

PRODUCTION: SOME IMPROVEMENT

Output growth varied widely from country to country and product to product

CHEMICAL PRODUCTION IN 2003 is hard to pin down. It ranged from no growth in Germany and the Netherlands to as much as 6.3% in Taiwan. In the U.S., which had growth in total chemical output of just 0.2%, the range on a sector basis ran from a decline of 1.5% for basic chemicals to an increase of 5.1% for paints and coatings.

These mixed results are against a backdrop of global production that the American Chemistry Council estimates grew some 5.4% in 2003. And that figure is well above the 10-year average annual growth of 3.9% for the trade association's index of global production.

Also hidden in the annual numbers is the fact that some countries, including the U.S., turned the corner in the middle of the year. Thus, the yearly average does not show much improvement even though the final two quarters were showing better results than seen in the first half.

An indication of this improvement is chemical plant capacity utilization in the U.S. After falling for three straight years, the government's year-end capacity use estimate finally increased in December 2003 to 74.4% from 72.8% in the same

month the year before. However, this figure is still below the decade year-end high of 81.1% seen in 1994. In the intervening years, capacity utilization fell in all but 1999.

The government's report of an only 0.2% increase in production of all chemicals last year to an index of 105.6 (all indexes are 1997 = 100) was toward the low end of output growth in the countries surveyed by C&EN. Canada's chemical index climbed 3.8% to 131.2.

In Europe, the European Chemical Industry Council and national associations report that in Germany and the Netherlands, the production indexes were unchanged from the year before at 107.5 and 124.0, respectively. The U.K. had an 0.5% growth rate to 112.9, while Italy had the best growth: 4.4% to 104.9.

In the Asia-Pacific region, of Japan, Taiwan, and South Korea, production growth was the lowest in Japan. The Japanese Ministry of Economy, Trade & Industry reports just 1.5% growth to 97.3. And, as the index indicates, this was just 97.3% of production in 1997. Japan's chemical index excludes pharmaceuticals.

Meanwhile, South Korea's National Statistical Office reports growth in chemical output of 3.8% to an index of 128.1, and Taiwan posted its 6.3% index gain to 145.8.

The Chinese government does not publish a production index, but reports of output of individual products and product categories show continued good growth. For instance, fertilizer production was up 7.1% last year. Production of plastics grew 16.6%, with polyvinyl chloride up 18.2%, polyethylene up 16.5%, and polypropylene

up 14.1%. Polyester fiber output jumped 32.3%, while synthetic rubber increased at a low rate, by comparison, of 8.9%. For inorganic chemicals, growth ranged from 7.1% for hydrochloric acid to 14.2% for sodium hydroxide. Organic chemical production growth in China ranged from 3.1% for alkylbenzene to 41.7% for methanol.

Ethylene, the largest volume and probably the most important petrochemical, is a good product to compare around the world, and there are big regional differences in how it fared last year. In the U.S., ethylene production in 2003 declined 2.8% to 50.7 million metric tons, according to the National Petroleum Refiners Association. In Canada, ethylene production eased a mere 0.1% to 4.73 million metric tons.

Elsewhere in the world, however, there was growth in ethylene output. In the countries belonging to the European Union, ethylene production increased 2.6% to 20.7

million metric tons.

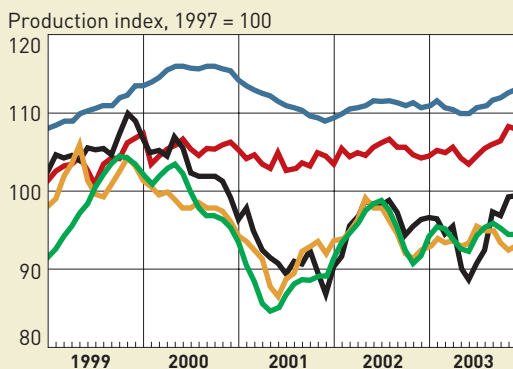
In the Asia-Pacific region, total ethylene output from Japan, South Korea, Taiwan, and China rose 7.3% to a total 22.1 million metric tons. Japan produced 7.37



FACTS & FIGURES

U.S. PRODUCTION

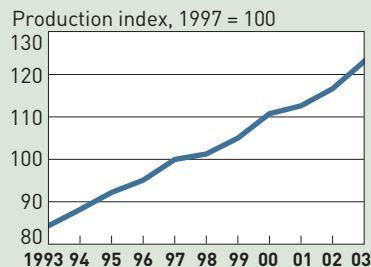
Chemical output started to rise in 2003



NOTE: Seasonally adjusted. SOURCE: Federal Reserve Board

GLOBAL OUTPUT

Worldwide chemical production kept growing



NOTE: Annual averages. SOURCE: American Chemistry Council's Business of Chemistry Global Production Index

million metric tons, up 3.0% from 2003. South Korea's output of 5.87 million metric tons was 4.3% ahead of the year before. Taiwan increased output 12.0% to 2.68 million metric tons, while China's ethylene production grew 13.0% to 6.12 million metric tons.

The increase in ethylene output fed a rise in polyolefin production. In the four countries, output of just polyethylene alone increased 6.4% to 11.9 million metric tons.

PRODUCTION

U.S. PRODUCTION INDEX

Chemicals and manufacturing rose just a tad

PRODUCTION INDEX, 1997=100	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
Total index	80.8	85.2	89.3	93.1	100.0	105.9	110.6	115.4	111.5	110.9	111.2	0.3%	3.2%
Manufacturing, total	78.1	83.1	87.8	92.1	100.0	106.8	112.3	117.7	113.1	112.5	112.6	0.1	3.7
Nondurable manufacturing	91.4	94.6	96.2	96.5	100.0	101.5	102.2	102.8	99.8	99.2	97.0	-2.2	0.6
Chemicals	89.0	91.3	92.7	94.6	100.0	101.8	103.8	105.5	103.9	105.3	105.6	0.2	1.7
Basic chemicals	92.4	93.2	93.1	93.1	100.0	97.6	101.8	98.9	91.4	95.3	93.9	-1.5	0.2
Alkalies & chlorine	122.4	97.3	103.9	109.3	100.0	101.3	125.8	116.8	110.1	108.5	104.3	-3.8	-1.6
Synthetic dyes & pigments	97.8	100.5	96.2	96.0	100.0	100.8	97.2	96.2	93.0	95.6	93.6	-2.1	-0.4
Other basic inorganic chemicals	97.7	90.1	93.8	96.6	100.0	105.1	109.3	98.4	97.1	96.9	93.7	-3.3	-0.4
Organic chemicals	86.4	91.2	90.4	90.2	100.0	92.2	99.1	99.9	88.2	94.9	94.6	-0.3	0.9
Synthetic materials ^a	88.4	95.5	96.1	94.1	100.0	104.1	105.6	103.2	92.1	96.2	94.9	-1.3	0.7
Plastic material & resin	81.7	93.2	93.9	91.0	100.0	107.9	112.4	112.3	100.2	105.8	104.3	-1.4	2.5
Artificial & synthetic fibers	105.7	104.4	105.5	105.9	100.0	100.8	92.1	83.0	72.6	72.5	71.0	-1.9	-3.9
Chemical products	85.0	86.9	90.4	94.7	100.0	104.6	106.2	110.2	115.8	115.6	116.3	0.6	3.2
Pharmaceuticals & medicines	83.0	86.4	89.7	94.9	100.0	108.0	112.7	116.6	124.9	126.8	127.6	0.6	4.4
Soap, cleaning compounds & toiletries	87.7	87.1	91.8	94.4	100.0	98.5	94.2	99.0	101.3	96.3	96.6	0.4	1.0
Paint & coatings	95.6	102.6	99.5	99.3	100.0	100.4	98.9	98.6	96.1	106.2	111.6	5.1	1.6
Pesticide, fertilizer & other agricultural chemicals	95.0	94.9	94.5	96.4	100.0	102.4	91.8	84.9	80.6	81.7	80.9	-0.9	-1.6

^a Includes synthetic rubber. SOURCE: Federal Reserve Board

ASIA PRODUCTION INDEX

Taiwan outstripped Japan and South Korea in chemical production growth

PRODUCTION INDEX, 1997=100	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
JAPAN													
Mining & manufacturing	89.6	91.3	94.3	96.5	100.0	92.9	93.6	99.1	91.3	90.1	93.1	3.3%	0.4%
All chemicals ^a	84.0	89.4	94.5	95.7	100.0	94.9	98.3	98.9	95.8	95.8	97.3	1.5	1.5
Petrochemicals	79.2	84.4	92.9	94.5	100.0	94.5	99.3	99.1	94.5	95.5	98.4	3.0	2.2
Aromatics	76.8	78.9	89.0	85.5	100.0	93.9	100.9	100.1	97.7	100.8	106.5	5.7	3.3
Industrial sodium chemicals	92.8	92.5	97.3	95.7	100.0	95.7	97.2	98.2	91.0	92.6	91.3	-1.4	-0.2
Inorganic chemicals & dyes	95.9	94.5	98.5	96.8	100.0	97.7	103.3	106.8	101.8	103.9	106.3	2.3	1.0
Organic chemicals	79.6	82.0	90.4	93.2	100.0	96.6	101.9	100.6	94.3	94.6	100.0	5.7	2.3
Cyclic intermediates & dyes	80.7	89.3	96.9	96.8	100.0	95.1	98.2	97.7	93.9	95.6	96.6	1.0	1.8
Plastics	80.1	86.5	92.6	89.8	100.0	92.2	94.8	96.4	91.0	91.0	91.3	0.3	1.3
Synthetic rubber	82.3	84.9	94.1	95.5	100.0	95.5	99.1	99.9	92.0	96.1	99.6	3.6	1.9
Fertilizers	105.7	103.8	104.2	101.8	100.0	90.9	88.1	87.1	80.6	75.0	69.5	-7.3	-4.1
SOUTH KOREA													
All manufacturing	71.0	78.9	88.3	95.9	100.0	93.4	116.8	136.8	137.1	148.3	156.0	5.2%	8.2%
Chemicals & chemical products	68.8	74.4	79.5	89	100.0	96.6	106.6	113.0	116.0	123.4	128.1	3.8	6.4
Rubber & plastic products	81.5	88.2	92.6	98.1	100.0	79.2	93.1	99.4	101.9	108.5	111.3	2.6	3.2
TAIWAN													
All manufacturing	81.6	86.3	90.8	93.3	100.0	103.2	111.2	120.2	110.1	120.4	129.4	7.4%	4.7%
Chemicals	70.3	83.6	88.6	93.8	100.0	102.9	112.6	120.5	129.4	137.1	145.8	6.3	7.6
Basic chemicals	80.9	84.0	88.7	95.9	100.0	98.9	107.5	120.9	123.5	125.4	133.5	6.5	5.1
Petrochemicals	72.7	85.2	89.0	95.5	100.0	101.2	118.5	133.4	163.8	175.4	197.8	12.7	10.5
Fertilizers	84.6	88.1	94.7	96.5	100.0	92.3	85.0	83.0	77.5	74.2	73.8	-0.5	-1.4
Man-made fibers	74.5	82.8	85.6	91.1	100.0	105.5	107.6	111.8	107.7	112.2	111.8	-0.3	4.1
Plastics & resins	64.6	84.8	91.5	95.1	100.0	103.3	113.2	117.8	118.0	125.3	129.0	2.9	7.2
Synthetic rubber	44.5	60.9	77.1	80.3	100.0	103.3	109.0	102.4	105.5	115.8	120.8	4.3	10.5

^a Excludes pharmaceuticals. SOURCES: Japan's Ministry of Economy, Trade & Industry; National Statistical Office, Republic of Korea; Taiwan's Ministry of Economic Affairs, Department of Statistics

EUROPE PRODUCTION INDEX

Germany and the Netherlands just held their own

CHEMICAL PRODUCTION INDEX, 1997=100	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
Belgium	80.1	80.4	87.9	90.2	100.0	101.2	108.1	119.9	116.5	127.2	na	—	—
France	87.2	91.8	93.8	96.2	100.0	105.1	107.5	112.5	115.2	110.8	na	—	—
Germany	85.0	89.6	89.8	94.4	100.0	100.2	104.5	107.5	104.9	107.5	107.5	0.0%	2.4%
Italy	88.8	91.8	94.6	96.6	100.0	100.2	100.4	101.8	99.2	100.5	104.9	4.4	1.7
Netherlands	85.1	93.9	100.0	95.6	100.0	100.0	107.0	116.0	117.0	124.0	124.0	0.0	3.8
Spain	79.9	91.3	93.4	93.5	100.0	103.6	107.7	106.2	107.1	110.3	113.5	2.9	3.6
U.K.	88.3	92.9	97.7	98.2	100.0	101.6	104.9	109.3	113.2	112.3	112.9	0.5	2.5

na = not available. SOURCES: European Chemical Industry Council, national chemical associations

CANADA PRODUCTION INDEX

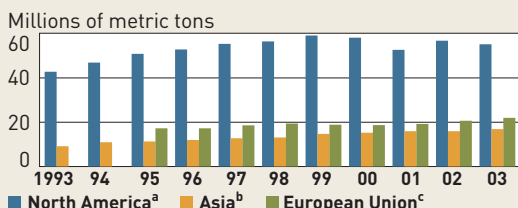
Pharmaceuticals continued to thrust ahead

PRODUCTION INDEX, 1997=100	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
All manufacturing	82.2	88.4	92.9	93.9	100.0	105.0	113.5	126.4	121.5	124.7	124.4	-0.3%	4.2%
Chemicals	89.2	94.5	99.3	99.8	100.0	100.9	105.2	116.2	119.1	126.4	131.2	3.8	3.9
Basic chemicals	85.8	91.0	97.6	93.0	100.0	98.2	97.9	106.0	92.9	95.2	99.2	4.2	1.5
Pharmaceuticals & medicines	92.5	92.4	96.8	96.6	100.0	95.3	111.2	142.1	186.1	225.4	243.8	8.1	10.2

SOURCE: Statistics Canada

ETHYLENE PRODUCTION

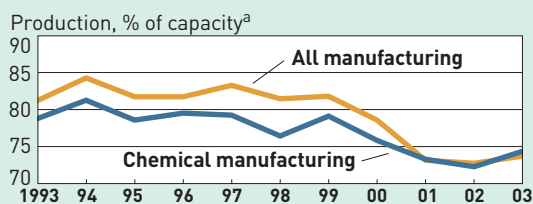
Output slumped in North America



a U.S. and Canada. b Japan, South Korea, and Taiwan. c Countries as of Dec. 31, 2003. Data prior to 1995 are unavailable.

U.S. PLANT USE

After three years of decline, capacity utilization turned up for chemicals and manufacturing



a As of December. SOURCE: Federal Reserve Board

U.S. ORGANICS

Acrylonitrile led with double-digit gains

MILLIONS OF LB UNLESS OTHERWISE NOTED	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
Acrylonitrile	2,489	3,026	3,207	3,373	3,291	3,120	3,120	3,419	2,961	2,732	3,310	21.2%	2.9%
Aniline ^a	991	1,263	1,391	1,079	1,339	1,545	1,586	1,866	1,907	2,030	2,137	5.3	8.0
Benzene (liters) ^{b,c}	1,677	2,074	2,168	2,116	2,342	2,237	2,401	2,419	1,921	2,148	2,094	-2.5	2.2
1,3-Butadiene ^d	3,117	3,376	3,682	3,845	4,107	4,066	4,282	4,429	3,794	4,120	4,192	1.7	3.0
Cumene	4,393	5,217	5,625	5,879	6,119	6,713	6,970	8,247	7,025	7,723	7,490	-3.0	5.5
Ethylbenzene ^a	9,336	10,758	13,656	10,359	11,975	12,661	13,106	13,156	10,233	11,932	12,297	3.1	2.8
Ethylene	40,019	44,602	46,966	49,097	51,078	52,061	55,777	55,364	49,633	52,127	50,653	-2.8	2.4
Ethylene dichloride ^a	17,947	16,762	17,263	11,336	26,294	24,560	22,836	21,850	20,583	20,565	22,033	7.1	2.1
Ethylene oxide	5,330	7,238	7,621	7,239	8,241	8,140	8,884	8,526	7,370	7,599	8,069	6.2	4.2
2-Ethylhexanol ^a	695	732	743	760	768	811	878	822	735	849	756	-11.0	0.8
Propylene ^e	21,470	23,943	25,691	25,111	27,533	28,690	29,105	31,873	29,048	31,801	30,678	-3.5	3.6
Styrene	9,594	11,294	11,386	11,874	11,366	11,390	11,898	11,916	9,290	10,800	11,392	5.5	1.7
Urea	16,572	15,904	16,240	17,096	16,608	17,730	17,814	15,364	13,404	15,516	13,540	-12.7	-2.0
Vinyl acetate	2,773	3,036	2,893	2,914	2,935	2,939	3,037	3,300	2,619	2,973	2,879	-3.2	0.4

a Reporting method changed in 1996; data may not be comparable with preceding years. b Tar distillers and coke-oven operators not included. c Specification grades. d Rubber grade. e All grades. SOURCES: National Petroleum Refiners Association, Bureau of the Census

PRODUCTION

CANADA ORGANICS

Production of toluene and xylenes surged in 2003

THOUSANDS OF METRIC TONS	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
Benzene	685	770	781	758	715	718	805	859	751	849	843	-0.7%	2.1%
Butadiene	174	170	205	212	219	236	230	252	245	276	276	0.0	4.7
Ethylene	2,536	2,716	3,130	3,202	3,244	3,557	3,881	4,069	4,261	4,734	4,729	-0.1	6.4
Formaldehyde	154	168	na	195	210	228	211	194	179	212	245	15.6	4.8
Propylene	766	725	822	822	859	1,038	1,000	934	882	956	938	-1.9	2.0
Toluene	337	288	283	303	321	222	260	218	222	256	289	12.9	-1.5
Urea	3,090	3,153	3,331	3,281	3,470	3,714	3,783	3,887	3,363	3,436	3,311	-3.6	0.7
Xylenes	311	356	434	384	362	308	253	312	271	294	336	14.3	0.8

na = not available. SOURCE: Statistics Canada

EUROPE ORGANICS

Production showed mixed picture

THOUSANDS OF METRIC TONS	1995	1996	1997	1998	1999	2000	2001	2002	2003 ^a	ANNUAL CHANGE	
										2002-03	1995-03
Acetic acid	703	589	781	584	593	754	163	177	641	262.1%	-1.1%
Acetone	874	992	1,173	1,254	1,307	1,325	404	979	495	-49.4	-6.9
Benzene	3,257	3,617	3,561	3,345	3,705	4,565	6,670	6,455	3,968	-38.5	2.5
Butadiene	1,939	1,906	1,939	1,971	2,027	2,097	1,992	2,024	2,131	5.3	1.2
1-Butanol	141	140	164	188	44	67	531	575	491	-14.6	16.9
Ethylbenzene	na	na	679	684	937	149	1,180	769	911	18.5	—
Ethylene	17,707	17,748	18,537	18,980	19,362	19,444	19,674	20,159	20,686	2.6	2.0
Ethylene dichloride	251	413	902	860	1,056	1,122	2,759	3,358	3,184	-5.2	37.4
Ethylene glycol	351	365	506	1,171	1,177	1,195	268	239	266	11.3	-3.4
Ethylene oxide	148	190	634	644	592	637	934	717	792	10.5	23.3
Formaldehyde	889	735	808	824	947	954	2,463	3,003	1,309	-56.4	5.0
Methanol	2,625	1,046	2,365	2,242	869	1,148	2,030	1,844	2,009	8.9	-3.3
Phenol	909	951	na	1,391	na	na	689	797	724	-9.2	-2.8
Phthalic anhydride	213	182	414	446	446	488	371	442	232	-47.5	1.1
Propylene	11,884	12,037	12,624	12,885	13,153	13,330	13,352	14,107	14,708	4.3	2.7
Propylene glycol	323	328	361	351	429	443	316	305	329	7.9	0.2
Propylene oxide	410	398	819	727	845	908	735	777	861	10.8	9.7
Styrene	na	na	3,025	3,152	2,989	3,215	958	3,078	1,226	-60.2	—
Toluene	1,329	1,161	209	1,130	1,172	1,155	886	817	742	-9.2	-7.0
Vinyl acetate	na	na	391	469	718	644	457	334	451	35.0	—
Xylenes	240	129	1,368	2,514	2,497	2,602	579	1,122	583	-48.0	11.7

^a C&EN estimates based on partial reporting. na = not available. SOURCES: European Union and national government statistics offices, Association of Petrochemical Producers in Europe

CHINA ORGANICS

Growth was strong in all sectors, but methanol jumped

THOUSANDS OF METRIC TONS	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
								2002-03	1997-03
Alkylbenzene	247	na	311	315	365	390	402	3.1%	8.5%
Benzene (pure)	1,358	1,341	1,535	1,850	1,988	2,131	2,408	13.0	10.0
Butadiene	497	467	534	595	645	736	858	16.6	9.5
Caprolactam	100	120	109	164	152	170	201	18.2	12.3
Ethylene	3,585	3,772	4,348	4,743	4,807	5,414	6,118	13.0	9.3
Ethylene glycol	170	750	844	908	808	906	969	7.0	33.7
Methanol (refined)	1,743	1,581	1,794	1,967	2,065	2,110	2,989	41.7	9.4
Propylene	3,145	3,282	3,947	4,693	4,779	5,321	5,932	11.5	11.2
Phthalic anhydride	253	257	317	404	428	536	598	11.6	15.4
Styrene	359	515	598	807	799	896	948	5.8	17.6
p-Xylene	1,029	1,109	1,131	1,270	1,454	1,475	1,571	6.5	7.3

na = not available. SOURCE: China National Chemical Information Center

ASIA ORGANICS

Production gains seen for nearly all sectors in Japan, South Korea, and Taiwan

THOUSANDS OF METRIC TONS	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
JAPAN													
Acetic acid	484	519	574	599	620	654	644	675	594	569	592	4.0%	2.0%
Acetone	350	354	396	417	458	459	507	508	476	472	492	4.2	3.5
Acrylonitrile	594	610	663	675	730	667	738	732	738	708	780	10.2	2.8
Benzene ^a	3,327	3,620	4,013	4,177	4,502	4,203	4,459	4,425	4,261	4,313	4,551	5.5	3.2
Butadiene	809	856	991	1,025	1,052	977	1,035	1,044	976	993	1,062	6.9	2.8
Butanol	388	380	424	415	447	424	495	461	472	476	519	9.0	3.0
Caprolactam	510	519	545	555	556	519	581	599	531	508	530	4.3	0.4
Cyclohexane	633	640	681	639	721	652	688	673	598	607	685	12.9	0.8
Ethylene	5,773	6,125	6,944	7,138	7,416	7,076	7,687	7,614	7,361	7,152	7,367	3.0	2.5
Ethylene dichloride	2,735	2,792	2,932	3,116	3,491	3,491	3,503	3,431	3,275	3,352	3,463	3.3	2.4
Ethylene glycol	527	567	709	751	886	920	922	930	787	733	814	11.1	4.4
Ethylene oxide	680	716	803	840	952	953	976	990	891	868	939	8.2	3.3
Octanol	312	305	321	331	321	285	315	278	262	302	306	1.3	-0.2
Phenol	513	675	771	768	833	851	888	916	884	891	926	3.9	6.1
Phthalate plasticizers	432	444	462	484	481	398	417	396	369	377	382	1.3	-1.2
Phthalic anhydride	277	308	316	342	330	301	301	290	259	262	262	0.0	-0.6
Polypropylene glycol	286	283	304	296	295	274	302	304	294	299	314	5.0	0.9
Propylene	4,272	4,435	4,956	5,143	5,409	5,101	5,520	5,453	5,342	5,309	5,610	5.7	2.8
Purified terephthalic acid	1,553	1,579	1,681	1,561	1,663	1,616	1,547	1,527	1,496	1,624	1,443	-11.1	-0.7
Styrene	2,167	2,598	2,939	3,085	3,035	2,770	3,055	2,968	3,004	3,016	3,201	6.1	4.0
Toluene ^a	1,191	1,219	1,374	1,370	1,419	1,349	1,488	1,489	1,423	1,548	1,584	2.3	2.9
Toluene diisocyanate	137	144	160	166	192	192	192	214	214	223	230	3.1	5.3
Xylene ^a	3,462	3,627	4,154	3,931	4,634	4,340	4,641	4,681	4,798	4,900	5,213	6.4	4.2
<i>p</i> -Xylene	2,156	2,199	2,476	2,329	2,921	2,754	2,969	2,920	2,814	2,920	3,097	6.1	3.7
SOUTH KOREA													
Benzene	1,139	1,255	1,285	1,407	1,819	2,412	2,572	2,834	2,650	2,851	3,246	13.9%	11.0%
Butadiene	486	547	555	601	658	731	764	808	777	815	860	5.5	5.9
Ethylene	3,273	3,667	3,721	3,968	4,450	5,110	5,216	5,439	5,398	5,631	5,872	4.3	6.0
Propylene	1,808	2,095	2,131	2,244	2,760	3,247	3,282	3,409	3,273	3,554	3,753	5.6	7.6
Vinyl chloride	680	687	675	709	911	984	1,017	1,133	1,392	1,393	1,441	3.4	7.8
TAIWAN													
Acrylonitrile	144	153	156	180	180	167	175	186	292	339	352	3.8%	9.3%
Benzene	na	422	489	511	506	415	605	690	1,070	931	998	7.2	—
Butadiene	90	127	121	129	130	122	190	220	349	346	390	12.7	15.8
Caprolactam	76	104	108	104	114	123	119	171	184	186	216	16.1	11.0
Diocetyl phthalate	210	205	140	193	274	270	269	198	280	257	243	-5.4	1.5
Ethylene	742	889	874	906	959	935	1,296	1,592	2,584	2,393	2,679	12.0	13.7
Ethylene glycol	174	179	192	194	193	206	301	612	1,036	939	1,169	24.5	21.0
Propylene	418	532	474	514	553	545	765	930	1,410	1,462	1,752	19.8	15.4
Purified terephthalic acid	1,635	1,793	2,140	2,210	2,345	2,433	2,769	3,140	3,217	3,705	4,079	10.1	9.6
Styrene	369	386	425	411	464	386	806	956	1,146	1,249	1,274	2.0	13.2
Toluene	19	39	20	13	43	23	18	26	54	42	64	52.4	12.9
Vinyl chloride	780	851	802	1,013	927	1,018	1,288	1,410	1,452	1,557	1,718	10.3	8.2

^a Petroleum and nonpetroleum sources. na = not available. **SOURCES:** Japan's Ministry of Economy, Trade & Industry; National Statistical Office, Republic of Korea; Petrochemical Industry Association of Taiwan; Taiwan Ministry of Economic Affairs

PRODUCTION

U.S. INORGANICS

Only oxygen saw double-digit growth

THOUSANDS OF METRIC TONS UNLESS OTHERWISE NOTED												ANNUAL CHANGE	
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003 ^a	2002-03	1993-03
Aluminum sulfate ^b	952	1,034	1,038	1,086	1,053	1,058	1,085	976	1,019	1,053	923	-12.3%	-0.3%
Ammonia ^{c,d}	15,596	16,207	15,785	16,256	16,227	16,757	15,725	14,339	11,090	12,333	10,665	-13.5	-3.7
Ammonium nitrate ^e	7,510	7,771	7,700	7,708	7,804	8,235	6,920	7,237	5,833	6,325	5,689	-10.1	-2.7
Ammonium sulfate ^f	2,206	2,344	2,401	2,414	2,451	2,528	2,357	2,547	2,347	2,583	2,517	-2.6	1.3
Chlorine ^g	10,956	11,054	11,242	11,301	11,720	11,647	12,111	12,698	11,487	11,681	10,693	-8.5	-0.2
Hydrochloric acid ^h	3,167	3,405	3,541	3,733	4,145	4,226	4,081	4,278	3,969	4,037	4,107	1.7	2.6
Hydrogen (mcm), 100% ^{h,j}	6,032	9,373	9,968	10,930	14,895	15,631	12,856	13,139	13,451	13,564	14,272	5.2	9.0
Nitric acid, 100% ^k	7,486	7,904	8,018	8,349	8,556	8,421	8,113	7,898	6,416	6,939	6,388	-7.9	-1.6
Nitrogen gas (mcm), 100% ^l	22,540	24,636	23,900	23,107	22,908	24,664	24,296	26,590	26,222	26,023	26,788	2.9	1.7
Oxygen (mcm), 100% ⁱ	15,489	17,132	17,840	19,312	21,040	19,142	19,397	18,859	16,367	17,160	19,624	14.4	2.4
Phosphoric acid, P ₂ O ₅	10,444	11,602	11,913	11,981	11,935	12,599	12,433	11,330	10,472	10,744	11,005	2.4	0.5
Sodium chlorate	489	507	560	600	568	707	742	853	792	721	656	-9.1	3.0
Sodium hydroxide	11,307	11,373	10,347	10,488	9,953	11,893	11,971	10,451	9,811	9,459	8,699	-8.0	-2.6
Sodium sulfate ^m	537	591	645	602	640	571	599	462	512	500	472	-5.6	-1.3
Sulfuric acid ⁿ	36,134	40,645	43,100	43,327	43,472	44,000	40,594	39,584	36,338	35,551	37,161	4.5	0.3
Titanium dioxide ^o	1,160	1,252	1,253	1,226	1,330	1,323	1,354	1,403	1,327	1,409	1,421	0.8	2.1

a Preliminary data. **b** Commercial, 17% Al₂O₃; includes municipalities. **c** Synthetic anhydrous. **d** Excludes by-product ammonia liquor and ammonium sulfate. **e** Original solution. **f** Synthetic and noncoke by-product. **g** Includes quantities liquefied for use, storage, or shipment. **h** Includes anhydrous hydrochloric acid production. **i** High- and low-purity gas. **j** Liquid and gas; excludes amounts vented and used as fuel and amounts produced in petroleum refineries for captive use. **k** Includes unspecified amounts produced but not withdrawn from the system. **l** Excludes amounts produced and consumed in making synthetic ammonia or ammonia derivatives. **m** Anhydrous, high and low purity, and Glauber's salt. **n** Gross (new and fortified). **o** Composite and pure. **mcm** = millions of cubic meters.
SOURCE: Department of Commerce, Bureau of the Census

CANADA INORGANICS

Most production decreased in 2003

THOUSANDS OF METRIC TONS												ANNUAL CHANGE	
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2002-03	1993-03
Aluminum sulfate	193	174	171	172	162	191	205	167	170	176	171	-2.8%	-1.2%
Ammonia	4,181	4,384	4,655	4,682	4,768	4,737	4,889	4,888	4,297	4,501	4,455	-1.0	0.6
Ammonium nitrate	1,025	938	1,031	1,059	979	1,000	1,052	1,110	1,174	1,152	1,031	-10.5	0.1
Carbon black	166	167	176	185	205	217	218	229	215	215	205	-4.7	2.1
Chlorine	1,170	1,074	1,131	1,119	1,067	989	1,065	1,079	1,054	1,095	994	-9.2	-1.6
Hydrochloric acid	134	134	138	147	142	149	157	155	143	151	153	1.3	1.3
Hydrogen peroxide	128	143	145	156	179	199	228	237	203	222	226	1.8	5.8
Nitric acid	917	910	991	1,039	1,002	935	1,007	1,074	1,054	1,143	1,105	-3.3	1.9
Sodium chlorate	830	962	1,020	926	1,038	1,012	1,048	1,107	1,082	1,055	1,129	7.0	3.1
Sodium hydroxide	1,225	1,153	1,182	1,154	1,099	1,015	1,082	1,094	1,074	1,111	1,059	-4.7	-1.4
Sulfuric acid	3,713	4,065	4,220	4,278	4,088	4,333	4,194	3,804	3,846	3,887	3,465	-10.9	-0.7

SOURCE: Statistics Canada



EUROPE INORGANICS

Most sectors showed long-term growth

THOUSANDS OF
METRIC TONS UNLESS
OTHERWISE NOTED

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003 ^a	ANNUAL CHANGE	
											2002-03	1994-03
Carbon black	364	775	687	1,243	1,386	1,322	1,342	1,059	1,008	735	-0.3%	8.1%
Chlorine	na	9,093	8,959	9,386	9,190	9,219	9,697	9,265	9,222	9,518	3.2	—
Hydrochloric acid	1,013	1,248	1,540	1,907	1,830	2,098	2,050	2,608	4,032	2,276	-43.6	9.4
Hydrogen (mcm)	950	2,043	1,904	1,883	2,124	2,252	2,196	5,553	6,393	4,715	-26.2	19.5
Hydrogen peroxide	53	227	143	133	248	438	847	372	646	236	-63.5	18.1
Nitrogen (mcm)	1,237	7,457	11,398	11,950	10,490	7,422	8,091	12,829	11,519	12,389	7.6	29.2
Oxygen (mcm)	1,415	5,814	7,044	10,610	4,674	5,592	5,965	12,678	15,838	13,251	-16.3	28.2
Phosphoric acid ^b	483	548	615	599	526	995	692	2,463	3,200	na	—	—
Sodium carbonate	na	1,526	1,592	1,589	4,998	4,567	4,401	1,451	85	1,493	1,656.5	—
Sodium hydroxide	2,555	5,656	5,785	6,197	6,090	5,418	5,780	6,756	8,681	5,249	-39.5	8.3
Sodium sulfate	1,209	1,506	1,930	2,718	2,748	2,237	2,314	1,806	2,936	731	-75.1	-5.4
Sulfuric acid ^c	3,518	4,918	5,795	6,586	6,832	7,109	6,598	8,157	11,969	4,374	-63.5	2.4
Titanium oxides	na	na	na	na	415	433	538	na	440	419	-4.8	—

a C&EN estimates based on partial reporting. b As P₂O₅. c As SO₂. mcm = million cubic meters. na = not available.
SOURCES: European Union and national government statistics offices, EuroChlor

JAPAN INORGANICS

Output of chlorine, ammonia, sodium silicate, and sulfuric acid kept falling

THOUSANDS OF
METRIC TONS UNLESS
OTHERWISE NOTED

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
Ammonia	1,708	1,713	1,831	1,811	1,836	1,689	1,685	1,715	1,604	1,450	1,291	-11.0%	-2.8%
Ammonium sulfate ^a	1,681	1,710	1,771	1,756	1,780	1,618	1,716	1,749	1,585	1,564	1,570	0.4	-0.7
Carbon black	702	698	757	757	776	723	761	788	742	755	788	4.4	1.2
Chlorine, liquid	900	872	942	894	928	881	875	847	777	754	723	-4.1	-2.2
Hydrochloric acid	2,355	2,370	2,469	2,416	2,539	2,408	2,448	2,494	2,342	2,317	2,363	2.0	0.0
Hydrogen peroxide	144	142	143	143	141	140	145	151	159	167	176	5.4	2.0
Nitrogen (mcm)	8,957	9,098	9,130	9,314	9,676	9,716	9,855	10,290	10,296	10,455	10,835	3.6	1.9
Oxygen (mcm)	7,944	8,277	8,598	8,904	9,795	9,188	9,534	10,655	10,373	10,720	11,250	4.9	3.5
Sodium hydroxide	3,777	3,786	4,004	4,062	4,391	4,252	4,345	4,471	4,291	4,271	4,369	2.3	1.5
Sodium silicate	729	831	836	800	795	765	769	720	679	622	596	-4.2	-2.0
Sulfuric acid	6,937	6,594	6,888	6,851	6,828	6,739	6,943	7,059	6,727	6,763	6,534	-3.4	-0.6
Titanium dioxide	246	238	249	238	241	251	269	270	257	240	253	5.4	0.3

a Agricultural and nonagricultural use. mcm = millions of cubic meters. SOURCE: Ministry of Economy, Trade & Industry

CHINA INORGANICS

Production in all sectors continued to grow at a high rate

THOUSANDS OF
METRIC TONS

	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
								2002-03	1997-03
Chlorine, liquid	1,472	1,471	1,632	1,829	2,061	2,402	2,718	13.2%	10.8%
Hydrochloric acid, 31%	3,843	3,801	3,960	4,454	4,705	4,926	5,276	7.1	5.4
Phosphorus, yellow	387	390	448	510	605	694	751	8.2	11.7
Sodium carbonate	7,285	7,368	7,486	9,199	9,144	10,189	11,075	8.7	7.2
Sodium hydroxide	5,483	5,184	5,495	7,123	7,880	8,227	9,399	14.2	9.4
Sulfuric acid	19,460	20,519	21,589	23,888	26,963	29,674	33,191	11.9	9.3

SOURCE: China National Chemical Information Center

PRODUCTION

U.S. PLASTICS & SYNTHETIC RUBBER

Overall resin production for plastics slipped last year

THOUSANDS OF METRIC TONS ^a												ANNUAL CHANGE		
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2002-03	1993-03	
THERMOPLASTIC RESINS														
Polyethylene														
Low-density ^{b,c}	3,278	2,077	3,467	3,531	3,489	3,437	3,493	3,436	3,491	3,647	3,540	-2.9%	0.8%	
Linear low-density ^{b,c}	2,196	2,278	2,378	2,885	3,124	3,278	3,677	3,607	4,659	5,139	5,052	-1.7	8.7	
High-density ^{c,d}	4,509	5,043	5,085	5,612	5,696	5,862	6,289	6,336	6,933	7,243	7,125	-1.6	4.7	
Polypropylene ^e	3,914	4,327	4,940	5,439	6,042	6,271	7,028	7,139	7,228	7,691	8,013	4.2	7.4	
Styrene polymers														
Polystyrene ^f	2,442	2,653	2,566	2,751	2,894	2,829	2,935	3,104	2,773	3,025	2,900	-4.1	1.7	
Styrene-acrylonitrile ^g	48	63	59	55	44	55	56	58	58	59	55	-6.9	1.4	
Acrylonitrile-butadiene-styrene & other styrene polymers ^{g,h}	1,326	1,465	1,319	1,347	1,359	1,447	1,406	1,415	1,240	1,323	1,296	-2.0	-0.2	
Polyamine, nylon type	348	428	463	500	554	583	612	581	517	578	580	0.4	5.2	
Polyvinyl chloride & copolymers ^e	4,652	5,312	5,577	5,996	6,388	6,578	6,764	6,551	6,467	6,939	6,669	-3.9	3.7	
TOTAL	22,713	23,644	25,853	28,117	29,590	30,341	32,259	32,227	33,365	35,644	35,230	-1.2%	4.5%	
THERMOSETTING RESINS														
Epoxy ⁱ	232	273	287	300	297	290	298	314	273	297	262	-11.8%	1.2%	
Urea & melamine	914	1,005	955	1,104	1,197	1,302	1,354	1,437	1,379	1,460	1,440	-1.4	4.7	
Phenolic	1,396	1,465	1,453	1,577	1,694	1,787	1,990	1,974	1,979	2,013	2,015	0.1	3.7	
TOTAL	2,542	2,742	2,695	2,981	3,187	3,379	3,642	3,726	3,630	3,770	3,717	-1.4%	3.9%	
GRAND TOTAL	25,255	26,386	28,548	31,098	32,777	33,720	35,901	35,953	36,995	39,414	38,946	-1.2%	4.4%	

Total rubber production was on the rise, though polychloroprene slipped

THOUSANDS OF METRIC TONS ^a												ANNUAL CHANGE	
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2002-03	1993-03
Styrene-butadiene rubber	817	851	878	907	932	908	910	874	782	768	781	1.7%	-0.4%
Polybutadiene	473	505	523	535	564	561	588	605	562	583	594	1.9	2.3
Ethylene-propylene	227	262	270	289	309	320	339	349	306	301	309	2.7	3.1
Nitrile, solid	78	84	83	85	85	87	88	89	84	84	85	1.2	0.9
Polychloroprene	70	76	70	70	73	69	66	64	57	54	53	-1.9	-2.7
Other ^j	400	408	427	437	449	447	478	484	424	425	427	0.5	0.7
TOTAL	2,065	2,186	2,251	2,323	2,412	2,392	2,469	2,465	2,215	2,215	2,249	1.5%	0.9%

NOTE: Totals are for those products listed and exclude some small-volume plastics. Synthetic rubber data include Canada. **a** Dry-weight basis unless otherwise specified. **b** Density 0.940 and below. **c** Data include Canada from 2001. **d** Density above 0.940. **e** Data include Canada from 1995. **f** Data include Canada from 2000. **g** Data include Canada from 1994. **h** Includes styrene-butadiene copolymers and other styrene-based polymers. **i** Unmodified. **j** Includes butyl styrene-butadiene rubber latex, nitrile latex, polyisoprene, and miscellaneous others. **SOURCES:** American Plastics Council, International Institute of Synthetic Rubber Producers

CANADA PLASTICS

Polyethylene saw a slump in 2003

THOUSANDS OF METRIC TONS												ANNUAL CHANGE	
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2002-03	1993-03
Polyesters, unsaturated	45	60	58	61	71	82	108	120	115	113	139	23.0%	11.9%
Polyethylene ^a	1,742	1,908	2,073	2,194	2,195	2,283	2,485	2,751	3,035	3,330	3,083	-7.4	5.9
Polystyrene ^b	158	177	189	209	181	180	200	203	186	195	183	-6.2	1.5

a Includes high-, low-, and linear low-density polyethylene. **b** Includes acrylonitrile-butadiene-styrene. **SOURCE:** Statistics Canada

EUROPE PLASTICS & SYNTHETIC RUBBER

Production began to pick up for major polymers

THOUSANDS OF METRIC TONS											ANNUAL CHANGE	
	1995	1996	1997	1998	1999	2000	2001	2002	2003 ^a	2002-03	1995-03	
Polyethylene	2,832	3,000	8,508	9,731	10,223	10,579	11,487	11,599	11,942	3.0%	19.7%	
Polystyrene	891	1,044	1,117	1,090	675	331	2,410	2,550	2,540	-0.4	14.0	
Acrylonitrile-butadiene-styrene	643	604	762	859	971	1,038	466	792	na	—	—	
Polyvinyl chloride	3,905	4,322	4,792	2,651	3,209	4,893	5,681	6,531	6,694	2.5	7.0	
Epoxy resins	340	282	373	334	393	419	215	451	68	-84.9	-18.2	
Polypropylene	na	na	na	4,158	6,524	6,984	7,526	8,113	8,638	6.5	—	
Polyamides ^b	441	843	1,652	1,494	766	1,412	1,209	1,786	1,421	-20.4	15.7	
Synthetic rubber	1,753	1,946	2,419	2,245	2,239	2,342	2,691	3,166	2,055	-35.1	2.0	

a C&EN estimates based on partial reporting. b Includes some polymers used in fiber production. na = not available. SOURCES: European Union and national government statistics offices.

ASIA PLASTICS & SYNTHETIC RUBBER

In Japan, South Korea, and Taiwan, growth has generally slowed

THOUSANDS OF METRIC TONS											ANNUAL CHANGE		
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2002-03	1993-03
JAPAN													
Polyethylene	2,762	2,944	3,193	3,313	3,366	3,143	3,369	3,342	3,294	3,176	3,165	-0.3%	1.4%
High-density	1,024	1,113	1,238	1,271	1,313	1,168	1,301	1,246	1,240	1,181	1,169	-1.0	1.3
Low-density	1,573	1,645	1,748	1,830	1,839	1,760	1,856	1,892	1,852	1,789	1,795	0.3	1.3
Polyethylene terephthalate	1,213	1,279	1,377	1,360	1,398	1,300	1,281	1,308	1,243	1,211	1,076	-11.1	-1.2
Polypropylene	2,031	2,225	2,502	2,730	2,854	2,520	2,626	2,721	2,696	2,641	2,751	4.2	3.1
Polyvinyl chloride	1,980	2,112	2,274	2,511	2,626	2,457	2,460	2,410	2,195	2,225	2,164	-2.7	0.9
Polystyrene	1,966	2,099	2,149	2,178	2,201	1,975	2,037	2,024	1,810	1,837	1,801	-2.0	-0.9
Epoxy	170	181	194	201	222	204	225	243	192	201	195	-3.0	1.4
Phenolic resins	328	330	327	294	303	259	250	262	232	242	261	7.9	-2.3
Polycarbonate	149	171	227	251	292	317	351	354	370	386	409	6.0	10.6
Synthetic rubber	1,310	1,349	1,498	1,520	1,592	1,520	1,577	1,590	1,466	1,522	1,577	3.6	1.9
SOUTH KOREA													
Acrylonitrile-butadiene-styrene	350	409	491	560	596	636	784	777	932	1,120	1,143	2.1%	12.6%
Polyethylene, high-density	1,189	1,294	1,232	1,340	1,549	1,615	1,756	1,706	1,839	1,871	1,925	2.9	4.9
Polyethylene, low-density	853	923	970	1,256	1,394	1,518	1,642	1,576	1,614	1,624	1,627	0.2	6.7
Polypropylene	1,436	1,607	1,619	1,738	2,056	2,355	2,440	2,413	2,485	2,622	2,811	7.2	6.9
Polystyrene	809	869	905	1,000	1,104	1,038	1,105	1,212	1,354	1,361	1,427	4.8	5.8
Polyvinyl chloride	760	791	914	1,005	1,087	1,013	1,170	1,191	1,238	1,244	1,278	2.7	5.3
TAIWAN													
Acrylonitrile-butadiene-styrene	642	735	759	911	979	899	1,016	1,067	985	1,078	1,105	2.5%	5.6%
Polyethylene, high-density	152	187	212	241	243	273	395	306	510	507	547	7.9	13.7
Polyethylene, low-density	217	224	208	233	235	224	236	273	477	492	536	8.9	9.5
Polyester resin	93	128	134	146	171	175	204	198	204	219	212	-3.2	8.6
Polypropylene	220	341	417	448	420	418	517	564	773	830	937	12.9	15.6
Polystyrene	593	626	671	808	780	764	765	711	866	848	858	1.2	3.8
Polyurethane resin	85	111	111	127	151	145	157	185	170	189	193	2.1	8.5
Synthetic rubber													
Styrene-butadiene	65	88	95	98	103	107	104	83	81	78	69	-11.5	0.6
Polybutadiene	43	46	51	51	55	56	54	50	52	52	54	3.8	2.3

SOURCES: Japan's Ministry of Economy, Trade & Industry; National Statistical Office, Republic of Korea; Petrochemical Industry Association of Taiwan; Taiwan Ministry of Economic Affairs

PRODUCTION

CHINA PLASTICS, RUBBER & FIBER

Production of plastics continued to surge

THOUSANDS OF METRIC TONS	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
								2002-03	1997-03
Plastics	6,474	7,029	8,418	11,455	12,828	13,665	15,938	16.6%	16.2%
Polyvinyl chloride	1,536	1,599	1,894	2,343	2,836	3,389	4,007	18.2	17.3
Polyethylene	2,152	2,292	2,714	3,085	3,122	3,547	4,132	16.5	11.5
Polypropylene	1,881	2,075	2,722	3,035	3,226	3,742	4,268	14.1	14.6
Polyester fiber	1,274	2,503	1,898	2,210	2,932	3,139	4,153	32.3	21.8
Synthetic rubber	623	589	761	1,010	1,220	1,168	1,272	8.9	12.6

SOURCE: China National Chemical Information Center

U.S. PAINTS & COATINGS

Only architectural coatings shipments grew in 2003

MILLIONS OF LITERS	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
Architectural	2,301	2,441	2,350	2,422	2,483	2,392	2,498	2,464	2,525	2,721	2,956	8.6%	2.5%
Product ^a	1,351	1,412	1,423	1,510	1,609	1,620	1,665	1,715	1,540	1,559	1,453	-6.8	0.7
Special purpose	678	734	738	791	689	655	659	689	609	693	655	-5.5	-0.3
TOTAL	4,330	4,587	4,512	4,724	4,780	4,667	4,822	4,868	4,674	4,973	5,064	1.8%	1.6%

^a For original equipment manufacturers. SOURCE: Department of Commerce

U.S. SYNTHETIC FIBERS

Nylon bucked trend and grew while all other categories declined

THOUSANDS OF METRIC TONS	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
NONCELLULOSIC FIBERS													
Acrylic ^a	196	200	196	211	209	157	143	154	137	118	100	-15.4%	-6.5%
Nylon	1,206	1,243	1,226	1,270	1,286	1,218	1,217	1,215	1,019	1,112	1,115	0.3	-0.8
Olefin	959	1,083	1,085	1,095	1,216	1,326	1,395	1,461	1,342	1,354	1,348	-0.4	3.5
Polyester	1,613	1,750	1,763	1,736	1,855	1,768	1,736	1,775	1,464	1,482	1,374	-7.3	-1.6
TOTAL	3,975	4,276	4,270	4,311	4,567	4,469	4,491	4,605	3,962	4,066	3,938	-3.2%	-0.1%
CELLULOSIC FIBERS													
Acetate ^b & rayon	229	227	226	215	208	166	134	158	103	81	75	-6.7%	-10.5%
TOTAL FIBERS	4,204	4,503	4,496	4,527	4,775	4,635	4,625	4,764	4,065	4,147	4,013	-3.2%	-0.5%

^a Includes modacrylic. ^b Includes diacetate and triacetate; excludes production for cigarette filters. SOURCE: Fiber Economics Bureau

EUROPE SYNTHETIC FIBERS

Fibers continued a slow decline in 2003

THOUSANDS OF METRIC TONS	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
Acrylic	686	714	623	677	705	650	614	623	607	620	671	8.2%	nm
Polyester	895	982	973	895	995	959	909	968	924	909	849	-6.6	nm
Polyamide	591	641	632	632	673	641	595	636	555	549	518	-5.6	nm
Cellulosics	713	682	736	766	722	715	651	627	607	585	586	0.2	nm

NOTE: Data prior to 2001 are not comparable with data from 2001 and succeeding years. nm = not meaningful.

SOURCE: International Rayon & Synthetic Fibers Committee



JAPAN SYNTHETIC FIBERS

Production of most fibers maintained downward trend

THOUSANDS OF METRIC TONS	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
Man-made ^a	1,748	1,773	1,804	1,802	1,822	1,724	1,634	1,643	1,564	1,416	1,316	-7.0%	-2.8%
Acrylic ^b	351	376	370	388	416	418	372	377	365	358	298	-16.6	-1.6
Nylon ^c	225	214	201	201	198	180	174	176	162	126	121	-4.1	-6.0
Polyester ^a	716	732	743	724	731	684	665	665	628	564	528	-6.3	-3.0
Polypropylene ^a	78	79	92	100	110	109	109	111	117	114	116	2.1	4.1

a Staple and filament. b Staple only. c Filament only. SOURCE: Ministry of Economy, Trade & Industry

U.S. FERTILIZERS

Nitrogen solutions, monoammonium phosphate, and phosphate rock had double-digit gains

THOUSANDS OF METRIC TONS	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
												2002-03	1993-03
NITROGEN PRODUCTS													
Ammonia	11,331	11,647	14,509	14,671	15,160	15,032	14,484	13,438	10,455	11,306	10,475	-7.3%	-0.9%
Ammonium nitrate	2,331	2,268	2,648	2,431	3,012	3,183	3,165	2,873	2,192	2,246	2,142	-4.6	-0.8
Ammonium sulfate	2,136	2,233	2,351	2,330	2,424	2,453	2,517	2,595	2,353	2,405	2,595	7.9	2.0
Urea	3,554	3,528	4,808	4,822	4,989	4,850	5,066	4,742	3,678	4,477	4,443	-0.7	2.3
Nitrogen solutions	na	3,397	7,856	8,178	8,994	8,980	10,136	9,038	9,143	7,985	8,863	11.0	—
PHOSPHATE PRODUCTS													
Diammonium phosphate	12,268	12,454	14,010	14,155	14,325	14,088	14,528	12,670	10,049	10,825	9,991	-7.7%	-2.0%
Monoammonium phosphate	2,266	2,523	2,541	2,529	3,170	3,624	3,511	4,106	4,087	4,175	4,734	13.4	7.6
Concentrated													
superphosphate	1,758	1,395	1,528	1,512	1,443	1,321	1,066	1,098	1,094	1,067	991	-7.1	-5.6
Phosphate rock	37,396	32,199	38,303	40,911	40,890	37,814	38,352	36,088	34,219	29,183	32,327	10.8	-1.4
Phosphoric acid, P ₂ O ₅	9,941	10,079	11,263	11,073	11,494	11,264	11,470	10,751	9,406	10,125	10,253	1.3	0.3
POTASH PRODUCTS													
Potassium chloride	1,908	1,679	1,654	1,612	1,635	1,586	1,491	1,430	1,339	1,391	1,361	-2.2%	-3.3%

NOTE: Years ending June 30. Figures are based on Fertilizer Institute surveys and may not represent the entire industry. na = not available.
SOURCE: Fertilizer Institute

EUROPE FERTILIZERS

Slowdown abated, with production of some compounds picking up

THOUSANDS OF METRIC TONS	1995	1996	1997	1998	1999	2000	2001	2002	2003 ^a	ANNUAL CHANGE	
										2002-03	1995-03
Ammonium nitrate	1,344	1,460	1,171	631	897	721	687	885	615	-30.5%	-9.3%
Ammonium sulfate	802	475	478	585	566	675	1,442	638	178	-72.1	-17.2
Anhydrous ammonia	1,955	2,246	2,291	2,295	2,213	2,078	2,362	6,719	3,975	-40.8	9.3
Nitric acid	192	263	266	290	264	153	600	460	1,239	169.3	26.2
Urea	89	113	368	na	600	725	458	239	526	120.1	24.9

a C&EN estimates based on partial reporting. na = not available. SOURCES: European Union and national government statistics offices

CHINA FERTILIZERS

Production of phosphates rebounded

THOUSANDS OF METRIC TONS	1997	1998	1999	2000	2001	2002	2003	ANNUAL CHANGE	
								2002-03	1997-03
Fertilizer ^a	27,443	28,719	30,013	34,920	36,365	36,656	39,246	7.1%	6.1%
Nitrogen	20,745	21,752	23,239	24,441	25,243	27,426	28,796	5.0	5.6
Phosphate	6,500	6,629	6,361	8,702	9,239	7,760	8,806	13.5	5.2

a Nutrient content basis, as nitrogen or P₂O₅. SOURCE: China National Chemical Information Center