

FLUORSPAR

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: In 2014, minimal fluorspar (calcium fluoride) was produced in the United States. One company sold fluorspar from stockpiles produced as a byproduct of its limestone quarrying operation in Cave-in-Rock, IL. This company also continued development work and stockpiling of ore for future processing at the Klondike II fluorspar mine in Kentucky. Synthetic fluorspar was recovered as a byproduct of petroleum alkylation, stainless steel pickling, and uranium processing. However, no data were collected from any of these operations.

U.S. consumption was supplied by imports and small amounts of byproduct synthetic fluorspar. 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. Fluorspar was also used in iron and steel casting, primary aluminum production, glass manufacture, enamels, welding rod coatings, cement production, as a flux in steelmaking and in other applications.

An estimated 74,000 tons of fluorosilicic acid (equivalent to about 131,000 tons of 92% fluorspar) was recovered from five phosphoric acid plants processing phosphate rock. Fluorosilicic acid was used primarily in water fluoridation.

Salient Statistics—United States:	2010	2011	2012	2013	2014^e
Production:					
Finished, all grades	NA	NA	NA	NA	NA
Fluorspar equivalent from phosphate rock	128	124	130	131	131
Imports for consumption:					
Acid grade	442	560	464	512	350
Metallurgical grade	97	167	156	130	130
Total fluorspar imports	539	727	620	643	480
Hydrofluoric Acid	135	132	133	119	130
Cryolite	5	10	8	19	14
Exports	18	24	24	16	15
Consumption:					
Apparent ¹	492	672	525	548	578
Reported	503	456	416	441	440
Price², acid grade, yearend, dollars per ton:					
Filtercake	260–290	400–450	400–450	350	310–350
Arsenic <5 parts per million	280–320	540–550	540–550	540–550	400–450
Stocks, yearend, consumer and dealer³					
	131	162	234	313	200
Employment, mine, number^e					
	4	11	5	6	6
Net import reliance⁴ as a percentage of apparent consumption					
	100	100	100	100	100

Recycling: A few thousand tons per year of synthetic fluorspar are 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 (2010–13): Mexico, 75%; China, 15%; South Africa, 7%; Mongolia, 3%.

Tariff: Item	Number	Normal Trade Relations 12–31–14
Metallurgical grade (less than 97% CaF ₂)	2529.21.0000	Free
Acid grade (97% or more CaF ₂)	2529.22.0000	Free
Natural Cryolite	2530.90.1000	Free
Hydrogen Fluoride (Hydrofluoric Acid)	2811.11.0000	Free
Synthetic Cryolite	2826.30.0000	Free

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

Government Stockpile: The last of the Government stocks of fluorspar officially were sold in fiscal year 2007.

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Events, Trends, and Issues: Fluorspar prices, particularly those for acid grade fluorspar, continued to decline in 2014. Prices of metallurgical grade fluorspar remained stable. Price declines were largely the consequence of continued global surplus in fluorspar stocks and downstream fluorochemicals. Several leading chemical companies also reported that the weak market had adverse effects on earnings. However, industry analysts reported that the fluorochemicals market will probably rebound in the coming years as new applications for fluoropolymers are developed and the demand for refrigerants in developing countries increases.

Exploration and development work continued at fluorspar projects in Canada, Mongolia, South Africa, the United States, and Vietnam. The status of the projects varied from exploration drilling to mine startups.

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 reserves information for Kenya has been revised based on company sources. Spain's reserves were revised to match previously reported estimates.

	Mine production		Reserves ^{5,6}
	2013	2014 ^e	
United States	NA	NA	4,000
Bulgaria	60	50	NA
China	4,400	4,400	24,000
Germany	55	50	NA
Iran	70	70	NA
Kazakhstan	65	65	NA
Kenya	49	90	5,000
Mexico	1,230	1,200	32,000
Mongolia	226	340	22,000
Morocco	76	70	NA
Namibia	50	40	NA
Russia	80	20	NA
South Africa	175	230	41,000
Spain	117	107	6,000
United Kingdom	45	45	NA
Other countries	73	70	110,000
World total (rounded)	6,770	6,850	240,000

World Resources: Identified world fluorspar resources were approximately 500 million tons of contained fluorspar. Additionally, there are enormous quantities of fluorine present in phosphate rock. Current U.S. reserves of phosphate rock are estimated to be 1.1 billion tons, which at 3.5% fluorine would contain about 79 million tons of fluorspar equivalent. World reserves of phosphate rock are estimated to be 67 billion tons, equivalent to about 4.8 billion tons of 100% fluorspar equivalent.

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.

¹Excludes fluorspar production withheld for proprietary reasons and fluorspar equivalent of fluorosilicic acid, hydrofluoric acid, and cryolite.

²Free on board (f.o.b.), Tampico, Mexico. Source: Industrial Minerals.

³Industry stocks for two leading consumers and fluorspar distributors.

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

⁵See [Appendix C](#) for resource/reserve definitions and information concerning data sources.

⁶Measured as 100% calcium fluoride.