

ABRASIVES (MANUFACTURED)

(Fused aluminum oxide and silicon carbide)

(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 regular-grade fused aluminum oxide had an estimated value of \$1.7 million. Silicon carbide was produced by two companies at two plants in the United States. Domestic production of crude silicon carbide had an estimated value of about \$26 million. Bonded and coated abrasive products accounted for most abrasive uses of fused aluminum oxide and silicon carbide.

| Salient Statistics—United States: | 2008 | 2009 | 2010 | 2011 | 2012^e |
|--|-------------|-------------|-------------|-------------|-------------------------|
| Production, ¹ United States and Canada (crude): | | | | | |
| Fused aluminum oxide, regular | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| Silicon carbide | 35,000 | 35,000 | 35,000 | 35,000 | 35,000 |
| Imports for consumption (U.S.): | | | | | |
| Fused aluminum oxide | 285,000 | 64,200 | 185,000 | 223,000 | 193,000 |
| Silicon carbide | 127,000 | 78,000 | 143,000 | 129,000 | 113,000 |
| Exports (U.S.): | | | | | |
| Fused aluminum oxide | 21,900 | 12,300 | 20,000 | 19,900 | 19,500 |
| Silicon carbide | 17,000 | 20,700 | 23,100 | 27,800 | 19,000 |
| Consumption, apparent (U.S.): | | | | | |
| Fused aluminum oxide | NA | NA | NA | NA | NA |
| Silicon carbide | 145,000 | 92,300 | 155,000 | 136,000 | 130,000 |
| Price, value of imports, dollars per ton (U.S.): | | | | | |
| Fused aluminum oxide, regular | 512 | 608 | 555 | 627 | 555 |
| Fused aluminum oxide, high-purity | 1,230 | 1,170 | 1,300 | 1,360 | 1,180 |
| Silicon carbide | 835 | 557 | 793 | 1,260 | 1,280 |
| Net import reliance ² as a percentage of apparent consumption (U.S.): | | | | | |
| Fused aluminum oxide | NA | NA | NA | NA | NA |
| Silicon carbide | 76 | 62 | 77 | 74 | 73 |

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

Import Sources (2008–11): Fused aluminum oxide, crude: China, 81%; Venezuela, 8%; Canada, 8%; and other, 3%. Fused aluminum oxide, grain: Brazil, 28%; Germany, 22%; Austria, 19%; Italy, 7%; and other, 24%. Silicon carbide, crude: China, 68%; South Africa, 11%; Romania, 6%; Netherlands, 6%; and other, 9%. Silicon carbide, grain: China, 44%; Brazil, 23%; Norway, 7%; Russia, 6%; and other, 20%.

| Tariff: | Item | Number | Normal Trade Relations |
|----------------|---|---------------|-------------------------------|
| | Fused aluminum oxide, crude | 2818.10.1000 | <u>12-31-12</u> Free. |
| | White, pink, ruby artificial corundum, greater than 97.5% fused aluminum oxide, grain | 2818.10.2010 | 1.3% ad val. |
| | Artificial corundum, not elsewhere specified or included, fused aluminum oxide, grain | 2818.10.2090 | 1.3% ad val. |
| | Silicon carbide, crude | 2849.20.1000 | Free. |
| | Silicon carbide, grain | 2849.20.2000 | 0.5% ad val. |

Depletion Allowance: None.

Government Stockpile: None.

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Events, Trends, and Issues: In 2012, China was the world's leading producer of abrasive fused aluminum oxide and abrasive silicon carbide, with production of nearly 695,000 tons and 450,000 tons, respectively, nearly at capacity. Imports and higher operating costs continued to challenge abrasives producers in the United States and Canada. Foreign competition, particularly from China, is expected to persist and further curtail production in North America. Abrasives markets are greatly influenced by activity in the manufacturing sector in the United States. During 2012, these manufacturing sectors included the aerospace, automotive, furniture, housing, and steel industries. The U.S. abrasive markets also are influenced by economic and technological trends.

World Production Capacity:

| | Fused aluminum oxide | | Silicon carbide | |
|--------------------------|-----------------------------|--------------------|------------------------|--------------------|
| | <u>2011</u> | <u>2012</u> | <u>2011</u> | <u>2012</u> |
| United States and Canada | 60,400 | 60,400 | 42,600 | 42,600 |
| Argentina | — | — | 5,000 | 5,000 |
| Australia | 50,000 | 50,000 | — | — |
| Austria | 60,000 | 60,000 | — | — |
| Brazil | 50,000 | 50,000 | 43,000 | 43,000 |
| China | 700,000 | 700,000 | 455,000 | 455,000 |
| France | 40,000 | 40,000 | 16,000 | 16,000 |
| Germany | 80,000 | 80,000 | 36,000 | 36,000 |
| India | 40,000 | 40,000 | 5,000 | 5,000 |
| Japan | 25,000 | 25,000 | 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>190,000</u> | <u>190,000</u> |
| World total (rounded) | 1,190,000 | 1,190,000 | 1,010,000 | 1,010,000 |

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

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.

⁰Estimated. NA Not available. — Zero.

¹Rounded to the nearest 5,000 tons to protect proprietary data.

²Defined as imports – exports.