

Mineral Industry Surveys

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FLUORSPAR IN THE THIRD QUARTER 2017

Fluorspar imports in the third quarter of 2017 were 91,400 metric tons (t), 76,000 t of which were acid grade and 15,400 t of which were metallurgical grade (fig. 1, table 1). These quantities represented a decrease in total fluorspar imports of 28% compared with the second quarter of 2017 and a decrease of 7% compared with the third quarter of 2016. Fluorspar exports were 3,880 t, likely re-exports as the United States has no domestic fluorspar production.

Imports of fluorine-containing materials were 31,800 t for hydrofluoric acid, 5,470 t for aluminum fluoride, and 2,790 t for cryolite in the third quarter of 2017. These quantities represented a decrease of 5% for hydrofluoric acid, an increase of 29% for aluminum fluoride, and an increase of 15% for cryolite compared with the second quarter of 2017. Compared to the third quarter of 2016, imports decreased by 4% for hydrofluoric acid, increased slightly for aluminum fluoride, and decreased by 6% for cryolite (table 1).

Exports of fluorine-containing materials were 2,290 t for hydrofluoric acid, 69 t for aluminum fluoride, and 3,430 t for

cryolite in the third quarter of 2017. Exports of aluminum fluoride and cryolite were likely re-exports as the United States has no domestic production (table 1).

In order of import quantity, Mexico and Spain were the leading import sources of fluorspar (table 2), whereas Mexico, Japan, and China were the leading import sources of hydrofluoric acid (table 3). Though imports of acid-grade fluorspar from China increased in the third quarter compared with the second quarter, they remained relatively low compared with previous quarters owing to the high price of acid-grade fluorspar from China (tables 2, 5).

Compared with prices of the previous quarter, prices at the end of the third quarter of 2017 for acid-grade fluorspar from Mexico and South Africa remained unchanged. Acid-grade fluorspar prices from China, specifically free-on-board wet filtercake, decreased by 10% to 11% compared with the previous quarter; however, they remain relatively high having increased by 38% to 42% compared with the third quarter of the previous year. Prices at the end of the third quarter of 2017

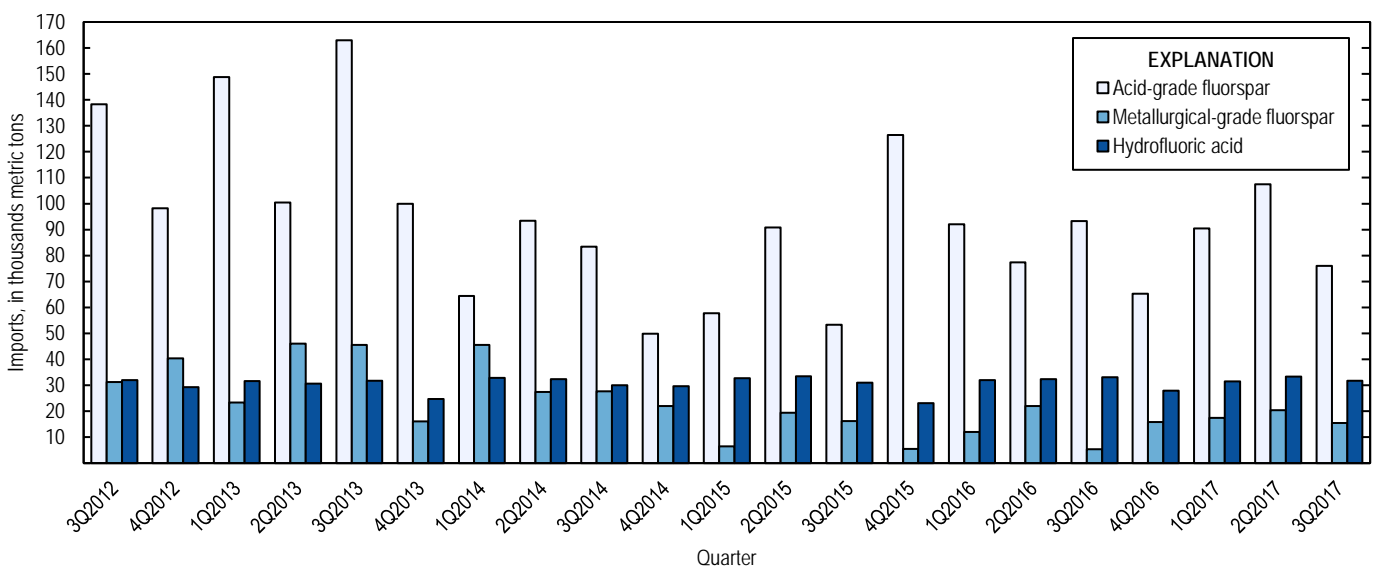


Figure 1. Acid-grade fluorspar, metallurgical-grade fluorspar, and hydrofluoric acid imports from the third quarter of 2012 through the third quarter of 2017. Source: U.S. Census Bureau.

for metallurgical-grade fluorspar from Mexico remained the same as the previous quarter (fig. 2, table 5).

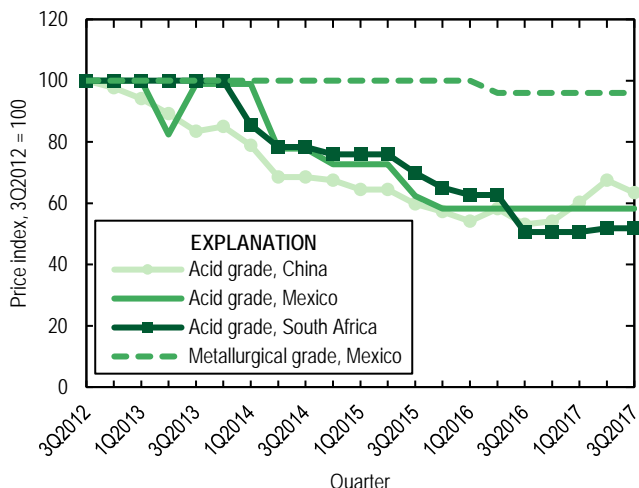


Figure 2. Acid- and metallurgical-grade fluorspar prices, by country, from the third quarter of 2012 through the third quarter of 2017. Prices are indexed to the third quarter of 2012. Source: Industrial Minerals (London).

Mining and Exploration News

Construction began on two fluorspar mines in the third quarter of 2017. Canada Fluorspar Inc.'s St. Lawrence Mine has an anticipated annual acid-grade fluorspar production capacity of 200,000 metric tons per year (t/yr). First production was expected in early 2018 (Canada Fluorspar Inc., 2017, written communication; VOcm, 2017). SepFluor's Nokeng Mine in Gauteng, South Africa, began construction in July with the first production anticipated for the first quarter of 2019. The mine is expected to produce 180,000 t/yr of acid-grade fluorspar and 30,000 t/yr of metallurgical-grade fluorspar (Breytenbach, 2017; Roskill Information Services, 2017).

In August 2017, Arctic Star Exploration TSXV:ADD announced the discovery of a rare carbonatite-syenite complex in east-central British Columbia. The complex likely hosts fluorspar as well as copper, gold, iron, lime, nickel, platinum-group metals, rare-earth elements, sodalite, tantalum, titanium, vermiculite, and zirconium (Klein, 2017).

Fluorochemical News

In September 2017, Arkema SA announced that it plans to expand fluoropolymer Kynar® PVDF production capacities by 20% beginning in mid-2018 at its plant in Calvert City, KY (Arkema SA, 2017a).

Legislation and Government Programs

On August 8, 2017, the D.C. Circuit Court of Appeals ruled that the Environmental Protection Agency (EPA) did not have the authority to ban the use of hydrofluorocarbons under the Significant New Alternative Policy (SNAP) program

(Mexichem Fluor, Inc. v. EPA, 2017). Arkema announced its support of the ruling (Arkema SA, 2017b). However, Honeywell International, Inc. and Chemours Company filed an appeal arguing that the court ignored the EPA's original directive to replace ozone-depleting substances with safer alternatives (Chemours Company, 2017; Honeywell International, Inc., 2017).

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NOTICE

The U.S. Geological Survey plans to discontinue this quarterly Mineral Industry Surveys report. The last published report will be Fluorspar in the Fourth Quarter 2017. Information on this mineral commodity will still be available on an annual basis in the fluorspar chapters of the Mineral Commodity Summaries and the Minerals Yearbook, Volume I, Metals and Minerals. Prior to the proposed discontinuation date, please direct any comments or concerns to Elizabeth Sangine, Chief, Mineral Commodities Section, escottsangine@usgs.gov.

TABLE 1
SALIENT FLUORSPAR STATISTICS¹

(Metric tons, unless otherwise specified)

	2016			2017			
	3d quarter	4th quarter	1st quarter– 4th quarter	1st quarter	2d quarter	3d quarter	1st quarter– 3d quarter
Production:							
Fluorspar:	--	--	--	--	--	--	--
Imports for consumption: ²							
Fluorspar:							
Acid grade, more than 97% calcium fluoride	93,300	65,300	328,000	90,400	107,000	76,000	274,000
Metallurgical grade, less than 97% calcium fluoride	5,390	15,900	55,200	17,400	20,400	15,400	53,300
Total	98,700	81,200	383,000	108,000	128,000	91,400	327,000
Hydrofluoric acid	33,100	27,900	126,000	31,500	33,400	31,800	96,600
Aluminum fluoride	5,420	5,750	20,400	6,350	4,230	5,470	16,100
Cryolite	2,960	4,400	15,700	2,670	2,420	2,790	7,880
Exports: ²							
Fluorspar:							
Acid grade, more than 97% calcium fluoride	1,710	761	6,930	811	1,220	2,090	4,120
Metallurgical grade, less than 97% calcium fluoride	1,110	1,310	5,000	941	1,480	1,800	4,220
Total	2,820	2,070	11,900	1,750	2,710	3,880	8,340
Hydrofluoric acid	1,940	3,490	11,500	4,010	3,370	2,290	9,670
Aluminum fluoride	249	56	1,270	82	55	69	206
Cryolite	3,390	2,780	13,200	2,850	2,990	3,430	9,270
Apparent consumption: ³							
Fluorspar:							
Acid grade, more than 97% calcium fluoride	91,600	64,600	321,000	89,600	106,000	73,900	270,000
Metallurgical grade, less than 97% calcium fluoride	4,280	14,500	50,200	16,500	18,900	13,600	49,000
Total	95,900	79,100	371,000	106,000	125,000	87,600	319,000

-- Zero.

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

²Source: U.S. Census Bureau.

³Imports minus exports. Note that unlike previous apparent consumption values, this does not include stock adjustments in the calculation.

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

	2016						2017							
	3d quarter		4th quarter		1st quarter-4th quarter		1st quarter		2d quarter		3d quarter		1st quarter - 3d 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)	Quantity (metric tons)	Value (thousands)
Acid grade, more than 97% calcium fluoride:														
China	8,550	\$2,550	--	--	46,100	\$14,000	44,300	\$12,900	38	\$22	266	\$148	44,600	\$13,000
France	--	--	--	--	285	150	--	--	--	--	--	--	--	--
Germany	--	--	168	\$91	441	235	137	73	114	51	229	109	480	233
Israel	--	--	--	--	1	7	--	--	--	--	--	--	--	--
Japan	--	--	--	--	--	--	--	--	1	3	--	--	1	3
Mexico	52,000	14,000	62,900	17,200	213,000	58,400	31,300	8,450	48,800	12,900	65,400	17,100	146,000	38,500
Mongolia	95	51	152	78	247	129	76	39	38	20	38	22	152	80
Russia	--	--	1	6	1	6	--	--	--	--	--	--	--	--
South Africa	14,900	3,130	--	--	31,300	6,260	--	--	27,900	5,990	--	--	27,900	5,990
Spain	--	--	--	--	10,900	2,680	10,100	2,240	--	--	10,000	2,420	20,100	4,650
United Kingdom	167	87	2,070	997	2,230	1,090	2	5	--	--	2	6	4	11
Vietnam	17,700	5,360	--	--	23,300	6,490	4,500	993	30,500	9,740	--	--	35,000	10,700
Total	93,300	25,200	65,300	18,300	328,000	89,500	90,400	24,700	107,000	28,700	76,000	19,800	274,000	73,200
Metallurgical grade, less than 97% calcium fluoride:														
China	9	6	52	17	61	23	191	122	271	161	86	51	548	334
Mexico	5,380	1,130	15,800	3,650	54,500	12,400	17,300	3,970	20,100	4,670	15,400	3,660	52,700	12,300
Mongolia	--	--	--	--	700	406	--	--	--	--	--	--	--	--
Netherlands	--	--	--	--	--	--	--	--	--	--	1	8	1	8
Total	5,390	1,140	15,900	3,670	55,200	12,900	17,400	4,090	20,400	4,830	15,400	3,720	53,300	12,600
Grand total	98,700	26,300	81,200	22,000	383,000	102,000	108,000	28,800	128,000	33,500	91,400	23,500	327,000	85,900

-- 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}

	2016						2017							
	3d quarter		4th quarter		1st quarter–4th quarter		1st quarter		2d quarter		3d quarter		1st quarter–3d 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)	Quantity (metric tons)	Value (thousands)
Canada	200	\$309	110	\$211	595	\$988	182	\$225	316	\$551	114	\$216	613	\$993
China	2,100	1,940	1,980	1,780	7,550	6,900	1,650	1,450	1,740	1,810	987	1,150	4,370	4,410
Germany	312	591	281	521	1,100	2,260	386	737	418	810	322	595	1,130	2,140
Japan	517	618	551	728	1,560	2,020	955	1,170	993	1,240	1,240	1,520	3,190	3,930
Mexico	29,700	45,700	24,700	38,100	114,000	175,000	27,900	40,100	29,600	42,200	28,500	41,500	86,100	124,000
Republic of Korea	51	201	37	134	89	334	89	279	56	201	149	531	294	1,010
Spain	36	104	19	58	149	424	56	137	95	188	252	367	403	693
Taiwan	166	295	217	418	533	1,130	126	264	68	208	70	206	264	677
Other ³	99	244	83	164	346	829	99	236	115	259	99	225	313	720
Total	33,100	50,000	27,900	42,100	126,000	190,000	31,500	44,600	33,400	47,400	31,800	46,400	96,600	138,000

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

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

³Includes imports from Belgium, India, and Singapore, all countries with imports less than 100 metric tons in the third quarter of 2017.

Source: U.S. Census Bureau.

TABLE 4
U.S. EXPORTS OF FLUORSPAR, BY COUNTRY AND VALUE^{1,2,3}

	2016						2017							
	3d quarter		4th quarter		1st quarter–4th quarter		1st quarter		2d quarter		3d quarter		1st quarter–3d 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)	Quantity (metric tons)	Value (thousands)
Acid grade, more than 97% calcium fluoride:														
Canada	1,420	\$239	636	\$137	6,520	\$1,060	729	\$196	866	\$185	803	\$158	2,400	\$539
Chile	--	--	81	9	81	9	22	9	--	--	172	19	194	29
Mexico	285	32	--	--	285	32	--	--	322	36	1,090	122	1,410	158
Other ⁴	--	--	44	6	44	6	60	18	36	4	20	5	116	27
Total	1,710	271	761	152	6,930	1,100	811	223	1,220	225	2,090	304	4,120	753
Metallurgical grade, less than 97% calcium fluoride:														
Canada	642	102	968	157	4,190	672	936	156	1,330	262	1,170	227	3,430	645
Hong Kong	--	--	--	--	--	--	--	--	--	--	308	45	308	45
Malaysia	6	6	--	--	10	10	--	--	--	--	164	24	164	24
Other ⁵	461	64	341	55	802	119	5	4	156	23	160	23	321	50
Total	1,110	172	1,310	212	5,000	801	941	160	1,480	285	1,800	319	4,220	764
Grand total	2,820	443	2,070	364	11,900	1,900	1,750	383	2,710	510	3,880	623	8,340	1,520

-- Zero.

¹Exports include domestic exports only.

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

³Free alongside ship values at U.S. ports.

⁴Includes exports to El Salvador, Italy, and the Republic of Korea.

⁵Includes exports to Australia, Chile, the Dominican Republic, France, Indonesia, Japan, Mexico, Nicaragua, and Trinidad and Tobago.

Source: U.S. Census Bureau.

TABLE 5
END OF QUARTER FLUORSPAR PRICES

(Dollars per metric ton)

	2016		2017		
	3d quarter	4th quarter	1st quarter	2d quarter	3d quarter
Acid grade, more than 97% calcium fluoride:					
Chinese, dry basis, cost, insurance, and freight, Gulf port, filtercake	260–270	260–270	260–270	260–270	260–270
Chinese, free on board (f.o.b.) China, wet filtercake	240–260	250–270	310–330	380–400	340–360
Mexican, f.o.b. Tampico, filtercake	260–280	260–280	260–280	260–280	260–280
Mexican, f.o.b. Tampico, arsenic <5 parts per million	280–310	280–310	280–310	280–310	280–310
South African, f.o.b. Durban, filtercake	200–220	200–220	200–220	200–230	200–230
Metallurgical grade, less than 97% calcium fluoride, Mexican, f.o.b. Tampico	230–250	230–250	230–250	230–250	230–250

Source: Industrial Minerals magazine (London).