BERYLLIUM

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

<u>Domestic Production and Use</u>: A company in Utah mined bertrandite ore and recovered beryllium hydroxide from this ore and from imported beryl. The beryllium hydroxide was shipped to a plant in Ohio, where it was converted into beryllium metal, alloys, and oxide. Beryllium consumption of 295 tons was valued at about \$104 million, based on the quoted producer price for beryllium-copper master alloy. The use of beryllium (as an alloy, metal, and oxide) in electronic and electrical components and aerospace and defense applications accounted for an estimated 80% of total consumption.

Salient Statistics—United States:	<u> 1997</u>	<u>1998</u>	<u> 1999</u>	<u>2000</u>	2001 ^e
Production, mine shipments	231	243	200	180	180
Imports for consumption, ore and metal	20	50	20	20	50
Exports, metal	40	60	40	35	40
Government stockpile releases ^{e 1}	76	57	145	220	65
Consumption:					
Apparent	316	320	385	300	295
Reported, ore	259	270	260	240	240
Price, dollars (yearend):					
Domestic, metal, vacuum-cast ingot, per pound	327	327	327	421	338
Domestic, metal, powder blend, per pound	385	385	385	492	375
Domestic, beryllium-copper master alloy,					
per pound of contained beryllium	160	160	160	160	160
Domestic, beryllium oxide, powder, per pound	77	77	77	100	100
Stocks, consumer, yearend	110	80	20	115	75
Employment, number:					
Mine, full-time equivalent employees ^e	25	NA	NA	NA	NA
Primary refineries ^e	400	NA	NA	NA	NA
Net import reliance ² as a percentage					
of apparent consumption	27	24	48	37	39

Recycling: Quantities of new scrap generated in the processing of beryllium-copper alloys and quantities of obsolete military equipment containing metallic beryllium were recycled. Data on beryllium recycled in this manner are not available.

<u>Import Sources (1997-2000)</u>: Ore, metal, scrap, and master alloy: Russia, 21%; Canada, 18%; Germany, 12%; Kazakhstan, 12%; and other, 37%.

Tariff: Item	Number	Normal Trade Relations 12/31/01		
Beryllium ores and concentrates	2617.90.0030	Free.		
Beryllium oxide or hydroxide	2825.90.1000	3.7% ad val.		
Beryllium-copper master alloy	7405.00.6030	Free.		
Beryllium unwrought:				
Waste and scrap	8112.11.3000	Free.		
Other	8112.11.6000	8.5% ad val.		
Beryllium, wrought	8112.19.0000	5.5% ad val.		

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

Government Stockpile:

Stockpile Status—9-30-01³

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2001	Disposals FY 2001
Beryl ore (11% BeO)	281	33	281	145	_
Beryllium-copper master alloy	41	16	41	80	51
Bervllium metal	298	34	252	36	23

BERYLLIUM

Events, Trends, and Issues: For the first one-half year, sales of alloy products (strip and bulk) were unchanged compared with those of the previous year. However, sales of strip products (the larger of the two lines) decreased in the second quarter, owing to a slow-down in the telecommunications and computer markets. Imports for consumption of beryllium ore, metal, and alloys increased; Brazil and Russia were the leading suppliers. Metal exports were up, with Canada, Chile, France, Japan, and the Netherlands the major recipients of the materials.

For fiscal year 2001, ending September 30, 2001, the Defense National Stockpile Center (DNSC) sold about 1,260 tons of beryllium-copper master alloy (BCMA) (about 51 tons of beryllium content) valued at about \$7.62 million and about 23 tons of beryllium metal valued at about \$3.62 million from the National Defense Stockpile. There were no sales of beryl ore in fiscal year 2001. The DNSC also proposed maximum disposal limits in fiscal year 2002 of about 3,630 tons of beryl ore (about 145 tons of beryllium content), about 2,000 tons of BCMA (about 80 tons of beryllium content), and about 36 tons of beryllium metal.

Because of the toxic nature of beryllium, the industry must maintain careful control over the quantity of beryllium dust and fumes in the workplace. The U.S. Environmental Protection Agency issues standards for certain hazardous air pollutants, including beryllium, under the Clean Air Act, and the Occupational Safety and Health Administration issues standards for airborne beryllium particles. To comply with these standards, plants are required to install and maintain pollution-control equipment. In beryllium-processing plants, harmful effects are prevented by maintaining clean workplaces; requiring the use of safety equipment, such as personal respirators; collecting dust, fumes, and mists at the source of deposition in dust collectors; establishing medical programs; and implementing other procedures to provide safe working conditions.

World Mine Production, Reserves, and Reserve Base:

Mine production^e 2001 2000 United States 180 180 China 55 55 Kazakhstan 4 4 Russia 40 40 Other countries World total (rounded) 280 280

Reserves and reserve base⁴

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 18,000 tons of beryllium. The world reserves and reserve base are not sufficiently well delineated to report consistent figures for all countries.

<u>World Resources</u>: World resources of beryllium have been estimated to be more than 80,000 tons (contained mostly in known nonpegmatite deposits). About 65% of the beryllium resources is concentrated in the United States; the Spor Mountain and Gold Hill areas in Utah and the Seward Peninsula area in Alaska account for most of the total.

<u>Substitutes</u>: Although the cost of beryllium is high compared with that of other materials, it is used in applications in which its properties are crucial. Graphite, steel, and titanium may be substituted for beryllium metal in some applications, and phosphor bronze may be substituted for beryllium-copper alloys, but these substitutions can result in substantial loss in performance. In some applications, aluminum nitride may be substituted for beryllium oxide.

^eEstimated. NA Not available. — Zero.

¹Net quantity (uncommitted inventory).

²Defined as imports - exports + adjustments for Government and industry stock changes.

³See Appendix B for definitions.

⁴See Appendix C for definitions.