MOLYBDENUM

(Data in metric tons of molybdenum content unless otherwise noted)

Domestic Production and Use: In 2004, molybdenum, valued at about \$1.18 billion (based on average oxide price), was produced by seven mines. Molybdenum ore was produced at three primary molybdenum mines, one each in Colorado, Idaho, and New Mexico, whereas four copper mines (two in Arizona, one each in Montana and Utah) recovered molybdenum as a byproduct. Three roasting plants converted molybdenite (MoS₂) concentrate to molybdic oxide, from which intermediate products, such as ferromolybdenum, metal powder, and various chemicals, were produced. Iron and steel, cast and wrought alloy, and superalloy producers accounted for about 75% of the molybdenum consumed.

Salient Statistics—United States:	<u>2000</u>	<u>2001</u>	2002	2003	2004 ^e
Production, mine	40,900	37,600	32,300	33,600	39,900
Imports for consumption	15,000	12,800	11,500	11,900	15,900
Exports	27,900	31,500	23,800	35,700	54,100
Consumption:					
Reported	18,300	15,800	15,300	15,700	16,800
Apparent	28,600	19,600	20,700	12,800	1,700
Price, average value, dollars per kilogram ¹	5.64	5.20	8.27	11.65	29.67
Stocks, mine and plant concentrates,					
product, and consumer materials	11,400	10,700	10,000	6,900	6,900
Employment, mine and plant, number	618	518	489	510	568
Net import reliance ² as a percentage of					
apparent consumption	Ε	E	E	E	E

Recycling: Molybdenum in the form of molybdenum metal or superalloys was recovered, but the amount was small. Although molybdenum is not recovered from scrap steel, recycling of steel alloys is significant, and some molybdenum content is reutilized. The amount of molybdenum recycled as part of new and old steel and other scrap may be as much as 30% of the apparent supply of molybdenum.

<u>Import Sources (2000-03)</u>: Ferromolybdenum: China, 78%; United Kingdom, 20%; and other, 2%. Molybdenum ores and concentrates: Mexico, 58%; Canada, 38%; Chile, 2%; and other, 2%.

<u>Tariff</u> : Item	Number	Normal Trade Relations 12-31-04
Molybdenum ore and concentrates, roasted	2613.10.0000	12.8¢/k g + 1.8% ad val.
Molybdenum ore and concentrates, other	2613.90.0000	17.8¢/kg.
Molybdenum chemicals:		
Molybdenum oxides and hydroxides	2825.70.0000	3.2% ad val.
Molybdates of ammonium	2841.70.1000	4.3% ad val.
Molybdates, all others	2841.70.5000	3.7% ad val.
Molybdenum pigments:		
Molybdenum orange	3206.20.0020	3.7% ad val.
Ferroalloys:		
Ferromolybdenum	7202.70.0000	4.5% ad val.
Molybdenum metals:		
Powders	8102.10.0000	9.1¢/kg + 1.2% ad val.
Unwrought	8102.94.0000	13.9¢/kg + 1.9% ad val.
Wrought bars and rods	8102.95.3000	6.6% ad val.
Wrought plates, sheets, strips, etc.	8102.95.6000	6.6% ad val.
Wire	8102.96.0000	4.4% ad val.
Waste and scrap	8102.97.0000	Free.
Other	8102.99.0000	3.7% ad val.

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

Government Stockpile: None.

MOLYBDENUM

Events, Trends, and Issues: U.S. mine output of molybdenum in 2004 increased about 19% from that of 2003. U.S. imports for consumption increased an estimated 34% from those of 2003, while the U.S. exports increased 51% from those of 2003. The increase in exports reflects the return to full production levels by the end of 2004 by some copper companies after reduced byproduct molybdenum production in 2003. U.S. reported consumption increased 7% from that of 2003. Mine capacity utilization was about 53%.

China continued its high level of steel production and consumption, thus providing a stable demand for molybdenum. Strong copper prices and a deficit of refined copper allowed the Bagdad and Sierrita Mines in Arizona to return to full production capacity, thus increasing byproduct molybdenum production. The Continental Pit operation in Butte, MT, resumed mining activities and was expected to produce about 3,200 tons (7 million pounds) of molybdenum in 2004. With the continuing high price of nickel-bearing stainless steel in 2004, consumers increasingly considered use of duplex stainless steel, with higher molybdenum content.

	Mine	Mine production		Reserve base ³	
	2003	<u>2004^e</u>	(thous	(thousand metric tons)	
United States	33,600	39,900	2,700	5,400	
Armenia	3,500	3,500	200	400	
Canada	7,500	9,700	450	910	
Chile	30,000	33,400	1,100	2,500	
China	30,600	31,000	3,300	8,300	
Iran	1,400	1,400	50	140	
Kazakhstan	230	230	130	200	
Kyrgyzstan	250	250	100	180	
Mexico	3,500	3,500	90	230	
Mongolia	1,600	1,700	30	50	
Peru	9,600	11,000	140	230	
Russia ^e	2,900	2,900	240	360	
Uzbekistan ^e	<u>500</u>	<u>500</u>	60	<u>150</u>	
World total (rounded)	125,000	139,000	8,600	19,000	

<u>World Resources</u>: Identified resources amount to about 5.4 million tons of molybdenum in the United States and about 13 million tons in the rest of the world. Molybdenum occurs as the principal metal sulfide in large low-grade porphyry molybdenum deposits and as an associated metal sulfide in low-grade porphyry copper deposits. Resources of molybdenum are adequate to supply world needs for the foreseeable future.

<u>Substitutes</u>: There is little substitution for molybdenum in its major application as an alloying element in steels and cast irons. In fact, because of the availability and versatility of molybdenum, industry has sought to develop new materials that benefit from the alloying properties of the metal. Potential substitutes for molybdenum include chromium, vanadium, columbium (niobium), and boron in alloy steels; tungsten in tool steels; graphite, tungsten, and tantalum for refractory materials in high-temperature electric furnaces; and chrome-orange, cadmium-red, and organic-orange pigments for molybdenum orange.

^eEstimated. E Net exporter.

¹Time-average price per kilogram of molybdenum contained in technical-grade molybdic oxide, as reported by Platts Metals Week.

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

³See Appendix C for definitions.