

BERYLLIUM

(Data in metric tons of contained beryllium, unless otherwise noted)

Domestic Production and Use: One company in Utah mined bertrandite ore and recovered beryllium hydroxide from this ore and from imported and domestic beryl. Beryllium hydroxide was shipped to a plant in Ohio, where it was converted into beryllium metal, alloys, and oxide. Another company in Pennsylvania purchased beryllium oxide from Asia and converted this material into beryllium alloys. Small quantities of beryl were recovered as a byproduct of U.S. pegmatite mining operations in various States. Beryllium consumption of 220 tons was valued at approximately \$78 million, based on the producer price for beryllium-copper master alloy. Beryllium was used as an alloy and oxide in electronic components, 54%; as an alloy and oxide in electrical components, 19%; as an alloy, oxide, and metal in aerospace and defense applications, 14%; and as an alloy, metal, and oxide in other applications, 13%.

Salient Statistics—United States:	1992	1993	1994	1995	1996^e
Production, mine	193	198	173	202	217
Imports for consumption, ore and metal	6	8	53	32	45
Exports, metal	41	20	29	61	50
Shipments from Government stockpile excesses ¹	² 15	² 31	² (2)	² (19)	—
Consumption: Apparent	159	183	198	198	220
Reported	196	196	174	227	220
Price, dollars:					
Domestic, metal, vacuum-cast ingot, per pound	308	308	275	308	327
Domestic, metal, powder blend, per pound	280	295	295	295	385
Domestic, beryllium-copper master alloy, per pound of contained beryllium	160	160	160	160	160
Domestic, beryllium oxide, powder, per pound	72.50	72.50	72.50	70.50	77.00
Stocks, consumer, yearend	111	114	113	162	160
Employment, number:					
Mine, full-time equivalent employees ^e	25	25	25	25	25
Primary refineries ^e	400	400	400	400	400
Net import reliance ³ as a percent of apparent consumption	E	E	13	E	E

Recycling: Substantial quantities of new scrap generated in the processing of beryllium-copper alloys were recycled. Small quantities of obsolete military equipment containing metallic beryllium were recycled.

Import Sources (1992-95): Ore, metal, scrap, and master alloy: Russia, 40%; Kazakstan, 21%; China, 12%; France, 10%; and other, 17%.

Tariff: Item	Number	Most favored nation (MFN) 12/31/96	Non-MFN⁴ 12/31/96
Ore and concentrates	2617.90.0030	Free	Free.
Unwrought beryllium	8112.11.6000	8.5% ad val.	25.0% ad val.
Beryllium, wrought	8112.19.0000	5.5% ad val.	45.0% ad val.
Beryllium-copper master alloy	7405.00.6030	3.6% ad val.	28.0% ad val.
Beryllium oxide or hydroxide	2825.90.1000	3.7% ad val.	25.0% ad val.

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

Government Stockpile:

Stockpile Status—9-30-96

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposals Jan.-Sept. 96
Beryl ore (11% BeO)	545	—	545	—
Beryllium-copper master alloy	268	—	—	—
Beryllium metal	363	—	—	—

BERYLLIUM

Events, Trends, and Issues: Increased sales for telecommunications and consumer applications partially were responsible for the upturn in beryllium demand in 1996. Beryllium-aluminum alloys were increasing market share by substituting for aluminum, magnesium, titanium, or resin-matrix composites in some defense aerospace and commercial satellite applications.

In August, the International Trade Commission (ITC) made a preliminary determination that beryllium metal and high-beryllium alloys (beryllium content greater than 30%) from Kazakstan were being sold in the United States at less than fair value. As a result, it established a preliminary antidumping duty of 70.8%; the period under investigation was July 1, 1995, through December 31, 1995. The ITC was expected to finalize its ruling within 120 days after the preliminary decision. The United States imported 23 tons of beryllium metal and scrap in 1995; however, no beryllium imports from Kazakstan were recorded in 1996 through July.

After completing a merger with another Canadian firm, the original property owner plans to resume work on a beryllium prospect near Thor Lake, Northwest Territories. This property, which has an average grade of 1% BeO in a variety of beryllium-containing minerals totaling 500,000 tons of reserves, was investigated as a beryllium prospect in the late 1980's. In 1990, the owner halted production plans because of insufficient orders for the potential products. The new company announced that it will conduct a feasibility study to determine the economics of producing either beryllium metal or beryllium oxide.

The Defense Logistics Agency continued to offer 2,000-pound lots of beryl from the National Defense Stockpile for sale once a month. No bids for the material were received. In its fiscal year 1997 Annual Materials Plan, the Defense Logistics Agency has authority to sell about 1,800 tons of beryl.

Beryllium dust and fines have been recognized as the cause of berylliosis, a chronic lung disease. Harmful effects are minimized by maintaining a clean workplace and requiring the use of safety equipment.

World Mine Production, Reserves, and Reserve Base:

	Mine production	
	1995	1996 ^e
United States	202	217
Brazil	34	34
China ^o	55	55
Kazakstan ^o	4	4
Russia ^o	32	30
Other countries	(6)	1
World total	327	341

Reserves and reserve base⁵

The United States has very little beryl that can be economically handsorted from pegmatites. The Spor Mountain area, Utah, contains a large reserve base of bertrandite, which was being mined. Domestic deposits of bertrandite ores in Utah and Texas contain about 21,000 tons of beryllium. The world reserves and reserve base are not sufficiently well delineated to report consistent figures for all countries.

World Resources: No quantitative information is available on foreign resources of beryllium-bearing minerals and rocks. The identified resources of beryllium in known domestic deposits are estimated at 66,000 tons of contained beryllium.

Substitutes: Because of the relatively high price of beryllium, uses are expected to continue principally in applications that require its light weight, high strength, and high thermal conductivity. Steel, titanium, and graphite composites may be substituted for beryllium metal; phosphor bronze may be substituted for beryllium-copper alloys, but with substantial loss of performance. Aluminum nitride can substitute for beryllium oxide in some applications.

^eEstimated. E Net exporter. NA Not available.

¹Data in parentheses denote stockpile acquisitions.

²Data represent the net difference between the estimated beryllium content of beryl shipped for upgrading and stockpile receipts of beryllium metal.

These data are not included in net import reliance calculations.

³Defined as imports - exports + adjustments for Government and industry stock changes.

⁴See Appendix B.

⁵See Appendix C for definitions.

⁶Less than ½ unit.