



# 2017 Minerals Yearbook

---

**BARITE [ADVANCE RELEASE]**

---

# BARITE

By Michele E. McRae

Domestic survey data and tables were prepared by Raymond I. Eldridge III, statistical assistant.

In 2017, primary U.S. barite production (sold or used by producers) was 334,000 metric tons (t) valued at an estimated \$32.1 million, and apparent consumption was 2.44 million metric tons (Mt). Imports for consumption were 2.22 Mt, and exports were 116,000 t (table 1). World barite production was 8.67 Mt.

The United States was the world's leading barite consumer. Domestic oil and natural gas drilling, the principal use of barite, increased in 2017 after historically low activity in 2016. The U.S. annual average count of active rigs increased by 72% to 875 (Baker Hughes, a GE company, LLC, 2019b). Domestic apparent consumption of barite increased by 73% to 2.44 Mt (table 1), and sales of crushed and ground barite increased by 43% to 2.03 Mt.

Barite is the mineralogical name for barium sulfate. In commerce, the mineral is sometimes referred to as barytes. In this report, the term primary barite refers to the first marketable product, which includes crude barite that underwent simple beneficiation methods, such as jigging, tabling, and washing, or more complex methods, such as flotation, heavy-media separation, or magnetic separation. Most barite ores require some upgrading to minimum commercial purity or density levels. The primary use of barite is as a weighting agent in drilling muds.

## Production

Domestic production and sales data for barite were derived from voluntary responses to the U.S. Geological Survey (USGS) canvass. Data were received from seven mining operations, but only five had reportable production. This represented 100% of domestic barite sold or used at company grinding mills. Data were received from 19 of the 21 grinding mills that operated during the year, representing 79% of the quantity of ground barite sold. Estimates for nonrespondents (mines and grinding mills) were made using prior year data and other industry data. Of the operating mines, four were in Nevada, and one was in Georgia.

In 2017, the leading companies that mined and ground barite in the United States were also major oil-service companies. Information on the mines and mills can be found in table 2. Crude barite production was 334,000 t in 2017, a 44% increase compared with 232,000 t in 2016. The bulk of mine production was from Nevada, and a small quantity was from Georgia. The estimated value of domestic production was \$32.1 million (table 1).

Halliburton Energy Services, Inc.'s Rossi Mine in Nevada, which suspended operations in October 2015, remained idle in 2017. However, the Bureau of Land Management (BLM) was finalizing a draft Environmental Impact Statement for a planned mine expansion (Janice Stadelman, Geologist, Tuscarora

Field Office, Bureau of Land Management, written commun., October 30, 2017).

Progressive Contracting, Inc. (PCI) (St. George, UT) continued its project to extract barite ore at the site of the former Coyote Mine, which was also known as the Patsy Ann Mine, in the Tuscarora Mountains in Elko County, NV. The company's original plan, approved in 2015, was to remove 54,000 t (60,000 short tons) of ore that had been blasted or broken up and left in place in the late 1970s and early 1980s and transport it to an offsite jig plant for processing. In 2017, the BLM was in the process of permitting PCI's proposal to extract ore from the mine's highwall. The BLM was also in the process of permitting the company's proposed project to remove ore from the former Beacon Mine in the same vicinity as the Coyote project (Janice Stadelman, Geologist, Tuscarora Field Office, Bureau of Land Management, written commun., October 30, 2017).

National Oilwell Varco, Inc. initiated closure activities at its Big Ledge Mine. The mine, which restarted operations in 2007, had been idle since 2014. The company's Dry Creek Mill site would continue to operate using stockpiled ore for 3 to 5 years (Gooch, 2017).

Twenty-one grinding mills operated for all or part of the year. Most Nevada barite ore was ground at nearby company-owned grinding mills. In addition to the 4 grinding mills in Nevada, 13 grinding mills operated along the coast of the Gulf of Mexico (5 in Louisiana and 8 in Texas). These stand-alone grinding mills processed imported crude barite that was primarily ground to American Petroleum Institute (API) specifications for the oil and gas drilling market, although some was ground for other uses. An additional four grinding mills in the Midwest and Southeast ground barite for use as extenders, fillers, pigments, and other uses and also produced API-grade barite for the oil and gas drilling market.

The Port of Corpus Christi notified the U.S. Department of Commerce's Foreign-Trade Zones Board of proposed production by Superior Weighting LLC (CES Energy Solutions Corp., Calgary, Alberta, Canada). The company intended to grind barite and process calcium carbonate and bentonite for the oilfield market (U.S. Department of Commerce, 2017).

## Environment

Common impurities in drilling-grade barite include quartz, chert, dolomite, siderite, and metallic oxide and sulfide compounds. These impurities are ordinarily insoluble, and as a result, standards limiting their concentrations have not been developed. In addition, the API standard does not address heavy-metal impurities, but barite derived from base-metal deposits can contain heavy metals, such as cadmium and mercury, and discharges of these are sometimes regulated by environmental laws. For example, U.S. environmental regulations on offshore

drilling allow drilling waste discharges containing barite only if the barite contains less than 3 parts per million (ppm) cadmium and less than 1 ppm mercury (Drilling Waste Management Information System, undated).

## Consumption

In 2017, domestic apparent consumption of barite increased by 73% to 2.44 Mt (table 1). Sales of ground barite by region, total, and State generally reflected patterns in drilling activity. Rig counts increased in most leading oil- and gas-producing States, and total sales of ground barite increased by 43% to 2.03 Mt from 1.42 Mt in 2016. By yearend 2017, nearly one-half of the active rigs in the United States were in Texas, where sales of ground barite more than doubled to 876,000 t. Although more rigs were operating in Louisiana at yearend 2017 than at yearend 2016, fewer rigs were operating offshore in the Gulf of Mexico (Baker Hughes, a GE company, LLC, 2019a). Because offshore wells typically have higher formation pressure than onshore wells, drilling muds used in offshore wells typically require a larger percentage of barite. The 4% decrease in barite sales in Louisiana, to 517,000 t, is attributed to the decrease in offshore drilling in the Gulf of Mexico. Sales by mills in all other States combined increased by 35% to 636,000 t (table 3). About 1.87 Mt, or 92%, of barite sales from domestic crushers and grinders was for oil and gas drilling markets, and the remaining 8% was for other industrial end uses (table 4). Sales of drilling-grade barite increased by 45%, and sales of domestic and imported barite for other industrial uses increased by 24% to 163,000 t (table 4).

Barite's role in the well-drilling industry is primarily as a weighting agent in drilling muds to suppress high formation pressures and to prevent blowouts. Barite is a component of almost all drilling fluids and can account for approximately 10% of the composition of low-weighted, oil-based muds and as much as or more than 40% (by weight) of high-weighted, oil-based muds (Bosch, 2016). As a well is drilled, the drill bit passes through various formations, each with different characteristics. Deeper wells require a higher percentage of barite in the mud mix. Most barite must be ground to a small, uniform size, based on specifications set by the API, before use as a weighting agent in drilling mud.

The most essential characteristic of barite used in drilling mud is its specific gravity (SG). Until 2010, the API specification for weighting agents in drilling fluids called for a minimum SG of 4.2. Because of concerns about dwindling reserves of 4.2-SG barite, the API issued a new edition of API Specification 13A, Specification for Drilling Fluids Materials, which added specifications for 4.1-SG barite (effective August 1, 2010). Except for SG, other specifications for 4.1-SG barite are the same as 4.2-SG barite. These specifications require barite to be ground finely enough that at least 97% of the material, by weight, passes through a 200-mesh (Tyler) [75-micrometer ( $\mu\text{m}$ )] screen and no more than 30%, by weight, can be less than 6  $\mu\text{m}$  in effective diameter. The diameter is measured using sedimentation techniques. Lastly, the ground barite may contain a maximum of no more than 250 ppm of water-soluble alkaline earth metals, such as calcium (American Petroleum Institute, 2010, p. 13–23, 83–96).

Since the adoption of the 4.1-SG specification, 4.1- and sub-4.1-SG barite have gained widespread acceptance in the U.S. drilling industry. Increasingly considered “premium” material, 4.2-SG barite is combined with lower SG barite to create blends tailored for specific applications (Newcaster, 2015). Within the barite industry, the term “grade” increasingly refers to barite of differing SG, as opposed to indicating purity, as is the case with many other mineral commodities. Although higher SG barite typically contains a higher percentage of barite, the presence of certain impurities can also raise the SG of lower purity material. Because neither the USGS barite canvass nor the Harmonized Tariff Schedule of the United States (HTS), used to categorize import data, differentiate between barite products of differing SGs, little information is available about the relative proportion of the differing SGs of barite used.

The color of barite used for drilling petroleum varies and can be black, blue, brown, buff, or gray. In addition to a high SG, other advantageous properties of barite include low abrasion, low oil absorption, chemical and physical inertness, nontoxicity, low solubility, and a relatively low cost when compared to alternatives. An additional benefit of barite is that it does not interfere with magnetic measurements taken in the borehole, either during logging-while-drilling or in separate drill-hole logging. Because of these properties, barite has been the leading choice for use as a weighting agent in oil and gas drilling, and available substitutes have not significantly displaced barite in this application.

Industrial end uses, such as barium chemicals, filler in paint and plastics, and powder coatings, require barite ground to a small, uniform size. The required size depends on the application, but for paint- and plastic-grade material, grain size averages about 2 to 3  $\mu\text{m}$ . Barite-containing materials were used for sound reduction in engine compartments in automobiles, boats, and trucks. Barite was also used in the base coat of automobile finishes for smoothness and corrosion resistance and continued to be used in friction products for automobiles and trucks.

Barite used as an aggregate in “heavy” concrete, or radiation-shielding concrete, is crushed and screened to sizes ranging from 4.75 millimeters (0.187 inches) to 3.75 centimeters (1.5 inches) for the coarse grade. New Riverside Ochre Co., Inc. (Cartersville, GA) was the leading supplier of barite aggregate.

## Prices

Because domestic barite-mining companies sold very little primary barite, value data for primary barite were largely estimated. The average unit value for primary barite from domestic mines and their associated beneficiation plants was estimated to have increased slightly to \$96 per metric ton in 2017 from a revised \$95 per metric ton in 2016 (table 1).

Value data for ground barite, as reported to the USGS, do not necessarily represent open market prices. Because oil-service companies own many of the U.S. barite grinding mills, barite is often sold to customers at a reduced price or at cost because the barite is merely a small part of the overall service contract. Taking this reduced cost into account when comparing prices with those from 2016, the average unit value

for barite ground in Louisiana decreased by approximately \$8 to \$160 per metric ton, the average unit value for barite ground in Texas decreased by \$18 to \$172 per metric ton, and the unit value of barite ground in other States increased by \$1 to \$205 per metric ton (table 3). The unit value of barite used for chemicals, glass, paint, rubber, and other filler increased by approximately \$12 to \$407 per ton in 2017. The average unit value for drilling-grade barite decreased by approximately \$6 to \$160 per metric ton (table 4).

According to yearend published price ranges for crude barite from major exporting countries, the yearend 2017 free-on-board (f.o.b.) price for barite from China, API grade, 4.20 SG unground lump was \$80 to \$90 per metric ton, a decrease from \$90 to \$100 per metric ton as reported in 2016. The f.o.b. price for barite from Chennai, India, API grade, 4.20 SG unground lump was \$90 to \$100 per metric ton, a decrease from \$115 to \$125 per metric ton. The f.o.b. price for barite from Morocco, API grade, 4.20 SG unground lump was \$70 to \$88 per metric ton, a decrease from \$105 to \$115 per metric ton at yearend 2016 (Industrial Minerals, 2016, 2017).

## Foreign Trade

In 2017, barite exports (natural and precipitated barium sulfate) were 116,000 t (table 5), a 48% increase compared with those in 2016. The leading recipients of barite exports from the United States were Canada (45%), the Marshall Islands (41%), and Mexico (6%).

Combined imports of barite (crude and ground natural barium sulfate, and precipitated barium sulfate) totaled 2.22 Mt, an increase of 77% compared with those of 2016 (table 1). China was the leading supplier and accounted for 47% of total barite imported, followed by India (23%), Mexico (14%), and Morocco (14%), which made up most of the remaining imports. Imports of the several forms of barite reported under the HTS nomenclature “Other sulfates of barium,” the chemically precipitated form of barite, were 18,000 t, a 14% decrease compared with those of 2016 (table 6).

The tariff on U.S. imports of crude barite was \$1.25 per metric ton, but imports of ground barite had no tariff. As a result, the major importers of crude barite applied for and received foreign trade zone (FTZ) status for many of their grinding mills in the United States. FTZ status allows the grinding mills to import crude barite duty free, process it, and report it as ground barite imports for consumption. Grinding mills in FTZs are identified in table 2.

## World Review

Estimated world barite production increased by 16% to 8.67 Mt in 2017, from a revised 7.44 Mt in 2016. Major exporting countries including China, India, Mexico, and Morocco accounted for most of the increase (table 8). Because the United States is the world’s leading barite consumer, using approximately 20% or more of world production annually, changes in U.S. consumption strongly influence world production and trade patterns. In 2017, U.S. domestic consumption, as measured by sales of ground barite, increased

by approximately 610,000 t, and domestic imports increased by 965,000 t, which likely accounted for a significant portion of the 1.23-Mt increase in world production.

## Outlook

Because of its properties making it the leading choice as a weighting agent in oil and gas drilling, available substitutes are not expected to significantly displace barite for the foreseeable future. Long-term barite consumption is therefore expected to be commensurate with increased oil and gas production.

Although the U.S. monthly average rig count reached its lowest level in May 2016, it increased throughout the rest of 2016 into 2017. In November, the United States surpassed crude oil production of 10 million barrels per day for the first time since 1970, attributed primarily to advances in oil and gas recovery from shale and other low permeability formations. The U.S. Energy Information Administration projects that crude oil production will continue to set annual records through 2027, and natural gas plant liquids production is expected to reach 6 million barrels per day by 2029. All of these factors are likely to contribute to continued strong domestic demand for barite (U.S. Energy Information Administration, 2018; 2019, p. 16).

## References Cited

- American Petroleum Institute, 2010, Specification for drilling fluids materials—ANSI/API Specification 13A (18th ed.): Washington, DC, American Petroleum Institute, ANSI/API specification 13A series, 109 p.
- Baker Hughes, a GE company, LLC, 2019a, Rigs by State—Current & historical: Houston, TX, Baker Hughes, a GE company, LLC, November. (Accessed December 6, 2019, via <https://rigcount.bakerhughes.com/na-rig-count>.)
- Baker Hughes, a GE company, LLC, 2019b, Worldwide rig counts—Current & historical data: Houston, TX, Baker Hughes, a GE company, LLC, May. (Accessed May 6, 2019, via <https://rigcount.bhge.com/intl-rig-count>.)
- Bosch, Chris, 2016, Oilfield mineral consumption trends: IMFORMED [Industrial Mineral Forums & Research Ltd.] Oilfield Minerals & Markets Forum Houston 2016, Houston, TX, June 6, presentation.
- Drilling Waste Management Information System, [undated], Fact sheet—Discharge to ocean: Argonne, IL, Argonne National Laboratory. (Accessed November 25, 2019, at <https://web.archive.org/web/20111016032003/http://web.ead.anl.gov/dwm/techdesc/discharge/index.cfm>.)
- Gooch, Shawn, 2017, Fact Sheet—Big Ledge Mine and Dry Creek Mill project permit number NEV2007103: Nevada Division of Environmental Protection fact sheet, April 4, 10 p.
- Industrial Minerals, 2016, IM’s December price movements: Industrial Minerals, December 23. (Accessed January 30, 2017, via <http://indmin.com>.)
- Industrial Minerals, 2017, IM’s December price movements: Industrial Minerals, December 22. (Accessed February 5, 2018, via <http://indmin.com>.)
- Newcaster, John, 2015, Application of barite in drilling fluids past & future: IMFORMED [Industrial Mineral Forums & Research Ltd.] Oilfield Minerals & Markets Forum Houston 2015, Houston, TX, May 28, presentation.
- U.S. Department of Commerce, 2017, Foreign-Trade Zone (FTZ) 122—Corpus Christi, Texas, notification of proposed production activity, Superior Weighting Products LLC (barite/calcium carbonate/bentonite), Corpus Christi, Texas: Federal Register, v. 82, no. 9, January 13, p. 4286. (Accessed November 25, 2019, at <https://www.govinfo.gov/content/pkg/FR-2017-01-13/pdf/2017-00584.pdf>.)
- U.S. Energy Information Administration, 2018, Today in energy—U.S. monthly crude oil production exceeds 10 million barrels per day, highest since 1970: U.S. Energy Information Administration, February 1. (Accessed August 2, 2019, at <https://www.eia.gov/todayinenergy/detail.php?id=34772>.)
- U.S. Energy Information Administration, 2019, Annual energy outlook 2019 with projections to 2050: U.S. Energy Information Administration, January 24, 165 p. (Accessed August 2, 2019, at <https://www.eia.gov/outlooks/aeo/pdf/aeo2019.pdf>.)

## GENERAL SOURCES OF INFORMATION

### U.S. Geological Survey Publications

Barite. Ch. in Mineral Commodity Summaries, annual.  
 Barite (Barium). Ch. in Critical Mineral Resources of the United States—Economic and Environmental Geology and Prospects for Future Supply, Professional Paper 1802, 2017.  
 Historical Statistics for Mineral and Material Commodities in the United States. Data Series 140, 2005.

### Other

Barite. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.  
 Barium Minerals. Ch. in Industrial Minerals and Rocks (7th ed.), Society for Mining, Metallurgy, and Exploration, Inc., 2006.  
 Barytes. British Geological Survey Mineral Profile, September 2005.  
 Economics of Barytes, The (10th ed.). Roskill Information Services Ltd., 2006.

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

(Thousand metric tons and thousand dollars)

	2013	2014	2015	2016	2017
United States:					
Barite, primary:					
Sold or used by producers:					
Quantity	831 <sup>r</sup>	667 <sup>r</sup>	433 <sup>r</sup>	232 <sup>r</sup>	334
Value <sup>e</sup>	93,300 <sup>r</sup>	74,900 <sup>r</sup>	51,200 <sup>r</sup>	22,000 <sup>r</sup>	32,100
Exports: <sup>2</sup>					
Quantity	207	161	147	78	116
Value	62,300	45,300	54,800	30,100	29,700
Imports for consumption: <sup>3</sup>					
Quantity	2,250	2,700	1,660	1,260	2,220
Value	352,000	386,000	247,000	192,000	254,000
Consumption, apparent <sup>4</sup>	2,870	3,210	1,950 <sup>r</sup>	1,410 <sup>r</sup>	2,440
Crushed and ground, sold or used by processors: <sup>5</sup>					
Quantity	3,550	3,410	2,010	1,420	2,030
Value	643,000	652,000	390,000	266,000	364,000
World, production	9,000	9,870	8,250 <sup>r</sup>	7,440 <sup>r</sup>	8,670

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

<sup>1</sup>Table includes data available through December 17, 2019. Data are rounded to no more than three significant digits.

<sup>2</sup>Exports include natural barium sulfate and other sulfates of barium calculated from Harmonized Tariff Schedule B codes 2511.10.1000 and 2833.27.0000.

<sup>3</sup>Imports include crude, ground, and other barite imports calculated from Harmonized Tariff Schedule codes 2511.10.1000, 2511.10.5000, and 2833.27.0000.

<sup>4</sup>Sold or used by producers, plus imports, minus exports.

<sup>5</sup>Includes domestically mined and imported crude barite.

TABLE 2  
ACTIVE BARITE MINES AND GRINDING MILLS IN THE UNITED STATES IN 2017<sup>1</sup>

State and operator (owner)	County or Parish	Mine or mill	Foreign Trade Zone
<b>Mines:</b>			
Georgia, New Riverside Ochre Co., Inc.	Bartow	New Riverside Ochre	
<b>Nevada:</b>			
Baker Hughes Drilling Fluids (Baker Hughes, a GE company, LLC)	Lander	Argenta Mine	
Do.	do.	Slaven Canyon Mine	
Halliburton Energy Services, Inc. (Halliburton Co.)	Elko	Rossi Mine	
M-I L.L.C., operating as M-I SWACO (Schlumberger Ltd.)	Lander	Greystone Mine	
Do.	do.	Mountain Springs Mine	
National Oilwell Varco, Inc.	Elko	Big Ledge Mine	
<b>Grinding mills:</b>			
Georgia, CIMBAR Performance Minerals	Murray	Chatsworth	
Indiana, CIMBAR Performance Minerals	Posey	Mt. Vernon	
<b>Louisiana:</b>			
Baker Hughes Drilling Fluids (Baker Hughes, a GE company, LLC)	St. Mary	Morgan City	No. 124, Gramercy, LA.
Excalibar Minerals LLC (Newpark Resources, Inc.)	Iberia	New Iberia	Do.
Halliburton Energy Services, Inc. (Halliburton Co.)	Calcasieu	Lake Charles	No. 087, Lake Charles, LA.
Do.	Lafourche	Larose	No. 124, Gramercy, LA.
M-I L.L.C., operating as M-I SWACO (Schlumberger Ltd.)	St. Mary	Amelia	Do.
<b>Nevada:</b>			
Baker Hughes Drilling Fluids (Baker Hughes, a GE company, LLC)	Lander	Barite Grinding Plant	
Halliburton Energy Services, Inc. (Halliburton Co.)	Eureka	Dunphy	
M-I L.L.C., operating as M-I SWACO (Schlumberger Ltd.)	Lander	Battle Mountain	
National Oilwell Varco, Inc.	Elko	Osino	
Ohio, CIMBAR Performance Minerals	Columbiana	Wellsville	
Tennessee, Excalibar Minerals LLC (Newpark Resources, Inc.)	Dyer	Dyersburg	
<b>Texas:</b>			
Baker Hughes Drilling Fluids (Baker Hughes, a GE company, LLC)	Nueces	Corpus Christi	No. 122, Corpus Christi, TX.
CIMBAR Performance Minerals	Harris	Houston	
Excalibar Minerals LLC (Newpark Resources, Inc.)	do.	do.	
Do.	Nueces	Corpus Christi	No. 122, Corpus Christi, TX.
Halliburton Energy Services, Inc. (Halliburton Co.)	do.	do.	Do.
M-I L.L.C., operating as M-I SWACO (Schlumberger Ltd.)	Galveston	Galveston	No. 036, Galveston, TX.
Milwhite Inc. (Control MINAR, S.A. de C.V.)	Cameron	Brownsville	
Superior Weighting Products, LLC (CES Energy Solutions Corp.)	Nueces	Corpus Christi	No. 122, Corpus Christi, TX.

Do., do. Ditto.

<sup>1</sup>Table includes data available through December 17, 2019.

TABLE 3  
CRUSHED AND GROUND BARITE SOLD OR USED BY PROCESSORS  
IN THE UNITED STATES, BY STATE<sup>1,2</sup>

State	2016			2017		
	Number of plants	Quantity (thousand metric tons)	Value (thousands)	Number of plants	Quantity (thousand metric tons)	Value (thousands)
Louisiana	5	540	\$91,100	5	517	\$82,900
Texas	7	408	77,700	8	876	151,000
Other <sup>3</sup>	9	471	97,100	8	636	130,000
Total	21	1,420	266,000	21	2,030	364,000

<sup>1</sup>Table includes data available through December 17, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes domestically mined and imported crude barite.

<sup>3</sup>Includes Georgia, Indiana, Nevada, Ohio, and Tennessee.

TABLE 4  
CRUSHED AND GROUND BARITE SOLD OR USED BY PROCESSORS  
IN THE UNITED STATES, BY USE<sup>1,2</sup>

(Thousand metric tons and thousand dollars)

Use	2016		2017	
	Quantity	Value	Quantity	Value
Barium chemicals, filler and (or) extender, glass	131	51,700	163	66,400
Well drilling	1,290	214,000	1,870	297,000
Total	1,420	266,000	2,030	364,000

<sup>1</sup>Table includes data available through December 17, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes domestically mined and imported crude barite.

TABLE 5  
U.S. EXPORTS OF NATURAL BARIUM SULFATE (BARITE), BY COUNTRY OR LOCALITY<sup>1,2</sup>

Country or locality	2016		2017	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Argentina	--	--	2,970	\$885
Brazil	409	\$258	878	531
Canada	35,500	7,680	52,000	9,340
China	165	201	377	711
Colombia	84	51	961	510
Guyana	5,930	7,920	--	--
Italy	102	80	60	45
Jamaica	22	52	132	55
Korea, Republic of	44	100	806	2,540
Marshall Islands	18,000	4,680	46,900	9,180
Mauritania	--	--	181	52
Mexico	14,600	7,210	7,120	4,440
Pakistan	310	164	5	15
Saudi Arabia	691	344	12	7
Suriname	--	--	2,730	919
Thailand	467	75	226	47
Trinidad and Tobago	1,820	725	26	26
Other <sup>3</sup>	347 <sup>r</sup>	537 <sup>r</sup>	399	423
Total	78,500	30,100	116,000	29,700

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

<sup>1</sup>Table includes data available through December 17, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Exports include natural barium sulfate and other sulfates of barium calculated from Harmonized Tariff Schedule B codes 2511.10.1000 and 2833.27.0000.

<sup>3</sup>Includes 20 countries and (or) localities with less than 100 metric tons each in 2017.

Source: U.S. Census Bureau.

TABLE 6  
U.S. IMPORTS FOR CONSUMPTION OF BARITE, BY COUNTRY OR LOCALITY<sup>1,2</sup>

Country or locality	2016		2017	
	Quantity (metric tons)	Value <sup>3</sup> (thousands)	Quantity (metric tons)	Value <sup>3</sup> (thousands)
<b>Crude:</b>				
China	205,000	\$35,300	295,000	\$37,800
India	97	11	195,000	15,100
Mexico	52,200	5,120	108,000	8,970
Morocco	11,700	3,620	108,000	10,800
Pakistan	--	--	9,830	801
Switzerland	--	--	19,900	2,090
Other [4 countries and (or) localities]	244 <sup>r</sup>	14 <sup>r</sup>	69	57
<b>Total</b>	<b>270,000</b>	<b>44,100</b>	<b>734,000</b>	<b>75,600</b>
<b>Ground:</b>				
China	801,000	94,300	752,000	73,600
Germany	1,550	1,510	1,730	1,680
India	37,500	5,020	325,000	30,200
Japan	2,680	452	1,650	291
Mexico	82,300	11,500	195,000	25,800
Morocco	40,100	4,440	192,000	17,200
Other [10 countries and (or) localities]	801 <sup>r</sup>	181 <sup>r</sup>	486	205
<b>Total</b>	<b>966,000</b>	<b>117,000</b>	<b>1,470,000</b>	<b>149,000</b>
<b>Other sulfates of barium:</b>				
China	3,460	2,910	4,380	3,290
France	72	79	90	106
Germany	8,140	19,100	7,530	18,500
Hong Kong	--	--	61	37
Italy	4,540	5,780	4,660	4,640
Japan	769	1,570	1,150	2,310
Mexico	3,730	651	22	46
Switzerland	--	--	55	72
United Arab Emirates	20	12 <sup>r</sup>	40	26
United Kingdom	55	70	18	71
Other [4 countries and (or) localities]	151 <sup>r</sup>	354 <sup>r</sup>	--	--
<b>Total</b>	<b>20,900</b>	<b>30,500<sup>r</sup></b>	<b>18,000</b>	<b>29,100</b>

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

<sup>1</sup>Table includes data available through December 17, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Imports calculated from Harmonized Tariff Schedule codes 2511.10.1000, 2511.10.5000, and 2833.27.0000.

<sup>3</sup>Cost, insurance, and freight value.

Source: U.S. Census Bureau.

TABLE 7  
U.S. IMPORTS FOR CONSUMPTION OF BARIUM CHEMICALS<sup>1,2</sup>

	2016		2017	
	Quantity (metric tons)	Value <sup>3</sup> (thousands)	Quantity (metric tons)	Value <sup>3</sup> (thousands)
Barium chloride	1,770	\$1,730	2,500	\$2,220
Barium oxide, hydroxide, peroxide	3,410	5,430	3,840	5,930
Barium carbonate, precipitated	1,560	2,270	2,510	2,760

<sup>1</sup>Table includes data available through December 17, 2019. Data are rounded to no more than three significant digits.

<sup>2</sup>Imports calculated from Harmonized Tariff Schedule codes 2816.40.2000, 2827.39.4500, and 2836.60.0000.

<sup>3</sup>Cost, insurance, and freight value.

Source: U.S. Census Bureau.



TABLE 8  
BARITE: WORLD PRODUCTION, BY COUNTRY OR LOCALITY<sup>1</sup>

(Metric tons)

Country or locality <sup>2</sup>	2013	2014	2015	2016	2017
Algeria, crude	30,245	56,829	44,000 <sup>r</sup>	52,000 <sup>r</sup>	50,000 <sup>e</sup>
Argentina	26,792	16,265	12,917 <sup>r</sup>	12,389 <sup>r</sup>	12,000 <sup>e</sup>
Australia	13,176	14,676	6,017	7,139 <sup>r</sup>	8,958
Bolivia	30,863 <sup>r</sup>	26,240 <sup>r</sup>	46,732 <sup>r</sup>	16,632 <sup>r</sup>	17,000 <sup>e</sup>
Bulgaria <sup>e</sup>	--	20,000	60,000	50,000	65,000
Burma <sup>3</sup>	31,295	23,060	2,836 <sup>r</sup>	3,215 <sup>r</sup>	2,500 <sup>e</sup>
Canada <sup>e</sup>	22,000	35,000	42,000 <sup>r</sup>	20,000 <sup>r</sup>	50,000
China <sup>e</sup>	3,200,000	3,900,000	3,300,000	2,800,000	3,200,000
Egypt	3,000 <sup>e</sup>	3,379	7,540	8,000 <sup>e</sup>	8,000 <sup>e</sup>
Germany	45,446	87,585	45,311	49,374 <sup>r</sup>	50,000 <sup>e</sup>
Guatemala	343	43	544	500 <sup>e</sup>	500 <sup>e</sup>
India	1,316,193	1,182,829	670,000 <sup>r,e</sup>	1,200,000 <sup>r,e</sup>	1,560,000 <sup>e</sup>
Iran	435,798	440,741	405,038	520,000 <sup>r,e</sup>	550,000 <sup>e</sup>
Kazakhstan <sup>e</sup>	507,000	590,000	607,000	620,000 <sup>r</sup>	620,000
Laos	10,500	30,610	32,150 <sup>r</sup>	33,240 <sup>r</sup>	33,000 <sup>e</sup>
Liberia	36,000 <sup>e</sup>	48,000 <sup>e</sup>	--	--	--
Malaysia	500	14,456	-- <sup>r</sup>	-- <sup>r</sup>	--
Mexico	343,585	420,000 <sup>e</sup>	271,697 <sup>r</sup>	156,854 <sup>r</sup>	359,912
Morocco, crude	1,094,470	1,006,600	1,212,130	668,500	950,000
Nigeria	17,784	7,113 <sup>r</sup>	3,323 <sup>r</sup>	537 <sup>r</sup>	500 <sup>e</sup>
Pakistan	87,165	153,808	121,575	107,224	106,081
Peru	52,491	106,071	28,407	7,953	9,182
Russia	360,000 <sup>e</sup>	360,000 <sup>e</sup>	361,000	434,000	221,000
Saudi Arabia	30,000	32,000	-- <sup>r</sup>	-- <sup>r</sup>	--
Slovakia	24,000	21,000	20,000 <sup>e</sup>	15,000 <sup>r,e</sup>	15,000 <sup>e</sup>
Thailand	107,437	134,961	170,661 <sup>r</sup>	223,101	147,954
Tunisia, crude	5,300	9,800	10,000 <sup>e</sup>	10,000 <sup>e</sup>	10,000 <sup>e</sup>
Turkey, ground	257,116	320,754	209,097	105,573 <sup>r</sup>	200,000 <sup>e</sup>
United Kingdom	30,000	44,000	50,000	56,000 <sup>r</sup>	56,000 <sup>e</sup>
United States, crude <sup>4</sup>	831,000 <sup>r</sup>	667,000 <sup>r</sup>	433,000 <sup>r</sup>	232,000 <sup>r</sup>	334,000
Vietnam <sup>e</sup>	55,000	95,000	80,000	30,000 <sup>r</sup>	30,000
Total	9,000,000	9,870,000	8,250,000 <sup>r</sup>	7,440,000 <sup>r</sup>	8,670,000

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

<sup>1</sup>Table includes data available through August 15, 2018. All data are reported unless otherwise noted. Totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>In addition to the countries and (or) localities listed, Afghanistan, Italy, and some other countries and (or) localities may produce barite, but output data were not reported and available information was inadequate to make reliable production estimates.

<sup>3</sup>Production is based on fiscal year, with a starting date of April 1 of the year shown.

<sup>4</sup>Crude barite sold or used by producers.