

BERYLLIUM

(Data in metric tons of beryllium content unless otherwise noted)

Domestic Production and Use: A company in Utah mined bertrandite ore, which it converted, along with imported beryl and beryl from the National Defense Stockpile, into beryllium hydroxide. Some of the beryllium hydroxide was shipped to the company's plant in Ohio, where it was converted into beryllium copper master alloy, metal, and/or oxide, and some was sold. Estimated beryllium consumption of 91 tons was valued at about \$28 million, based on the estimated unit value for beryllium in imported beryllium-copper master alloy. Based on sales revenues, nearly one-half of beryllium use was estimated to be in computer and telecommunications products, and the remainder was in aerospace and defense applications, appliances, automotive electronics, industrial components, and other applications.

Salient Statistics—United States:	2003	2004	2005	2006	2007^e
Production, mine shipments ^e	85	90	110	155	100
Imports for consumption ¹	163	85	93	62	80
Exports ²	269	217	201	135	90
Government stockpile releases ³	33	106	79	158	1
Consumption:					
Apparent ⁴	57	69	84	226	91
Reported, ore	140	130	160	180	NA
Unit value, average annual, beryllium-copper master alloy, dollars per pound contained beryllium ⁵	113	125	99	128	141
Stocks, ore, consumer, yearend	45	40	35	50	NA
Net import reliance ⁶ as a percentage of apparent consumption	E	E	E	⁷ 31	E

Recycling: Beryllium was recycled mostly from new scrap generated during the manufacture of beryllium products. Detailed data on the quantities of beryllium recycled are not available, but may represent as much as 10% of apparent consumption.

Import Sources (2003-06):¹ Kazakhstan, 42%; Germany, 24%; United Kingdom, 6%; and other, 28%.

Tariff: Item	Number	Normal Trade Relations 12-31-07
Beryllium ores and concentrates	2617.90.0030	Free.
Beryllium oxide and hydroxide	2825.90.1000	3.7% ad val.
Beryllium-copper master alloy	7405.00.6030	Free.
Beryllium:		
Unwrought, including powders	8112.12.0000	8.5% ad val.
Waste and scrap	8112.13.0000	Free.
Other	8112.19.0000	5.5% ad val.

Depletion Allowance: 22% (Domestic), 14% (Foreign).

Government Stockpile: The Defense Logistics Agency, U.S. Department of Defense, had a goal of retaining 45 tons of hot-pressed beryllium powder in the National Defense Stockpile. Disposal limits for beryllium materials in the fiscal year 2008 Annual Materials Plan are as follows: beryl ore, 109 tons of contained beryllium; beryllium-copper master alloy, 11 tons of contained beryllium; and beryllium metal, 36 tons.

Stockpile Status—9-30-07⁸

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2007	Disposals FY 2007
Beryl ore (11% BeO)	—	—	—	⁹ 145	—
Beryllium-copper master alloy	3	—	3	¹⁰ 44	—
Beryllium metal:					
Hot-pressed powder	155	—	110	—	—
Vacuum-cast	40	—	40	¹⁰ 36	—

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Events, Trends, and Issues: During the first half of 2007, the leading U.S. beryllium producer sold a lower volume of bulk and strip beryllium-copper alloy products than it did during the first half of 2006. Sales of beryllium products for defense applications and medical and industrial x-ray equipment were higher than those during the first half of 2006; sales of beryllium blanks to an experimental nuclear fusion reactor in Europe continued in 2007. Sales of beryllium-aluminum products were higher than those during the first half of 2006, while sales of beryllium oxide ceramics were the same during the two periods.

The leading U.S. beryllium producer began work on opening a new bertrandite mine in Utah. The mine was expected to begin ore production in 2008. The company also planned to build a new primary beryllium facility at its operations in Ohio. The engineering and design of the new facility was being funded by the Department of Defense's Defense Production Act Title III Program, and was expected to be completed before the end of 2007. Construction and startup of the facility was expected to take 2 to 3 years; funding would require additional Title III approval. Primary beryllium is the feedstock used to make beryllium metal products. The only primary beryllium facility in the United States was closed in 2000.

Because of the toxic nature of beryllium, various international, national, and State guidelines and regulations have been established regarding beryllium in air, water, and other media. Industry must maintain careful control over the quantity of beryllium dust, fumes, and mists in the workplace. Control of potential health hazards adds to the final cost of beryllium products.

World Mine Production, Reserves, and Reserve Base:

	Mine production ^e	
	2006	2007
United States	155	100
China	20	20
Mozambique	6	6
Other countries	(12)	(12)
World total (rounded)	180	130

Reserves and reserve base¹¹

The United States has very little beryl that can be economically handsorted from pegmatite deposits. The Spor Mountain area, Utah, an epithermal deposit, contains a large reserve base of bertrandite, which was being mined. Proven bertrandite reserves in Utah total about 15,900 tons of contained beryllium. World beryllium reserves and reserve base are not sufficiently well delineated to report consistent figures for all countries.

World Resources: World resources in known deposits of beryllium have been estimated to be more than 80,000 tons. About 65% of these resources is in nonpegmatite deposits in the United States; the Spor Mountain and Gold Hill areas in Utah and the Seward Peninsula area in Alaska account for most of the total.

Substitutes: Because the cost of beryllium is high compared with that of other materials, it is used in applications in which its properties are crucial. In some applications, certain metal matrix or organic composites, high-strength grades of aluminum, pyrolytic graphite, silicon carbide, steel, or titanium may be substituted for beryllium metal or beryllium composites. Copper alloys containing nickel and silicon, tin, titanium, or other alloying elements or phosphor bronze alloys (copper-tin-phosphorus) may be substituted for beryllium-copper alloys, but these substitutions can result in substantially reduced performance. Aluminum nitride or boron nitride may be substituted for beryllium oxide in some applications.

^eEstimated. E Net exporter. NA Not available. — Zero.

¹Includes estimated beryllium content of imported ores and concentrates, oxide and hydroxide, unwrought metal (including powders), beryllium articles, waste and scrap, and beryllium-copper master alloy.

²Includes estimated beryllium content of exported unwrought metal (including powders), beryllium articles, and waste and scrap.

³Change in total inventory level from prior yearend inventory; includes committed and uncommitted inventories.

⁴The sum of U.S. mine shipments and net import reliance.

⁵Calculated from gross weight and customs value of imports; beryllium content estimated to be 4%.

⁶Defined as imports – exports + adjustments for Government and industry stock changes.

⁷Significant releases of beryl from the National Defense Stockpile resulted in a positive net import reliance as a percentage of apparent consumption in 2006.

⁸[See Appendix B for definitions.](#)

⁹Actual quantity will be limited to remaining inventory.

¹⁰Represents inventory sold, but not yet shipped.

¹¹[See Appendix C for definitions.](#)

¹²Less than ½ unit.