

## BAUXITE AND ALUMINA<sup>1</sup>

(Data in thousand metric dry tons unless otherwise noted)

**Domestic Production and Use:** In 2018, the quantity of bauxite consumed, nearly all of which was imported, was estimated to be 3.9 million tons, 11% more than that in 2017, with an estimated value of about \$120 million. About 80% of the bauxite was refined by the Bayer process for alumina or aluminum hydroxide, and the remainder went to products such as abrasives, cement, chemicals, proppants, refractories, and as a slag adjuster in steel mills. Three domestic Bayer-process refineries had a combined alumina production capacity of 4 million tons per year. Two of the refineries produced an estimated 1.5 million tons in 2018, 5% more than that in 2017. One other refinery has been on care-and-maintenance status since 2016. About 70% of the alumina produced went to primary aluminum smelters, and the remainder went to nonmetallurgical products, such as abrasives, ceramics, chemicals, and refractories.

<b>Salient Statistics—United States:</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018<sup>e</sup></b>
<b>Bauxite:</b>					
Production, mine	W	W	W	W	W
Imports for consumption <sup>2</sup>	11,800	11,300	5,920	4,430	4,500
Exports <sup>2</sup>	15	21	40	29	23
Stocks, industry, yearend <sup>2</sup>	1,210	1,500	880	880	600
<b>Consumption:</b>					
Apparent <sup>3</sup>	W	W	W	W	W
Reported	9,840	9,660	5,360	3,510	3,900
Price, average value, U.S. imports (f.a.s.), dollars per ton	27	28	28	32	31
Net import reliance <sup>4</sup> as a percentage of apparent consumption	>75	>75	>75	>75	>75
<b>Alumina:</b>					
Production, refinery <sup>5</sup>	4,460	4,550	2,360	1,430	1,500
Imports for consumption <sup>5</sup>	1,630	1,570	1,140	1,330	1,700
Exports <sup>5</sup>	2,170	2,210	1,330	516	350
Stocks, industry, yearend <sup>5</sup>	276	274	320	264	400
Consumption, apparent <sup>3</sup>	3,930	3,920	2,130	2,300	2,700
Price, average value, U.S. imports (f.a.s.), dollars per ton	394	400	362	487	560
Net import reliance <sup>4</sup> as a percentage of apparent consumption	E	E	E	38	45

**Recycling:** None.

**Import Sources (2014–17):** Bauxite:<sup>2</sup> Jamaica, 46%; Brazil, 25%; Guinea, 15%; Guyana, 6%; and other, 8%. Alumina:<sup>5</sup> Australia, 36%; Brazil, 27%; Suriname, 14%; Jamaica, 7%; and other, 16%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations 12–31–18</b>
	Bauxite, calcined (refractory grade)	2606.00.0030	Free.
	Bauxite, calcined (other)	2606.00.0060	Free.
	Bauxite, crude dry (metallurgical grade)	2606.00.0090	Free.
	Aluminum oxide (alumina)	2818.20.0000	Free.
	Aluminum hydroxide	2818.30.0000	Free.

**Depletion Allowance:** 22% (Domestic), 14% (Foreign).

**Government Stockpile:** None

**Events, Trends, and Issues:** In 2018, two domestic alumina refineries produced alumina from imported bauxite. A 500,000-ton-per-year alumina refinery in Burnside, LA, produced specialty-grade alumina. A 1.2-million-ton-per-year alumina refinery in Gramercy, LA, produced alumina principally for aluminum smelting. A project at the Gramercy refinery was completed in the first half of 2018 that increased specialty-grade alumina capacity by 200,000 tons per year. The Gramercy refinery was also adding another production line for specialty-grade alumina. The average price free alongside ship (f.a.s.) for U.S. imports for consumption of metallurgical-grade alumina during the first 8 months of 2018 was \$560 per ton, 22% higher than that of the same period in 2017, and ranged between \$450 per ton and \$900 per ton. For the first 8 months of 2018, the estimated average price (f.a.s.) for U.S. imports for consumption of crude-dry bauxite was \$31 per ton, 3% less than that of the same period in 2017.

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The Government of Malaysia continued its ban on bauxite mining through at least yearend 2018 but did permit exports of stockpiled bauxite. Media sources reported that some mines continued illegal mining. The ban was imposed in January 2016 because of concerns about pollution from mines and uncovered stockpiles at ports. In February, the Government of Brazil ordered a 6.3-million-ton-per-year alumina refinery and a nearby 10-million-ton-per-year bauxite mine to shut down one-half of their capacities, citing concerns that leaks from disposal areas may have taken place after heavy rainfall in the area. In June, an alumina refinery in Guinea that was shut down in 2012 was restarted and would be ramped up by midyear 2019. From August 8 to September 30, a labor dispute involving about 1,600 of 3,500 employees at two bauxite mines and three alumina refineries negatively affected production in Australia.

In April, the U.S. Department of the Treasury, in consultation with the U.S. Department of State, designated several Russian individuals and businesses for sanctions in response to activities of the Government of Russia. Among the designated companies was a producer of bauxite, alumina, and aluminum. A winddown period was granted to companies with contracts with the sanctioned company, through at least December 2018, and consumers in the United States may enter contracts for deliveries in 2019 in similar amounts purchased in 2018.

In May 2018, the U.S. Department of the Interior, in coordination with other executive branch agencies, published a list of 35 critical minerals (83 FR 23295), including aluminum (bauxite). This list was developed to serve as an initial focus, pursuant to Executive Order 13817, "A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals" (82 FR 60835).

**World Alumina Refinery and Bauxite Mine Production and Bauxite Reserves:** Reserves data for India, Indonesia, and other countries were updated based on Government data and other sources.

	Alumina <sup>5</sup>		Bauxite		Reserves <sup>6</sup>
	2017	2018 <sup>e</sup>	2017	2018 <sup>e</sup>	
United States	1,430	1,500	W	W	20,000
Australia	20,500	19,000	87,900	75,000	76,000,000
Brazil	10,900	7,900	38,500	27,000	2,600,000
Canada	1,570	1,600	—	—	—
China	69,000	72,000	70,000	70,000	1,000,000
Guinea	—	100	46,200	50,000	7,400,000
India	6,060	6,500	22,900	24,000	660,000
Indonesia	1,300	1,300	2,900	7,100	1,200,000
Jamaica	1,780	2,500	8,250	10,000	2,000,000
Malaysia	—	—	2,000	2,000	110,000
Russia	2,820	2,800	5,520	5,500	500,000
Vietnam	900	1,100	2,400	2,500	3,700,000
Other countries	12,700	13,200	22,500	22,000	5,200,000
World total (rounded)	129,000	130,000	309,000	300,000	30,000,000

**World Resources:** Bauxite resources are estimated to be 55 billion to 75 billion tons, in Africa (32%), Oceania (23%), South America and the Caribbean (21%), Asia (18%), and elsewhere (6%). Domestic resources of bauxite are inadequate to meet long-term U.S. demand, but the United States and most other major aluminum-producing countries have essentially inexhaustible subeconomic resources of aluminum in materials other than bauxite.

**Substitutes:** Bauxite is the only raw material used in the production of alumina on a commercial scale in the United States. Although currently not economically competitive with bauxite, vast resources of clay are technically feasible sources of alumina. Other raw materials, such as alunite, anorthosite, coal wastes, and oil shales, offer additional potential alumina sources. Synthetic mullite, produced from kaolin, bauxitic kaolin, kyanite, and sillimanite, substitutes for bauxite-based refractories. Silicon carbide and alumina-zirconia can substitute for abrasives but cost more.

<sup>e</sup>Estimated. E Net exporter. W Withheld to avoid disclosing company proprietary data. — Zero.

<sup>1</sup>See also Aluminum. As a general rule, 4 tons of dried bauxite is required to produce 2 tons of alumina, which, in turn, produces 1 ton of aluminum.

<sup>2</sup>Includes all forms of bauxite, expressed as dry equivalent weights.

<sup>3</sup>Defined as production + imports – exports + adjustments for industry stock changes.

<sup>4</sup>Defined as imports – exports + adjustments for industry stock changes.

<sup>5</sup>Calcined equivalent weights.

<sup>6</sup>See Appendix C for resource and reserve definitions and information concerning data sources.

<sup>7</sup>For Australia, Joint Ore Reserves Committee-compliant reserves were about 2.3 billion tons.