

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 a company plant in Ohio, where it was converted into beryllium alloys, metal, and oxide, and some was sold to other companies. Beryllium consumption of 70 tons was valued at about \$15 million, based on the estimated unit value for beryllium-copper master alloy. 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:	2001	2002	2003	2004	2005^e
Production, mine shipments ^e	100	80	85	90	90
Imports for consumption ¹	242	141	163	85	120
Exports ²	150	165	269	217	210
Government stockpile releases ³	90	90	33	106	70
Consumption:					
Apparent ⁴	297	156	57	69	70
Reported, ore	170	120	140	130	NA
Unit value, average annual, beryllium-copper master alloy, dollars per pound contained beryllium ⁵	75	123	113	125	100
Stocks, ore, consumer, yearend	100	90	45	40	NA
Net import reliance ⁶ as a percentage of apparent consumption	66	49	E	E	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 (2001-04): Beryllium contained in ores and concentrates, oxide and hydroxide, unwrought metal (including powders), beryllium articles, waste and scrap, and beryllium-copper master alloy: Kazakhstan, 22%; Russia, 21%; Germany, 16%; Japan, 14%; and other, 27%.

Tariff: Item	Number	Normal Trade Relations⁷ 12-31-05
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 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 2006 Annual Materials Plan were unchanged from those of fiscal year 2005.

Stockpile Status—9-30-05⁸

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2005	Disposals FY 2005
Beryl ore (11% BeO)	130	34	130	⁹ 145	10
Beryllium-copper master alloy	—	28	—	⁹ 44	—
Beryllium metal:					
Vacuum-cast	41	28	41	36	27
Hot-pressed powder	155	—	110	—	—

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Events, Trends, and Issues: During the first half of 2005, U.S. beryllium demand for defense applications was reduced owing to a shift in military funds to support operations in the Middle East, which resulted in delayed funding for some military applications that used beryllium. Demand from two major market sectors (automotive electronics and computers and telecommunications) was weak. Demand from other market sectors, including aerospace, the oil and gas industry, and plastic tooling applications, was stronger than that during the first half of 2004. Shipments of beryllium mirror blanks for the James Webb space telescope were completed during the year.

In China, a newly constructed beryllium refinery began operations. The refinery, which is the second such refinery in China, was designed to produce 100 tons per year of beryllium oxide and 1,000 tons per year of beryllium-copper master alloy.

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. Plants are required to install and maintain pollution-control equipment. Harmful effects are prevented by maintaining clean workplaces; requiring the use of safety equipment, such as personal respirators; collecting dust, fumes, and mists at the source; establishing medical programs; and implementing other procedures to provide safe working conditions. Control of potential health hazards adds to the final cost of beryllium products.

World Mine Production, Reserves, and Reserve Base: Recent analysis has indicated that mine production in Kazakhstan and Russia ceased in the 1990s.

	Mine production^e		Reserves and reserve base¹⁰
	2004	2005	
United States	90	90	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 16,000 tons of contained beryllium. World beryllium reserves and reserve base are not sufficiently well delineated to report consistent figures for all countries.
China	20	20	
Mozambique	3	3	
Other countries	1	1	
World total	114	114	

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. Graphite, steel, and titanium may be substituted for beryllium metal in some applications, and phosphor bronze may be substituted for beryllium-copper alloys, but these substitutions can result in substantial loss in performance. In some applications, aluminum nitride may be substituted for beryllium oxide.

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

¹Series revised; includes 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.

²Series revised; includes 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; see footnotes 1 and 2.

⁷No tariff for Canada or Mexico. Tariffs for other countries for some items may be eliminated under special trade agreements.

⁸[See Appendix B for definitions.](#)

⁹Actual quantity limited to remaining inventory.

¹⁰[See Appendix C for definitions.](#)