BAUXITE AND ALUMINA[1]

(Data in thousand metric dry tons unless otherwise noted)

Domestic Production and Use: In 2016, the quantity of bauxite consumed, nearly all of which was imported, was estimated to be 6.8 million tons, a reduction of 28% from that in 2015, with an estimated value of $231 million. More than 90% of the bauxite was converted to alumina, and the remainder went to nonmetallurgical products, such as abrasives, chemicals, proppants, and refractories. Four domestic Bayer-process refineries had a combined alumina production capacity of 5.6 million tons per year but produced 2.5 million tons in 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.

Salient Statistics—United States:	2012	2013	2014	2015	2016[e]
Bauxite:					
Production, mine	W	W	W	W	W
Imports for consumption[2]	11,000	10,800	11,800	11,300	6,300
Exports[2]	42	21	15	20	40
Stocks, industry, yearend[2]	1,530	1,300	1,210	1,500	880
Consumption:					
Apparent[3]	W	W	W	W	W
Reported	9,560	10,200	9,840	9,420	6,800
Price, average value, U.S. imports (f.a.s.), dollars per ton	28	27	27	26	29
Net import reliance,[4] as a percentage of apparent consumption	>75	>75	>75	>75	>75
Alumina:					
Production, refinery	4,370	4,320	4,460	4,540	2,500
Imports for consumption[5]	1,900	2,050	1,630	1,570	1,200
Exports[5]	1,720	2,250	2,130	2,180	1,500
Stocks, industry, yearend[5]	363	280	276	274	100
Consumption, apparent[3]	5,140	4,210	3,970	3,930	2,370
Price, average value U.S. imports (f.a.s.) dollars per ton	374	368	394	400	360
Net import reliance,[4] as a percentage of apparent consumption	15	E	E	E	E

Recycling: None.

Import Sources (2012–15):[6] Bauxite: Jamaica, 42%; Brazil, 26%; Guinea, 23%; Guyana, 5%; and other, 4%. Alumina: Australia, 37%; Suriname, 32%; Brazil, 15%; Jamaica, 4%; and other, 12%.

Tariff: Item	Number	Normal Trade Relations 12–31–16
Bauxite, calcined (refractory grade)	2606.00.0030	Free.
Bauxite, calcined (other)	2606.00.0060	Free.
Bauxite, crude dry (metallurgical grade)	2606.00.0090	Free.
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 2016, two of the four domestic alumina refineries shut down; a 2.3-million-ton-per-year alumina refinery in Point Comfort, TX, completely shut down in March, having already shut down 1.2 million tons per year of capacity in the fourth quarter of 2015, and a 1.6-million-ton-per-year alumina refinery in Corpus Christi, TX, shut down in September citing a price dispute with its bauxite supplier. It had been producing at about 80% of capacity since October 2014. At a 1.2-million-ton-per-year alumina refinery in Gramercy, LA, 100,000 tons per year of capacity was modified to produce higher value-added specialty alumina instead of smelter-grade alumina.

The average price free alongside ship (f.a.s.) for U.S. imports for consumption of metallurgical-grade alumina during the first 9 months of 2016 was $358 per ton, 13% lower than that of the same period in 2015, and ranged between $283 per ton and $449 per ton. According to production data from the International Aluminium Institute, world alumina

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production through September 2016 decreased slightly compared with that of the same period in 2015. For the first 9 months of 2016, the estimated average price (f.a.s.) for U.S. imports for consumption of crude-dry bauxite was $29 per ton, 3% higher than that of the same period in 2015. A significant portion of bauxite consumed at alumina refineries in the United States came from mines owned by the same companies that owned the refineries.

In 2016, global bauxite production decreased by 11% owing to reduced production of 34 million tons in Malaysia. Although the Government of Malaysia banned bauxite mining in January pending stricter environmental laws, exports of stockpiled bauxite continued throughout the year. In October, the Government of Indonesia announced that it would issue 5-year bauxite export permits to companies building alumina refineries. Export of bauxite and other unprocessed mineral ores from Indonesia had been prohibited since January 2014. A 1-million-ton-per-year alumina refinery in Indonesia was completed in May, and rampup of production had started. Global alumina production decreased slightly in 2016. Alumina imports to China, which totaled 4.65 million tons in 2015, decreased by 30%.

World Alumina Refinery and Bauxite Mine Production and Bauxite Reserves: Reserves for China, Greece, Malaysia, and Saudi Arabia were revised based on Government and company reports.

	Alumina		Bauxite		Reserves[7]
	2015	2016[e]	2015	2016[e]	
United States	4,540	2,500	W	W	20,000
Australia	20,100	20,700	80,900	82,000	6,200,000
Brazil	10,500	10,800	33,900	34,500	2,600,000
Canada	1,570	1,550	—	—	—
China	59,000	58,500	65,000	65,000	980,000
Greece	807	810	1,820	1,800	130,000
Guinea	—	—	18,100	19,700	7,400,000
Guyana	—	—	1,700	1,600	850,000
India	5,510	5,860	23,800	25,000	590,000
Indonesia	70	450	202	1,000	1,000,000
Ireland	1,980	1,900	—	—	—
Jamaica	1,870	1,850	9,630	8,500	2,000,000
Kazakhstan	1,450	1,400	4,680	4,600	160,000
Malaysia	—	—	35,000	1,000	110,000
Russia	2,590	2,700	5,900	5,400	200,000
Saudi Arabia	846	1,700	1,600	4,000	210,000
Spain	1,630	1,550	—	—	—
Suriname	748	—	1,600	—	580,000
Vietnam	484	500	1,150	1,500	2,100,000
Other countries	5,290	5,500	7,580	6,860	2,700,000
World total (rounded)	119,000	118,000	293,000	262,000	28,000,000

World Resources: Bauxite resources are estimated to be 55 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. Some refineries in China recover alumina from coal ash, and processes for recovering alumina from clay were being tested in Australia and Canada to determine if they would be economically competitive. Synthetic mullite, produced from kaolin, bauxitic kaolin, kyanite, and sillimanite, substitutes for bauxite-based refractories. Although more costly, silicon carbide and alumina-zirconia can substitute for bauxite-based abrasives.

[e]Estimated. E Net exporter. W Withheld to avoid disclosing company proprietary data. — Zero.

[1]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.

[2]Includes all forms of bauxite, expressed as dry equivalent weights.

[3]Defined as production + imports – exports + adjustments for industry stock changes.

[4]Defined as imports – exports + adjustments for industry stock changes.

[5]Calcined equivalent weights.

[6]Based on aluminum equivalents.

[7]See Appendix C for resource and reserve definitions and information concerning data sources.