

FLUORSPAR

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: In Illinois, fluorspar (calcium fluoride) was processed and sold from stockpiles produced as a byproduct of limestone quarrying. Byproduct calcium fluoride was recovered from industrial waste streams, although data are not available on exact quantities. Domestically, production of hydrofluoric acid (HF) in Louisiana and Texas was by far the leading use for acid-grade fluorspar. HF is the primary feedstock for the manufacture of virtually all fluorine-bearing chemicals and is also a key ingredient in the processing of aluminum and uranium. Other uses included 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 68,000 tons of fluorosilicic acid (equivalent to about 120,000 tons of 92% fluorspar) was recovered from phosphoric acid plants processing phosphate rock. Fluorosilicic acid was used primarily in water fluoridation.

Salient Statistics—United States:	2006	2007	2008	2009	2010^e
Production:					
Finished, all grades	—	—	NA	NA	NA
Fluorspar equivalent from phosphate rock	70	94	111	114	120
Imports for consumption:					
Acid grade	490	577	496	417	470
Metallurgical grade	62	43	76	58	70
Total fluorspar imports	553	620	572	475	540
Fluorspar equivalent from hydrofluoric acid plus cryolite	233	233	209	175	200
Exports	13	14	19	14	20
Shipments from Government stockpile	66	17	—	—	—
Consumption:					
Apparent ¹	608	613	528	473	520
Reported	523	539	506	400	480
Price, average value, dollars per ton, c.i.f. U.S. port					
Acid grade	217	NA	NA	NA	NA
Metallurgical grade	101	111	107	109	101
Stocks, yearend, consumer and dealer ²	90	90	115	103	110
Net import reliance ³ as a percentage of apparent consumption	100	100	100	100	100

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

Import Sources (2006–09): Mexico, 47%; China, 40%; South Africa, 9%; and Mongolia, 4%.

Tariff: Item	Number	Normal Trade Relations 12-31-10
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: The last of the Government stocks of fluorspar officially were sold in fiscal year 2007.

Events, Trends, and Issues: World fluorspar demand showed some signs of recovery in 2010, but was still depressed compared with that of 2008. Prices were higher compared with those of 2009 but were still far below their peak in late 2008. Market conditions improved enough that some African fluorspar mines, which were forced to shut down in 2009 because of low demand and low prices, were able to resume production in 2010. With the dramatic decrease in fluorspar exports from China in recent years, companies outside of China were attempting to replace lost Chinese export supplies by expanding capacity at current mines or by developing new fluorspar mining projects. For example, Mexico's second leading fluorspar producer was developing new fluorspar mining concessions that were expected to be in production by the end of 2010. The new operations would increase the company's annual acidspare capacity by between 30,000 and 40,000 tons. Development work continued on the new U.S. fluorspar mine in western Kentucky, which was expected to begin production in early 2011 and produce about 50,000 tons of fluorspar per year. Work proceeded on reopening the St. Lawrence fluorspar mine in southeastern Newfoundland, Canada,

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with planned output of 120,000 to 180,000 tons of fluorspar per year. Some exploration activities were ongoing, particularly in Sweden, but development or exploration work on other projects was slowed by lagging demand and lack of investment capital.

Fluorspar was included in the list of 14 raw materials labeled as “critical” by an expert group chaired by the European Commission of the European Union (EU). The EU faces a potential shortage of these materials, which have high supply risks because a large share of the worldwide production comes from a handful of countries. This concentration of production is compounded by low substitutability and low recycling rates. The list was established in the framework of the 2008 EU Raw Materials Initiative, and the results of the report were expected to be used to help form strategies to ensure future access to critical raw materials. The expert group recommended updating the list of EU critical raw materials every 5 years and enlarging the scope for criticality assessment; policy actions improving access to primary resources; policy actions making recycling of raw materials or raw material-containing products more efficient; encouraging substitution of certain raw materials, notably by promoting research on substitutes for critical raw materials; and improving the overall material efficiency of critical raw materials.⁴

World Mine Production and Reserves: Production estimates for individual countries were made using country or company specific data where available; other estimates were made based on general knowledge of end-use markets. The reserve estimate for China has been revised based on new information.

	Mine production		Reserves ^{5, 6}
	2009	2010 ^e	
United States	NA	NA	NA
Brazil	64	65	NA
China	2,900	3,000	24,000
Kazakhstan	67	65	NA
Kenya	16	30	2,000
Mexico	1,040	1,000	32,000
Mongolia	460	450	12,000
Morocco	75	80	NA
Namibia	74	110	3,000
Russia	240	220	NA
South Africa	204	130	41,000
Spain	140	120	6,000
Other countries	180	170	110,000
World total (rounded)	5,460	5,400	230,000

World Resources: Identified world fluorspar resources were approximately 500 million tons of contained fluorspar. 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 fluorspar. 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 fluorspar.

Substitutes: Aluminum smelting dross, borax, calcium chloride, iron oxides, manganese ore, silica sand, and titanium dioxide have been used as substitutes for fluorspar fluxes. Byproduct fluorosilicic acid 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.

¹Excludes fluorspar equivalent of fluorosilicic acid, hydrofluoric acid, and cryolite.

²Industry stocks for two leading consumers and fluorspar distributors.

³Defined as imports – exports + adjustments for Government and industry stock changes.

⁴Blamey, Andy, 2010, EU faces possible shortages of critical metals, minerals—report: Platts Metals Week, June 17. (Accessed September 24, 2010, at <http://www.platts.com/RSSFeedDetailedNews/RSSFeed/HeadlineNews/Metals/8823248/>.)

⁵See Appendix C for resource/reserve definitions and information concerning data sources.

⁶Measured as 100% calcium fluoride.