U.S. Department of the Interior
U.S. Geological Survey

MINERAL COMMODITY SUMMARIES 2009

Abrasives
Aluminum
Antimony
Arsenic
Asbestos
Barite
Bauxite
Beryllium
Bismuth
Boron
Bromine
Cadmium
Cement
Cesium
Chromium
Clays
Cobalt
Copper
Diamond
Diatomite
Feldspar
Fluorspar
Gallium
Garnet
Gemstones
Germanium
Gold
Graphite
Gypsum
Hafnium
Helium
Indium
Iodine
Iron Ore
Iron and Steel
Kyanite
Lead
Lime
Lithium
Magnesium
Manganese
Mercury
Mica
Molybdenum
Nickel
Niobium
Nitrogen
Peat
Perlite
Phosphate Rock
Platinum
Potash
Pumice
Quartz Crystal
Rare Earths
Rhenium
Rubidium
Salt
Sand and Gravel
Scandium
Selenium
Silicon
Silver
Soda Ash
Sodium Sulfate
Stone
Strontium
Sulfur
Talc
Tantalum
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Vanadium
Vermiculite
Yttrium
Zinc
Zirconium

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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 141 tons was valued at about $50 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 used 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:	2004	2005	2006	2007	2008[e]
Production, mine shipmentse	90	110	155	152	155
Imports for consumption[1]	85	93	62	72	80
Exports[2]	217	201	135	101	130
Government stockpile releases[3]	106	79	158	36	36
Consumption:					
Apparent[4]	69	84	226	109	141
Reported, ore	130	160	180	192	NA
Unit value, average annual, beryllium-copper master alloy, dollars per pound contained beryllium[5]	125	99	128	144	162
Stocks, ore, consumer, yearend	40	35	50	100	NA
Net import reliance[6] as a percentage of apparent consumption	E	E	[7]31	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 (2004-07):[1] Kazakhstan, 58%; United Kingdom, 10%; Ireland, 9%; Japan, 7%; and other, 16%.

Tariff: Item	Number	Normal Trade Relations 12-31-08
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 2009 Annual Materials Plan are as follows: beryl ore, 36 tons of contained beryllium; beryllium-copper master alloy, 11 tons of contained beryllium; and beryllium metal, 36 tons.

Stockpile Status—9-30-08[8]

Material	Uncommitted inventory	Authorized for disposal	Disposal plan FY 2008	Disposals FY 2008
Beryl ore (11% BeO)	1	1	[9]109	—
Beryllium-copper master alloy	—	—	11	3
Beryllium metal:				
Hot-pressed powder	133	88	—	21
Vacuum-cast	31	31	36	9

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BERYLLIUM

Events, Trends, and Issues: During the first three quarters of 2008, the leading U.S. beryllium producer had greater sales of bulk and strip beryllium-copper alloy products than during the first three quarters of 2007. Sales of beryllium products for defense applications and medical and industrial x-ray equipment were lower than those during the first three quarters of 2007; sales of beryllium to an experimental nuclear fusion reactor in Europe and to the National Aeronautics and Space Administration for the James Webb Space Telescope effectively ended in 2007. Sales of beryllium oxide ceramics were lower than those during the first three quarters of 2007.

In 2008, the leading U.S. beryllium producer opened a new bertrandite mine in Utah. The company also began construction of a new primary beryllium facility at its operations in Ohio. The engineering and design of the new facility was funded by the U.S. Department of Defense under the Defense Production Act, Title III. Construction and startup of the facility was expected to take 2 to 3 years; funding would require additional Title III approval. 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 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]	
	2007	2008
United States	152	155
China	20	20
Mozambique	6	6
Other countries	(11)	(11)
World total (rounded)	180	180

Reserves and reserve base[10]

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 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. NA Not available. — 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.

[11]Less than ½ unit.