

**GARNET (INDUSTRIAL)<sup>1</sup>**

(Data in metric tons of garnet unless otherwise noted)

**Domestic Production and Use:** Garnet for industrial use was mined in 2017 by four firms—one in Idaho, one in Montana, and two in New York. In 2017, the estimated value of crude garnet production was about \$15 million, and refined material sold or used had an estimated value of \$28 million. The major end uses of garnet were, in decreasing percentage of consumption, for abrasive blasting, waterjet cutting, water-filtration media, and other end uses, such as in abrasive powders, nonslip coatings, and sandpaper. Domestic industries that consume garnet include aircraft and motor vehicle manufacturers, ceramics and glass producers, electronic component manufacturers, filtration plants, glass polishing, the petroleum industry, shipbuilders, textile stonewashing, and wood-furniture-finishing operations.

<b>Salient Statistics—United States:</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017<sup>e</sup></b>
Production (crude)	50,600	42,100	55,200	56,400	63,000
Production (refined, sold or used)	45,500	37,100	48,700	49,400	55,000
Imports for consumption <sup>e, 2</sup>	148,000	213,000	238,000	149,000	70,000
Exports <sup>e</sup>	14,400	15,400	14,700	13,400	17,000
Consumption, apparent <sup>e, 3</sup>	184,000	240,000	278,000	192,000	120,000
Employment, mine and mill, number <sup>e</sup>	103	99	105	108	120
Net import reliance <sup>4</sup> as a percentage of apparent consumption	72	82	80	71	46

**Recycling:** Small quantities of garnet reportedly are recycled; however, a new processing plant in Pennsylvania, which recycles garnet, began production in June 2017. The quantity of garnet recycled was not available.

**Import Sources (2013–16):<sup>e</sup>** Australia, 45%; India, 37%; South Africa, 11%; China, 6%; and other, 1%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations 12–31–17</b>
	Emery, natural corundum, natural garnet, and other natural abrasives, crude	2513.20.1000	Free.
	Emery, natural corundum, natural garnet, and other natural abrasives, other than crude	2513.20.9000	Free.

**Depletion Allowance:** 14% (Domestic and foreign).

**Government Stockpile:** None.

**Events, Trends, and Issues:** Compared with 2016, imports in 2017 were estimated to have decreased by 53%, whereas exports in 2017 were estimated to have increased by 27%. The significant decrease in imports of garnet can, at least in part, be attributed to price changes and a supply shortage of garnet. In 2017, the average unit value of garnet imports was \$309 per ton, which represents an increase of 54% compared with the average unit value in 2016. In the United States, on the other hand, most domestically produced crude garnet concentrate was priced around \$232 per ton.

During 2017, estimated domestic production of crude garnet concentrates increased by 11% compared with production in 2016. U.S. garnet production was estimated to be about 4% of total global garnet production. The 2017 estimated domestic sales or use of refined garnet increased by 12% compared with sales in 2016. Additionally, a new processing plant in Pennsylvania, which recycles garnet, began production in June 2017 and could account for the increase in exports of garnet in 2017 and part of the reduction of imports; the majority of the increased exports were from the Philadelphia customs district and there were zero imports into the Philadelphia customs district in 2017.

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Estimated U.S. garnet apparent consumption decreased by 38% compared with that of 2016, with the United States consuming about 6% of global garnet production. World production of garnet decreased in 2017 owing to the closure of mines in Australia and a crackdown on illegal mining and port restrictions in India. The crackdown in India resulted in a global supply shortage of garnet in 2017. The reduction in apparent consumption in the United States was due to a drastic reduction in imports from India and Australia, particularly into the New Orleans customs district. It was unclear whether this was due to the supply shortage or reduced demand. As a result of reduced apparent consumption, U.S. net import reliance decreased in 2017, but the United States remained a net importer.

The garnet market is very competitive. To increase profitability and remain competitive with imported material, production may be restricted to only high-grade garnet ores or other salable mineral products that occur with garnet, such as kyanite, marble, metallic ores, mica minerals, sillimanite, staurolite, or wollastonite. With the increase in price in imported material, domestic production is expected to continue to increase.

### **World Mine Production and Reserves:**

	Mine production		Reserves <sup>5</sup>
	<u>2016</u>	<u>2017<sup>e</sup></u>	
United States	56,400	63,000	5,000,000
Australia	575,000	400,000	Moderate to Large
China	88,900	100,000	Moderate to Large
India	500,000	200,000	19,000,000
South Africa	271,000	300,000	NA
Other countries	<u>50,000</u>	<u>50,000</u>	<u>6,500,000</u>
World total (rounded)	1,540,000	1,100,000	Moderate to Large

**World Resources:** World resources of garnet are large and occur in a wide variety of rocks, particularly gneisses and schists. Garnet also occurs in contact-metamorphic deposits in crystalline limestones, pegmatites, serpentinites, and vein deposits. In addition, alluvial garnet is present in many heavy-mineral sand and gravel deposits throughout the world. Large domestic resources of garnet also are concentrated in coarsely crystalline gneiss near North Creek, NY; other significant domestic resources of garnet occur in Idaho, Maine, Montana, New Hampshire, North Carolina, and Oregon. In addition to those in the United States, major garnet deposits exist in Australia, Canada, China, India, and South Africa, where they are mined for foreign and domestic markets; deposits in Russia and Turkey also have been mined in recent years, primarily for internal markets. Additional garnet resources are in Chile, Czechia, Pakistan, Spain, Thailand, and Ukraine; small mining operations have been reported in most of these countries.

**Substitutes:** Other natural and manufactured abrasives can substitute to some extent for all major end uses of garnet. In many cases, however, using the substitutes would entail sacrifices in quality or cost. Fused aluminum oxide and staurolite compete with garnet as a sandblasting material. Ilmenite, magnetite, and plastics compete as filtration media. Corundum, diamond, and fused aluminum oxide compete for lens grinding and for many lapping operations. Emery is a substitute in nonskid surfaces. Fused aluminum oxide, quartz sand, and silicon carbide compete for the finishing of plastics, wood furniture, and other products.

<sup>e</sup>Estimated. NA Not Available.

<sup>1</sup>Excludes gem and synthetic garnet.

<sup>2</sup>It was assumed that 75% of imports under Harmonized Tariff Schedule codes 2513.20.1000 and 2513.20.9000 were industrial garnet.

<sup>3</sup>Defined as crude production + imports – exports.

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

<sup>5</sup>See [Appendix C](#) for resource and reserve definitions and information concerning data sources.