

# Mineral Industry Surveys

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## FLUORSPAR IN THE FOURTH QUARTER 2017

Fluorspar imports in the fourth quarter of 2017 were 74,300 metric tons (t), 57,100 t of which were acid grade and 17,200 t of which were metallurgical grade (fig. 1, table 1). These quantities represented a decrease in total fluorspar imports of 19% compared with those in the third quarter of 2017 and a decrease of 9% compared with those in the fourth quarter of 2016. Mexico was the leading import source of fluorspar (table 2). Total fluorspar imports for 2017 increased by 5% compared with those in 2016. Fluorspar exports in the fourth quarter of 2017 were 2,590 t and were likely re-exports as the United States has no domestic fluorspar production.

Imports of other fluorine-containing materials were 26,100 t for hydrofluoric acid, 4,550 t for aluminum fluoride, and 2,020 t for cryolite in the fourth quarter of 2017 (table 1). Mexico, China, and Japan were the leading import sources of hydrofluoric acid, in descending order of import quantity (table 3). Exports of other fluorine-containing materials were

5,340 t for hydrofluoric acid, 125 t for aluminum fluoride, and 4,600 t for cryolite in the fourth quarter of 2017. Exports of aluminum fluoride and cryolite were likely re-exports as the United States has no domestic production (table 1).

Compared with prices of the previous quarter, prices at the end of the fourth quarter of 2017 for acid-grade fluorspar from Mexico and South Africa remained unchanged. Acid-grade fluorspar prices from China, specifically free-on-board (f.o.b.) wet filtercake, increased by 17% to 18% compared with the previous quarter and by 56% to 60% compared with the fourth quarter of the previous year. Prices at the end of the fourth quarter of 2017 for metallurgical-grade fluorspar from Mexico remained the same as the previous quarter (fig. 2). As recently as the fourth quarter of 2016, the percent difference between Chinese Gulf port and Chinese f.o.b acid-grade fluorspar prices ranged from 0% to 4%. However, in the fourth quarter of 2017, the Chinese f.o.b. price was approximately 54 to 56%

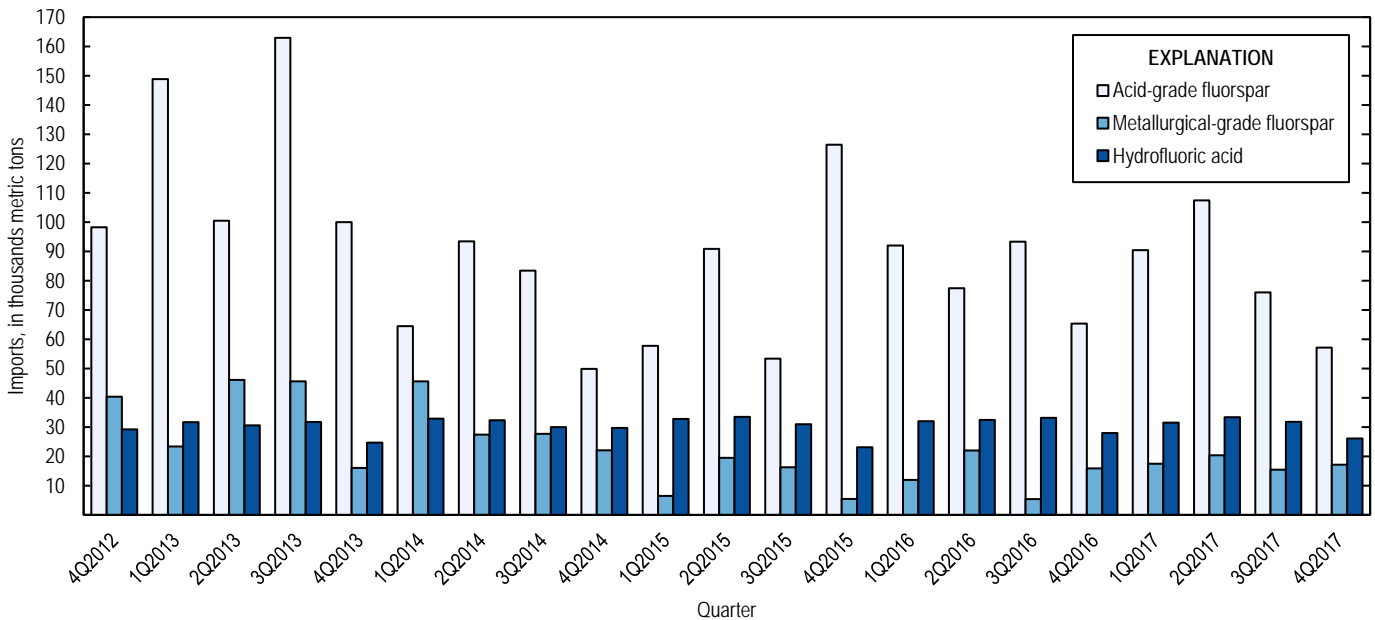


Figure 1. Acid-grade fluorspar, metallurgical-grade fluorspar, and hydrofluoric acid imports from the fourth quarter of 2012 through the fourth quarter of 2017. Source: U.S. Census Bureau.

more than the Chinese Gulf port price (table 5).

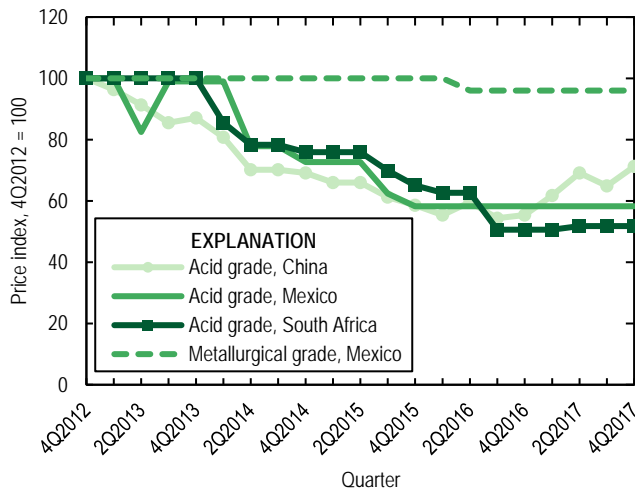


Figure 2. Acid- and metallurgical-grade fluorspar prices, by country, from the fourth quarter of 2012 through the fourth quarter of 2017. Prices are indexed to the fourth quarter of 2012. Source: Industrial Minerals (London).

### Industry News

India-based SRF Ltd. acquired all assets and technical knowledge related to refrigerant HFC-125 from Mexichem SA. All assets would be transferred from the United Kingdom to India (Cooling Post, 2017a; Kumar, 2017). In an unrelated development, Mexichem, partnered with Daikin Ltd., launched the lower global-warming potential refrigerant R-407H, branded by Mexichem as Klea-407H, as an alternative to refrigerants such as R-404a and R-507 (Cooling Post, 2017b; HPAC Magazine, 2017).

Honeywell International Inc. announced plans to temporarily idle production of uranium hexafluoride (UF<sub>6</sub>) at its Metropolis processing facility in Illinois owing to decreased demand and global oversupply of UF<sub>6</sub>. This idling would also result in the layoff of 170 of its 200 employees (Honeywell International Inc., 2017).

### Legislation and Government Programs

North Carolina State officials planned to revoke The Chemours Company's permit to discharge wastewater into the Cape Fear River. The North Carolina Department of Environmental Quality alleged that Chemours failed to report a spill of the fluorinated chemical GenX on October 6, 2017 (Pope, 2017).

As of November 10, 2017, the State of California's Office of Environmental Health Hazard Assessment added fluorinated chemicals perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) to the list of chemicals that

cause reproductive toxicity under Proposition 65 (Office of Environmental Health Hazard Assessment, 2017). Relatedly, funding for a national study into the long-term effects of PFOA and PFOS was included in the National Defense Authorization Act, signed by the President of the United States on December 12, 2017 (CBS News, 2017; Welsh, 2017).

### References Cited

- CBS News, 2017, Trump signs National Defense Authorization Act: CBS News, December 12. (Accessed February 16, 2018, at <https://www.cbsnews.com/news/trump-signs-national-defense-authorization-act-live-stream/>.)
- Cooling Post, 2017a, Mexichem sells UK R125 business: Cooling Post, November 3. (Accessed February 16, 2018, at <https://www.coolingpost.com/world-news/mexichem-sells-uk-r125-business/>.)
- Cooling Post, 2017b, Mexichem to sell R407H refrigerant: Cooling Post, November 14. (Accessed February 16, 2018, at <https://www.coolingpost.com/world-news/mexichem-sell-r407h-refrigerant/>.)
- Honeywell International, Inc., 2017, Statement from Honeywell: Honeywell International, Inc. press release, November 20. (Accessed February 16, 2018, at [http://www.honeywell-metropolisworks.com/?press\\_release=statement-from-honeywell](http://www.honeywell-metropolisworks.com/?press_release=statement-from-honeywell).)
- HPAC Magazine, 2017, Mexichem launches lower GWP refrigerant Klea 407H: HPAC Magazine, December 15. (Accessed February 16, 2018, at <https://www.hpacmag.com/refrigeration/mexichem-launches-lower-gwp-refrigerant-klea-407h/1004114855/>.)
- Kumar, Arun, 2017, SRF acquires hydrofluorocarbon refrigerant from Mexichem for \$10 million: The Economic Times, November 2. (Accessed February 16, 2018, at <https://economictimes.indiatimes.com/industry/indl-goods/svs/chem-/fertilisers/srf-acquires-hydrofluorocarbon-refrigerant-from-mexichem-for-10-million/articleshow/61458849.cms>.)
- Office of Environmental Health Hazard Assessment, 2017, Chemicals listed effective November 10, 2017 as known to the State of California to cause reproductive toxicity—Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS): Office of Environmental Health Hazard Assessment, November 9. (Accessed April 4, 2018, at <https://oehha.ca.gov/proposition-65/cmr/chemicals-listed-effective-november-10-2017-known-state-california-cause>.)
- Pope, Terry, 2017, State environmental officials say they will revoke Chemours' river discharge permit: The State Port Pilot, November 23. (Accessed February 16, 2018, at [http://stateportpilot.com/news/article\\_00a92bf2-d060-11e7-896f-a360106166cc.html](http://stateportpilot.com/news/article_00a92bf2-d060-11e7-896f-a360106166cc.html).)
- Welsh, Kathy, 2017, Two Maloney bills signed into law: Hudson Valley News Network, December 13. (Accessed April 16, 2018, at <https://hudsonvalleynewsnetwork.com/2017/12/13/two-maloney-bills-signed-law/>.)

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TABLE 1  
SALIENT FLUORSPAR STATISTICS<sup>1</sup>

(Metric tons, unless otherwise specified)

	2016		2017				
	4th quarter	1st quarter– 4th quarter	1st quarter	2d quarter	3d quarter	4th quarter	1st quarter– 4th quarter
<b>Production:</b>							
Fluorspar:	--	--	--	--	--	--	--
<b>Imports for consumption:<sup>2</sup></b>							
Fluorspar:							
Acid grade, more than 97% calcium fluoride	65,300	328,000	90,400	107,000	76,000	57,100	331,000
Metallurgical grade, less than 97% calcium fluoride	15,900	55,200	17,400	20,400	15,400	17,200	70,400
<b>Total</b>	<b>81,200</b>	<b>383,000</b>	<b>108,000</b>	<b>128,000</b>	<b>91,400</b>	<b>74,300</b>	<b>401,000</b>
Hydrofluoric acid	27,900	126,000	31,500	33,400	31,800	26,100	123,000
Aluminum fluoride	5,750	20,400	6,350	4,230	5,470	4,550	20,600
Cryolite	4,400	15,700	2,670	2,420	2,790	2,020	9,900
<b>Exports:<sup>2</sup></b>							
Fluorspar:							
Acid grade, more than 97% calcium fluoride	761	6,930	811	1,220	2,090	1,050	5,180
Metallurgical grade, less than 97% calcium fluoride	1,310	5,000	941	1,480	1,800	1,530	5,760
<b>Total</b>	<b>2,070</b>	<b>11,900</b>	<b>1,750</b>	<b>2,710</b>	<b>3,880</b>	<b>2,590</b>	<b>10,900</b>
Hydrofluoric acid	3,490	11,500	4,010	3,370	2,290	5,340	15,000
Aluminum fluoride	56	1,270	82	55	69	125	331
Cryolite	2,780	13,200	2,850	2,990	3,430	4,600	13,900
<b>Apparent consumption:<sup>3</sup></b>							
Fluorspar:							
Acid grade, more than 97% calcium fluoride	64,600	321,000	89,600	106,000	73,900	56,100	326,000
Metallurgical grade, less than 97% calcium fluoride	14,500	50,200	16,500	18,900	13,600	15,600	64,700
<b>Total</b>	<b>79,100</b>	<b>371,000</b>	<b>106,000</b>	<b>125,000</b>	<b>87,600</b>	<b>71,700</b>	<b>390,000</b>

-- 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.

<sup>3</sup>Imports 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<sup>1,2,3</sup>

	2016									
	4th quarter		1st quarter–4th quarter							
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)						
Acid grade, more than 97% calcium fluoride:										
China	--	--	46,100	\$14,000						
France	--	--	285	150						
Germany	168	\$91	441	235						
Israel	--	--	1	7						
Mexico	62,900	17,200	213,000	58,400						
Mongolia	152	78	247	129						
Russia	1	6	1	6						
South Africa	--	--	31,300	6,260						
Spain	--	--	10,900	2,680						
United Kingdom	2,070	997	2,230	1,090						
Vietnam	--	--	23,300	6,490						
Total	65,300	18,300	328,000	89,500						
Metallurgical grade, less than 97% calcium fluoride:										
China	52	17	61	23						
Mexico	15,800	3,650	54,500	12,400						
Mongolia	--	--	700	406						
Total	15,900	3,670	55,200	12,900						
Grand total	81,200	22,000	383,000	102,000						
	2017									
	1st quarter		2d quarter		3d quarter		4th quarter		1st quarter - 4th 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)
Acid grade, more than 97% calcium fluoride:										
China	44,300	\$12,900	38	\$22	266	\$148	246	\$133	44,900	\$13,200
Germany	137	73	114	51	229	109	144	35	624	268
Israel	--	--	--	--	--	--	34	21	34	21
Japan	--	--	1	3	--	--	1	7	2	10
Mexico	31,300	8,450	48,800	12,900	65,400	17,100	56,500	14,800	202,000	53,300
Mongolia	76	39	38	20	38	22	--	--	152	80
South Africa	--	--	27,900	5,990	--	--	--	--	27,900	5,990
Spain	10,100	2,240	--	--	10,000	2,420	21	12	20,100	4,670
United Kingdom	2	5	--	--	2	6	179	121	183	132
Vietnam	4,500	993	30,500	9,740	--	--	--	--	35,000	10,700
Total	90,400	24,700	107,000	28,700	76,000	19,800	57,100	15,200	331,000	88,400

See footnotes at end of table.

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

	2017									
	1st quarter		2d quarter		3d quarter		4th quarter		1st quarter - 4th 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)
Metallurgical grade, less than 97% calcium fluoride—Continued:										
China	191	122	271	161	86	51	53	19	601	353
Mexico	17,300	3,970	20,100	4,670	15,400	3,660	17,100	4,020	69,800	16,300
Netherlands	--	--	--	--	1	8	--	--	1	8
Total	17,400	\$4,090	20,400	\$4,830	15,400	\$3,720	17,200	\$4,040	70,400	\$16,700
Grand total	108,000	28,800	128,000	33,500	91,400	23,500	74,300	19,200	401,000	105,000

-- 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.

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

	2016			
	4th quarter		1st quarter–4th quarter	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Canada	110	\$211	595	\$988
China	1,980	1,780	7,550	6,900
Germany	281	521	1,100	2,260
Japan	551	728	1,560	2,020
Mexico	24,700	38,100	114,000	175,000
Korea, Republic of	37	134	89	334
Spain	19	58	149	424
Taiwan	217	418	533	1,130
Other <sup>3</sup>	83	164	346	829
Total	27,900	42,100	126,000	190,000

	2017									
	1st quarter		2d quarter		3d quarter		4th quarter		1st quarter–4th 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)
Canada	182	\$225	316	\$551	114	\$216	133	\$210	745	\$1,200
China	1,650	1,450	1,740	1,810	987	1,150	942	1,040	5,320	5,450
Germany	386	737	418	810	322	595	234	478	1,360	2,620
Japan	955	1,170	993	1,240	1,240	1,520	712	1,100	3,900	5,030
Mexico	27,900	40,100	29,600	42,200	28,500	41,500	23,600	35,000	110,000	159,000
Korea, Republic of	89	279	56	201	149	531	33	121	327	1,130
Spain	56	137	95	188	252	367	293	370	695	1,060
Taiwan	126	264	68	208	70	206	96	266	360	943
Other <sup>3</sup>	99	236	115	259	99	225	48	142	361	862
Total	31,500	44,600	33,400	47,400	31,800	46,400	26,100	38,700	123,000	177,000

<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>Includes imports from Belgium, India, and Singapore, all countries with imports less than 300 t in the fourth of 2017.

Source: U.S. Census Bureau.

TABLE 4  
U.S. EXPORTS OF FLUORSPAR, BY COUNTRY AND VALUE<sup>1, 2, 3</sup>

	2016				2017									
	4th quarter		1st quarter–4th quarter		1st quarter		2d quarter		3d quarter		4th quarter		1st quarter–4th 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	636	\$137	6,520	\$1,060	729	\$196	866	\$185	803	\$158	1,000	\$126	3,400	\$665
Chile	81	9	81	9	22	9	--	--	172	19	--	--	194	29
Mexico	--	--	285	32	--	--	322	36	1,090	122	--	--	1,410	158
Other <sup>4</sup>	44	6	44	6	60	18	36	4	20	5	51	9	167	36
Total	761	152	6,930	1,100	811	223	1,220	225	2,090	304	1,050	135	5,180	888
Metallurgical grade, less than 97% calcium fluoride:														
Canada	968	157	4,190	672	936	156	1,330	262	1,170	227	1,450	280	4,880	924
Hong Kong	--	--	--	--	--	--	--	--	308	45	--	--	308	45
Malaysia	--	--	10	10	--	--	--	--	164	24	21	3	185	27
Other <sup>5</sup>	341	55	802	119	5	4	156	23	160	23	65	9	386	59
Total	1,310	212	5,000	800 <sup>r</sup>	941	160	1,480	284 <sup>r</sup>	1,800	319	1,530	292	5,760	1,060
Grand total	2,070	364	11,900	1,900	1,750	383	2,710	510	3,880	623	2,590	427	10,900	1,940

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

<sup>1</sup>Exports include domestic exports only.

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

<sup>3</sup>Free alongside ship values at U.S. ports.

<sup>4</sup>Includes exports to El Salvador, Germany, Italy, and the Republic of Korea.

<sup>5</sup>Includes exports to Australia, China, 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			
	4th quarter	1st quarter	2d quarter	3d quarter	4th 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	250-270	310-330	380-400	340-360	400-420
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	200-230	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).