

ABRASIVES (MANUFACTURED)

(Fused aluminum oxide, silicon carbide, and metallic abrasives)
(Data in metric tons unless otherwise specified)

Domestic Production and Use: In 2023, 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 \$3.4 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 \$28 million. Metallic abrasives were produced by 11 companies in eight States. Production of metallic abrasives had an estimated value of about \$130 million, and metallic abrasive shipments were valued at \$140 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:	2019	2020	2021	2022	2023^e
Production:					
Fused aluminum oxide, crude ^{1, 2}	10,000	10,000	10,000	20,000	20,000
Silicon carbide ²	35,000	35,000	35,000	40,000	40,000
Metallic abrasives	177,000	176,000	176,000	180,000	180,000
Shipments, metallic abrasives	195,000	194,000	193,000	199,000	210,000
Imports for consumption:					
Fused aluminum oxide	184,000	121,000	159,000	225,000	120,000
Silicon carbide	131,000	88,400	125,000	165,000	120,000
Metallic abrasives	27,900	25,800	26,400	20,100	18,000
Exports:					
Fused aluminum oxide	18,400	11,400	13,500	14,400	10,000
Silicon carbide	11,500	8,310	12,000	12,000	11,000
Metallic abrasives	31,200	18,000	20,100	23,900	22,000
Consumption, apparent:					
Fused aluminum oxide ³	166,000	109,000	146,000	210,000	110,000
Silicon carbide ⁴	155,000	115,000	148,000	193,000	150,000
Metallic abrasives ⁵	192,000	202,000	199,000	195,000	210,000
Price, average unit value of imports, dollars per metric ton:					
Fused aluminum oxide, crude	716	666	674	797	670
Fused aluminum oxide, ground and refined	1,250	1,180	1,290	1,030	1,400
Silicon carbide, crude	701	628	587	1,080	910
Metallic abrasives	1,310	1,130	1,510	2,130	1,900
Net import reliance ⁶ as a percentage of apparent consumption:					
Fused aluminum oxide	>95	>95	>95	>95	>95
Silicon carbide	77	70	76	79	73
Metallic abrasives	E	4	3	E	E

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

Import Sources (2019–22): Fused aluminum oxide, crude: China,⁷ 91%; Bahrain, 3%; Russia, 2%; Turkey, 2%; and other, 2%. Fused aluminum oxide, ground and refined: Canada, 26%; Brazil, 19%; Austria, 15%; China,⁷ 13%; and other, 27%. Total fused aluminum oxide: China,⁷ 65%; Canada, 10%; Brazil, 7%; Austria, 5%; and other, 13%. Silicon carbide, crude: China,⁷ 91%; Netherlands, 3%; South Africa, 2%; Vietnam, 2%; and other 2%. Silicon carbide, ground and refined: China,⁷ 51%; Brazil, 19%; Canada, 11%; Norway, 8%; and other, 11%. Total silicon carbide: China,⁷ 81%; Brazil, 5%; Canada, 3%; Netherlands, 2%; and other, 9%. Metallic abrasives: Canada, 40%; Turkey, 16%; Thailand, 10%; China,⁷ 8%; and other, 26%.

Tariff:	Item	Number	Normal Trade Relations 12–31–23
	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.

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Depletion Allowance: None.

Government Stockpile: None.

Events, Trends, and Issues: In 2023, China was the world's leading manufacturer of abrasive fused aluminum oxide and abrasive silicon carbide. Imports from China, where production costs were lower, continued to challenge abrasives manufacturers in the United States and Canada. China accounted for 98% of United States imports of crude fused aluminum oxide, 23% of ground and refined fused aluminum oxide imports, 98% of crude silicon carbide imports, and 63% of ground and refined silicon carbide imports. Foreign competition was expected to persist and continue to limit production in North America. The import quantities of abrasive fused aluminum oxide (crude and ground and refined) in 2023 were 59% and 7% lower, respectively, than those in 2022. The import quantities of abrasive silicon carbide (crude and ground and refined) in 2023 were 31% and 23% lower, respectively, than those in 2022.

The United States returned to being a net exporter of metallic abrasives in 2022 and 2023 as compared with being a net importer in 2020 and 2021. The import quantity of metallic abrasives in 2023 was 9% lower than that in 2022. Canada was the leading supplier of metallic abrasive imports.

The consumption of abrasives in the United States is influenced by activity in the manufacturing sectors that use them, particularly the aerospace, automotive, furniture, housing, and steel industries. The U.S. abrasive markets also are influenced by technological trends.

World Production Capacity: Fused aluminum oxide capacity data for Austria were revised based on company reports.

	Fused aluminum oxide ^e		Silicon carbide ^e	
	2022	2023	2022	2023
United States	—	—	40,000	40,000
United States and Canada	60,000	60,000	—	—
Australia	50,000	50,000	—	—
Austria	90,000	90,000	—	—
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	80,000	80,000	200,000	200,000
World total (rounded)	1,310,000	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, metallic abrasives, or staurolite, can be substituted for fused aluminum oxide and silicon carbide in various applications.

^eEstimated. E Net exporter. — Zero.

¹Production data for fused aluminum oxide are combined 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.