

## FLUORSPAR

(Data in thousand metric tons, unless otherwise noted)

**Domestic Production and Use:** There was no domestic mine production of fluorspar in 1999. There was some recovery of byproduct calcium fluoride from industrial waste streams, although it is not included in the data shown below. Material purchased from the National Defense Stockpile or imported was screened and dried for resale to customers. Domestically, an estimated 90% of reported fluorspar consumption went into the production of hydrofluoric acid (HF) in Louisiana and Texas and aluminum fluoride in Texas. HF is the primary feedstock for the manufacture of virtually all organic and inorganic fluorine-bearing chemicals, and is also a key ingredient in the processing of aluminum and uranium. The remaining estimated 10% of the reported fluorspar consumption was consumed as a flux in steelmaking, in iron and steel foundries, primary aluminum production, glass manufacture, enamels, welding rod coatings, and other uses or products. To supplement domestic fluorine supplies, about 68,200 tons of fluorosilicic acid (equivalent to 120,000 tons of 92% fluorspar) was recovered from phosphoric acid plants processing phosphate rock. Fluorosilicic acid was used primarily in water fluoridation, either directly or after processing into sodium silicofluoride, and to make aluminum fluoride for the aluminum industry.

<b>Salient Statistics—United States:</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999<sup>e</sup></b>
Production: Finished, all grades <sup>e1</sup>	251	8	—	—	—
Fluorspar equivalent from phosphate rock	98	119	121	118	120
Imports for consumption:					
Acid grade	470	474	485	462	400
Metallurgical grade	88	39	51	41	72
Fluorspar equivalent from hydrofluoric acid plus cryolite	114	131	175	204	128
Exports <sup>3</sup>	42	62	62	44	48
Shipments from Government stockpile	74	287	97	110	132
Consumption: Apparent <sup>4</sup>	599	719	551	572	552
Reported	534	527	491	538	500
Stocks, yearend, consumer and dealer <sup>5</sup>	405	234	375	471	413
Employment, mine and mill, number	130	5	—	—	—
Net import reliance <sup>6</sup> as a percent of apparent consumption	91	99	100	100	100

**Recycling:** An estimated 10,000 tons per year of synthetic fluorspar is recovered from uranium enrichment, stainless steel pickling, and petroleum alkylation. Primary aluminum producers recycled HF and fluorides from smelting operations. HF is recycled in the petroleum alkylation process.

**Import Sources (1995-98):** China, 65%; South Africa, 20%; Mexico, 13%; and other, 2%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12/31/99</b>
Acid grade (97% or more CaF <sub>2</sub> )	2529.22.0000	Free.
Metallurgical grade (less than 97% CaF <sub>2</sub> )	2529.21.0000	Free.

**Depletion Allowance:** 23% (Domestic), 15% (Foreign).

**Government Stockpile:** During fiscal year 1999, the Defense National Stockpile Center (DNSC) sold 75,300 tons (83,000 short dry tons) of acid grade, which exhausted the last remaining inventory of acid grade available. The DNSC sold 45,000 tons (50,000 short dry tons) of metallurgical grade. Under the proposed fiscal year 2000 Annual Materials Plan, the DNSC will be authorized to sell 45,000 tons (50,000 short dry tons) of metallurgical grade.

### Stockpile Status—9-30-99<sup>7</sup>

<b>Material</b>	<b>Uncommitted inventory</b>	<b>Committed inventory</b>	<b>Authorized for disposal</b>	<b>Disposal plan FY 1999</b>	<b>Disposals FY 1999</b>
Acid grade	—	250	—	109	75
Metallurgical grade	146	46	146	45	45

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**Events, Trends, and Issues:** The Chinese Government revised the export license system for 1999. The revisions required that all bidding be done remotely by computer, changed the ratio of public to agreement bidding, increased the size of the nonrefundable deposit, increased the number of bidding rounds to four, and changed the method for calculating the export license fees. The results of the first round of bids for export licenses in the first quarter sent shock waves through world fluorspar markets when the export licenses jumped from \$26 per ton to \$56 to \$60 per ton. The later round of bids lowered the export license fees to about \$39 per ton, but damage had already been done and Chinese fluorspar exports for 1999 were expected to be substantially lower than in recent years. In the United States, major consumers responded by purchasing as much material as possible under 1998 export licenses that were issued before the end of 1998 at the old fixed rate of \$27 per ton. Another response was to draw down company stocks while hoping prices would decrease.

In South Africa, the Vergenoeg Fluorspar Mine owned by Bayer AG of Germany was sold to Canadian mining company Metorex, which subsequently sold a 30% stake to Minerales y Productos Derivados SA of Spain.<sup>8</sup> Also in South Africa, the Witkop Fluorspar Mine owned by Phelps Dodge Corporation through its subsidiary Phelps Dodge Mining (Pty.) Ltd. was sold to the South African Land and Exploration Company.<sup>9</sup>

In complying with a 1997 amendment to the Montreal Protocol, an international agreement designed to curtail illegal trade in chlorofluorocarbons, hydrochlorofluorocarbons, and other ozone-depleting chemicals went into effect on November 10, 1999. The agreement will require countries to establish licensing systems for international sales of ozone-depleting substances.<sup>10</sup> The licensing system may help increase sales of replacement compounds, such as hydrofluorocarbon 134a, by making it more difficult to acquire illegal chlorofluorocarbons.

### **World Mine Production, Reserves, and Reserve Base:**

	Mine production		Reserves <sup>11 12</sup>	Reserve base <sup>11 12</sup>
	1998	1999 <sup>e</sup>		
United States	—	—	—	6,000
Brazil	78	75	W	W
China	2,550	2,100	23,000	94,000
France	110	110	10,000	14,000
Kenya	70	70	2,000	3,000
Mexico	598	600	32,000	40,000
Morocco	110	110	W	W
South Africa	226	220	30,000	36,000
Spain	120	120	6,000	8,000
United Kingdom	65	30	2,000	3,000
Other countries	<u>743</u>	<u>790</u>	<sup>13</sup> <u>10,000</u>	<sup>13</sup> <u>170,000</u>
World total (may be rounded)	4,670	4,220	220,000	370,000

**World Resources:** Identified world fluorspar resources were approximately 400 million tons of contained fluorspar. Resources of equivalent fluorspar from domestic phosphate rock were approximately 32 million tons. World resources of fluorspar from phosphate rock were estimated at 330 million tons.

**Substitutes:** Olivine and/or dolomitic limestone were used as substitutes for fluorspar. Byproduct fluorosilicic acid from phosphoric acid production was used as a substitute in aluminum fluoride production.

<sup>e</sup>Estimated. W Withheld to avoid disclosing company proprietary data.

<sup>1</sup>Shipments.

<sup>2</sup>Includes fluorspar from National Defense Stockpile reprocessed by Ozark-Mahoning Co., Illinois.

<sup>3</sup>Exports are all general imports reexported or National Defense Stockpile material exported.

<sup>4</sup>Excludes fluorspar equivalent of fluorosilicic acid, hydrofluoric acid, and cryolite.

<sup>5</sup>Industry stocks plus National Defense Stockpile material committed for sale pending shipment.

<sup>6</sup>Defined as imports - exports + adjustments for Government and industry stock changes.

<sup>7</sup>See Appendix B for definitions.

<sup>8</sup>African Mining, 1999, Spanish fluorspar leader takes stake in Vergenoeg: African Mining Bulletin, no. 101, electronic issue, July 5, unpaginated.

<sup>9</sup>Industrial Minerals, 1999, Phelps Dodge fluorspar sold to S.A. Land & Exploration for \$12.3m: Industrial Minerals, no. 382, July, p. 13.

<sup>10</sup>Chemical Market Reporter, 1999, Treaty on CFCs trade set to take effect: Chemical Market Reporter, v. 256, no. 10, September 6, p. 6.

<sup>11</sup>See Appendix C for definitions.

<sup>12</sup>Measured as 100% calcium fluoride.

<sup>13</sup>Includes Brazil and Morocco.