

ABRASIVES (MANUFACTURED)

(Fused aluminum oxide, silicon carbide, and metallic abrasives)

(Data in metric tons unless otherwise noted)

Domestic Production and Use: Fused aluminum oxide was produced by two companies at three plants in the United States and Canada. Production of crude fused aluminum oxide had an estimated value of \$3.0 million. Silicon carbide was produced by two companies at two plants in the United States. Production of crude silicon carbide had an estimated value of about \$30 million. Metallic abrasives were produced by 11 companies in eight States. Production of metallic abrasives had an estimated value of about \$100 million. Bonded and coated abrasive products accounted for most abrasive uses of fused aluminum oxide and silicon carbide. Metallic abrasives are used primarily for steel shot and grit and cut wire shot, which are used for sandblasting, peening, and stonecutting applications.

Salient Statistics—United States:

	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021^e</u>
Production:					
Fused aluminum oxide, crude ^{1,2}	10,000	10,000	10,000	10,000	10,000
Silicon carbide ²	35,000	35,000	35,000	35,000	35,000
Metallic abrasives	179,000	180,000	177,000	176,000	180,000
Shipments, metallic abrasives	197,000	196,000	195,000	194,000	200,000
Imports for consumption:					
Fused aluminum oxide	206,000	192,000	184,000	121,000	110,000
Silicon carbide	137,000	146,000	131,000	88,000	90,000
Metallic abrasives	29,600	29,900	27,900	25,800	29,000
Exports:					
Fused aluminum oxide	15,500	20,100	18,400	11,400	11,000
Silicon carbide	6,100	10,100	11,500	8,300	12,000
Metallic abrasives	31,000	33,600	31,200	18,100	20,000
Consumption, apparent:					
Fused aluminum oxide ³	191,000	172,000	166,000	110,000	100,000
Silicon carbide ⁴	166,000	171,000	155,000	115,000	110,000
Metallic abrasives ⁵	196,000	192,000	192,000	202,000	200,000
Price, average unit value of imports, dollars per ton:					
Fused aluminum oxide, regular	489	681	716	666	630
Fused aluminum oxide, high-purity	1,220	1,290	1,250	1,180	1,300
Silicon carbide, crude	479	670	701	628	530
Metallic abrasives	1,020	1,180	1,310	1,130	1,300
Net import reliance ⁶ as a percentage of apparent consumption:					
Fused aluminum oxide	>75	>75	>75	>75	>75
Silicon carbide	>75	>75	>75	>50	>50
Metallic abrasives	E	E	E	4	5

Recycling: Up to 30% of fused aluminum oxide may be recycled, and about 5% of silicon carbide is recycled.

Import Sources (2017–20): Fused aluminum oxide, crude: China,⁷ 91%; France, 3%; Bahrain and Russia, 2% each; and other, 2%. Fused aluminum oxide, grain: Canada, 22%; Brazil, 19%; Austria, 15%; China,⁷ 12%; and other, 32%. Silicon carbide, crude: China,⁷ 88%; the Netherlands and South Africa, 4% each; and other 4%. Silicon carbide, grain: China,⁷ 47%; Brazil, 21%; Russia, 9%; Norway, 7%; and other, 16%. Metallic abrasives: Canada, 33%; China,⁷ 15%; Turkey, 12%; Germany, 10%; and other, 30%.

<u>Tariff:</u>	<u>Item</u>	<u>Number</u>	<u>Normal Trade Relations</u> <u>12–31–21</u>
	Artificial corundum, crude	2818.10.1000	Free.
	White, pink, ruby artificial corundum, greater than 97.5% aluminum oxide, grain	2818.10.2010	1.3% ad valorem.
	Artificial corundum, not elsewhere specified or included, fused aluminum oxide, grain	2818.10.2090	1.3% ad valorem.
	Silicon carbide, crude	2849.20.1000	Free.
	Silicon carbide, grain	2849.20.2000	0.5% ad valorem.
	Iron, pig iron, or steel granules	7205.10.0000	Free.

ABRASIVES (MANUFACTURED)

Depletion Allowance: None.

Government Stockpile: None.

Events, Trends, and Issues: In 2021, China was the world's leading producer of abrasive fused aluminum oxide and abrasive silicon carbide. Imports, especially from China where operating costs were lower, continued to challenge abrasives producers in the United States and Canada. In recent years, imports of abrasives from Hong Kong have also increased. Foreign competition is expected to persist and continue to limit production in North America. The average unit value of imports had increased every year since 2016 for regular fused aluminum oxide and crude silicon carbide but have decreased since 2020. The average unit values of imports of regular fused aluminum oxide and crude silicon carbide during the first 7 months of 2021 were 6% and 14% lower, respectively, than those in 2020 and 13% and 33% lower, respectively, than those in 2019.

Abrasives consumption in the United States is greatly influenced by activity in the manufacturing sectors, particularly the aerospace, automotive, furniture, housing, and steel industries. Automobile and steel production were greatly affected by the global COVID-19 pandemic as well as a global semiconductor chip shortage, which in turn reduced the demand for metallic abrasives.

Domestic production remains consistent, although foreign trade continues to be negatively affected by the COVID-19 pandemic. Imports and exports showed signs of recovery from 2020, but they remained significantly below pre-pandemic levels. Additionally, a global container shortage arose that greatly delayed shipments and caused container prices to nearly double compared with prices in 2020.

World Production Capacity:

	Fused aluminum oxide ^e		Silicon carbide ^e	
	<u>2020</u>	<u>2021</u>	<u>2020</u>	<u>2021</u>
United States	60,000	60,000	40,000	40,000
Australia	50,000	50,000	—	—
Austria	60,000	60,000	—	—
Brazil	50,000	50,000	40,000	40,000
China	800,000	800,000	450,000	450,000
France	40,000	40,000	20,000	20,000
Germany	80,000	80,000	35,000	35,000
India	40,000	40,000	5,000	5,000
Japan	15,000	15,000	60,000	60,000
Mexico	—	—	45,000	45,000
Norway	—	—	80,000	80,000
Venezuela	—	—	30,000	30,000
Other countries	<u>80,000</u>	<u>80,000</u>	<u>200,000</u>	<u>200,000</u>
World total (rounded)	1,300,000	1,300,000	1,000,000	1,000,000

World Resources:⁸ Although domestic resources of raw materials for fused aluminum oxide production are limited, adequate resources are available in the Western Hemisphere. Domestic resources are more than adequate for silicon carbide production.

Substitutes: Natural and manufactured abrasives, such as garnet, emery, or metallic abrasives, can be substituted for fused aluminum oxide and silicon carbide in various applications.

^eEstimated. E Net exporter. — Zero.

¹Production data for aluminum oxide are combined production data from the United States and Canada to avoid disclosing company proprietary data.

²Rounded to the nearest 5,000 tons to avoid disclosing company proprietary data.

³Defined as imports – exports because production includes data from Canada; actual consumption is higher than that shown.

⁴Defined as production + imports – exports.

⁵Defined as shipments + imports – exports.

⁶Defined as imports – exports.

⁷Includes Hong Kong.

⁸See Appendix C for resource and reserve definitions and information concerning data sources.