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, 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 250 tons was valued at about $114 million, based on the estimated unit value for beryllium in imported beryllium-copper master alloy. Based on sales revenues, 32% of beryllium alloy strip and bulk products was estimated to be used in industrial components and commercial aerospace applications, 20% in consumer electronics applications, 14% in automotive electronics applications, 12% in energy applications, 12% in telecommunications infrastructure applications, 8% in appliance applications, and 2% in defense and medical applications. Based on sales revenues, 52% of beryllium metal and beryllium composite products was estimated to be used in defense and science applications, 26% in industrial components and commercial aerospace applications, 8% in medical applications, 7% in telecommunications infrastructure applications, and the remaining 7% in other applications.

Salient Statistics—United States:	**2009**	**2010**	**2011**	**2012**	**2013[e]**
Production, mine shipments[e]	120	180	235	225	220
Imports for consumption[1]	24	271	92	100	61
Exports[2]	23	39	21	55	38
Government stockpile releases[3]	19	29	22	([4])	9
Consumption:					
Apparent[5]	170	456	333	265	250
Reported, ore	150	200	250	220	230
Unit value, annual average, beryllium-copper master alloy, dollars per pound contained beryllium[6]	154	228	203	204	209
Stocks, ore, consumer, yearend	30	15	10	15	20
Net import reliance[7] as a percentage of apparent consumption	29	61	29	15	11

Recycling: Beryllium was recovered from new scrap generated during the manufacture of beryllium products and from old scrap. Detailed data on the quantities of beryllium recycled are not available but may represent as much as 20% to 25% of apparent consumption. The leading U.S. beryllium producer established a comprehensive recycling program for all of its beryllium products, and indicated a 40% recovery rate of its beryllium alloy new and old scrap. Beryllium manufactured from recycled sources requires only 20% of the energy as that of beryllium manufactured from virgin sources.

Import Sources (2009–12):[1] Russia, 42%; Kazakhstan, 25%; China, 9%; Japan, 6%; and other, 18%.

Tariff: Item	**Number**	**Normal Trade Relations 12–31–13**
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. The disposal limit for beryllium materials in the fiscal year 2014 Annual Materials Plan was beryllium metal, 16 tons of contained beryllium.

Stockpile Status—9–30–13[8]

Material	**Uncommitted inventory**	**Authorized for disposal**	**Disposal plan FY 2013**	**Disposals FY 2013**
Beryllium metal:				
Hot-pressed powder	73	28	—	9
Vacuum-cast	6	6	16	—

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BERYLLIUM

Events, Trends, and Issues: Market conditions were relatively unchanged for beryllium-based products in 2013. During the first 9 months of 2013, the leading U.S. beryllium producer reported the volume of shipments of strip and bulk beryllium-copper alloy products to be 4% higher and 6% lower, respectively, than those during the first 9 months of 2012. Sales of beryllium-copper alloy products for key large markets, including industrial components/commercial aerospace and consumer electronics, remained relatively unchanged from sales in the first 9 months of 2012, while the smaller automotive electronics market and beryllium hydroxide sales were greater. Sales of beryllium-copper alloy products for the remaining smaller markets, including energy and appliances, were lower. Overall, beryllium metal and beryllium composite sales decreased slightly during the first 9 months of 2013 from those in the same period of 2012, with the largest markets, defense and science, affected by reduced Government defense budgets.

The leading U.S. beryllium producer announced plans to significantly increase beryllium hydroxide production capacity at its operation in Delta, UT. The producer anticipated a worldwide decline of stockpiled beryllium within 3 years.

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 is required to carefully control the quantity of beryllium dust, fumes, and mists in the workplace.

World Mine Production and Reserves:

	Mine production[e]		Reserves[9]
	2012	2013	
United States	225	220	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 15,000 tons of contained beryllium. World beryllium reserves are not available.
China	20	20	
Mozambique	2	2	
Other countries	1	1	
World total (rounded)	250	240	

World Resources: World identified resources 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 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.

[e]Estimated. — 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]Less than ½ unit.
[5]The sum of U.S. mine shipments and net import reliance.
[6]Calculated from gross weight and customs value of imports; beryllium content estimated to be 4%.
[7]Defined as imports – exports + adjustments for Government and industry stock changes.
[8]See Appendix B for definitions.
[9]See Appendix C for resource/reserve definitions and information concerning data sources.