

FLUORSPAR

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: A small amount of fluor spar was recovered as a byproduct of limestone quarrying in Illinois and stockpiled for future processing. Some byproduct calcium fluoride was recovered from industrial waste streams, although data are not available on exact quantities. Material purchased from the National Defense Stockpile or imported was screened and dried for resale to customers. Domestically, about 85% of reported fluor spar 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 15% of the reported fluor spar consumption was as a flux in steelmaking, in iron and steel casting, primary aluminum production, glass manufacture, enamels, welding rod coatings, cement production, and other uses or products. An estimated 47,000 tons of fluorosilicic acid (equivalent to about 83,000 tons of 92% fluor spar) 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.

Salient Statistics—United States:	2003	2004	2005	2006	2007^e
Production:					
Finished, all grades	—	—	—	—	—
Fluor spar equivalent from phosphate rock	94	90	86	70	83
Imports for consumption:					
Acid grade	533	546	586	490	556
Metallurgical grade	34	53	43	62	47
Total fluor spar imports	567	599	629	553	603
Fluor spar equivalent from hydrofluoric acid plus cryolite	180	197	209	233	246
Exports ¹	31	21	36	13	13
Shipments from Government stockpile	75	62	28	66	17
Consumption:					
Apparent ²	589	691	616	608	601
Reported	616	618	582	523	550
Price, average value, dollars per ton, c.i.f. U.S. port					
Acid grade	138	167	202	217	NA
Metallurgical grade	85	83	93	101	111
Stocks, yearend, consumer and dealer ³	206	105	131	90	85
Employment, mine and mill, number	—	—	—	—	—
Net import reliance ⁴ as a percentage of apparent consumption	100	100	100	100	100

Recycling: A few thousand tons per year of synthetic fluor spar is recovered primarily from uranium enrichment, but also from petroleum alkylation and stainless steel pickling. Primary aluminum producers recycled HF and fluorides from smelting operations. HF is recycled in the petroleum alkylation process.

Import Sources (2003-06): China, 62%; Mexico, 18%; South Africa, 14%; Mongolia, 5%; and other, 1%.

Tariff: Item	Number	Normal Trade Relations 12-31-07
Acid grade (97% or more CaF ₂)	2529.22.0000	Free.
Metallurgical grade (less than 97% CaF ₂)	2529.21.0000	Free.

Depletion Allowance: 22% (Domestic), 14% (Foreign).

Government Stockpile: During fiscal year 2007, the Defense National Stockpile Center (DNSC), Defense Logistics Agency, sold about 9,070 tons (10,000 short dry tons) of metallurgical-grade fluor spar and 2,020 tons (2,230 short dry tons) of acid-grade fluor spar from the National Defense Stockpile.

Material	Stockpile Status—9-30-07⁵			Disposal plan FY 2007	Disposals FY 2007
	Uncommitted inventory	Committed inventory	Authorized for disposal		
Acid grade	—	—	—	11	2
Metallurgical grade	1	(⁶)	—	54	9

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Events, Trends, and Issues: In 2007, Hastie Mining Co. and Moodie Mineral Co. continued their drilling program for fluor spar in Livingston County, KY. Drilling on the vein deposit during 2006 and 2007 had resulted in reserves in excess of 1 million metric tons with an average ore grade of 55% calcium fluoride. Additional drilling was planned for the fourth quarter of 2007. Mine development was scheduled to begin in 2008 with production expected in the latter part of the year. Hastie Mining installed a briqueting machine to manufacture fluor spar briquets for the metallurgical market. The company planned to install a heavy-media plant in 2008 to process stockpiled fluor spar ore produced as a byproduct at its limestone quarry in Hardin County, IL. Work on restarting an idle flotation plant at Salem, KY, also was planned for 2008.⁷

Effective June 1, 2007, China raised the export tax on fluor spar to 15% from the previous rate of 10%, which had only been introduced in the fourth quarter of 2006. This move was part of a policy intended to conserve important resources for domestic use. This and other actions by the Chinese Government in recent years have resulted in significant price increases for Chinese acid-grade fluor spar. By the second quarter of 2007, export prices for acid-grade fluor spar reportedly were at \$230 per metric ton, free on board, China. Including insurance and freight costs, delivered prices to U.S. Gulf of Mexico ports were \$280 per ton or higher.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ^{8,9}	Reserve base ^{8,9}
	2006	2007 ^e		
United States	—	—	NA	6,000
China	2,750	2,750	21,000	110,000
France	40	—	10,000	14,000
Kenya	83	90	2,000	3,000
Mexico	938	900	32,000	40,000
Mongolia	388	400	12,000	16,000
Morocco	95	95	NA	NA
Namibia	¹⁰ 130	¹⁰ 130	3,000	5,000
Russia	210	210	Moderate	18,000
South Africa	270	295	41,000	80,000
Spain	132	140	6,000	8,000
Other countries	<u>294</u>	<u>300</u>	<u>110,000</u>	<u>180,000</u>
World total (rounded)	5,330	5,310	240,000	480,000

World Resources: Identified world fluor spar resources were approximately 500 million tons of contained fluor spar. The quantity of fluorine present in phosphate rock deposits is enormous. Current U.S. reserves of phosphate rock are estimated to be 1.0 billion tons, which at 3.5% fluorine would contain 35 million tons of fluorine, equivalent to about 72 million tons of fluor spar. World reserves of phosphate rock are estimated to be 18 billion tons, equivalent to 630 million tons of fluorine and 1.29 billion tons of fluor spar.

Substitutes: Olivine and/or dolomitic limestone have been used as substitutes for fluor spar. Byproduct fluorosilicic acid from phosphoric acid production has been used as a substitute in aluminum fluoride production, and also has the potential to be used as a substitute in HF production.

^eEstimated. NA Not available. — Zero.

¹Exports are all general imports reexported or National Defense Stockpile material exported.

²Excludes fluor spar equivalent of fluorosilicic acid, hydrofluoric acid, and cryolite.

³Industry stocks for three leading consumers, fluor spar distributors, and National Defense Stockpile material committed for sale pending shipment.

⁴Defined as imports – exports + adjustments for Government and industry stock changes.

⁵[See Appendix B for definitions.](#)

⁶Less than ½ unit.

⁷D. Hastie, Owner, Hastie Mining Co., oral commun., October 2007.

⁸[See Appendix C for definitions.](#)

⁹Measured as 100% calcium fluoride.

¹⁰Data are in wet tons.