

**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 2008 by four firms—one in Idaho, one in Montana, and two in New York. The estimated value of crude garnet production was about \$11 million, while refined material sold or used had an estimated value of \$5.8 million. Major end uses for garnet were waterjet cutting, 35%; abrasive blasting media, 30%; water filtration, 15%; abrasive powders, 10%; and other end uses, 10%.

<b>Salient Statistics—United States:</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008<sup>e</sup></b>
Production (crude)	28,400	40,100	34,100	61,400	61,000
Sold by producers	30,400	23,100	16,800	20,700	21,000
Imports for consumption <sup>e</sup>	36,500	41,800	50,800	52,300	54,600
Exports <sup>e</sup>	10,900	13,400	13,300	12,000	13,900
Consumption, apparent <sup>e, 2</sup>	54,000	68,600	71,600	102,000	102,000
Price, range of value, dollars per ton <sup>3</sup>	50-2,000	50-2,000	50-2,000	50-2,000	50-2,000
Stocks, producer	NA	NA	NA	NA	NA
Employment, mine and mill, number <sup>e</sup>	160	160	160	160	160
Net import reliance <sup>4</sup> as a percentage of apparent consumption	47	41	52	40	40

**Recycling:** Small amounts of garnet reportedly are recycled.

**Import Sources (2004-07):<sup>e</sup>** Australia, 37%; India, 30%; China, 21%; Canada, 11%; and other, 1%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations 12-31-08</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.
	Natural abrasives on woven textile	6805.10.0000	Free.
	Natural abrasives on paper or paperboard	6805.20.0000	Free.
	Natural abrasives sheets, strips, disks, belts, sleeves, or similar form	6805.30.1000	Free.

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

**Government Stockpile:** None.

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**Events, Trends, and Issues:** During 2008, U.S. garnet consumption decreased slightly, while domestic production of crude garnet concentrates remained about the same compared with the production of 2007. In 2007, domestic U.S. production of crude garnet concentrates increased about 80% compared with the production of 2006, owing to the purchase and startup of production by the Ruby Valley Garnet Mine in Montana. In 2008, imports were estimated to have increased 4% compared with those of 2007, and exports were estimated to have increased 16% from those of 2007. The 2008 estimated domestic sales of garnet remained at about the same level as sales of 2007. In 2008, the United States was a net importer. Garnet imports have supplemented U.S. production in the domestic market, with Australia, Canada, China, and India being major garnet suppliers.

The garnet market is very competitive. To increase profitability and remain competitive with foreign imported material, other salable mineral products that occur with garnet, such as kyanite, marble, mica minerals, sillimanite, staurolite, wollastonite, or metallic ores, may be produced.

**World Mine Production, Reserves, and Reserve Base:** The reserve base for India was revised based on information reported by the Government of India.

	Mine production		Reserves <sup>5</sup>	Reserve base <sup>5</sup>
	<u>2007</u>	<u>2008<sup>e</sup></u>		
United States	61,400	61,000	5,000,000	25,000,000
Australia	160,000	160,000	1,000,000	7,000,000
China	30,000	30,000	Moderate to Large	Moderate to Large
India	65,000	65,000	90,000	6,500,000
Other countries	<u>35,500</u>	<u>36,000</u>	<u>6,500,000</u>	<u>20,000,000</u>
World total (rounded)	352,000	352,000	Moderate	Large

**World Resources:** World resources of garnet are large and occur in a wide variety of rocks, particularly gneisses and schists. Garnet also occurs as 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, China, and India, 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 located in Canada, Chile, Czech Republic, Pakistan, South Africa, 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, 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. Diamond, corundum, and fused aluminum oxide compete for lens grinding and for many lapping operations. Emery is a substitute in nonskid surfaces. Finally, quartz sand, silicon carbide, and fused aluminum oxide 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>Defined as crude production – exports + imports.

<sup>3</sup>Includes both crude and refined garnet; most crude concentrate is \$50 to \$120 per ton, and most refined material is \$150 to \$450 per ton.

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

<sup>5</sup>[See Appendix C for definitions.](#)