

BERYLLIUM

(Data in metric tons of contained beryllium, unless 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 200 tons was valued at approximately \$71 million, based on the producer price for beryllium-copper master alloy. Beryllium was used as an alloy and oxide in electronic components, 57%; as an alloy and oxide in electrical components, 20%; as an alloy, oxide, and metal in aerospace and defense applications, 13%; and as an alloy, metal, and oxide in other applications, 10%.

Salient Statistics—United States:	1991	1992	1993	1994	1995^e
Production, mine	174	193	198	173	225
Imports for consumption, ore and metal	55	6	8	53	30
Exports, metal	33	41	20	29	55
Shipments from Government stockpile excesses ¹	—	² 15	² 31	² (2)	² (19)
Consumption, apparent	203	159	183	198	200
Price, dollars:					
Domestic, metal, vacuum-cast ingot, per pound	308	308	308	275	275
Domestic, metal, powder blend, per pound	280	280	295	295	295
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	72.50	70.50
Imported ore, per stu (20 pounds) BeO	113	NA	NA	NA	NA
Stocks, consumer, yearend	112	111	114	113	113
Employment:					
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	14	E	E	13	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 (1991-94): Ore, metal, scrap, and master alloy: Russia, 30%; Germany, 21%; China, 11%; Brazil, 11%; and other, 27%.

Tariff:	Item	Number	Most favored nation (MFN) 12/31/95	Non-MFN⁴ 12/31/95
	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	6.0% 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—9-30-95

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposals Jan.-Sept. 95
Beryl ore (11% BeO)	545	—	545	—
Beryllium-copper master alloy	268	—	—	—
Beryllium metal	363	—	—	—

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Events, Trends, and Issues: Although U.S. beryllium demand remained flat, the mix of end products changed slightly. Beryllium metal demand decreased, but demand for beryllium alloys and beryllium oxide ceramics increased. Much of the increase in alloy demand was in automotive electronics and telecommunications and computers. One new application for beryllium-aluminum alloys was in some military helicopter electrooptical systems. Because a U.S. firm has developed a castable beryllium-aluminum alloy, this material could be used to replace aluminum in housings for avionics or in small structural components.

Two U.S. firms began importing beryllium metal and alloys from Kazakstan during 1994. As a result of this importation, beryllium metal from Kazakstan became ineligible for special duty status under the Generalized System of Preferences on July 1, 1995, because the country exceeded its competitive need limits in 1994.

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.

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		Reserves and reserve base⁵
	1994	1995^e	
United States	173	225	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 adequately delineated.
Argentina	—	1	
Brazil	34	30	
China ^e	55	55	
Kazakstan ^e	4	4	
Russia ^e	32	30	
Zimbabwe	1	1	
Other countries	1	1	
World total	300	347	

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 import reliance calculations.

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

⁴See Appendix B.

⁵See Appendix C for definitions.