

# Mineral Industry Surveys

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## FLUORSPAR IN THE SECOND QUARTER 2022

Fluorspar imports in the second quarter of 2022 were 107,000 metric tons (t), 73,100 t of which were acid grade and 33,800 t of which were metallurgical grade (fig. 1, table 1). In terms of quantity, acid-grade imports decreased by 21% compared with imports in the second quarter of 2021, and by 30% compared with the previous quarter. Imports of metallurgical-grade fluorspar more than quintupled compared with the second quarter of 2021 and more than tripled compared with imports in the previous quarter. The leading source of acid-grade imports was Mexico (57%). After having no reported domestic acid-grade imports from China in 2021, in the second quarter of 2022, China reemerged as an important import source, accounting for 38% of acid-grade imports. Mexico accounted for 95% of metallurgical-grade imports, followed by China (4%) (table 2).

In the second quarter of 2022, imports of other fluorine-containing materials produced directly from fluorspar were 27,100 t for hydrofluoric acid, 8,640 t for cryolite, and 6,450 t for aluminum fluoride (table 1). Mexico was the leading

supplier of hydrofluoric acid accounting for 89% of imports (table 3). Exports of acid- and metallurgical-grade fluorspar, aluminum fluoride, and cryolite were likely re-exports as there is no domestic production (table 1).

In the second quarter of 2022, the quarterly average unit value of acid-grade imports was \$439 per metric ton, an increase of 36% compared with the 2021 annual average unit value of \$322 per metric ton. The quarterly average unit value of acid-grade imports from Mexico was \$362, a 9% increase compared with \$331 in 2021. The quarterly average unit value of acid-grade imports from China was \$590 per metric ton. Supply-side constraints included the idling of Canada Fluorspar (NL), Inc.'s (CFI's) operations in Newfoundland and Labrador, Canada, decreased production in Mexico, and rising energy and logistics costs reportedly contributed to increased fluorspar prices (Cook, 2022). However, the quarterly average unit value of metallurgical-grade imports from Mexico was \$99 per metric ton, an 30% decrease compared with the 2021 annual average unit value of \$141 per

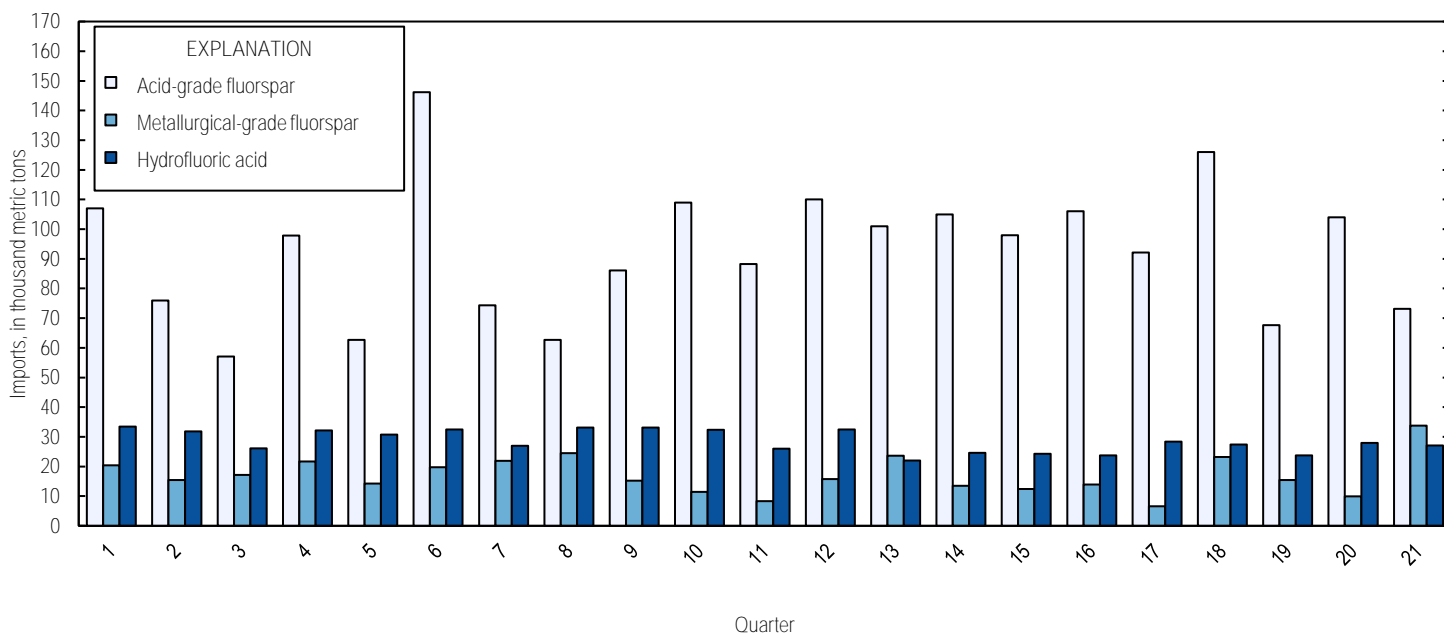


Figure 1. Acid-grade fluorspar, metallurgical-grade fluorspar, and hydrofluoric acid imports from the second quarter of 2017 through the second quarter of 2022. Source: U.S. Census Bureau and U.S. Geological Survey.

metric ton (table 2).

### Mining and Exploration News

In the second quarter of 2022, the mine and processing operations of CFI remained idle and under the control of a court-appointed receiver. The receiver sold the company's stockpile of 8,095 t (dry) of acid-grade fluorspar to Fluorsid Noralf AS of Norway for \$550 per metric ton and advanced plans to sell CFI's assets to interested parties. By the end of April, the receiver had identified more than 5 qualified bidders. Based on feedback from the qualified bidders, the lender agreed to fund a National Instrument 43-101 report for the operation which was expected to be completed in mid-June. Because of the extra time needed to complete the report, the projected closing date for sale of the company's assets was extended to September 2 (Grant Thornton Ltd. 2022, p. 19, 23–24, 27, Appendix D).

Mexichem Fluor, S.A. de C.V.'s (known commercially as Koura) force majeure for fluorspar supply contracts remained in effect in the second quarter of 2022 owing to ongoing safety issues at the company's Las Cuevas Mine. The Las Cuevas Mine is Koura's main fluorspar production asset and is thought to be the world's leading producing and exporting fluorspar mine. Koura is vertically integrated with downstream production of fluorochemicals including aluminum fluoride, hydrofluoric acid, medical propellants, and refrigerant gases (Orbia Advance Corp., S.A.B. de C.V., 2022, p. 68–69, 93, 94). Production statistics from the Government of Mexico indicated that the country's fluorspar production in the first half of 2022 was 499,000 t, which was only a slight decrease from production in the first half of 2021 (National Institute of Statistics and Geography, 2022). Trade statistics, however, indicated that acid-grade fluorspar exports from Mexico decreased by 46% in the first half of 2022 compared with the first half of 2021, and that metallurgical-grade fluorspar exports decreased by 52% (Zen Innovations AG, 2022).

### Fluorochemical News

In June, the U.S. Environmental Protection Agency (EPA) released four interim drinking water health advisories for per- and polyfluoroalkyl substances (PFAS). Drinking water advisories for perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) replaced initial advisories released in 2016. The updated advisory levels considered lifetime exposure and were based on new research that indicated that adverse health effects may occur even when PFOA and PFOS concentration levels were near zero or below the non-detection limit. The EPA released two new advisories

for perfluorobutane sulfonic acid (and its potassium salt) and hexafluoropropylene oxide dimer acid (and its ammonium salt) which were designed as replacements for PFOS and PFOA, respectively. The agency expected that these interim advisories would be replaced with a national PFAS drinking water regulation that was slated for release in the fall of 2022. In a separate action, the EPA announced that, through the Bipartisan Infrastructure Law, \$1 billion in grant funding was available for communities, states and territories to address PFAS and other drinking water contamination (U.S. Environmental Protection Agency, 2022).

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- U.S. Environmental Protection Agency, 2022, EPA announces new drinking water health advisories for PFAS chemicals, \$1 billion in Bipartisan Infrastructure Law funding to strengthen health protections: U.S. Environmental Protection Agency, June 15. (Accessed September 27, 2022, at <https://www.epa.gov/newsreleases/epa-announces-new-drinking-water-health-advisories-pfas-chemicals-1-billion-bipartisan>.)
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TABLE 1  
SALIENT FLUORSPAR STATISTICS<sup>1</sup>

(Metric tons)

	2021				2022	
	2d quarter	3d quarter	4th quarter	1st quarter– 4th quarter	1st quarter	2d quarter
Production, fluorspar	--	--	--	--	--	--
Imports for consumption: <sup>2</sup>						
Fluorspar:						
Acid grade, more than 97% calcium fluoride	92,300 <sup>r</sup>	125,000 <sup>r</sup>	67,600	391,000 <sup>r</sup>	104,000	73,100
Metallurgical grade, less than 97% calcium fluoride	6,640	23,200	15,400	59,200	9,940	33,800
Total	99,000 <sup>r</sup>	149,000	83,000	451,000	114,000	107,000
Hydrofluoric acid	28,400	27,400	23,700	103,000	28,000	27,100
Aluminum fluoride	5,200	10,200	7,220	27,600	4,600	6,450
Cryolite	12,400	8,190	9,670	41,600	6,010	8,640
Exports: <sup>2</sup>						
Fluorspar:						
Acid grade, more than 97% calcium fluoride	1,010	754	1,070	3,860 <sup>r</sup>	2,250	5,650
Metallurgical grade, less than 97% calcium fluoride	3,520	2,570	2,380	10,900	2,420	2,920
Total	4,530	3,320	3,450	14,800 <sup>r</sup>	4,670	8,570
Hydrofluoric acid	4,550	3,470 <sup>r</sup>	2,480	16,600	2,310	2,000
Aluminum fluoride	60	65	28	196	560	9,800
Cryolite	2,040	2,710 <sup>r</sup>	4,360 <sup>r</sup>	10,700 <sup>r</sup>	2,980	2,560
Apparent consumption, fluorspar: <sup>3</sup>						
Acid grade, more than 97% calcium fluoride	91,300 <sup>r</sup>	125,000	66,500	388,000	102,000	67,500
Metallurgical grade, less than 97% calcium fluoride	3,120	20,600	13,100	48,300	7,520	30,900
Total	94,400 <sup>r</sup>	145,000	79,600	436,000	109,000	98,400

<sup>r</sup>Revised. -- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Source: U.S. Census Bureau; may be adjusted by U.S. Geological Survey.

<sup>3</sup>Imports minus exports.

TABLE 2  
U.S. IMPORTS FOR CONSUMPTION OF FLUORSPAR, BY COUNTRY AND VALUE<sup>1,2,3</sup>

	2021								2022			
	2d quarter		3d quarter		4th quarter		1st quarter–4th quarter		1st quarter		2d quarter	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Acid grade, more than 97% calcium fluoride:												
Canada	8,480	\$2,460	--	--	18,400	\$5,350	39,400	\$11,300	1	\$3	--	--
China	--	--	--	--	--	--	--	--	--	--	27,600	\$16,300
Germany	194	108	82	\$47	82	47	512	288	--	--	--	--
Hong Kong	--	--	--	--	--	--	--	--	134	71	--	--
Japan	892	537	636	370	824	446	2,380	1,380	629	361	3,580	580
Mexico	82,600 <sup>r</sup>	26,700 <sup>r</sup>	82,900 <sup>r</sup>	27,400	47,700	16,000	260,000	86,100 <sup>r</sup>	62,300	19,200	42,000	15,200
Mongolia	131	79	396	237	532	350	1,190	750	--	--	--	--
South Africa	--	--	--	--	--	--	24,800	9,940	18,200	6,090	--	--
Spain	--	--	7	5	--	--	7	5	--	--	--	--
United Kingdom	3	8	1	3	3	8	10	32	3	9	4	14
Vietnam	--	--	41,400	10,600	--	--	63,000	16,200 <sup>e</sup>	23,000	6,310 <sup>e</sup>	--	--
Total	92,300 <sup>r</sup>	29,900 <sup>r</sup>	125,000 <sup>r</sup>	38,700	67,600	22,200	391,000 <sup>r</sup>	126,000	104,000	32,100	73,100	32,100
Metallurgical grade, less than 97% calcium fluoride:												
Canada	--	--	--	--	6	4	6	4	--	--	--	--
China	--	--	15	12	300	169	455	263	270	150	1,500	878
Mexico	6,600	1,200	22,900	2,840	14,600	2,220	57,900	8,160	9,580	1,110	32,100	3,160
Mongolia	--	--	245	144	498	295	743	439	--	--	249	147
Netherlands	35	22	--	--	1	4	37	28	--	--	--	--
Pakistan	--	--	--	--	--	--	--	--	83	57	--	--
South Africa	11	5	--	--	--	--	29	15	--	--	--	--
United Kingdom	--	--	3	7	6	18	10	31	5	4	1	5
Total	6,640	1,230	23,200	3,000	15,400	2,710	59,200	8,940	9,940	1,320	33,800	4,190
Grand total	99,000 <sup>r</sup>	31,200 <sup>r</sup>	149,000	41,700	83,000	24,900	451,000	135,000	114,000	33,400	107,000	36,300

<sup>e</sup>Estimated. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Imports for consumption include imports of immediate entry and warehouse withdrawals.

<sup>2</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>3</sup>Cost, insurance, and freight at U.S. ports.

Source: U.S. Census Bureau, may be adjusted by U.S. Geological Survey.

TABLE 3  
U.S. IMPORTS FOR CONSUMPTION OF HYDROFLUORIC ACID<sup>1,2</sup>

	2021								2022			
	2d quarter		3d quarter		4th quarter		1st quarter–4th quarter		1st quarter		2d quarter	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Canada	63	\$133	70	\$153	90	\$183	325	\$679	121	\$230	104	\$220
China	89	153	18	20	17	48	329	464	56	96	--	--
Germany	221	464	136	276	250	619	884	1,810	111	282	238	590
India	182	277	89	151	53	93	430	656	--	--	18	40
Japan	503	1,150	662	1,440	536	1,190	2,280	5,040	393	854	724	1,460
Korea, Republic of	223	623	308	1,010	293	953	1,020	3,190	200	614	552	966
Mexico	25,800	39,900	25,300	40,900	21,300	35,500	93,800	150,000	26,100	47,900	24,100	45,000
Mongolia	17	39	--	--	--	--	17	39	--	--	--	--
Singapore	114	346	113	398	97	365	417	1,430	80	295	118	456
Spain	580	785	389	541	510	795	1,830	2,660	331	649	386	976
Taiwan	632	1,730	365	795	559	1,260	1,940	4,870	610	2,100	860	2,780
United Kingdom	--	--	(3)	3	--	--	(3)	3	--	--	--	--
Total	28,400	45,600	27,400	45,700	23,700	41,000	103,000	171,000 <sup>1</sup>	28,000	53,100	27,100	52,500

<sup>1</sup>Revised. -- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Cost, insurance, and freight at U.S. ports.

<sup>3</sup>Less than ½ unit.

Source: U.S. Census Bureau.