

**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 2000 by five firms, three in New York, one in Montana, and one in Idaho. Output of crude garnet was valued at more than \$5 million, while refined material sold or used was valued at \$11.7 million. Major end uses for garnet were abrasive blasting media, 45%; water filtration, 15%; waterjet cutting, 10%; and abrasive powders, 10%.

<b>Salient Statistics—United States:</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000<sup>e</sup></b>
Production (crude)	60,900	64,900	74,000	60,700	50,000
Sold by producers	46,200	53,600	51,900	43,900	44,400
Imports for consumption <sup>e</sup>	9,000	10,000	20,000	12,000	23,000
Exports <sup>e</sup>	12,000	12,000	12,000	10,000	10,000
Consumption, apparent	34,500	46,300	39,900	39,100	56,900
Price, range of value, dollars per ton <sup>2</sup>	50-2,000	50-2,000	50-2,000	55-2,000	50-2,000
Stocks, producer <sup>e</sup>	14,600	19,900	39,900	46,700	47,200
Employment, mine and mill, number	210	250	230	220	220
Net import reliance <sup>3</sup> as a percent of apparent consumption	E	E	E	E	22

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

**Import Sources (1996-99)<sup>e</sup>:** Australia, 65%; India, 20%; and China, 15%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations 12/31/00</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 2000, U.S. garnet consumption grew significantly; demand was met by imports and by sales of producer stocks. Sweetwater Garnet, Inc. shut down in 1999 and continued to be offered for sale in 2000. The sale of the Cominco American Mine to Montana-Oregon Investment Group LLC took effect December 31, 1999, and the name was changed to the Ruby Garnet Mine. Although U.S. producer sales increased only slightly during 2000, some forecasts indicate that domestic and foreign markets for industrial garnet may continue to grow in the next several years. Markets for waterjet cutting and blasting media are expected to exhibit the highest demand. With the worldwide increases in petroleum prices, there has been an increase in the use of garnet for cleaning drillpipe by the oil and gas industry. China has now joined Australia and India as an important garnet exporter.

### **World Mine Production, Reserves, and Reserve Base:**

	<b>Mine production</b>		<b>Reserves<sup>4</sup></b>	<b>Reserve base<sup>4</sup></b>
	<b>1999</b>	<b>2000<sup>e</sup></b>		
United States	60,700	50,000	5,000,000	25,000,000
Australia	116,000	125,000	1,000,000	7,000,000
China	20,000	25,000	Moderate to Large	Moderate to Large
India	55,000	60,000	500,000	20,000,000
Other countries	<u>20,300</u>	<u>30,000</u>	<u>6,500,000</u>	<u>20,000,000</u>
World total (rounded)	272,000	290,000	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, and other significant domestic resources of garnet occur in Idaho, Maine, Montana, New Hampshire, North Carolina, and Oregon. In addition to 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 areas.

**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. E Net exporter.

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

<sup>2</sup>Includes both crude and refined garnet; most crude concentrate is \$50 to \$100 per ton, and most refined material is \$150 to \$400 per ton.

<sup>3</sup>Defined as imports - exports + adjustments for industry stock changes.

<sup>4</sup>See Appendix C for definitions.