BERYLLIUM

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

Domestic Production and Use: One 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—some of which was sold. Estimated beryllium consumption of 120 tons was valued at about $30 million, based on the estimated unit value for beryllium in imported beryllium-copper master alloy. Based on sales revenues, more than one-half of beryllium use was estimated to be in computer and telecommunications products, and the remainder was used in aerospace and defense applications, appliances, automotive electronics, industrial components, and other applications.

Salient Statistics—United States:	2005	2006	2007	2008	2009[e]
Production, mine shipments[e]	110	155	152	176	120
Imports for consumption[1]	93	62	72	70	20
Exports[2]	201	135	101	112	30
Government stockpile releases[3]	79	158	27	39	11
Consumption:					
Apparent[4]	84	226	100	212	120
Reported, ore	160	180	190	220	140
Unit value, average annual, beryllium-copper master alloy, dollars per pound contained beryllium[5]	99	128	144	159	120
Stocks, ore, consumer, yearend	35	50	100	61	60
Net import reliance[6] as a percentage of apparent consumption	E	[7]31	E	17	2

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 (2005-08):[1] Kazakhstan, 58%; United Kingdom, 11%; Kenya, 8%; Ireland, 6%; and other, 17%.

Tariff: Item	Number	Normal Trade Relations 12-31-09
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 2010 Annual Materials Plan are as follows: beryl ore, 1 ton, and beryllium metal, 54 tons of contained beryllium.

Stockpile Status—9-30-09[8]

Material	Uncommitted inventory	Authorized for disposal	Disposal plan FY 2009	Disposals FY 2009
Beryl ore (11% BeO)	—	—	[9]36	—
Beryllium-copper master alloy	—	—	[9]11	—
Beryllium metal:				
Hot-pressed powder	132	87	—	1
Vacuum-cast	16	16	36	14

Prepared by **Brian W. Jaskula [(703) 648-4908, bjaskula@usgs.gov, fax: (703) 648-7757]**

BERYLLIUM

Events, Trends, and Issues: Market conditions deteriorated for beryllium-based products in 2009. During the first three quarters of 2009, the leading U.S. beryllium producer reported volume shipments of bulk and strip beryllium-copper alloy products to be 49% and 41% lower, respectively, than those during the first three quarters of 2008. Sales of beryllium products for key markets, including aerospace, automotive electronics, ceramics, computer and telecommunications, medical and industrial x-ray equipment, and oil and gas, were substantially lower than those during the first three quarters of 2008. Sales of beryllium products for defense-related applications were higher in the first half of 2009 compared with those of the first half of 2008. During the third quarter of 2009, however, Government-funding delays and postponed defense-related orders reduced sales considerably.

In an effort to ensure current and future availability of high-quality domestic beryllium to meet critical defense and commercial needs, the U.S. Department of Defense in 2005, under the Defense Production Act, Title III, invested in a public-private partnership with the leading U.S. beryllium producer to build a new $90.4 million primary beryllium facility in Ohio. In 2009, the Department of Defense increased its threshold of support to $85 million from $50 million. The leading U.S. beryllium producer continued construction of the new beryllium facility in 2009, and the facility was expected to be completed by the end of 2010. Primary beryllium facilities, the last of which closed in the United States in 2000, produce the feedstock used to make beryllium metal products.

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 carefully control the quantity of beryllium dust, fumes, and mists in the workplace, which adds to the final cost of beryllium products.

World Mine Production and Reserves:

	Mine production[e]		Reserves[10]
	2008	2009	
United States	176	120	The United States has very little beryl that can be economically handsorted from pegmatite deposits. The Spor Mountain area in Utah, an epithermal deposit, contains a large bertrandite resource, which was being mined. Proven bertrandite reserves in Utah total about 15,900 tons of contained beryllium. World beryllium reserves are not sufficiently well delineated to report consistent figures for all countries.
China	20	20	
Mozambique	1	1	
Other countries	(11)	(11)	
World total (rounded)	200	140	

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 Gold Hill and Spor Mountain 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.

[e]Estimated. E Net exporter. — Zero.

[1]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.

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

[3]Change in total inventory level from prior yearend inventory.

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

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

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

[7]Significant 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.

[9]Actual quantity will be limited to remaining inventory.

[10]See Appendix C for definitions. Reserve base estimates were discontinued in 2009; see Introduction.

[11]Less than ½ unit.