

## ABRASIVES (MANUFACTURED)

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

(Data in metric tons unless otherwise noted)

**Domestic Production and Use:** In 2022, 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 \$160 million, and metallic abrasive shipments were valued at \$190 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.

<b>Salient Statistics—United States:</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022<sup>e</sup></b>
Production:					
Fused aluminum oxide, crude <sup>1,2</sup>	10,000	10,000	10,000	10,000	10,000
Silicon carbide <sup>2</sup>	35,000	35,000	35,000	35,000	35,000
Metallic abrasives	180,000	177,000	176,000	176,000	180,000
Shipments, metallic abrasives	196,000	195,000	194,000	193,000	190,000
Imports for consumption:					
Fused aluminum oxide	192,000	184,000	120,000	159,000	200,000
Silicon carbide	146,000	131,000	88,400	125,000	140,000
Metallic abrasives	29,900	27,900	25,800	26,400	21,000
Exports:					
Fused aluminum oxide	20,100	18,400	11,400	13,500	17,000
Silicon carbide	10,100	11,500	8,310	12,000	12,000
Metallic abrasives	33,600	31,200	18,100	20,200	22,000
Consumption, apparent:					
Fused aluminum oxide <sup>3</sup>	172,000	166,000	109,000	146,000	180,000
Silicon carbide <sup>4</sup>	171,000	155,000	115,000	148,000	160,000
Metallic abrasives <sup>5</sup>	192,000	192,000	202,000	199,000	190,000
Price, average unit value of imports, dollars per ton:					
Fused aluminum oxide, crude	681	716	666	674	800
Fused aluminum oxide, ground and refined	1,290	1,250	1,180	1,290	1,500
Silicon carbide, crude	670	701	628	587	1,000
Metallic abrasives	1,180	1,310	1,130	1,510	2,100
Net import reliance <sup>6</sup> as a percentage of apparent consumption:					
Fused aluminum oxide	>75	>75	>75	>75	>75
Silicon carbide	80	77	70	76	79
Metallic abrasives	E	E	4	3	E

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

**Import Sources (2018–21):** Fused aluminum oxide, crude: China,<sup>7</sup> 93%; Bahrain, 3%; Russia, 2%; Canada, 1%; and other, 1%. Fused aluminum oxide, ground and refined: Canada, 25%; Brazil, 19%; Austria, 15%; China,<sup>7</sup> 13%; and other, 28%. Total fused aluminum oxide: China,<sup>7</sup> 63%; Canada, 10%; Brazil, 7%; Austria, 5%; and other, 15%. Silicon carbide, crude: China,<sup>7</sup> 90%; Netherlands and South Africa, 3% each; Luxembourg, 1%; and other 3%. Silicon carbide, ground and refined: China,<sup>7</sup> 48%; Brazil, 21%; Canada, 9%; Russia, 7%; and other, 15%. Total silicon carbide: China,<sup>7</sup> 79%; Brazil, 6%; Netherlands and South Africa, 3%, each; and other, 9%. Metallic abrasives: Canada, 33%; Turkey, 16%; China,<sup>7</sup> 12%; Thailand, 9%; and other, 30%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations 12–31–22</b>
	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 2022, 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 93% of United States imports of crude fused aluminum oxide, 13% of ground and refined fused aluminum oxide imports, 90% of crude silicon carbide imports, and 48% of ground and refined silicon carbide imports. Foreign competition is expected to persist and continue to limit production in North America. The import quantity and value of abrasive fused aluminum oxide (crude and ground and refined) in 2022 were 26% and 44% higher, respectively, than those in 2021. The import quantity and value of abrasive silicon carbide (crude and ground and refined) in 2022 were 9% and 76% higher, respectively, than those in 2021.

The United States returned to being a net exporter of metallic abrasives in 2022 as compared with being a net importer in 2020 and 2021. 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. Imports and exports continued to recover from the negative effects from the global coronavirus disease 2019 (COVID-19) pandemic, and they have returned to pre-pandemic levels.

### **World Production Capacity:**

	Fused aluminum oxide <sup>e</sup>		Silicon carbide <sup>e</sup>	
	2021	2022	2021	2022
United States	—	—	40,000	40,000
United States and Canada	60,000	60,000	—	—
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	80,000	80,000	200,000	200,000
World total (rounded)	1,300,000	1,300,000	1,000,000	1,000,000

**World Resources:**<sup>8</sup> 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.

<sup>e</sup>Estimated. E Net exporter. — Zero.

<sup>1</sup>Production data for fused aluminum oxide are combined data from the United States and Canada to avoid disclosing company proprietary data.

<sup>2</sup>Rounded to the nearest 5,000 tons to avoid disclosing company proprietary data.

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

<sup>4</sup>Defined as production + imports – exports.

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

<sup>6</sup>Defined as imports – exports.

<sup>7</sup>Includes Hong Kong.

<sup>8</sup>See Appendix C for resource and reserve definitions and information concerning data sources.