

MOLYBDENUM

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

Domestic Production and Use: In 1999, molybdenum, valued at about \$256 million (based on average oxide price), was produced by eight mines. Molybdenum ore was produced at three mines in Colorado, New Mexico, and Idaho, whereas five mines in Arizona, Montana, New Mexico, and Utah recovered molybdenum as a byproduct. Three plants converted molybdenite (MoS₂) concentrate to molybdic oxide, from which intermediate products, such as ferro-molybdenum, metal powder, and various chemicals, were produced. Iron and steel producers accounted for about 75% of the molybdenum consumed. Major end-use applications were as follows: machinery, 35%; electrical, 15%; transportation, 15%; chemicals, 10%; oil and gas industry, 10%; and others, 15%.

Salient Statistics—United States:	1995	1996	1997	1998	1999^e
Production, mine	60,900	54,900	60,900	53,300	44,100
Imports for consumption	11,500	13,400	13,200	14,400	11,900
Exports, all primary forms	51,300	49,600	62,100	46,300	38,400
Consumption: Reported	19,900	20,900	20,000	19,000	15,700
Apparent	20,200	21,200	23,000	24,500	18,400
Price, average value, dollars per kilogram ¹	17.50	8.30	9.46	5.90	5.80
Stocks, mine and plant concentrates, product, and consumer materials	12,400	9,900	11,400	16,200	15,400
Employment, mine and plant, number	700	800	700	600	475
Net import reliance ² as a percent of apparent consumption	E	E	E	E	E

Recycling: Secondary molybdenum in the form of molybdenum metal or superalloys was recovered, but the amount was small. About 1,000 tons of molybdenum was reclaimed from spent catalysts. While molybdenum is not recovered from scrap steel, recycling of steel alloys is significant, and molybdenum content is reutilized. Data on the quantities of molybdenum recycled in this manner are not available.

Import Sources (1995-98): United Kingdom, 29%; Chile, 23%; China, 20%; Canada, 14%; and other, 14%.

Tariff: Item	Number	Normal Trade Relations 12/31/99
Molybdenum ore and concentrates, roasted	2613.10.0000	12.8¢/kg + 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	8102.91.1000	13.9¢/kg + 1.9% ad val.
Waste and scrap	8102.91.5000	Free.
Wrought	8102.92.3000	6.6% ad val.
Wire	8102.93.0000	4.4% ad val.
Other	8102.99.0000	3.7% ad val.

Depletion Allowance: 23% (Domestic), 15% (Foreign).

Government Stockpile: None.

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Events, Trends, and Issues: U.S. mine output of molybdenum in 1999 decreased to the lowest level since 1993. The decline reflected reduced prices. Reported consumption, exports, and U.S. producer inventories were each about 17% below those of 1998.

Prices of concentrates and molybdenum products moderated toward the end of the year. The domestic price for technical-grade molybdic oxide averaged \$5.80 per kilogram of contained molybdenum during 1999, a decline of 2% from that of 1998. Mine capacity utilization was 55%. Two mines in Arizona stopped recovering molybdenum in 1999. The Morenci Mine recovered no molybdenum. The San Manuel Mine closed, and the equipment was removed in midyear. During the fourth quarter of the year, there was realignment of producers, with Phelps Dodge Corp. purchasing Cyprus Amax and Grupo Mexico S.A. de C.V. purchasing ASARCO Incorporated. (For details see Copper Mineral Industry Surveys for July and August 1999.)

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ³ (thousand metric tons)	Reserve base ³
	1998	1999 ^e		
United States	53,300	44,100	2,700	5,400
Armenia	2,500	2,500	20	30
Canada	7,991	8,000	450	910
Chile	25,298	25,000	1,100	2,500
China	30,000	33,000	500	1,000
Iran	600	700	50	140
Kazakhstan	100	200	130	200
Mexico	5,949	6,000	90	230
Mongolia	2,000	2,000	30	50
Peru	4,344	4,000	140	230
Russia	2,000	3,000	240	360
Uzbekistan	500	500	60	150
Other countries	—	—	—	590
World total (may be rounded)	135,000	129,000	5,500	12,000

World Resources: Identified resources amount to about 5.5 million metric tons of molybdenum in the United States and more than 12 million metric tons in the world. Molybdenum occurs as the principal metal sulfide in large low-grade porphyry molybdenum deposits and as a subsidiary metal sulfide in low-grade porphyry copper deposits. Resources of molybdenum are adequate to supply world needs for the foreseeable future.

Substitutes: 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 the metal, industry has sought to develop new materials that benefit from the alloying properties of molybdenum. Potential substitutes for molybdenum include chromium, vanadium, columbium, 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.

¹Major producer price per kilogram of molybdenum contained in technical-grade molybdic oxide.

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

³See Appendix C for definitions.