

## BARITE

(Data in thousand metric tons unless otherwise noted)

**Domestic Production and Use:** In 2021, one company in Nevada mined barite from two mines that operated intermittently, but mine production data were withheld to avoid disclosing company proprietary data. Another company in Nevada processed domestically mined barite from material that had been previously stockpiled. A third company's mining and processing assets in Nevada were reportedly idled and put up for sale. An estimated 1.5 million tons of barite (from domestic production and imports) was sold by crushers and grinders operating in eight States. Typically, more than 90% of the barite sold in the United States is used as a weighting agent in fluids used in the drilling of oil and natural gas wells. The majority of Nevada crude barite was ground in Nevada and then sold to companies drilling in the Central and Western United States. Because of the higher cost of rail and truck transportation compared to ocean freight, offshore drilling operations in the Gulf of Mexico and onshore drilling operations in other regions primarily used imported barite.

Barite also is used as a filler, extender, or weighting agent in products such as paints, plastics, and rubber. Some specific applications include use in automobile brake and clutch pads, in automobile paint primer for metal protection and gloss, as a weighting agent in rubber, and in the cement jacket around underwater petroleum pipelines. In the metal-casting industry, barite is part of the mold-release compounds. Because barite significantly blocks X-ray and gamma-ray emissions, it is used as aggregate in high-density concrete for radiation shielding around X-ray units in hospitals, nuclear powerplants, and university nuclear research facilities. Ultrapure barite is used as a contrast medium in X-ray and computed tomography examinations of the gastrointestinal tract.

### **Salient Statistics—United States:**

|  | <b><u>2017</u></b> | <b><u>2018</u></b> | <b><u>2019</u></b> | <b><u>2020</u></b> | <b><u>2021<sup>e</sup></u></b> |
|--|--------------------|--------------------|--------------------|--------------------|--------------------------------|
| Production:  |                    |                    |                    |                    |                                |
| Sold or used, mine   | 334                | 366                | 414                | W                  | W                              |
| Ground and crushed <sup>1</sup>  | 2,030              | 2,420              | 2,350              | 1,410              | 1,500                          |
| Imports for consumption <sup>2</sup>                                     | 2,470              | 2,460              | 2,500              | 1,480              | 1,700                          |
| Exports <sup>3</sup>   | 116                | 67                 | 38                 | 48                 | 45                             |
| Consumption, apparent (crude and ground) <sup>4</sup>                    | 2,680              | 2,760              | 2,880              | W                  | W                              |
| Price, average value, ground, ex-works, dollars per ton                  | 179                | 176                | 179                | 183                | 180                            |
| Employment, mine and mill, number <sup>e</sup>                           | 450                | 520                | 480                | 330                | 310                            |
| Net import reliance <sup>5</sup> as a percentage of apparent consumption | 88                 | 87                 | 86                 | >75                | >75                            |

**Recycling:** None.

**Import Sources (2017–20):** China,<sup>6</sup> 41%; India, 28%; Morocco, 14%; Mexico, 13%; and other, 4%.

| <b><u>Tariff:</u></b> | <b><u>Item</u></b>                    | <b><u>Number</u></b> | <b><u>Normal Trade Relations</u></b><br><b><u>12-31-21</u></b> |
|-----------------------|---------------------------------------|----------------------|--|
|                       | Ground barite                         | 2511.10.1000         | Free.  |
|                       | Crude barite                          | 2511.10.5000         | \$1.25 per metric ton.   |
|                       | Barium compounds:                     |                      |  |
|                       | Barium oxide, hydroxide, and peroxide | 2816.40.2000         | 2% ad valorem.   |
|                       | Barium chloride                       | 2827.39.4500         | 4.2% ad valorem.   |
|                       | Barium sulfate, precipitated          | 2833.27.0000         | 0.6% ad valorem.   |
|                       | Barium carbonate, precipitated        | 2836.60.0000         | 2.3% ad valorem.   |

**Depletion Allowance:** 14% (domestic and foreign).

**Government Stockpile:** None.

**Events, Trends, and Issues:** Domestic and global drilling rig counts, which have historically been a good barometer of barite consumption, generally increased throughout 2021. This trend was reflected in domestic sales of ground barite, which were estimated to have increased by 6% in 2021, attributed primarily to increased sales in Texas. World mine production was estimated to have increased by 8%. Despite modest increases in 2021, domestic and global production and consumption of barite were estimated to have remained well below the quantities attained prior to the global COVID-19 pandemic. Production in most leading barite-producing countries was estimated to have remained essentially unchanged compared with that in 2020 with the exception of Morocco. According to some domestic consumers, barite suppliers in Morocco were able to offer smaller shipments and shorter lead times than suppliers in China and India, which supported increased production. This allowed domestic consumers increased flexibility in responding to uncertainty in anticipated future consumption levels.

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Barite trade was negatively affected by ongoing logistics issues. In addition to contributing to reduced consumption of transport fuels, which directly affected barite consumption, continued travel restrictions were a factor in some areas. For example, prior to the COVID-19 pandemic, production in Laos had begun to emerge as a potentially significant new source of global supply. In 2020 and 2021, barite exports from Laos, a landlocked country, were reportedly inhibited by border closures with neighboring countries. Domestic importers also noted cost increases per ton of barite because of increased land- and ocean-based freight rates. As a bulk commodity used primarily for its weight, transportation expenses are a substantial component of the final cost of barite used on a per ton basis. However, it is unclear if these cost increases affected sales prices.

In 2021, researchers at Purdue University filed a patent application for a barium sulfate (barite)-based formulation for white paint that had a higher reflectivity compared with all other white paints. The new formulation, which used a higher concentration of barite with a broader range of particle sizes, had an ambient-cooling effect when used on exterior surfaces.

**World Mine Production and Reserves:** In response to concerns about dwindling global reserves of 4.2-specific-gravity barite used by the oil and gas drilling industry, the American Petroleum Institute issued an alternate specification for 4.1-specific-gravity weighting agents in 2010. Estimated reserves data are included only if developed since the adoption of the 4.1-specific-gravity standard.

|                       | Mine production    |                    | Reserves <sup>7</sup> |
|-----------------------|--------------------|--------------------|-----------------------|
|                       | 2020               | 2021 <sup>e</sup>  |                       |
| United States         | W                  | W                  | NA                    |
| China                 | <sup>8</sup> 2,800 | <sup>8</sup> 2,800 | 36,000                |
| India                 | 1,600              | 1,600              | 51,000                |
| Iran                  | 202                | 200                | 100,000               |
| Kazakhstan            | 445                | 450                | 85,000                |
| Laos                  | 180                | 110                | NA                    |
| Mexico                | 323                | 320                | NA                    |
| Morocco               | 410                | 1,100              | NA                    |
| Pakistan              | 86                 | 50                 | 40,000                |
| Russia                | 287                | 150                | 12,000                |
| Turkey                | 180                | 180                | 35,000                |
| Other countries       | <u>329</u>         | <u>370</u>         | <u>30,000</u>         |
| World total (rounded) | <sup>9</sup> 6,840 | <sup>9</sup> 7,300 | NA                    |

**World Resources:**<sup>7</sup> In the United States, identified resources of barite are estimated to be 150 million tons, and undiscovered resources contribute an additional 150 million tons. The world's barite resources in all categories are about 2 billion tons, but only about 740 million tons are identified resources

**Substitutes:** In the oil- and gas-drilling industry, alternatives to barite include celestite, ilmenite, iron ore, and synthetic hematite that is manufactured in Germany. However, the use of substitutes has been in relatively small amounts, and barite remains the preferred choice for drilling applications.

<sup>e</sup>Estimated. NA Not available. W Withheld to avoid disclosing company proprietary data.

<sup>1</sup>Imported and domestic barite, crushed and ground, sold or used by domestic grinding establishments.

<sup>2</sup>Includes data for the following Harmonized Tariff Schedule of the United States codes: 2511.10.1000, 2511.10.5000, and 2833.27.0000.

<sup>3</sup>Includes data for the following Schedule B codes: 2511.10.1000 and 2833.27.0000.

<sup>4</sup>Defined as sold or used by domestic mines + imports – exports.

<sup>5</sup>Defined as imports – exports.

<sup>6</sup>Includes Hong Kong.

<sup>7</sup>See Appendix C for resource and reserve definitions and information concerning data sources.

<sup>8</sup>The China Industrial Minerals Yearbook estimated that production was closer to 4 million tons.

<sup>9</sup>Excludes U.S. production.