: UCC.
ORGANO-SILICON COMPOUNDS:	:
DICHLOROMETHYLVINYLSILANE- - - - -	: UCC.
DIETHOXYPHOSPHORYLETHYLTRIETHOXYLSILANE - - - - -	: SFS, UCC.
ALPHA-GLYCIDIOXYPROPYLTRIMETHOXYLSILANE- - - - -	: UCC.
MERCAPTOPROPYLTRIMETHOXYLSILANE - - - - -	: UCC.
ALPHA-METHACRYLOXYPROPYLTRIMETHOXYLSILANE - - - - -	: UCC.
METHYLTRIMETHOXYLSILANE AND POLYMETHYLTRISILOXANE - - - - -	: UCC.
POLYOXYALKENE SILICONES- - - - -	: UCC.
SILICONE FLUIDS- - - - -	: SPD, SWS, UCC.
TRICHLOROMETHYLSILANE- - - - -	: DCC.
TRICHLOROPROPYLSILANE- - - - -	: DCC.
TRICHLOROVINYLSILANE - - - - -	: DCC, UCC.
VINYLTRIETHOXYLSILANE - - - - -	: UCC.
ORGANO-SILICON COMPOUNDS, ALL OTHER - - - - -	: UCC.
ORGANO-TIN COMPOUNDS:	:
BIS (TRIBUTYLTIN) OXIDE- - - - -	: X.
DIBUTYLTIN BIS (ISOOCETYLMERCAPTOACETATE) - - - - -	: CCW, X.
DIBUTYLTIN DICHLORIDE- - - - -	: CCW, X.

TABLE 2.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS FOR WHICH U.S. PRODUCTION AND/OR SALES WERE EITHER REPORTED OR ESTIMATED,
IDENTIFIED BY MANUFACTURER, 1976--CONTINUED

MISCELLANEOUS CHEMICALS	MANUFACTURERS' IDENTIFICATION CODES (ACCORDING TO LIST IN TABLE 3)
OTHER MISCELLANEOUS ACYCLIC CHEMICALS--CONTINUED	
ORGANO-TIN COMPOUNDS--CONTINUED	
DIBUTYL TIN METHOXIDE (DIBUTYLMETHOXYTIN) - - - - -	: CCA.
DIBUTYL TIN OXIDE - - - - -	: X.
TRIBUTYL TIN CHLORIDE - - - - -	: MET.
TRIBUTYL TIN FLUORIDE - - - - -	: MET.
ORGANO-TIN COMPOUNDS, ALL OTHER- - - - -	: APO, CCA, CCW, MET, X.
ORGANO-ZINC COMPOUNDS:	
DIETHYLZINC- - - - -	: TSA.
PERCHLOROMETHANETHIOL- - - - -	: SFA, SFC.
PERFLUOROALKYL POLYETHER - - - - -	: SYP(E), X.
@PHOSGENE (CARBONYL CHLORIDE) - - - - -	: ACS, CTN, DUP, MOB(E), OMC, OTC(E), PPG, RUC, UCC, : UPJ.
PINE OIL, SYNTHETIC- - - - -	: CBY, NCI.
PROPANONE PEROXIDE - - - - -	: GLD.
SODIUM ETHOXIDE- - - - -	: PMP(E).
SODIUM FORMALDEHYDE BISULFITE- - - - -	: EK, WAY.
SODIUM FORMALDEHYDE SULFOXYLATE- - - - -	: DA.
@SODIUM METHOXIDE - - - - -	: DA, HSH, OMC, RBC.
SUCCINYL PEROXIDE- - - - -	: WTL.
TETRAKIS(HYDROXYMETHYL)PHOSPHONIUM CHLORIDE- - - - -	: X.
ZINC FORMALDEHYDE SULFOXYLATE- - - - -	: USO.
@MISCELLANEOUS ACYCLIC CHEMICALS, ALL OTHER- - - - -	: ALD, ARA, BKL, CCL, DA, DAN, EK, GAF, GLY, GNM, IMC, : MET, NCI, PVO, SFS, SHC, SH, UCC, VTC, WAY, WLN, WTL.
MIXTURES NOT SPECIFICALLY ITEMIZED (SPECIFY):	
POLYMETHACRYLIC ACID ESTERS- - - - -	: DUP.
MIXTURES OF MISCELLANEOUS ACYCLIC CHEMICALS NOT SPECIF- ICALLY ITEMIZED - - - - -	: ALX, CCL, CEL, DUP, EKX, HPC, ICI, MCI, MLS, PG, PLC, : PMP, PVO, S, SCP, SM, TKL, VEL, WM, WTH

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 3.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: DIRECTORY OF MANUFACTURERS, 1976

ALPHABETICAL DIRECTORY BY CODE

[Names of manufacturers that reported production or sales of miscellaneous cyclic and acyclic chemicals to the U.S. International Trade Commission for 1976 are listed below in the order of their identification codes as used in table 2]

Code	Name of company	Code	Name of company
AAC	Alcolac Chemical Corp.	CNP	Nipro Inc.
ABB	Abbott Laboratories	CO	Continental Oil Co.
	Allied Chemical Corp.:	COL	Collier Carbon & Chemical Corp.
ACS	Specialty Chemicals Div.	CP	Colgate-Palmolive Co.
ACY	American Cyanamid Co.	CPS	CPS Chemical Co.
ADC	Anderson Development Co.	CPV	Cook Paint & Varnish Co., Inc.
AIP	Air Products & Chemicals, Inc.	CRN	CPC International, Inc., Amerchol
AKS	Arkansas Co., Inc.	CRZ	Crown Zellerbach Corp., Chemical Products Div.
ALB	Ames Laboratories, Inc.	CTN	Chemetron Corp., Chemical Products Div.
ALD	Aldrich Chemical Co., Inc.	CWN	Upjohn Co., Fine Chemical Div.
ALF	Allied Chemical Corp., Fibers Div.		
ALX	Alox Corp.	DA	Diamond Shamrock Corp.
AME	Stauffer Chemical Co.	DAN	Dan River, Inc.
ARA	Arapahoe Chemicals, Inc. Sub/Syntex Corp. (U.S.A)	DBC	Dow Badische Co.
ARC	Armak Co.	DCC	Dow Corning Corp.
ARM	USS Agri-Chemicals Div. of U. S. Steel Corp.	DIX	Dixie Chemical Co.
ARS	Arsynco, Inc.	DOM	Dominion Products, Inc.
ARZ	Arizona Chemical Co.	DOW	Dow Chemical Co.
ASH	Ashland Oil, Inc., Ashland Chemical Co.	DUP	E. I. DuPont de Nemours & Co., Inc.
ASL	Ansul Chemical Co.	DVC	Dover Chemical Corp. Sub. of ICC Industries, Inc.
AV	Avtex Fibers, Inc.		
AZT	Dart Industries, Inc., Aztec Chemicals Div.	EFH	E. F. Houghton & Co.
		EK	Eastman Kodak Co.:
BAS	BASF Wyandotte Corp.	EKT	Tennessee Eastman Co. Div.
BAX	Baxter Laboratories, Inc.	EXX	Texas Eastman Co. Div.
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Co. Div.	ELP	El Paso Products Co.
BKC	J. T. Baker Chemical Co.	EMR	Emery Industries, Inc.
BKL	Kewanee Industries, Inc., Millmaster Chemical Co. Div.	ENJ	Exxon Chemical Co. U.S.A.
BME	Bendix Corp., FMD Div.	EVN	Evans Chemetics, Inc.
BOR	Borden Co., Borden Chemical Div.	EW	Westinghouse Electric Corp.
BRD	Lonza, Inc.		
BUK	Buckeye Cellulose Corp.	FCA	Farmers Chemical Association, Inc.
		FER	Ferro Corp.:
CAD	Noury Chemical Corp.		Ferro Chemical Div.
CAU	Calcasieu Chemical Corp.		Grant Chemical Div.
CBD	Chembond Corp.		Keil Chemical Div.
CBY	Crosby Chemicals, Inc.	FIN	Hexcel Corp., Fine Organics Div.
CCA	Interstab Chemical, Inc.		FMC Corp.:
CCH	Pearsall Chemical Corp.	FMB	Industrial Chemical Div.
CCL	Catawba-Charlab, Inc., Polymer Specialties Co.	FMP	Industrial Chemical Div.
CCW	Cincinnati Milacron Chemicals, Inc.	FMT	Fairmount Chemical Co., Inc.
CDY	Chemical Dynamics Corp.	FOC	Handschy Chemical Co., Farac Oil & Chemical Div.
CEL	Celanese Corp.:	FRO	Vulcan Materials Co., Chemicals Div.
	Celanese Chemical Co.	FTE	Footte Mineral Co.
	Celanese Fibers Co.	FTX	CF Industries, Inc.
	Celanese Polymer Specialties Co.		
CGY	Ciba-Geigy Corp. and Pharmaceutical Div.	GAF	GAF Corp., Chemical Div.
CHL	Chemol, Inc.	GAN	Gane's Chemical Works, Inc.
CHN	N-Ren Corp., Cherokee Nitrogen Div.	GIV	Givaudan Corp.
CHP	C. H. Patrick & Co., Inc.	GLD	SCM Corp., Glidden-Durkee Div.
CHT	Chattem Drug & Chemical Co., Chattem Chemicals Div.	GLY	Glyco Chemicals, Inc.
CLK	Clark Chemical Corp.	GNM	General Mills Chemicals, Inc.
CLN	Standard Brands, Inc., Clinton Corp.	GOC	Gulf Oil Corp., Gulf Oil Chemicals Co.-U.S.
		GP	Georgia-Pacific Corp.:
			Rebecca Plant
			Resins Operations

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 3.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: DIRECTORY OF MANUFACTURERS, 1976--CONTINUED

Code	Name of company	Code	Name of company
GPR	Grain Processing Corp.	OCC	Oxirane Chemical Co.
GRD	W. R. Grace & Co., Polymers & Chemicals Div.	OH	Airco, Inc., Ohio Medical Products Div.
GRH	W. R. Grace & Co., Hatco Chemical Div.	OMC	Olin Corp.
GTL	Great Lakes Chemical Corp.	OMS	E. R. Squibb & Sons, Inc.
GYR	Goodyear Tire & Rubber Co.	ONX	Millmaster Onyx Corp., Onyx Chemical Co.
		ORO	Chevron Chemical Co.
HAL	C.P. Hall Co.	ORT	Roehr Chemicals, Inc.
HDC	Hodag Chemical Corp.	OTC	Story Chemical Corp.
HEX	Hexagon Laboratories, Inc.		
HFT	Syntex Agribusiness, Inc.	PAS	Pennwalt Corp.
HK	Hooker Chemicals & Plastic Corp.:	PCW	Pfister Chemical Works
HKD	Durez Div.	PD	Parke, Davis & Co. Sub of Warner-Lambert Co.
HMP	W. R. Grace & Co., Organic Chemicals Div.	PEN	CPC International, Inc., S. B. Penick Div.
HMY	Humphrey Chemical Co.	PFN	Pfanstiehl Laboratories, Inc.
HN	Tenneco Chemicals, Inc.	PFX	Plastifax, Inc.
HPC	Hercules, Inc.	PFZ	Pfizer, Inc. & Pfizer Pharmaceuticals, Inc.
HRT	Hart Products Corp.	PG	Procter & Gamble Co.
HSB	Harshaw Chemical Co. Div. of Kewanee Oil Co.	PIC	Pierce Chemical, Inc.
HUM	Kraft, Inc., Humko Products Chemical Div.	PLC	Phillips Petroleum Co.
		PLS	Plastics Engineering Co.
ICI	ICI United States, Inc., Specialty Chemical Group	PMP	Premier Malt Products, Inc.
IFF	International Flavor & Fragrances, Inc.	PNA	Pan American Chemical Corp.
IMC	IMC Chemical Group, Inc., Nitroparaffin Div.	PPG	Pittsburgh Plate Glass Co.
IOC	Ionac Chemical Co. Div. of Sybron Corp.	PRD	Ferro Corp., Productol Chemical Div.
		PTT	Petro-Tex Chemical
JCC	Jefferson Chemical Co., Inc.	PUB	Publicker Industries, Inc.
		PVO	PVO International, Inc.
KAI	Kaiser Aluminum & Chemical Corp., Kaiser Chemicals Div.	QCP	Quaker Chemical Corp.
KCC	Kennecott Copper Corp., Chino Mines Div.	QKO	Quaker Oats Co.
KCH	Joseph Ayers, Inc.		
KF	Kay-Fries Chemicals, Inc.	RBC	Fike Chemicals, Inc.
KPT	Koppers Co., Inc., Organic Materials Div.	RCI	Reichhold Chemicals, Inc.
		RCN	Racon, Inc.
LEM	Napp Chemicals, Inc.	RDA	Rhodia, Inc.
LIL	Eli Lilly & Co., Inc.	REH	Reheis Chemical Co. Div. of Armour Pharmaceutical Co.
		REM	Remington Arms Co., Inc.
MAL	Mallinckrodt Chemical Works	RH	Rohm & Haas Co.
MCB	Borg-Warner Corp., Weston Chemical Co.	RSA	R.S.A. Corp.
MCI	Mooney Chemicals, Inc.	RUB	Hooker Chemical Corp., Ruco Div.
MHI	Ventron Corp.	RUC	Rubicon Chemicals, Inc.
MIL	Milliken & Co., Milliken Chemical Div.		
MLS	Miles Laboratories, Inc., Marschall Div.	S	Sandoz, Inc.
MMM	Minnesota Mining & Manufacturing Co.	SAL	Salsbury Laboratories
MNO	Monochem, Inc.	SAR	Sartomer Industries, Inc.
MNR	Monroe Chemical	SBC	Scher Bros.
MOB	Mobay Chemical Co.	SCP	Henkel, Inc.
MON	Monsanto Co.	SDC	Martin-Marietta Corp., Sodeyco Div.
MRK	Merck & Co., Inc.		
MRV	Marlowe-Van Loan Corp.	SDH	Sterling Drug, Inc.:
MTO	Montrose Chemical Corp. of California	SDW	Hilton-Davis Chemical Co. Div.
			Winthrop Laboratories Div.
NCI	Union Camp Corp.	SFA	Stauffer Chemical Co.:
NEO	Norda, Inc.	SFC	Agricultural Div.
NES	Nease Chemical Co., Inc.	SFI	Calhio Chemicals, Inc. Div.
NEV	Neville Chemical Co.	SFP	Industrial Div.
NLC	Nalco Chemical Co.	SFS	Plastics Div.
NOC	Norac Co., Inc. and Mathe Chemical Co. Div.	SHC	Specialty Chemical Div.
NOR	Norwich Pharmacal Co.	SHP	Shell Oil Co., Shell Chemical Co. Div.
NPI	Stephan Chemical Co., Polychem Dept.	SK	Shepherd Chemical Co.
NSC	National Starch & Chemical Corp.	SKO	Smith & Kline Chemicals
NTB	National Biochemical Co.	SM	Getty Refining & Marketing Co.
NTL	NL Industries, Inc.		Mobil Oil Corp., Chemical Co.:
NWP	Northern Petrochemicals Co.		Chemical Coatings Div.
			Phosphorus Div.

MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS

TABLE 3.--MISCELLANEOUS CYCLIC AND ACYCLIC CHEMICALS: DIRECTORY OF MANUFACTURERS, 1976--CONTINUED

Code	Name of company	Code	Name of company
SNO	SunOlin Chemical Co.	UCC	Union Carbide Corp.
SNW	Sun Chemical Corp., Chemical Div.	UOP	UOP, Inc., UOP Chemical Div.
SOC	Standard Oil Co. of California, Chevron Chemical Co.	UPJ	Upjohn Co.
SOH	Vistron Corp.	UPM	UOP, Inc.
SPD	General Electric Co., Silicone Products Dept.	USB	U.S. Borax Research Corp.
STC	American Hoechst Corp., Sou-Tex Works	USI	National Distillers & Chemicals Corp., U.S. Industrial Chemicals Co.
STP	Stepan Chemical Co.	USO	U.S. Oil Company
SW	Sherwin-Williams Co.	USR	Uniroyal, Inc., Chemical Div.
SWS	Stauffer Chemical Co., SWS Silicones Div.	USS	USS Chemicals Div. of U.S. Steel Corp.
SYP	Dart Industries, Inc., Synthetic Products Co. Div.	VAL	Valchem
TCH	Emery Industries Inc., Trylon Div.	VEL	Velsicol Chemical Corp., Inc.
TID	Getty Refining & Marketing Co., Delaware Refinery	VGC	Virginia Chemicals, Inc.
TKL	Thiokol Chemical Corp.	VND	Van Dyk & Co., Inc.
TNA	Ethyl Corp.	VTC	Vicksburg Chemical Co. Div. of Vertac Consolidated
TNI	The Gillette Co., Chemical Div.	WAY	Phillip A. Hunt Chemical Corp., Organic Chemical Div.
TRC	Troy Chemical Corp.	WLN	Wilmington Chemical Corp.
TSA	Texas Alkyls, Inc.	WM	Inolex Corp.
TX	Texaco, Inc.	WTC	Witco Chemical Co., Inc.
TZC	Magnesium Elektron, Inc.	WTH	Union Carbide Corp., Chemical Div., Dover Plant
		WTL	Pennwalt Corp., Lucidal Div.
		WYC	Wycon Chemical Co.

Note.--Complete names and addresses of the above reporting companies are listed in table 1 of the Appendix.

APPENDIX

APPENDIX

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976

[Names of synthetic organic chemical manufacturers that reported production or sales to the U.S. International Trade Commission for 1976 are listed below alphabetically, together with their identification codes as used in table 2 of the 15 individual sections of this report]

Identification code	Name of company	Office address
AEP	A & E Plastik Pak Co., Inc-----	14505 E. Proctor Ave., Industry, CA 91749.
AZS	AZS Corp.-----	762 Marietta Blvd., Atlanta, GA 30318.
	AZ Products Co. Div-----	2525 So. Combee Rd., Eaton Park, FL 33840.
ABB	Abbott Laboratories-----	14th St. and Sheridan Rd., N. Chicago, IL 60064.
ABS	Abex Corp., Friction Products Group-----	P. O. Box 3207, Winchester, VA 22601.
WLC	Agrico Chemical Co-----	P. O. Box 3166, Tulsa, OK 74101.
AGY	Agway, Inc., Olean Nitrogen Div-----	1446 Buffalo St., Olean, NY 14760.
OH	Airco, Inc., Ohio Medical Products Div-----	3030 Airco Dr., Madison, WI 53701.
AIP	Air Products & Chemicals, Inc., Chemicals Group.	636 E. Swedesford Rd., #5 Executive Mall, Wayne, PA 19187.
ALC	Alco Chemical Corp-----	Trenton Ave. and William St., Philadelphia, PA 19134.
AAC	Alcolac, Inc-----	3440 Fairfield Rd., Baltimore, MD 21236.
ALD	Aldrich Chemical Co., Inc-----	940 W. St. Paul Ave., Milwaukee, WI 53233.
ALL	Alliance Chemical Co., Inc-----	33 Avenue P, Newark, NJ 07105.
	Allied Chemical Corp.:	
ACN	Agricultural Div-----	P. O. Box 2120, Houston, TX 77001.
ALF	Fibers Div-----	1411 Broadway - 38th Fl., New York, NY 10018.
ASC	Semet-Solvay Div-----	Columbia Rd., Morristown, NJ 07960.
ACS	Specialty Chemicals Div-----	P. O. Box 1219 R, Morristown, NJ 07960.
ACU	Union Texas Petroleum Div-----	P. O. Box 2120, Houston, TX 77001.
ALX	Alox Corp-----	3943 Buffalo Ave., Niagara Falls, NY 14303.
APH	Alpha Chemical Corp-----	Highway 57 East, Collierville, TN 38017.
ALP	Alpha Laboratories, Inc-----	1685 S. Fairfax St., Denver, CO 80222.
AMC	Amchem Products, Inc. Div. of Rorer-Amchem, Inc.	Brookside Ave. and Spring Garden St., Ambler, PA 19002.
HES	Amerada Hess Corp. (Hess Oil Virgin Islands Corp.)	1 Hess Plaza, Woodridge, NJ 07095.
AMB	American Bio-Synthetics Corp-----	710 W. National Ave., Milwaukee, WI 53204.
MAR	American Can Co., Wood Chemical Div-----	American Lane, Greenwich, CT 06830.
AC	American Color & Chemical Corp-----	P. O. Box 51, Reading, PA 19603.
ACY	American Cyanamid Co-----	Wayne, NJ 07470.
	American Hoechst Corp.:	
HST	Hoechst Fibers Industries Div-----	Route 202-206 North, Somerville, NJ 08876.
HST	Rhode Island Works-----	129 Quidnick St., Coventry, RI 02816.
STC	Sou-Tex Works-----	P. O. Box 866, E. Catawba Ave., Mount Holly, NC 28120.
APF	American Petrofina Co. of Texas-----	P. O. Box 849, Port Arthur, TX 77604.
ASY	American Synthetic Rubber Corp-----	P. O. Box 32960, 4500 Camp Ground Rd., Louisville, KY 40232.
ALB	Ames Laboratories, Inc-----	200 Rock Lane, Milford, CT 06460.
ACC	Amoco Chemicals Corp-----	200 E. Randolph Dr., Chicago, IL 60680.
AMO	Amoco Oil Company-----	200 E. Randolph Dr., Chicago, IL 60680.
PAN	Amoco Production Co-----	P. O. Box 591, Tulsa, OK 74102.
AMO	Amoco Texas Refining Co-----	200 E. Randolph Dr., Chicago, IL 60680.
ADC	Anderson Development Co-----	1415 E. Michigan St., Adrian, MI 49221.
ASL	Ansul Chemical Co-----	1 Stanton St., Marinette, WI 54143.
APX	Apex Chemical Co., Inc-----	200 S. 1st St., Elizabethport, NJ 07206.
APO	Apollo Colors, Inc-----	899 Skokie Blvd., Northbrook, IL 60062.
ARA	Arapahoe Chemicals, Inc. Sub/Syntex Corp. (U.S.A.).	2075 Walnut St., Boulder, CO 80302.
KPP	ARCO/Polymers, Inc-----	1500 Market St., Philadelphia, PA 19101.
ARD	Ardmore Chemical Co., Inc-----	840 Valley Brook Ave., Lyndhurst, NJ 07071.
ARN	Arenol Chemical Corp-----	40-33 23d St., Long Island City, NY 11101.
ARZ	Arizona Chemical Co-----	Berdan Ave., Wayne, NJ 07470.
AKS	Arkansas Co., Inc-----	185 Foundry St., Newark, NJ 07101.
ARC	Armak Co-----	300 S. Wacker Dr., Chicago, IL 60606.
AGP	Armour-Dial Co-----	2000 Aucutt Rd., Montgomery, IL 60538.
ARP	Armour Pharmaceutical Co-----	111 W. Clarendon Ave., Phoenix, AZ 85077.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976--CONTINUED

Identifi- cation code	Name of company	Office address
ARK	Armstrong Cork Co-----	Charlotte & Liberty Sts., Lancaster, PA 17604.
ARL	Arol Chemical Products Co-----	649 Ferry St., Newark, NJ 07105.
ARS	Arsynco, Inc-----	P. O. Box 8, Carlstadt, NJ 07072.
ASH	Ashland Oil, Inc-----	1401 Winchester Ave., Ashland, KY 41101 and P. O. Box 2458, Columbus, OH 43216.
	Ashland Chemical Co-----	P. O. Box 2219, Columbus, OH 43216.
BLA	Astor Products, Inc., Blue Arrow Div-----	P. O. Box 2366, Jacksonville, FL 32203.
AST	Astra Pharmaceutical Products, Inc-----	P. O. Box 1089, Pleasant St. Connector, Farmingham, MA 01701.
ATL	Atlantic Chemical Corp-----	10 Kingsland Rd., Nutley, NJ 07110.
ATR	Atlantic Richfield Co-----	P. O. Box 2679-T.A., Los Angeles, CA 90071.
APD	Atlas Powder Co. Sub. of Tyler Corp-----	P. O. Box 87, Joplin, MO 64801.
APR	Atlas Processing Co-----	P. O. Box 9389, 3546 Midway St., Shreveport, LA 71109.
AV	Avtex Fibers, Inc-----	P. O. Box 880, Executive Mall, Bldg. 9, Valley Forge, PA 19482.
KCH	Joseph Ayers, Inc-----	Route #2, Bethlehem, PA 18017.
BAS	BASF Wyandotte Corp-----	100 Cherry Hill Rd., Parsippany, NJ 07054.
BRP	BP Oil, Inc-----	270 Midland Bldg., Cleveland, OH 44115.
BKC	J. T. Baker Chemical Co-----	222 Red School Lane, Phillipsburg NJ 08865.
BAL	Baltimore Paint & Chemical Corp-----	2325 Hollins Ferry Rd., Baltimore, MD 21230.
BAX	Baxter Laboratories, Inc-----	6301 N. Lincoln Ave., Morton Grove, IL 60053.
BAO	Bayoil Co., Inc-----	2 Union St., Peabody, MA 01960.
BEE	Beecham, Inc-----	65 Industrial S., Clifton, NJ 07012.
BIC	Beker Industries, Inc-----	Carlsbad, NM 88220.
BCM	Belding Chemical Industries-----	1430 Broadway, New York, NY 10018.
BME	Bendix Corp., FMD Div-----	P. O. Box 238, Troy, NY 12180.
BEN	Bennett's-----	65 W. 1st St., Salt Lake City, UT 84110.
BDO	Benzenoid Organics, Inc-----	P. O. Box 157, Route 140, Bellingham, MA 02019.
PDC	Berncolors-Poughkeepsie, Inc-----	75 N. Water St., Poughkeepsie, NY 12602.
BNS	Binney and Smith, Inc-----	P. O. Box 431, 1100 Church Lane, Easton, PA 18042.
BOC	Biocraft Laboratories, Inc-----	12 Industrial Way, Walldwick NJ 07463.
BOR	Borden, Inc.: Borden Chemical Div----- Printing Ink Div-----	180 E. Broad St., Columbus, OH 43215. 630 Glendale-Milford Rd., Cincinnati, OH 45215.
MCB	Borg-Warner Corp.: Borg-Warner Chemicals----- Weston Chemical Div-----	International Center, Parkersburg, WV 26101. 103 Spring Valley Rd., Montvale, NJ 07645.
MRA	Bostik South, Inc. Sub of USM Corp-----	P. O. Box 5695, Greenville, SC 29606.
BFP	Breddo Food Products Co., Inc-----	18th and Kansas Avenue, Kansas City, KS 66105.
BRS	Bristol-Meyers Co., Bristol Laboratories Div.	P. O. Box 657, Syracuse, NY 13201.
BRU	M. A. Bruder & Sons, Inc-----	52d St. and Grays Ave., Philadelphia, PA 19143.
BUK	Buckeye Cellulose Corp-----	2899 Jackson Ave., Memphis, TN 38108.
BKM	Buckman Laboratories, Inc-----	1256 N. McLean Blvd., Memphis, TN 38108.
BJL	Burdick & Jackson Laboratories, Inc-----	1953 S. Harvey St., Muskegon, MI 49442.
BUR	Burroughs Wellcome Co-----	3030 Cornwallis Rd., Research Triangle Park, NC 27709.
FTX	CF Industries, Inc----- CPC International, Inc.:	Salem Lake Dr., Long Grove, IL 60047
ACR	Acme Resin Co. Div-----	1401 S. Circle Avenue, Forest Park, IL 60130.
CRN	Amerchol-----	Talmadge Rd., Edison, NJ 08817.
PEN	S. B. Penick Co-----	1050 Wall St. W., Lyndhurst, NJ 07071.
CPS	CPS Chemical Co-----	P. O. Box 162, Old Bridge, NJ 08857.
CBT	Samuel Cabot, Inc-----	One Union St., Boston, MA 02108.
CAU	Calcasieu Chemical Corp-----	P. O. Box 1522, Lake Charles, LA 70601.
CBM	Carborundum Co-----	P. O. Box 477, Niagara Falls, NY 14302.
CGL	Cargill, Inc-----	P. O. Box 9300, Minneapolis, MN 55402.
GOR	Carl Gordon Industries, Inc-----	1001 Southbridge St., Worcester, MA 01610.
ZGL	Carolina Processing Corp-----	P.O. Box 161, Severn, NC 27877.
JWC	J.W. Carroll & Sons Div. of U.S. Industries, Inc.	22600 S. Bonita St., Carson, CA 90745.
CRS	Carus Chemical Co-----	1500 8th St., LaSalle, IL 61301.

APPENDIX

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976--CONTINUED

Identi- fication code	Name of company	Office address
DOL	Castle & Cooke, Inc., Castle & Cooke Foods, Hawaii Pineapple Div.	650 Iwilei Rd., Honolulu, HI 96817.
CCL	Catawba-Charlab, Inc-----	P. O. Box 948, Charlotte, NC 28231.
CEL	Celanese Corp.: Celanese Chemical Co----- Celanese Coatings & Specialties Co., Wica Plant. Celanese Fibers Co----- Celanese Plastics Co----- Celanese Polymer Specialties Co-----	1211 Avenue of the Americas, New York, NY 10036. P. O. Box 1863, Louisville, KY 40201. P. O. Box 1414, Charlotte, NC 28201. 26 Main St., Chatham, NJ 07928. One Riverfront Plaza, Louisville, KY 40202.
CNT	CertainTeed Corp-----	P. O. Box 860, Valley Forge, PA 19482.
CPR	Certified Processing Corp-----	U.S. Highway 22, Hillside, NJ 07205.
GRS	Champlin Petroleum Co-----	P. O. Box 9176, Corpus Christi, TX 78408.
SOG	Charter International Oil Co-----	P. O. Box 5008, Houston, TX 77012.
CHT	Chattem Drug & Chemical Co., Chattem Chemicals Div.	1715 W. 38th St., Chattanooga, TN 37409.
CBD	Chembond Corp----- Chemed Corp.:	P. O. Box 270, Springfield, OR 97404.
GRC	Dubois Chemicals Div-----	Dubois Tower, Cincinnati, OH 45202.
GRL	Vestal Laboratories Div----- Chemetron Corp.:	4963 Manchester Ave., St. Louis, MO 63110.
CTN	Chemical Products Div-----	P. O. 66251-AMF O'Hare, Chicago, IL 60666.
HSC	Pigments Div-----	491 Columbia Ave., Holland, MI 49423.
CI	Chem-Fleur, Inc-----	200 Pulaski St., Newark, NJ 07105.
CDY	Chemical Dynamics Corp-----	P. O. Box 395, 3001 Hadley Rd., S. Plainfield, NJ 07080.
CHF	Chemical Formulators, Inc-----	P. O. Box 26, Nitro, WV 25143.
CHL	Chemol, Inc-----	P. O. Box 20687, Greensboro, NC 27420.
CPX	Chemplex Co-----	3100 Golf Rd., Rolling Meadows, IL 60008.
ORO	Chevron Chemical Co-----	575 Market St., San Francisco, CA 94105.
CHC	Choate Chemical Co-----	P. O. Box 27205, Richmond, VA 23261.
CHH	CHR. Hansen's Laboratory, Inc-----	9015 W. Maple St., West Allis, WI 53214.
CGY	Ciba-Geigy Corp----- Agricultural Div----- Pharmaceutical Div----- Resins Dept-----	444 Saw Mill River Rd., Ardsley, NY 19502. P. O. Box 11422, Greensboro, NC 27409. 556 Morris Ave., Summit NJ 07901. 444 Saw Mill River Rd., Ardsley, NY 10502.
CCW	Cincinnati Milacron Chemicals, Inc-----	West St., Reading, OH 45215.
CIN	Cindet Chemicals, Inc-----	2408 Doyle St., Greensboro, NC 27420.
CSO	Cities Service Co-----	P. O. Box 1562, Lake Charles, LA 70602.
CBN	Columbian Div-----	P. O. Box 300, Tulsa, OK 74102.
TEN	Copperhill Operations-----	Copperhill, TN 37317.
CBN	Petrochemicals Div-----	6th & Boston Sts., Tulsa, OK 74102.
CBN	Petrochemical-----	P. O. Box 1522, Lake Charles, LA 70602.
CLK	Clark Chemical Corp-----	131st St. & Kedzie Ave., Blue Island, IL 60406.
CLY	W. A. Cleary Corp-----	P. O. Box 10, Somerset, NJ 08873.
CLI	Clintwood Chemical Co-----	4342 S. Wolcott Ave., Chicago, IL 60609.
CSP	Coastal States Petrochemical Co-----	P. O. Drawer 521, Corpus Christi, TX 78403.
CP	Colgate-Palmolive Co-----	300 Park Ave., New York, NY 10022.
COL	Collier Carbon & Chemical Corp-----	P. O. Box 60455, Los Angeles, CA 90060.
CLD	Colloids, Inc-----	394 Frelinghuysen Ave., Newark, NJ 07114.
CNC	Columbia Nitrogen Corp-----	P. O. Box 1483, Augusta, GA 30903.
CMP	Commercial Products Co., Inc-----	117 Ethel Ave., Hawthorne, NJ 07506.
COR	Commonwealth Oil Refining Co., Inc-----	Petrochemical Complex, Ponce, PR 00731.
CPI	Commonwealth Petrochemicals, Inc-----	Petrochemical Complex, Ponce, PR 00731.
CNI	Conap, Inc-----	1405 Buffalo St., Olean, NY 14760.
CNE	Conchemco, Inc-----	1000 Marshall Dr., Lenexa, KS 66215.
SED	Colony Paint Div-----	18th & Garfield Sts., Kansas City, MO 64127.
CON	Concord Chemical Co., Inc-----	17th & Federal Sts., Camden, NJ 08105.
CWP	Consolidated Papers, Inc-----	231 1st Ave N., Wisconsin Rapids, WI 54494.
CTL	Continental Chemical Co-----	270 Clifton Blvd., Clifton, NJ 07015.
CO	Continental Oil Co-----	P. O. Box 1267, 1000 South Pine, Ponce City, OK 74601.
CPV	Cook Paint & Varnish Co-----	P. O. Box 389, Kansas City, MO 64141.
CFA	Cooperative Farm Chemicals Association-----	P. O. Box 308, Lawrence, KS 66044.

SYNTHETIC ORGANIC CHEMICALS, 1975

TABLE 1:--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS.
BY COMPANY, 1976--CONTINUED

Identifi- cation code	Name of company	Office address
COP	Coopers Creek Chemical Corp-----	River Rd., W. Conshohocken, PA 19428.
CPY	Copolymer Rubber & Chemical Corp-----	P. O. Box 2591, Baton Rouge, LA 70821.
SWC	Corco Cyclohexane, Inc-----	Petrochemical Complex, Ponce, PR 00731.
CSD	Cosden Oil & Chemical Co-----	P. O. Box 1311, Big Spring, TX 79720.
CRT	Crest Chemical Corp-----	225 Emmet St., Newark, NJ 07114.
CRD	Croda, Inc-----	51 Madison Ave., Suite 2518, New York, NY 10010.
ALT	Crompton & Knowles Corp-----	500 Pear St., Reading, PA 19603.
CBY	Crosby Chemicals, Inc-----	P. O. Box 460, Picayune, MS 39466.
CCP	Crown Central Petroleum Corp-----	1 N. Charles St., Baltimore, MD 21203.
CRZ	Crown Zellerbach Corp., Chemical Products Div.	Camas, WA 98607.
CTR	Customs Resins, Inc-----	P. O. Box 933, Henderson KY 42420.
DAN	Dan River, Inc-----	P. O. Box 261, Danville, VA 24541.
	Dart Industries, Inc.:	
AZT	Aztec Chemicals Div-----	555 Garden St., Elyria, OH 44035.
SYP	Synthetic Products Co. Div-----	1636 Wayside Rd., Cleveland, OH 44112.
DYS	Davies-Young Co-----	2700 Wagner Place, Maryland Heights, MO 63043.
DLI	Dawe's Laboratories, Inc-----	450 State St., Chicago Heights, IL 60411.
DGO	Day-Glo Color Corp-----	4732 St. Clair Ave., Cleveland, OH 44103.
DEG	Degen Oil & Chemical Co-----	200 Kellogg St., Jersey City, NJ 07305.
DNS	Dennis Chemical Co-----	2701 Papin St., St. Louis, MO 63103.
DEP	DePaul Chemical Co., Inc-----	44-27 Purves St., Long Island City, NY 11101.
DSO	DeSoto, Inc-----	1700 S. Mt. Prospect Ave., Des Plaines, IL 60018.
DEX	Dexter Chemical Corp-----	845 Edgewater Rd., Bronx, NY 10474.
HYC	Hysol Div-----	211 Franklin St., Olean, NY 14760.
MID	Midland Div-----	1-7 E. Water St., Waukegan, IL 60085.
DA	Diamond Shamrock Corp-----	1100 Superior Ave., Cleveland, OH 44114.
PLN	Disogrin Industries Corp-----	Grenier Field, Manchester, NH 03130.
DIX	Dixie Chemical Co-----	3635 W. Dallas Ave., Houston, TX 77019.
DPP	Dixie Pine Products Co., Inc-----	P. O. Box 470, Hattiesburg, MS 39401.
DOM	Dominion Products, Inc-----	882 3d Ave., Brooklyn, NY 11232.
DVC	Dover Chemical Corp. Sub. of ICC Industries, Inc.	15th & Davis Sts., Dover, OH 44622.
DBC	Dow Badische Chemical Co-----	602 Copper Rd., Freeport, TX 77541.
DOW	Dow Chemical Co-----	2020 Dow Center, Midland, MI 48640.
DCC	Dow Corning Corp-----	P. O. Box 1592, Midland, MI 48640.
DUP	E. I. duPont de Nemours & Co., Inc-----	DuPont Bldg., Wilmington, DE 19898.
DSC	Dye Specialties, Inc-----	26 Journal Sq., Jersey City, NJ 07306.
EPI	Eagle Pitcher Industries, Inc., Ohio Rubber Co. Div.	P. O. 1398, Denton, TX 76201.
EGR	Eagle River Chemical Corp-----	P. O. Box 2648, W. Helena, AR 72390.
ECC	Eastern Color & Chemical Co-----	35 Livingston St., Providence, RI 02904.
EK	Eastman Kodak Co-----	343 State St., Rochester, NY 14650.
EKT	Tennessee Eastman Co. Div-----	P. O. Box 511, Kingsport, TN 37662.
EKX	Texas Eastman Co. Div-----	P. O. Box 7444, Longview, TX 75602.
ESA	East Shore Chemical Co., Inc-----	1221 E. Barney Ave., Muskegon, MI 49443.
ELN	Elan Chemical Co-----	268 Doremus Ave., Newark, NJ 07105.
ELP	El Paso Products Co-----	P. O. Box 3986, Odessa, TX 79760.
EMR	Emery Industries, Inc-----	1300 Carew Tower, Cincinnati, OH 45202.
TCH	Trylon Div-----	P. O. Box 628, Mauldin, SC 29662.
EMK	Emkay Chemical Co-----	319 2d St., Elizabeth, NJ 07206.
EN	Endo Laboratories, Inc-----	1000 Stewart Ave., Garden City, NY 11530.
ENO	Enenco, Inc-----	P. O. Box 398, Memphis, TN 38101.
ESS	Essential Chemicals Group-----	28391 Essential Rd., Merton, WI 53056.
WMP	Essex Group Inc-----	1601 Wall St., Fort Wayne, IN 46804.
TNA	Ethyl Corp-----	330 S. 4th St., Richmond, VA 23231.
EVN	Evans Chemetics, Inc-----	90 Tokeneke Rd., Darien, CT 06820.
ENJ	Exxon Chemical Co. U.S.A-----	P. O. Box 3272, Houston, TX 77001.

APPENDIX

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976--CONTINUED

Identifi- cation code	Name of company	Office address
	FMC Corp.:	
FMN	Agricultural Chemical Div-----	100 Niagara St., Middleport, NY 14105.
FMB	Industrial Chemical Div-----	2000 Market St., Philadelphia, PA 19103 and Sawyer Ave. & River Rd., Town of Tonawanda, NY 14150.
FMP	Industrial Chemical Div-----	2000 Market St., Philadelphia, PA 19103.
FRP	FRP Co-----	P. O. Box 349, Baxley, GA 31513.
FAB	Fabricolor Manufacturing Corp-----	24-1/2 Van Houten St., P. O. Box 2398, Paterson, NJ 07509.
FMT	Fairmount Chemical Co., Inc-----	117 Blanchard St., Newark, NJ 07105.
FCA	Farmers Chemical Association, Inc-----	Salem Lake Dr., Long Grove, IL 60047.
FEL	Felton International, Inc-----	599 Johnson Ave., Brooklyn, NY 11235.
FER	Ferro Chemical Corp.:	
	Ferro Chemical Div-----	P. O. Box 46349, 7050 Krick Rd., Bedford, OH 44146.
	Grant Chemical Div-----	P. O. Box 263, Baton Rouge, LA 70821.
	Keil Chemical Div-----	3000 Sheffield Ave., Hammond, IN 46320.
	Ottawa Chemical Div-----	700 N. Wheeling St., Toledo, OH 43605.
PRD	Productol Chemical Div-----	13215 E. Penn St., Whittier, CA 90602.
FND	Fiber Industries, Inc-----	P. O. Box 10038, Charlotte, NC 28201.
RBC	Fike Chemicals, Inc-----	P. O. Box 546, Nitro, WV 25143.
	Firestone Tire & Rubber Co.:	
FIR	Firestone Plastics Co. Div-----	P. O. Box 699, Pottstown, PA 19464.
FRF	Firestone Synthetic Fibers Co-----	P. O. Box 450, Hopewell, VA 23869.
FRS	Firestone Synthetic Rubber & Latex Co. Div.	381 W. Wilberth Rd., Akron, OH 44301.
FST	First Chemical Corp-----	P. O. Box 1427, Pascagoula, MS 39567.
FMS	First Mississippi Corp-----	P. O. Box 1249, Jackson, MS 39205.
FLM	Fleming Laboratories, Inc-----	P. O. Box 10372, Charlotte, NC 28237.
CIK	Flint Ink Corp., Cal/Ink Div-----	1404 4th St., Berkeley, CA 94710.
FLO	Florasynth, Inc-----	1640 Bronxdale Ave., Bronx, NY 10462.
FTE	Foote Mineral Co-----	Route 100, Exton, PA 19341.
FOM	Formica Corp-----	120 E. 4th St., Cincinnati, OH 45202.
FG	Foster Grant Co., Inc-----	289 N. Main St., Leominster, MA 01453.
FLN	Franklin Chemical Corp-----	2020 Bruck St., Columbus, OH 43207.
FRE	Freeman Chemical Corp-----	222 E. Main St., Port Washington, WI 53074.
FB	Fritzsche Dodge & Olcott, Inc-----	76 9th Ave., New York, NY 10011.
FLH	H. B. Fuller Co-----	4450 Malsbary Rd., Blue Ash, OH 45242.
GAF	GAF Corp-----	P. O. Box 6037, Chattanooga, TN 37401.
	Chemical Div-----	33 Riverside Ave., Rensselaer, NY 12144.
GAN	Gane's Chemical, Inc-----	1144 Avenue of the Americas, New York, NY 10036.
AKL	Gardiner Big River, Inc-----	P. O. Box 825, Helena, AK 72342.
GE	General Electric Co-----	1 Plastics Ave., Pittsfield, MA 01201 and 1350 S. Second St., Coshocton, OH 43812.
GEI	Insulating Materials Products Section-----	1 Campbell Rd., Schenectady, NY 12306.
SPD	Silicone Products Dept-----	Waterford-Halfmoon Rd., Waterford, NY 12188.
GNF	General Foods Corp., Maxwell House Div-----	1125 Hudson St., Hoboken, NJ 07030.
GLC	General Latex & Chemical Corp-----	666 Main St., Cambridge, MA 02139.
GNM	General Mills Chemicals, Inc-----	4620 W. 77th St., Minneapolis, MN 55435.
GPM	General Plastics Manufacturing Co-----	3481 S. 35th St., Tacoma, WA 98409.
GNT	General Tire & Rubber Co., Chemical/ Plastics Div	1 General St., Akron, OH 44329.
GRG	P. D. George Co-----	5200 N. 2d St., St. Louis, MO 63147.
	Georgia-Pacific Corp.:	
PSP	Bellingham Div-----	P. O. Box 1235, Bellingham, WA 98225.
GP	Rebecca Chemical Div-----	P. O. Box 629, Plaquemine, LA 70764.
GP	Resins Operations-----	900 S.W. 5th Ave., Portland, OR 97240.
SKO	Getty Refining & Marketing Co-----	P. O. Box 1650, Tulsa, OK 74102.
TID	Delaware Refinery-----	Delaware City, DE 19706.
TNI	The Gillette Co., Chemical Div-----	3500 W. 16th St., N. Chicago, IL 60064.
GIL	Gilman Paint & Varnish Co-----	216 W. 8th St., Chattanooga, TN 37401.
GIV	Givaudan Corp-----	100 Delawanna Ave., Clifton, NJ 07014.
GLY	Glyco Chemicals, Inc-----	51 Weaver St., Greenwich, CT 06830.
GPI	Goodpasture, Inc-----	P. O. Drawer 921, Brownfield, TX 79316.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976--CONTINUED

Identifi- cation code	Name of company	Office address
BFG	B. F. Goodrich Co., B. F. Goodrich Chemical Co. Div.	6100 Oak Tree Blvd., Cleveland, OH 44131.
GYR	Goodyear Tire & Rubber Co----- W. R. Grace & Co.:	1144 E. Market St., Akron, OH 44316.
GCC	AG Chem. Group-----	P. O. Box 277, Memphis, TN 38101.
GRH	Hatco Chemical Div-----	King George Post Rd., Fords, NJ 08863.
MRO	Hatco Polyester Div-----	1711 Elizabeth Ave. West, Linden, NJ 07036.
HMP	Organic Chemicals Div-----	Poisson Ave., Nashua, NH 03060.
GRD	Polymers & Chemicals Div-----	55 Hayden Ave., Lexington, MA 02173.
GPR	Grain Processing Corp-----	1600 Oregon St., Muscatine, IA 52761.
GRA	Great American Chemical Corp-----	650 Water St., Fitchburg, MA 01420.
GTL	Great Lakes Chemical Corp-----	P. O. Box 2200, West Lafayette, IN 47906.
GRW	Great Western Sugar Co-----	P. O. Box 5308, Terminal Annex, Denver, CO 80217.
GNM	Greenwood Chemical Co-----	P. O. Box 26 - State Highway #690, Greenwood, VA. 22943.
GOC	Gulf Oil Corp., Gulf Oil Chemicals Co. - U. S.	P. O. Box 3766, Houston, TX 77001.
GTH	Guth Corp-----	322 S. Center St., Hillside, IL 60162.
HNC	H & N Chemical Co-----	90 Maltese Dr., Totowa, NJ 07512.
HLI	Haag Laboratories, Inc-----	14010 S. Seeley Ave., Blue Island, IL 60406.
HAL	C. P. Hall Co-----	7300 S. Central Ave., Chicago, IL 60638.
FOC	Handschy Chemical Co., Farac Oil and Chemical Div.	13601 S. Ashland Ave., Riverdale, IL 60627.
HAN	Hanna Chemical Coatings Corp-----	P. O. Box 147, Columbus, OH 43216.
HDM	Hardman, Inc-----	600 Cortlandt St., Belleville, NJ 07109.
HSB	Harshaw Chemical Co. Sub. of Kewanee Oil Co.	1945 E. 97th St., Cleveland, OH 44106.
HRT	Hart Products Corp-----	173 Sussex St., Jersey City, NJ 07302.
HVG	Haveg Industries, Inc. Sub. of Hercules, Inc.	900 Greenback Rd., Wilmington, DE 19808.
HKY	Hawkeye Chemical Co-----	P. O. Box 899, Clinton, IA 52733.
SCP	Henkel, Inc-----	400 Alfred Ave., Teaneck, NJ 07666.
HCR	Hercor Chemical Corp-----	Petrochemical Complex, Ponce, PR 00731.
HPC	Hercules, Inc-----	910 Market St., Wilmington, DE 19899.
HER	Heresite & Chemical Co-----	822 S. 14th St., Manitowoc, WI 54220.
HET	Heterochemical Corp-----	111 E. Hawthorne Ave., Valley Stream, NY 11580.
HEW	Hewitt Soap Co., Inc-----	333 Linden Ave., Dayton, OH 45403.
HEX	Hexagon Laboratories, Inc----- Hexcel Corp.:	3536 Peartree Ave., Bronx, NY 10475.
FIN	Fine Organics Div-----	205 Main St., Lodi, NJ 07644.
REZ	Rezolin Div-----	20701 Nordhoff St., Chatsworth, CA 91311.
HDG	Hodag Chemical Corp-----	7247 N. Central Park Ave., Skokie, IL 60076.
HOF	Hoffmann-LaRoche, Inc-----	324-424 Kingsland St., Nutley, NJ 07110.
HK & HKD	Hooker Chemicals & Plastics Corp-----	MPO Box 8, Niagara Falls, NY 14302, and Walck Rd., N. Tonawanda, NY 14121.
RUB	Ruco Div-----	P. O. Box 456, Burlington, NJ 08016.
EPH	E. F. Houghton & Co-----	303 W. Lehigh Ave., Philadelphia, PA 19133.
HMY	Humphrey Chemical Co-----	Devine St., North Haven, CT 06473.
WAY	Philip A. Hunt Chemical Corp., Organic Chemical Div.	P. O. Box 4249, E. Providence, RI 02914.
HNT	Huntington Laboratories, Inc-----	P. O. Box 710, Huntington, IN 46750.
HUS	Husky Industries, Inc-----	62 Perimeter Center E., Atlanta, GA 30346.
HYN	Hynson, Westcott & Dunning, Inc-----	Charles and Chase Sts., Baltimore, MD 21201.
ICI	ICI United States Inc.: Plastics Div-----	Wilmington, DE 19897.
IMC	Specialty Chemicals Group----- IMC Chemical Group, Inc-----	Wilmington, DE 19897. P. O. Box 207, Terre Haute, IN 47808; P. O. Box 149, Orrington, ME 04474 and 100 Lister Ave., Newark, NJ 07105.
	McWorter Resins-----	P. O. Box 308, Cottage Pl., Carpentersville, IL 60110.
	Nitroparaffin Div-----	IMC Plaza, Libertyville, IL 60048.

APPENDIX

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976--CONTINUED

Identi- fication code	Name of company	Office address
RAY	ITT Rayonier, Inc-----	605 3d Ave., New York, NY 10016.
INP	Indpol, Inc-----	P. O. Box 1087, Tustin, CA 92680.
INL	Inland Steel Co., Inland Steel Container Co.	4300 W. 130th St., Chicago, IL 60658.
ICC	Inmont Corp-----	1255 Broad St., Clifton, NJ 07015, and 150 Wagaraw Rd., Hawthorne, NJ 07506.
ICF		
WM	Inolex Corp-----	Jackson & Swanson Sts., Philadelphia, PA 19148.
WIL	Inolex Pharmaceutical Div-----	2600 Bond St., Park Forest South, IL 60466.
SPC	Insilco Corp., Sinclair Paint Co. Div-----	3960 E. Washington Blvd., Los Angeles, CA 90023.
IFF	International Flavor and Fragrances, Inc-----	521 W. 57th St., New York, NY 10019.
IPC	Interplastic Corp-----	2015 NE. Broadway St., Minneapolis, MN 55413.
CCA	Interstab Chemical, Inc-----	500 Jersey Ave., New Brunswick, NJ 08903.
IOC	Ionac Chemical Co. Div. of Sybron Corp-----	Birmingham Rd., Birmingham, NJ 08011.
IRI	Ironsides Resins, Inc-----	270 W. Mound St., Columbus, OH 43216.
JCC	Jefferson Chemical Co., Inc-----	P. O. Box 52332, Houston, TX 77052.
JFR	George A. Jeffreys & Co., Inc-----	P. O. Box 709, Salem, VA 24153.
JEN	Jennison-Wright Corp-----	P. O. Box 691, Toledo, OH 43694.
JRG	Andrew Jergens Co-----	2535 Spring Grove Ave., Cincinnati, OH 45214.
JSC	Jersey State Chemical Co-----	59 Lee Ave., Haledon, NJ 07508.
UPF	Jim Walter Resources, Inc-----	3300 1st Ave. N., Birmingham, AL 35222.
JNS	S. C. Johnson & Son, Inc-----	1525 Howe St., Racine, WI 53403.
JOB	Jones-Blair Co-----	2728 Empire Central, Dallas, TX 75235.
JOR	Jordan Chemical Co-----	1830 Columbia Ave., Folcroft, PA 19032.
KVP	KV Products-----	2503 S. Hanley Rd., St. Louis, MO 63144.
	Kaiser Aluminum & Chemical Corp.:	
SNI	Kaiser Agricultural Chemicals Div-----	P. O. Box 246, Savannah, GA 31402.
KAI	Kaiser Chemicals-----	P. O. Box 337, Gramercy, LA 70052.
KLM	Kalama Chemical, Inc-----	P. O. Box 427, Kalama, WA 98625.
KF	Kay-Fries Chemicals, Inc-----	200 Summit Ave., Montvale, NJ 07645.
KMP	Kelly-Moore Paint Co-----	1015 Commercial St., San Carlos, CA 94070.
	Kennecott Copper Corp.:	
KCC	Chino Mines Div-----	Hurley, MN 88043.
KCU	Utah Copper Div-----	P. O. Box 11299, Salt Lake City, UT 84147.
AMP	Kerr-McGee Chemical Corp-----	1101 Kerr Tower, Oklahoma City, OK 73102.
BKL	Kewanee Industries, Inc., Millmaster Chemical Co. Div.	99 Park Ave., New York, NY 10016.
KYS	Keysor Corp-----	26000 Springbrook Ave., Saugus, CA 91350.
KCW	Keystone Color Works, Inc-----	151 W. Gay Ave., York, PA 17403.
KNP	Knapp Products, Inc-----	187 Garibaldi Ave., Lodi, NJ 07644.
KMC	Kohler-McLister Paint Co-----	P. O. Box 546, Denver, CO 80201.
KON	H. Kohnstamm & Co., Inc-----	161 Avenue of the Americas, New York, NY 10013.
KPT	Koppers Co., Inc.:	
	Organic Materials Div-----	Koppers Bldg., Pittsburgh, PA 15219.
	Roads Materials Div-----	Koppers Bldg., Pittsburgh, PA 15219.
HUM	Kraft, Inc., Humko Products Div-----	P. O. Box 398, Memphis, TN 38101.
LKY	Lake States Div. of St. Regis Paper Co-----	603 W. Davenport St., Rhinelander, WI 54501.
LAK	Lakeway Chemicals, Inc-----	5025 Evanston Ave., Muskegon, MI 49443.
LUR	Laurel Products Corp-----	2600 E. Tioga St., Philadelphia, PA 19134.
LEA	Leatex Chemical Co-----	2722 N. Hancock St., Philadelphia, PA 19133.
LEV	Lever Brothers Co-----	390 Park Ave., New York, NY 10022.
LVR	C. Lever Co., Inc-----	736 Dunks Ferry Rd., Cornwells Hgts, PA 19020.
BLS	Life Savers, Inc-----	Church St., Canajoharie, NY 13317.
LIL	Eli Lilly & Co-----	307 E. McCarty St., Indianapolis, IN 46206 and G.P.O. Box 4388, San Juan, PR 00936.
BRD	Lonza, Inc-----	22-10 Route 208, Fair Lawn, NJ 07410.
TZC	Magnesium Elektron, Inc-----	Star Route A, Box 202-1, Flemington, NJ 08822.
MGR	Magruder Color Co., Inc-----	1 Virginia St., Newark, NJ 07114.
MAL	Mallinckrodt Chemical Works-----	2nd & Mallinckrodt, St. Louis, MO 63147.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976--CONTINUED

Identifi- cation code	Name of company	Office address
TRD	Manufacturing Enterprises, Inc., Squibb Manufacturing, Inc., Trade Enterprises, Inc., Ersana, Inc.	P. O. Box 609, Humacao, PR 00661.
MOR	Marathon Morco Co-----	P. O. Drawer C, 4401 Park Ave., Dickinson, TX 77539.
MOC	Marathon Oil Co., Texas Refining Div-----	P. O. Box 1191, Texas City, TX 77590.
MRB	Marblette Co-----	37-31 30th St., Long Island City, NY 11101.
MRD	Marden-Wild Corp-----	500 Columbia St., Somerville, MA 02143.
MRV	Marlowe-Van Loan Corp-----	P. O. Box 1851, High Point, NC 27261.
SDC	Martin-Marietta Corp., Sodyeco Div-----	P. O. Box 10098, Charlotte, NC 28237.
MRX	Max Marx Color & Chemical Co-----	192 Coit St., Irvington, NJ 07111.
MCA	Masonite Corp., Alpine Chemical Div-----	P. O. Box 2392, Gulfport, MS 39503.
MAY	Otto B. May, Inc-----	52 Amsterdam St., Newark, NJ 07105.
MCC	McCloskey Varnish Co-----	7600 State Rd., Philadelphia, PA 19136.
MGK	McLaughlin Gormley King Co-----	8810 10th Ave., N., Minneapolis, MN 55427.
MDJ	Mead Johnson & Co-----	2404 Penna. St., Evansville, IN 47721.
MLC	Melamine Chemicals, Inc-----	P. O. Box 748, Donaldsonville, LA 70346.
MRK	Merck & Co., Inc-----	126 E. Lincoln Ave., Rahway, NJ 07065.
MER	Merichem Co-----	1914 Haden Rd., Houston, TX 77015.
PPF	Midwest Manufacturing Corp-----	Oak St. at Bluff Rd., Burlington, IA 52601.
MLS	Miles Laboratories, Inc.: Marschall Div----- Summer Div-----	1127 Myrtle St., Elkhart, IN 46514. 1127 Myrtle St., Elkhart, IN 46514.
MIL	Milliken & Co., Milliken Chemical Div----- Millmaster Onyx Corp.:	P. O. Box 817, Inman, SC 29349.
ONX	Onyx Chemical Co. Div-----	190 Warren St., Jersey City, NJ 07302.
RPC	Refined-Onyx Div-----	624 Schuyler Ave., Lyndhurst, NJ 07071.
MMM	Minnesota Mining & Manufacturing Co-----	3M Center, St. Paul, MN 55101.
MIR	Miranol Chemical Co., Inc-----	660 Stuyvesant Ave., Irvington, NJ 07111.
MSC	Mississippi Chemical Corp-----	P. O. Box 388, Yazoo City, MS 39194.
MOB	Mobay Chemical Corp-----	Penn Lincoln Parkway, W. Pittsburgh, PA 15205.
CHG	Chemagro Agricultural Div-----	P. O. Box 4913, Kansas City, MO 64120.
VPC	Verona Div-----	Iorio Ct., Union, NJ 07083.
SM	Mobil Oil Corp----- Mobil Chemical Co----- Chemical Coatings Div----- Phosphorus Div-----	P. O. Box 900, Dallas, TX 75221. P. O. Box 3868, Beaumont, TX 77704. 1024 South Ave., Plainfield, NJ 07062. P. O. Box 26683, Richmond, VA 23261.
MOA	Mona Industries, Inc-----	65 E. 23d St., Paterson, NJ 07524.
MNO	Monochem, Inc-----	P. O. Box 488, Geismar, LA 70734.
MNR	Monroe Chemical Co-----	Saville Ave. at 4th St., Eddystone, PA 19013.
MON	Monsanto Co----- Bircham Bend Plant----- Chocolate Bayou Plant----- Plastics Div----- Springfield Plant----- Textiles Div-----	2710 Lafayette St., Santa Clara, CA 95050 and 800 N. Lindbergh Blvd., St. Louis, MO 63166. 190 Grochmal Ave., Indian Orchard, MA 01151. P. O. Box 711, Alvin, TX 77511. 5100 W. Jefferson Ave., Trenton, MI 48183; River Rd., Addyston, OH 45001 and P. O. Box 1311, Texas City, TX 77590. 730 Worcester St., Indian Orchard, MA 01151. 800 N. Lindbergh Blvd., St. Louis, MO 63166.
MTO	Montrose Chemical Corp. of California-----	3250 Wilshire Blvd, Suite 1800, Los Angeles, CA 90010.
MCI	Mooney Chemicals, Inc-----	2301 Scranton Rd., Cleveland, OH 44113.
MCP	Moretex Chemical Products, Inc-----	P. O. 1799, Spartanburg, SC 29304.
MRT	Morton Chemical Co. Div. of Morton Norwich Products, Inc-----	110 N. Wacker Dr., Chicago, IL 60606.
MOT	Motomco, Inc-----	267 Vreeland Ave., Paterson, NJ 07513.
PNX	Murphy-Phoenix Co-----	9505 Cassius Ave., Cleveland, OH 44105.
NTL	NL Industries, Inc-----	1221 Avenue of the Americas, New York, NY 10020.
CHN	N-Ren Corp., Cherokee Nitrogen Div-----	P. O. Box 429, Pryor, OK 74361.
NLC	Nalco Chemical Co-----	2901 Butterfield Rd, Oak Brook, IL 60521.
LEM	Napp Chemicals, Inc-----	199 Main St., Lodi, NJ 07644.
NTB	National Biochemical Co-----	3127 W. Lake St., Chicago, IL 60612.
NTC	National Casein Co-----	601 W. 80th St., Chicago, IL 60620.

APPENDIX

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976--CONTINUED

Identi- fication code	Name of company	Office address
USI	National Distillers & Chemicals Corp., U.S. Industrial Chemicals Co.	99 Park Ave., New York, NY 10016.
NMC	National Milling & Chemical Co-----	4601 Flat Rock Rd., Philadelphia, PA 19127.
USI	National Petro Chemical Corp-----	99 Park Ave., New York, NY 10016.
NSC	National Starch & Chemical Corp-----	10 Finderne Ave., Bridgewater, NJ 08876.
NES	Nease Chemical Co., Inc-----	P. O. Box 221, State College, PA 16801.
NEP	Nepera Chemical Co., Inc-----	Route 17, Harriman, NY 10926.
NEV	Neville Chemical Co-----	Neville Island P. O., Pittsburgh, PA 15225.
NLO	Niklor Chemical Co-----	2060 E. 220th St., Long Beach, CA 90810.
NIL	Nilok Chemicals, Inc-----	2235 Langdon Farm Rd., Cincinnati, OH 45230.
JDC	Nipak, Inc-----	P. O. Box 2820, Dallas, TX 75221.
CNP	Nipro, Inc-----	P. O. Box 1483, Augusta, GA 30903.
NOC	Norac Co., Inc-----	405 S. Motor Ave., Azusa, CA 91703.
NEO	Mathe Chemical Co. Div-----	169 Kennedy Dr., Lodi, NJ 07644.
NPV	Norda, Inc-----	140 Route 10, E. Hanover, NJ 07936.
LMI	Norris Paint & Varnish Co., Inc-----	P. O. Box 2023, Salem, OR 97308.
ATP	North American Chemical Co-----	19 S. Canal St., Lawrence, MA 01843.
NWP	Northern Fine Chemicals, Inc-----	93 Main St., Franklin, NJ 07416.
NW	Northern Petrochemical Co-----	2350 E. Devon Ave., Des Plaines, IL 60018.
NPC	Northwestern Chemical Co-----	120 N. Aurora St., W. Chicago, IL 60185.
NOR	Northwest Petrochemical Corp-----	P. O. Box 99, Anacortes, WA 98221.
NCW	Norwich Pharmacal Co-----	17 Eaton Ave., Norwich, NY 13815.
CAD	Nostrip Chemical Works, Inc-----	P. O. Box 160, Pedricktown, NJ 08067.
NVT	Noury Chemical Corp-----	2153 Lockport-Olcott Rd., Burt, NY 14028.
CMG	Novamont Corp., Neal Works-----	P. O. Box 189, Kenova, WV 25530.
	Nyanza, Inc-----	Maguno Rd., Ashland, MA 01721.
OBC	O'Brien Corp-----	2001 W. Washington Ave., South Bend, IN 46634.
FLW	Fuller-O'Brien Div-----	450 E. Grand Ave., S. San Francisco, CA 94080.
OMC	Olin Corp-----	120 Long Ridge Rd., Stamford, CT 06904 and P. O. Box 991, Little Rock, AR 72203.
OPC	Orbis Products Corp-----	140 Route 10, E. Hanover, NJ 07936.
ORG	Organics, Inc-----	7125 N. Clark St., Chicago, IL 60628.
BSW	Original Bradford Soap Works, Inc-----	200 Providence St., W. Warwick, RI 02893.
OCF	Owens-Corning Fiberglas Corp-----	Fiberglas Tower, Toledo, OH 43659.
OCC	Oxirane Chemical Co-----	10801 Choate Rd., Pasadena, TX 77507.
OCX	Oxochem Enterprise-----	King George Post Rd., Fords, NJ 08863.
PLB	P L Biochemical, Inc-----	1037 W. McKinley Ave., Milwaukee, WI 53201.
PPG	PPG Industries, Inc-----	1 Gateway Center, Pittsburgh, PA 15222.
PVO	PVO International, Inc., Chemical Specialties Div.	416 Division St., Boonton, NJ 07005.
AMR	Pacific Resins & Chemicals, Inc-----	1754 Thorne Rd., Tacoma, WA 93421.
PNA	Pan American Chemical Corp-----	21 Stable Ct., Wilmington, DE 19803.
PNT	Pantasote Co. of New York, Inc-----	26 Jefferson St., Passaic, NJ 07056.
PD	Parke, Davis & Co. Sub. of Warner- Lambert Co.	Jos. Campau at the River, Detroit, MI 48232.
PSC	Passaic Color & Chemical Co-----	28-36 Paterson St., Paterson, NJ 07501.
KAL	Pathan Chemical Co-----	427 Moyer St., Philadelphia, PA 19125.
CHP	C. H. Patrick & Co., Inc-----	P. O. Box 2526, Greenville, SC 29602.
CCH	Pearsall Chemical Corp-----	P. O. Box 437, Houston, TX 77001.
PEK	Peck's Products Co-----	610 E. Clarence Ave., St. Louis, MO 63147.
PCH	Peerless Chemical Co-----	12416 Cloverdale Ave., Detroit, MI 48204.
AES	Penetone Corp-----	74 Hudson Ave., Tenafly, NJ 07670.
PAS	Pennwalt Corp-----	3 Parkway, Philadelphia, PA 19102.
WTL	Lucidol Div-----	1740 Military Rd., Buffalo, NY 14240.
PAR	Pennzoil Co., Penreco Div-----	Union Bank Bldg., Butler, PA 16001.
PER	Perry & Derrick Co., Inc-----	2510 Highland Ave., Norwood, OH 45212.
UDI	Petrochemicals Co., Inc-----	P. O. Box 2199, Fort Worth, TX 76101.
PTT	Petro-Tex Chemical Corp-----	8600 Park Place Blvd., Houston, TX 77017.
PFN	Pfanzstiehl Laboratories, Inc-----	1219 Glen Rock Ave., Waukegan, IL 60085.
PCW	Pfister Chemical, Inc-----	Linden Ave., Ridgefield, NJ 07657.
PFZ	Pfizer, Inc-----	235 E. 42d St., New York, NY 10017.
	Pfizer Pharmaceuticals, Inc-----	P. O. Box 628, Barceloneta, PR 00617.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976--CONTINUED

Identi- fication code	Name of company	Office address
PHR	Pharmachem Corp-----	P. O. Box 1035, Bethlehem, PA 18018.
PLC	Phillips Petroleum Co-----	16D2 Phillips Bldg., Bartlesville, OK 74003.
PPR	Phillips Puerto Rico Core, Inc-----	GPO Box 4129, San Juan, PR 00936.
PIC	Pierce Chemical Co-----	P. O. Box 117, Rockford, IL 61103.
PIL	Pilot Chemical Co-----	11756 Burke St., Santa Fe Springs, CA 90670.
PPL	Pioneer Plastics Div. of LOF Plastics, Inc.	Pionite Rd., Auburn, ME 04210.
PIT	Pitt-Consol Chemical Co-----	P. O. Box 1267, 1000 S. Pine, Ponca City, OK 74601.
PLS	Plastics Engineering Co-----	P. O. Box 758, Sheboygan, WI 53081.
PMC	Plastics Manufacturing Co-----	2700 S. Westmoreland Ave., Dallas, TX 75224.
PLX	Plex Chemical Corp-----	1205 Atlantic St., Union City, CA 94487.
PFW	Polak's Frutal Works, Inc-----	33 Sprague Ave., Middletown, NY 10940.
POL	Polymer Corp-----	2120 Fairmont Ave., Reading, PA 19605.
PYZ	Polyrez Co., Inc-----	P. O. Box 320, Woodbury, NJ 08096.
SOL	Polysar Resins, Inc-----	29 Fuller St., Leominster, MA 01453.
PVI	Polyvinyl Chemical Ind-----	730 Main St., Wilmington, MA 01887.
POP	Pope Chemical Corp-----	33 6th Ave., Paterson, NJ 07524.
PRT	Pratt & Lambert, Inc-----	P. O. Box 22, Buffalo, NY 14240.
PMP	Premier Malt Products, Inc-----	917 W. Juneau Ave., Milwaukee, WI 53201.
PPC	Premier Petrochemicals Co-----	Meadows Bldg., Dallas, TX 75206.
PG	Procter & Gamble Co.: Procter & Gamble Mfg. Co-----	P. O. Box 599, Cincinnati, OH 45201.
PC	Procter & Gamble Paper Products Co.	6100 Center Hill Rd., Cincinnati, OH 45224.
PRC	Proctor Chemical Co., Inc-----	P. O. Box 399, Salisbury, NC 28144.
PUB	Products Research & Chemical Corp-----	2919 Empire Ave., Burbank, CA 91505.
PTO	Publicker Industries, Inc-----	1429 Walnut St., Philadelphia, PA 19102.
PUE	Puerto Rico Chemical Co., Inc-----	P. O. Box 496, Arecibo, PR 00613.
PRX	Puerto Rico Olefins Co-----	Firm Delivery, Ponce, PR 00731.
	Purex Corp-----	5101 Clark Ave., Lakewood, CA 90712.
QCP	Quaker Chemical Corp-----	Lime & Elm Sts., Conshohocken, PA 19428.
QKO	Quaker Oats Co-----	Merchandise Mart Plaza, Chicago, IL 60654.
QUN	K. J. Quinn & Co., Inc-----	195 Canal St., Malden, MA 02148.
RSA	R.S.A. Corp-----	690 Saw Mill River Rd., Ardsley, NY 10502.
RLS	Rachelle Laboratories, Inc-----	700 Henry Ford Ave., Long Beach, CA 90801.
RCN	Racon, Inc-----	P. O. Box 198, Wichita, KS 67201.
RAB	Raybestos-Manhattan, Inc., R. M. Friction Materials Co. Div.	75 E. Main St., Stratford, CT 06497.
RED	Red Spot Paint & Varnish Co., Inc-----	110 Main St., Evansville, IN 47703.
REH	Reheis Chemical Co. Div. of Armour Pharmaceutical Co.	111 W. Clarendon, Station 3206, Phoenix, AZ 85077.
RCI	Reichhold Chemicals, Inc-----	525 N. Broadway, White Plains, NY 10603.
	Reichhold Polymers, Inc-----	525 N. Broadway, White Plains, NY 10603.
RIL	Reilly Tar & Chemical Corp-----	1615 Merchants Bank, Indianapolis, IN 46204.
REL	Reliance Universal, Inc., Louisville Resins Operation	P. O. Box 21423, Louisville, KY 40221.
REM	Remington Arms Co., Inc-----	939 Barnum Ave., Bridgeport, CT 06602.
RSC	Resinous Chemicals Corp-----	1399 W. Blancke St., Linden, NJ 07036.
RSY	Resyn Corp-----	1401 W. Blancke St., Linden, NJ 07036.
RCC	Rexene Polyolefins Co-----	P. O. Box 37, Paramus, NJ 07652.
RCC	Rexene Styrenics Co-----	W. 115 Century Rd., Paramus, NJ 07652.
RCD	Richardson Co.: Organic Chemical Div-----	2400 E. Devon Ave., Des Plaines, IL 60018.
	Polymeric Systems Div-----	15 Meigs Ave., Madison, CT 06443.
LKL	Richardson-Merrell, Inc., Merrell-National Laboratories Div.	110 E. Amity Rd., Cincinnati, OH 45215.
AMS	Ridgway Color & Chemical-----	75 Front St., Ridgway, PA 15853.
RIK	Riker Laboratories, Inc. Sub. of 3M Co-----	19901 Nordhoff St., Northridge, CA 91324.
RSN	Rilsan Corp-----	139 Harriestown Rd., Glen Roc, NJ 07452.
RT	Ritter International-----	4001 Goodwin Ave., Los Angeles, CA 90039.
RIY	Riverdale Chemical Co-----	220 E. 17th St., Chicago Heights, IL 60411.
ROB	Robeco Chemicals, Inc-----	99 Park Ave., New York, NY 10016.
RBT	Robintech, Inc-----	1407 Texas St., Fort Worth, TX 76102.

APPENDIX

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976--CONTINUED

Identi- fication code	Name of company	Office address
MFG	Rockwell International Corp., Plastics Div.	4501 Benefit Ave., Ashtabula, OH 44004.
ORT	Roehr Chemicals Div. of Aceto Industrial Chemical Corp.	52-20 37th St., Long Island City, NY 11101.
RGC	Rogers Corp-----	Rogers, CT 06263.
RH	Rohm & Haas Co-----	Independence Mall West, Philadelphia, PA 19105.
RUC	Rubicon Chemicals, Inc-----	P. O. Box 517, Geismar, LA 70734.
GLD	SCM Corp.: Coatings & Resins Div----- Durkee Div----- Glidden-Durkee Div-----	299 Park Ave., New York, NY 10017. 299 Park Ave., New York, NY 10017. 299 Park Ave., New York, NY 10017.
NPR	Safeway Stores, Inc-----	8390 Capwell Dr., Oakland, CA 94604.
SLM	Salem Oil & Grease Co-----	60 Grove St., Salem, MA 01970.
SAL	Salsbury Laboratories-----	2000 Rockford Rd., Charles City, IA 50616.
S	Sandoz, Inc----- Colors & Chemicals Div----- Crop Protection Dept-----	P. O. Box 357, Fair Lawn, NJ 07410. Route #10, E. Hanover, NJ 07936. P. O. Box 207, Wasco, CA 93280.
SAR	Sartomer Industries, Inc-----	Gov. Printz Blvd. & Wanamaker Ave., Essington, PA 19029.
SCN	Schenectady Chemicals, Inc-----	P. O. Box 1046, Schenectady, NY 12301.
SBC	Scher Bros., Inc-----	P. O. Box 538, Allwood Station, Clifton, NJ 07012.
SCH	Schering Corp-----	1011 Morris Ave., Union, NJ 07083.
SCO	Scholler Bros., Inc-----	Collins and Westmoreland Sts., Philadelphia, PA 19134.
SPA	Scott Paper Co-----	106 E. Central Ave., Oconto Falls, WI 54154.
SEA	Seaboard Chemicals, Inc-----	30 Foster St., Salem, MA 01970.
SRL	G. D. Searle & Co-----	P. O. Box 5110, Chicago, IL 60680.
SKP	Shakespeare Co., Monofilament Div-----	P. O. Box 246, Columbia, SC 29202.
SHA	Shanco Plastics & Chemicals Co-----	2716 Kenmore Ave., Tonawanda, NY 14150.
SHO	Shell Oil Co-----	P. O. Box 2463, Houston, TX 77001.
SHC	Shell Chemical Co. Div-----	One Shell Plaza, P. O. Box 2463, Houston, TX 77001.
SHP	Shepherd Chemical Co-----	4900 Beech St., Norwood, OH 45212.
SW	Sherwin-Williams Co-----	101 Prospect Ave., NW Cleveland, OH 44115.
SID	George F. Siddall Co., Inc-----	P. O. Box 925, Spartanburg, SC 29304.
SMP	J. R. Simplot Co., Minerals-----	P. O. Box 912, Pocatello, ID 83210.
SIM	Simpson Timber Co-----	2301 N. Columbia Blvd., Portland, OR 97217.
GFS	G. Frederick Smith Chemical Co-----	867 McKinley Ave., Columbus, OH 43223.
SK	Smith, Kline Chemicals-----	1500 Spring Garden St., Philadelphia, PA 19101.
SLT	Soltex Polymer Corp-----	P. O. Box 1000, Deer Park, TX 77536.
SLC	Soluol Chemical Co., Inc-----	Green Hill and Market Sts., W. Warwick, RI 02893.
SAC	Southeastern Adhesives Co-----	P. O. Box 791, Lenoir, NC 28645.
SOP	Southern Chemical Products Co., Inc-----	P. O. Box 205, Macon, GA 31202.
SOS	Southern Sizing Co-----	1550 E. Taylor Ave., East Point, GA 30344.
SPL	Spaulding Fibre Co., Inc-----	310 Wheeler St., Tonawanda, NY 14150.
OMS	E. R. Squibb & Sons, Inc-----	Georges Rd., Brunswick, NJ 08903.
STA	A. E. Staley Mfg. Co-----	2200 E. Eldorado St., Decatur, IL 62525.
UBS	Chemical Specialties Div-----	2200 E. Eldorado St., Decatur, IL 62525.
CLN	Standard Brands, Inc., Clinton Corn Processing Co. Div.	1251 Beaver Channel Parkway, Clinton, IA 52733.
SOC	Standard Oil Co. of California, Chevron Chemical Co.	575 Market St., San Francisco, CA 94105.
SIO	Standard Oil Co. (Ohio)-----	270 Midland Bldg., Cleveland, OH 44130.
STT	Standard T Chemical Co-----	P. O. Box A-3351, Chicago, IL 60690.
STG	Stange Co-----	342 N. Western Ave., Chicago, IL 60612.
AME	Stauffer Chemical Co-----	P. O. Box 1110, Long Beach, CA 90801.
SFA	Agricultural Div-----	636 California St., San Francisco, CA 94108.
SFC	Calbio Chemicals, Inc-----	636 California St., San Francisco, CA 94108.
SFF	Food Ingredients Div-----	636 California St., San Francisco, CA 94108.
SFI	Industrial Div-----	636 California St., San Francisco, CA 94108.
SFP	Plastics Div-----	636 California St., San Francisco, CA 94108.
SFS	Specialty Div-----	636 California St., San Francisco, CA 94108.
SWS	SWS Silicones Div-----	636 California St., San Francisco, CA 94108.
STP	Stepan Chemical Co-----	RR #1, Elwood, IL 604217 and 100 West Hunter Ave., Maywood, NJ 07607.
NPI	Polychem Dept-----	51 Eames St., Wilmington, MA 01887.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976--CONTINUED

Identi- fication code	Name of company	Office address
	Sterling Drug, Inc.:	
SDG	Glenbrook Laboratories Div-----	90 Park Ave., New York, NY 10016.
SDH	Hilton-Davis Chemical Co. Div-----	2235 Langdon Farm Rd., Cincinnati, OH 45237.
TMS	Thomasset Colors Div-----	120 Lister Ave., Newark, NJ 07105.
SDW	Winthrop Laboratories Div-----	90 Park Ave., New York, NY 10016.
SLV	Sterwin Chemicals, Inc-----	Military Rd., Rothschild, WI 54474.
OTC	Story Chemical Corp-----	500 Agard Rd., Muskegon, MI 49445.
STY	Styrochem Corp-----	Petrochemical Complex, Ponce, PR 00731.
SBP	Sugar Beet Products Co-----	P. O. Box 1387, Saginaw, MI 48605.
	Sun Chemical Corp.: *	
SNW	Chemical Div-----	P. O. Box 70, Chester, SC 29706.
SNA	Pigments Div-----	441 Tompkins Ave., Staten Island, NY 10305.
SKG	Sunkist Growers, Inc-----	P. O. Box 7888, Van Nuys, CA 91409.
SUN	Sun Oil Co-----	240 Radnor-Chester Rd., St. Davids, PA 19087.
SNO	SunOlin Chemical Co-----	P. O. Box F, Claymont, DE 19703.
SNT	Suntide Refining Co-----	P. O. Box 2608, Corpus Christi, TX 78403.
SAG	Swift Agricultural Chemicals-----	P. O. Box 2175, Beaumont, TX 77704.
BUC	Synalloy Corp., Blackman-Uhler Chemical Div.	P. O. Box 5627, Spartanburg, SC 29301.
FAR	Syncon Resins, Inc-----	77 Jacobus Ave., S. Kearny, NJ 07032.
FCD	Synres Chemical Corp-----	209 N. Michigan Ave., Kenilworth, NJ 07033.
HFT	Syntex Agribusiness, Inc-----	P. O. Box 1246 SSS, Springfield, MO 65805.
TCC	Tanatex Chemical Corp-----	P. O. Box 388, Lyndhurst, NJ 07071.
CST	Charles S. Tanner Co-----	1310 Barcelona Dr., Greenville, SC 29605.
TBO	Tauber Oil Co-----	1610 Melrose Blvd., Houston, TX 77052.
TEK	Teknor Apex Co-----	505 Central Ave., Pawtucket, RI 02662.
HN	Tenneco Chemicals, Inc-----	Park Eighty Plaza West-One, Saddle Brook, NJ 07662.
TOC	Tenneco Oil Co-----	P. O. Box 2511, Houston, TX 77001.
TVA	Tennessee Valley Authority-----	Muscle Shoals, AL 35660.
TER	Terra Chemicals International, Inc-----	P. O. Box 1828, Sioux City, IA 51121.
COO	Terrell Corp-----	820 Woburn St., Wilmington, MA 01887.
TX	Texaco, Inc-----	135 E. 42 St., New York, NY 10017.
TSA	Texas Alkyls, Inc-----	P. O. Box 600, Deer Park, TX 77536.
TUS	Texas-U.S. Chemical Co-----	P. O. Box 667, Port Neches, TX 77651.
TXC	Tex Chem Co., Inc-----	20-21 Wagaraw Rd., Fair Lawn, NJ 07410.
TCI	Texize Chemicals, Co-----	P. O. Box 368, Greenville, SC 29602.
SKT	Textron, Inc., Spencer Kellogg Div-----	120 Delaware Ave., Buffalo, NY 14240.
TKL	Thiokol Corp-----	P. O. Box 1000, Newtown, PA 18940.
SOR	Thomason Industries, Inc., Southern Resin Div.	P. O. Drawer 1600, Fayetteville, NC 29302.
TMH	Thompson-Hayward Chemical Co-----	5200 Speaker Rd., Kansas City, MO 66110 and 2 E. Madison St., Waukegan, IL 60085.
TRC	Toms River Chemical Corp-----	P. O. Box 71, Toms River, NJ 08753.
ACT	Arthur C. Trask Co-----	7666 W. 63d St., Summit, IL 60501.
TRI	Triad Chemical-----	P. O. Box 310, Donaldsonville, LA 70346.
TRO	Troy Chemical Co-----	One Avenue L, Newark, NJ 07105.
UPM	UOP, Inc-----	10 UOP Plaza, Algonquin & Mt. Prospect Rd., Des Plaines, IL 60016.
UOP	UOP Chemical Div-----	State Highway 17, E. Rutherford, NJ 07073.
ARM	USS Agri-Chemicals Div of U.S. Steel Corp-----	P. O. Box 1685, Atlanta, GA 30301.
USS	USS Chemicals Div. of U.S. Steel Corp-----	600 Grant St., Rm. 2880, Pittsburgh, PA 15230.
UHL	Paul Uhlich & Co., Inc-----	1 Railroad Ave., Hastings on the Hudson, NY 10706.
UNC	Ungerer & Co-----	161 Avenue of the Americas, New York, NY 10013.
NCI	Union-Camp Corp-----	P. O. Box 6170, Jacksonville, FL 32205.
WTH	Chemical Div., Dover Plant-----	P. O. Box 220, Dover, OH 44622.
UCC	Union Carbide Corp-----	270 Park Ave., New York, NY 10017.
UOC	Union Oil Co. of California-----	200 E. Golf Rd., Palatine, IL 60067.
USR	Uniroyal, Inc., Chemical Div-----	Emic Bldg., Naugatuck, CT 06770.
SWT	Unitech Chemical, Inc-----	115 W. Jackson Blvd., Chicago, IL 60604.
UNN	United Chemical Corp. of Norwood-----	Endicott St., Norwood, MA 02062.

APPENDIX

TABLE 1.--SYNTHETIC ORGANIC CHEMICALS: ALPHABETICAL DIRECTORY OF MANUFACTURERS,
BY COMPANY, 1976--CONTINUED

Identi- fication code	Name of company	Office address
UNP	United Chemical Products Corp-----	472 York St., Jersey City, NJ 07302.
UNO	United-Erie, Inc-----	438 Huron St., Erie, PA 16512.
ROM	United Merchants & Manufacturers, Inc., Roma Chemical Div.	749 Quequechan St., Fall River, MA 02721.
USB	U.S. Borax Research Corp-----	3075 Wilshire Blvd., Los Angeles, CA 90005.
HLM	U.S. Industries, Inc., E. Helman Co. Div----	P. O. Box 5129, Akron, OH 44313.
USO	U.S. Oil Co-----	P. O. Box 4228, E. Providence, RI 02914.
UPJ	Upjohn Co-----	7000 Portage Rd., Kalamazoo, MI 49002.
CWN	Fine Chemical Div-----	410 Sackett Point Rd., North Haven, CT 06473.
VAL	Valchem Chemical Div. of United Merchants & Manufacturers, Inc.	1407 Broadway, New York, NY 10018.
VSV	Valentine Sugars, Inc-----	726 Whitney Bldg., New Orleans, LA 70130.
VLN	Valley Nitrogen Producers, Inc-----	1221 Van Ness Ave., Fresno, CA 93717.
MNP	The Valspar Corp-----	1101 S. 3d St., Minneapolis, MN 55415.
VNC	Vanderbilt Chemical Corp-----	31 Taylor Ave., Bethel, CT 06801 and Rt. 5 - Box 54, Murray, KY 42071.
VND	Van Dyk & Co., Inc-----	Main & Williams Sts., Belleville, NJ 07109.
VEL	Velsicol Chemical Corp-----	341 E. Ohio St., Chicago, IL 60611.
MHI	Ventron Corp-----	12-16 Congress St. Beverly, MA 01915.
VTC	Vicksburg Chemical Co. Div. of Vertac Consolidated.	P. O. Box 3, Vicksburg, MS 39180.
VIK	Viking Chemical Co-----	838 Baker Bldg., Minneapolis, MN 55402.
VIN	Vineland Chemical Co. & Corp-----	W. Wheat Rd., Vineland, NJ 08360.
VCC	Vinings Chemical Co-----	2555 Cumberland Pkwy., Suite 200, Atlanta, GA 30339.
VGC	Virginia Chemicals, Inc-----	3340 W. Norfolk Rd., Portsmouth, VA 23703.
SOH	Vistron Corp-----	393 Midland Bldg., Cleveland, OH 44115.
STC	Silmar Div-----	12333 S. Van Ness Ave., Hawthorne, CA 90250.
VTM	Vitamins, Inc-----	200 E. Randolph Dr., Chicago, IL 60601.
FRO	Vulcan Materials Co., Chemicals Div-----	P. O. Box 7689, Birmingham, AL 35223.
WJ	Warner-Jenkinson Manufacturing Co-----	2526 Baldwin St., St. Louis, MO 63106.
WAG	West Agro-Chemical, Inc-----	501 Santa Fe, Kansas City, MO 64108.
WCA	West Coast Adhesives Co-----	11104 NW. Front Ave., Portland, OR 97231.
EW	Westinghouse Electric Corp., Industrial Plastics Div., Chemical Products Plant.	Manor, PA 15665.
WVA	Westvaco Corp., Polychemicals Dept-----	P. O. Box 5207, N. Charleston, SC 29406.
WRD	Weyerhaeuser Co-----	118 S. Palmetto Ave., Marshfield, WI 54449.
WBG	White & Bagley Co-----	P. O. Box 706, Worcester, MA 01613.
WHI	White & Hodges, Inc-----	576 Lawrence St., Lowell, MA 01853.
WHL	Whitmoyer Laboratories, Inc-----	19 N. Railroad St., Myerstown, PA 17067.
APT	Whittaker Corp., Whittaker Coatings & Chemicals, Mol Rez Resins.	3134 California St., NE., Minneapolis, MN 55418.
WHW	Whittemore-Wright Co., Inc-----	62 Alford St., Charlestown, MA 02129.
WLN	Wilmington Chemical Corp-----	P. O. Box 66, Wilmington, DE 19899.
WTC	Witco Chemical Co., Inc-----	P. O. Box 305, Paramus, NJ 07652.
WAW	W. A. Wood Co-----	108 Spring St., Everett, MA 02149.
WBC	Worthington Biochemical Corp-----	Halls Mill Rd., Freehold, NJ 07728.
WYC	Wycon Chemical Co-----	5 Greenway Plaza East, Houston, TX 77046.
WYT	Wyeth Laboratories, Inc., Wyeth Laboratories Div. of American Home Products Corp.	P. O. Box 831, Paoli, PA 19301.

U.S. IMPORTS OF BENZENOID CHEMICALS AND PRODUCTS

U.S. general imports of benzenoid chemicals and products entered under the Tariff Schedules of the United States (TSUS), schedule 4, part 1, subparts B and C are analyzed by the U.S. International Trade Commission annually and published in detail in a separate report.¹ General imports of benzenoid items entered in parts 1B and 1C totaled 362.4 million pounds with a foreign invoice value of \$493.8 million in 1976 compared with 337.2 million pounds with a foreign invoice value of \$394.3 million in 1975.

Benzenoid products that are "competitive" with similar domestic products, because they accomplish results substantially equal to those accomplished by the similar domestic product when used in substantially the same manner, are subject to a special basis of valuation for customs purposes known as the "American selling price". If "noncompetitive", the benzenoid products are valued for customs purposes on the basis of the "United States value." The essential difference between these two values is that "American selling price" is based on the wholesale price in the United States of the "competitive" domestic product, whereas "United States value" is based on the wholesale price in the United States of the imported product less most of the expenses incurred in bringing the product to the United States and selling it. When neither of these two valuation bases applies, then the "export value," "foreign value," or "constructed value" is used as the valuation basis under section 402 or 402a Tariff Act of 1930, as amended. The competitive status of benzenoid imports in 1976 is shown in table 2.

Industrial organic chemicals that are entered under part 1B consist chiefly of benzenoid intermediates and small quantities of acyclic compounds which are derived in whole or in part from benzenoid compounds. Also included are mixtures and small quantities of finished products not specially provided for in part 1C (e.g., rubber-processing chemicals). In terms of value, 36.6 percent of all the benzenoid imports under part 1B in 1976 came from West Germany; 21.0 percent, from Japan; 10.8 percent from Italy; and 7.8 percent, from the United Kingdom.

Finished organic chemical products entered under part 1C include dyes, pigments, medicinals, flavor and perfume materials, pesticides, plastics materials, and certain other specified products. In terms of value 36.0 percent of all finished benzenoid imports under part 1C in 1976 came from West Germany; 15.7 percent, from Switzerland; 13.4 percent, from the United Kingdom; and 10.7 percent, from Japan.

¹ *Imports of Benzenoid Chemicals and Products, 1976*, TC Publication 828, 1977.

APPENDIX

TABLE 2.--BENZENOID CHEMICALS AND PRODUCTS: SUMMARY OF U.S. GENERAL IMPORTS ENTERED UNDER SCHEDULE 4, PARTS 1B AND 1C OF THE TSUS, AND ANALYSIS BY COMPETITIVE STATUS, 1976

Part and competitive status	Number of items	Quantity of total quantity	Percent of total quantity	Foreign invoice value	Percent of foreign value	Unit foreign value
		1,000 pounds		1,000 dollars		Per pound
<u>Schedule 4, Part 1B</u>						
Total ¹ -----	752	227,572	100.0	183,026	100.0	\$0.80
Competitive:						
Duty based on ASP ² -----	358	197,460	86.8	121,248	66.2	.61
Noncompetitive:						
Duty based on U.S. value-----	244	17,103	7.5	30,341	16.6	1.77
Duty based on export value-----	146	9,554	4.2	27,371	15.0	2.86
Competitive status not available-----	4	3,454	1.5	4,065	2.2	1.18
<u>Schedule 4, Part 1C</u>						
Total ¹ -----	2,003	134,847	100.0	310,817	100.0	2.30
Competitive:						
Duty Based on ASP ² -----	740	69,517	51.6	114,574	36.9	1.65
Noncompetitive:						
Duty based on U.S. value-----	1,038	27,708	20.5	90,882	29.2	3.28
Duty based on export value-----	219	34,850	25.8	97,487	31.4	2.80
Competitive status not available-----	6	2,772	2.1	7,875	2.5	2.84
<u>Summary (Schedule 4, Parts 1B and 1C)</u>						
Total ¹ -----	2,755	362,419	100.0	493,843	100.0	1.36
Competitive:						
Duty based on ASP ² -----	1,098	266,977	73.7	235,822	47.8	.88
Noncompetitive:						
Duty based on U.S. value-----	1,282	44,811	12.4	121,223	24.5	2.71
Duty based on export value-----	365	44,404	12.2	124,858	25.3	2.81
Competitive status not available-----	10	6,226	1.7	11,940	2.4	1.92

¹ Detail may not add to total due to rounding.² American selling price.

Source: Compiled by the U.S. International Trade Commission from records of the U.S. Bureau of Customs.

Note:--The totals shown in this table differ from those given in the official statistics of the U.S. Department of Commerce chiefly because of differences in coverage and in the methods used in compiling the data. In general, the statistical coverage in 1976 varies from a low of 51 percent for flavors and perfumes, to about 84 percent coverage of 84 percent dyes, 80 percent intermediates, and 78 percent pigments.

SYNTHETIC ORGANIC CHEMICALS, 1976

TABLE 3.--CYCLIC INTERMEDIATES: GLOSSARY OF SYNONYMOUS NAMES

Common name	Standard (Chemical Abstracts) name
1,2,4-Acid-----	4-Amino-3-hydroxy-1-naphthalenesulfonic acid.
Acid yellow 9-----	6-Amino-3,4'-azodibenzenesulfonic acid.
p-Aminobenzenesulfonic acid-----	Sulfanilic acid and salt.
Amino G acid-----	7-Amino-1,3-naphthalenedisulfonic acid.
Amino I 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.
Benzal chloride-----	α,α -Dichlorotoluene.
Benzanthrone-----	7H-Benz[de]anthracene-7-one.
Benzotrichloride-----	α,α,α -Trichlorotoluene.
Bisphenol A-----	4,4'-Isopropylidenediphenol.
B.O.N-----	3-Hydroxy-2-naphthoic acid.
Bromobenzanthrone-----	3-Bromo-7H-benz[de]anthracene-7-one.
Broenner's acid-----	6-Amino-2-naphthalenesulfonic acid.
C acid-----	3-Amino-1,5-naphthalenedisulfonic acid.
Chlorobenzanthrone-----	Chloro-7H-benz[de]anthracene-7-one.
Chromotropic acid-----	4,5-Dihydroxy-2,7-naphthalenedisulfonic acid.
Chrysazin-----	1,8-Dihydroxyanthraquinone.
2-Cyanopyridine-----	Picolinonitrile.
3-Cyanopyridine-----	Nicotinonitrile.
Cyanuric chloride-----	2,4,6-Trichloro-s-triazine.
DADI-----	Dianisidine diisocyanate.
DBB-----	p-Dibutoxybenzene.
Decacyclene-----	Diacenaphtho[1,2-j:1,2'-k]fluoranthene.
Developer Z-----	3-Methyl-1-phenyl-2-pyrazolin-5-one.
o-Dianisidine-----	3,3'-Dimethoxybenzidine.
1,1'-Dianthrimide-----	1,1'-Iminodianthraquinone.
Dibenzanthrone-----	Violanthrone.
4,4'-Dihydroxydiphenylsulfone-----	4,4'-Sulfonyldiphenol.
Dimethyl POPOP-----	1,4-Bis[2-(4-methyl-5-phenyloxazolyl)]benzene.
4,5-Dinitrochrysazin-----	1,8-Dihydroxy-4,5-dinitroanthraquinone.
Durene-----	1,2,4,5-Tetramethylbenzene.
Fast Red G base-----	2-Nitro-p-toluidine [$\text{NH}_2=1$].
Fast Scarlet R base-----	5-Nitro-o-anisidine [$\text{NH}_2=1$].
G salt-----	7-Hydroxy-1,3-naphthalenedisulfonic acid.
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.
Hellimellitene-----	1,2,3-Trimethylbenzene.
J acid-----	7-Amino-4-hydroxy-2-naphthalenesulfonic acid, sodium salt.
J acid urea-----	7,7'-Ureylenebis[4-hydroxy-2-naphthalenesulfonic acid].
Koch's acid-----	8-Amino-1,3,6-naphthalenetrisulfonic acid.
MEP-----	5-Ethyl-2-picoline.
Mesitylene-----	1,3,5-Trimethylbenzene.
Methane base-----	4,4'-Methylenebis[N,N-dimethylaniline].
Michler's hydrol-----	4,4'-Bis[dimethylamino]benzhydrol.
Michler's ketone-----	4,4'-Bis[dimethylamino]benzophenone.

APPENDIX

TABLE 3.--CYCLIC INTERMEDIATES: GLOSSARY OF SYNONYMOUS NAMES--CONTINUED

Common name	Standard (Chemical Abstracts) name
Naphthionic acid-----	4-Amino-1-naphthalenesulfonic acid.
o-Naphthionic acid-----	1-Amino-2-naphthalenesulfonic acid.
β-Naphthol-----	2-Naphthol, tech.
Naphthol AS-----	3-Hydroxy-2-naphthanilide.
α-Naphthylamine-----	1-Naphthylamine.
Neville & Winther's acid-----	4-Hydroxy-1-naphthalenesulfonic acid.
Pentaanthrimide-----	1,4,5,8-Tetrakis(1-anthraquinonylamino)anthraquinone.
Phenylbiphenyl-----	Terphenyl.
N-Phenyldiethanolamine-----	2,2'-[(Phenyl)imino]diethanol.
Phenyl J acid-----	7-Anilino-4-hydroxy-2-naphthalenesulfonic acid.
Phenyl peri acid-----	8-Anilino-1-naphthalenesulfonic acid.
POPOP-----	1,4-Bis[2-(5-phenyloxazolyl)]benzene.
Pseudocumene-----	1,2,4-Trimethylbenzene.
Pyrazoleanthrone-----	Anthra[1,9 cd]pyrazol-6(2H)-one.
Pyrazoleanthrone yellow-----	[3,3'-Bianthra[1,9-cd]pyrazole]-6,6'-(2H,2'H)dione.
Pyrazolone T-----	5-Oxo-1-(p-sulfophenyl)-2-pyrazoline-3-carboxylic acid.
Quinizarin-----	1,4-Dihydroxyanthraquinone.
2-Quinizarinsulfonic acid-----	9,10-Dihydro-1,4-dihydroxy-9,10-dioxo-2-anthracene-sulfonic acid.
Quinoline yellow base-----	Quinophthalone.
R salt-----	3-Hydroxy-2,7-naphthalenedisulfonic acid, disodium salt.
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.
o-Sulfobenzaldehyde-----	o-Formylbenzenesulfonic acid.
Thiosalicylic acid-----	o-Mercaptobenzoic acid.
Tobias acid-----	2-Amino-1-naphthalenesulfonic acid.
TODI-----	Bitolylene diisocyanate.
o-Tolidine-----	3,3'-Dimethylbenzidine.
α-Toluic acid-----	Phenylacetic acid.
α-Tolunitrile-----	Phenylacetone nitrile.
4-m-Tolylenediamine-----	Toluene-2,4-diamine.
Trimellitic anhydride-----	1,2,4-Benzenetricarboxylic acid, 1,2-anhydride.
Trimethyl base-----	1,3,3-Trimethyl-2-methyleneindoline.
Trinitrophenol-----	Picric acid.
Vinyltoluene-----	ar-Methylstyrene.

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