

Mineral Industry Surveys

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FLUORSPAR IN THE SECOND QUARTER 2019

Fluorspar imports in the second quarter of 2019 were 97,200 metric tons (t), 86,100 t of which were acid grade and 11,100 t of which were metallurgical grade (fig. 1, table 1). Acid-grade imports increased by 11% as compared with those in the previous quarter and increased by 37% as compared with imports in the second quarter of 2018. Metallurgical-grade imports decreased by 54% as compared with those in the previous quarter and decreased by 22% as compared with imports in the second quarter of 2018. Fluorspar imports can vary substantially from quarter to quarter based on supply agreements and production schedules of leading fluorspar consumers.

In the second quarter of 2019 imports of other fluorine-containing materials produced directly from fluorspar were 33,100 t for hydrofluoric acid, 12,900 t for aluminum fluoride, and 5,260 t for cryolite (table 1). Mexico was the leading supplier of hydrofluoric acid accounting for 90% 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).

The average unit value of acid-grade imports in the second quarter of 2019 was \$339 per metric ton, a 23% increase as compared with the annual average unit value of \$276 per metric ton in 2018. Although the average unit value of acid-grade imports from Mexico was unchanged from the previous quarter, at \$271 per metric ton, the increase in overall average unit value was attributed to imports from South Africa and Spain, which were \$450 and \$460 per metric ton, respectively. The average unit value of metallurgical-grade fluorspar from Mexico (99% of metallurgical-grade imports) was \$302 per metric ton, an 23% increase as compared with the annual average unit value of metallurgical-grade imports from Mexico in 2018.

According to Fastmarkets IM, the price of acid-grade fluorspar from China increased slightly to \$460 to \$520 per metric ton in the second quarter of 2019 compared with the first quarter of 2019 (table 4). Prices from other major exporting countries including Mexico and South Africa were unchanged. The price of metallurgical-grade fluorspar from Mexico was also unchanged from the previous quarter.

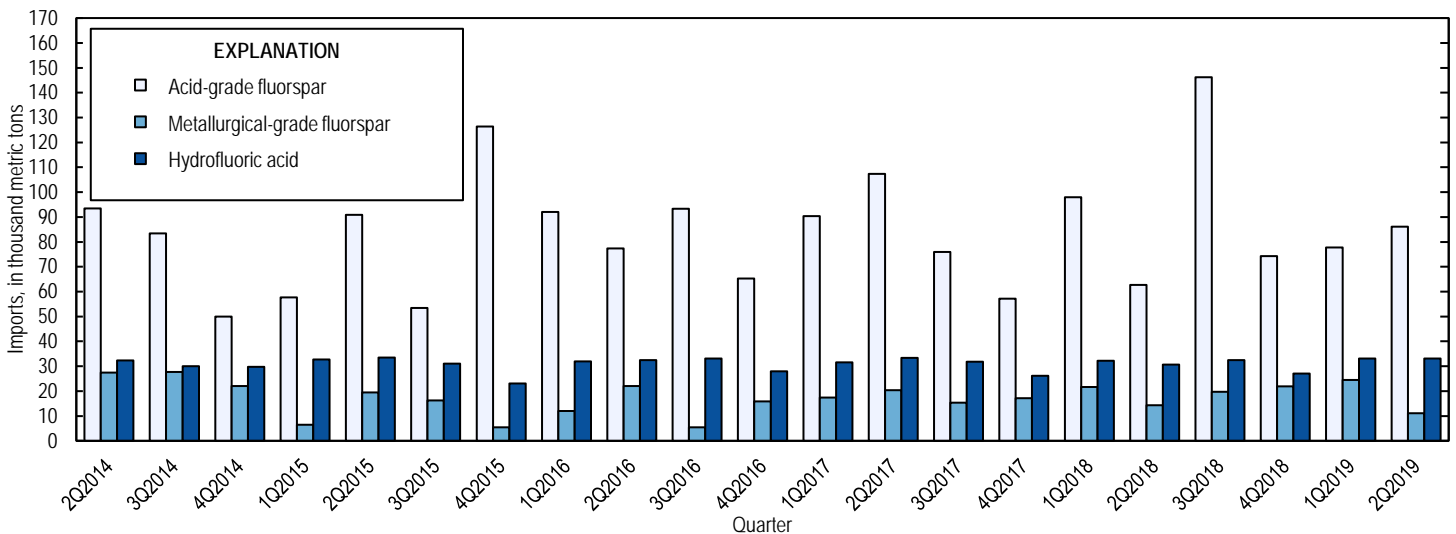


Figure 1. Acid-grade fluorspar, metallurgical-grade fluorspar, and hydrofluoric acid imports from the second quarter of 2014 through the second quarter of 2019. Source: U.S. Census Bureau.

Fluorochemical News

In April 2019, Husky Energy Inc. (Canada) announced that it would continue to use hydrofluoric acid (HF) as a catalyst in the alkylation unit of its refinery in Superior, WI, which was damaged by an explosion in 2018. Owing to safety concerns about the use of HF in refining operations, residents and public officials had asked the company to consider using a different catalyst. Although the HF tank wasn't damaged, debris from the explosion punctured an asphalt tank in the same vicinity. The company concluded that switching to a different catalyst would not be economical and that it would implement other safety measures to prevent release of HF (Hughlett, 2019).

During the course of its investigation of the Superior refinery accident, the U.S. Chemical Safety and Hazard Information Board (CSB) sent a letter to the U.S. Environmental Protection Agency (EPA) recommending that it review and update its 1993 study on the potential health and safety risks related to accidental release of HF. The CSB urged the EPA to evaluate whether refineries' risk management plans were sufficient to prevent future releases of HF, and to study the safety and efficacy of alternative alkylation technologies. The conclusion was based on both the CSB's ongoing investigation of the Superior refinery accident and its previous investigation of a 2015 accident at a refinery in Torrance, CA (U.S. Chemical Safety and Hazard Information Board, 2019a).

In June 2019, a series of explosions and subsequent fire destroyed the hydrofluoric acid alkylation unit at Philadelphia Energy Solutions (PES) refinery in Philadelphia, PA. Although a control room operator activated a safety system that drained the HF tank in the alkylation unit, the CSB later determined that an estimated 2.4 t of hydrofluoric acid was released as part of the process fluid in the system. The CSB further determined that the initial point of failure was a ruptured pipe elbow that had corroded from contact with the HF in the process fluid. PES later announced that the refinery would be permanently shut down and filed for bankruptcy (U.S. Chemical Safety and Hazard Information Board, 2019b).

Mining and Exploration News

Canada Fluorspar (NL) Inc. (CFI) submitted a project

registration for the construction of a marine shipping terminal to The Canadian Environmental Assessment Agency and the Newfoundland and Labrador Department of Municipal Affairs and Environment. CFI had previously planned to construct a marine shipping terminal at Blue Beach Cove, on the eastern shore of Newfoundland and Labrador, Canada. In the interim, fluorspar had been trucked 45 kilometers to Marystown for export. However, the company had received inquiries for larger shipments that could not be accommodated by either location. CFI's new proposed location in Little Lawn Harbour is closer to the mine site and would accommodate ships up to 72,000 deadweight tonnage, which would facilitate export of up to 200,000 metric tons per year of fluorspar concentrate and 2,000,000 metric tons per year of construction aggregate (Canada Fluorspar (NL) Inc., 2019, p. 1–4; Tilley, 2019).

References Cited

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- Hughlett, Mike, 2019, Husky Energy to stick with hydrogen fluoride at rebuilt Superior plant: The Star Tribune [Minneapolis, MN], April 3. (Accessed April 30, 2020, at <https://www.startribune.com/husky-energy-sticks-with-hydrogen-fluoride-at-rebuilt-superior-plant/508061162/?refresh=true>.)
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- U.S. Chemical Safety and Hazard Information Board, 2019a, CSB calls on EPA to update HF study in wake of the 2017 Husky Refinery fire: Washington, D.C., U.S. Chemical Safety and Hazard Information Board news release, April 24. (Accessed April 30, 2020, at <https://www.csb.gov/csb-calls-on-epa-to-update-hf-study-in-wake-of-the-2017-husky-refinery-fire/>.)
- U.S. Chemical Safety and Hazard Information Board, 2019b, Fire and explosions at Philadelphia Energy Solutions refinery hydrofluoric acid alkylation unit—Factual update: Washington, D.C., U.S. Chemical Safety and Hazard Information Board, October 16, 10 p. (Accessed April 30, 2020, at <https://www.csb.gov/chemical-safety-board-releases-factual-update-and-new-animation-detailing-the-events-of-the-massive-explosion-and-fire-at-the-pes-refinery-in-philadelphia-pa/>.)

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TABLE 1
SALIENT FLUORSPAR STATISTICS¹

(Metric tons, unless otherwise specified)

	2018				2019	
	2d quarter	3d quarter	4th quarter	1st quarter– 4th quarter	1st quarter	2d quarter
Production, fluorspar	--	--	--	--	--	--
Imports for consumption: ²						
Fluorspar:						
Acid grade, more than 97% calcium fluoride	62,700	146,000	74,300	381,000	77,700	86,100
Metallurgical grade, less than 97% calcium fluoride	14,300	19,700	21,900	77,600	24,500	11,100
Total	77,000	166,000	96,200	459,000	102,000	97,200
Hydrofluoric acid	30,900	32,500	27,000	123,000	33,100	33,100
Aluminum fluoride	6,830	6,320	8,640	25,600	7,050	12,900
Cryolite	3,940	4,060	6,490	16,800	5,970	5,260
Exports: ²						
Fluorspar:						
Acid grade, more than 97% calcium fluoride	1,300	403	126	2,720	125	796
Metallurgical grade, less than 97% calcium fluoride	1,190	1,750	1,500	6,250	1,740	929
Total	2,490	2,150	1,620	8,970	1,870	1,730
Hydrofluoric acid	4,510	4,420	5,330	18,500	4,800	4,610
Aluminum fluoride	170	304	450	1,030	89	159
Cryolite	3,900	2,570	2,070	11,700	2,850	2,360
Apparent consumption, fluorspar: ³						
Acid grade, more than 97% calcium fluoride	61,400	146,000	74,200	378,000	77,600	85,300
Metallurgical grade, less than 97% calcium fluoride	13,100	17,900	20,400	71,300	22,700	10,200
Total	74,500	164,000	94,600	450,000	100,000	95,500

-- Zero. NA Not available.

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

²Source: U.S. Census Bureau.

³Imports minus exports.

TABLE 2
U.S. IMPORTS FOR CONSUMPTION OF FLUORSPAR, BY COUNTRY AND VALUE^{1,2,3}

	2018								2019			
	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	--	--	11,000	\$3,430	--	--	11,000	\$3,430	4,810	\$1,250	--	--
China	280	\$166	--	--	--	--	394	244	--	--	9,960	\$4,760
France	--	--	--	--	--	--	--	--	--	--	38	21
Germany	189	102	76	55	444	\$73	1,190	307	452	77	--	--
Japan	1	3	629	330	--	--	630	333	--	--	--	--
Mexico	62,200	15,900	61,600	16,400	58,100	14,400	235,000	60,500	57,300	15,500	55,900	15,100
Mongolia	--	--	340	227	231	154	571	381	57	37	168	104
Russia	1	14	--	--	--	--	1	14	--	--	--	--
South Africa	--	--	26,700	9,470	--	--	41,700	14,400	--	--	9,990	4,500
Spain	19	13	8,990	2,980	--	--	19,000	6,320	1	6	10,100	4,640
United Kingdom	2	6	--	--	11	6	15	18	--	--	4	12
Vietnam	--	--	36,900	10,300	15,500	3,910	71,300	19,400	15,100	4,260	--	--
Total	62,700	16,300	146,000	43,200	74,300	18,600	381,000	105,000	77,700	21,100	86,100	29,200
Metallurgical grade, less than 97% calcium fluoride:												
Belgium	--	--	1	\$4	--	--	1	\$4	--	--	--	--
China	233	\$157	294	191	306	\$183	859	549	212	\$133	89	\$58
Germany	--	--	--	--	--	--	--	--	--	--	6	4
India	--	--	--	--	--	--	--	--	21	12	36	21
Mexico	13,700	3,560	19,200	5,020	21,200	4,730	75,400	18,500	23,900	5,640	11,000	3,320
Mongolia	280	189	200	152	340	224	1,100	777	336	198	--	--
Netherlands	--	--	--	--	--	--	--	--	1	4	--	--
South Africa	--	--	--	--	1	11	28	22	--	--	--	--
Spain	81	50	--	--	--	--	133	89	--	--	--	--
United Kingdom	--	--	--	--	1	17	1	17	--	--	--	--
Total	14,300	3,950	19,700	5,360	21,900	5,170	77,600	20,000	24,500	5,990	11,100	3,400
Grand total	77,000	20,200	166,000	48,600	96,200	23,700	459,000	125,000	102,000	27,100	97,200	32,600

-- Zero.

¹Imports for consumption include imports of immediate entry and warehouse withdrawals.

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

³Cost, insurance, and freight at U.S. ports.

Source: U.S. Census Bureau.

TABLE 3
U.S. IMPORTS FOR CONSUMPTION OF HYDROFLUORIC ACID^{1,2}

	2018								2019			
	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)
Belgium	--	--	--	--	--	--	--	--	18	\$42	--	--
Canada	83	\$162	122	\$246	104	\$216	410	\$855	63	210	44	\$154
China	660	911	803	929	395	480	2,550	3,190	431	592	892	1,110
Germany	443	843	389	800	243	541	1,460	2,920	271	634	238	605
India	55	87	--	--	18	22	74	109	37	49	179	179
Japan	524	1,290	330	1,090	354	956	1,490	3,820	270	682	589	1,480
Korea, Republic of	303	310	395	464	325	869	1,130	1,840	674	1,310	692	1,470
Mexico	27,600	40,400	29,800	43,500	24,800	37,300	112,000	165,000	30,600	46,500	29,600	46,200
Netherlands	--	--	--	--	--	--	--	--	--	--	18	23
Singapore	129	379	97	310	64	206	386	1,180	129	407	32	102
Spain	714	1,040	496	738	601	876	2,270	3,260	493	872	591	936
Sweden	--	--	18	70	--	--	18	70	--	--	--	--
Taiwan	148	370	70	201	133	403	438	1,230	56	158	175	475
United Kingdom	--	--	--	--	--	--	(3)	2	--	--	--	--
Total	30,700	45,800	32,500	48,400	27,000	41,900	122,000	183,000	33,100	51,400	33,100	52,700

-- Zero.

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

²Cost, insurance, and freight at U.S. ports.

³Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 4
END OF QUARTER FLUORSPAR PRICES

(Dollars per metric ton)

	2018			2019	
	2d quarter	3d quarter	4th quarter	1st quarter	2d quarter
Acid grade, more than 97% calcium fluoride:					
Dry basis, cost, insurance, and freight, Gulf port, filtercake	260–270	260–270	260–270	260–270	NA
China, free on board (f.o.b.) China, wet filtercake	450–530	410–500	550–580	450–515	460–520
Mexican, f.o.b. Tampico, wet filtercake ¹	260–280	300–320	400–450	400–450	400–450
Mexican, f.o.b. Tampico, arsenic <5 parts per million	280–310	NA	NA	NA	NA
South Africa, f.o.b. Durban, filtercake	350–400	350–400	450–490	440–490	440–490
Metallurgical grade, minimum 85% calcium fluoride, Mexican, f.o.b. Tampico	230–250	230–250	300–320	280–320	280–320

NA Not available.

¹As of the third quarter of 2018, price includes material formerly listed as 'Mexican, f.o.b. Tampico, arsenic <5 parts per million'.

Source: Fastmarkets IM (London).