

MOLYBDENUM

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

Domestic Production and Use: In 1995, molybdenum, valued at about \$280 million (based on average oxide price), was produced by 10 mines. A mine in Colorado mined molybdenum ore, whereas nine mines in Arizona, California, Montana, New Mexico, and Utah recovered molybdenum as a byproduct. Two 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 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 other, 15%.

Salient Statistics—United States:	1991	1992	1993	1994	1995^e
Production, mine	53,000	50,000	37,000	47,000	59,000
Imports for consumption	2,600	3,200	6,500	6,500	10,000
Exports, all primary forms	36,000	36,000	30,000	37,000	40,000
Consumption: Reported	17,000	17,000	18,000	19,000	26,000
Apparent	19,000	21,000	16,000	25,000	29,000
Price, average value, dollars per kilogram ¹	5.27	4.85	5.13	4.60	5.00
Stocks, mine and plant concentrates, product producers and end-use consumers	17,000	22,000	20,000	12,000	12,000
Employment, mine and plant, molybdenum production	1,000	750	680	700	700
Net import reliance ² as a percent of apparent consumption	E	E	E	E	E

Recycling: Secondary molybdenum in the form of metal or superalloys was recovered, but the amount was small. About 1,000 metric tons of molybdenum was reclaimed from spent catalysts. Although some molybdenum was recycled as a minor constituent of scrap alloy steels and iron, the use of such scrap did not generally depend on its molybdenum content.

Import Sources (1991-94): Chile, 20%; China, 27%; Canada, 15%; United Kingdom, 14% and other, 24%.

Tariff	Item	Number	Most favored nation (MFN) 12/31/95	Non-MFN³ 12/31/95
	Molybdenum ore and concentrates, roasted	2613.10.0000	13.1¢/kg + 1.9% ad val.	\$1.10/kg + 15% ad val.
	Molybdenum ore and concentrates, other	2613.90.0000	19.4¢/kg	77.2¢/kg.
	Molybdenum chemicals:			
	Molybdenum oxides and hydroxides	2825.70.0000	3.2% ad val.	20.5% ad val.
	Molybdates of ammonium	2841.70.1000	4.3% ad val.	29% ad val.
	Molybdates, all others	2841.70.5000	3.7% ad val.	25% ad val.
	Molybdenum pigments:			
	Molybdenum orange	3206.20.0020	3.7% ad val.	25% ad val.
	Miscellaneous chemical products:			
	Mix of two or more inorganic compounds of molybdenum	3823.90.3400	2.8% ad val.	18% ad val.
	Ferroalloys:			
	Ferromolybdenum	7202.70.0000	4.5% ad val.	31.5% ad val.
	Molybdenum metals:			
	Powders	8102.10.0000	12.9¢/kg + 1.8% ad val.	\$1.10/kg + 15% ad val.
	Unwrought	8102.91.1000	13.9¢/kg + 1.9% ad val.	\$1.10/kg + 15% ad val.
	Waste and scrap	8102.91.5000	Free	Free.
	Wrought	8102.92.0000	6.6% ad val.	60% ad val.
	Wire	8102.93.0000	6.2% ad val.	60% ad val.
	Other	8102.99.0000	5.1% ad val.	45% ad val.

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

Government Stockpile: None.

Events, Trends, and Issues: U.S. mine output of molybdenum in 1995 increased 26% compared with that of 1993. Reported consumption of molybdenum increased about 36%; exports and U.S. producer inventories were the same as those of 1994.

It is estimated that in 1996 domestic mine production of molybdenum will be 60,000 metric tons and that U.S. reported consumption will be 30,000 metric tons.

The domestic price for technical-grade molybdic oxide averaged \$5.00 per kilogram of contained molybdenum during 1995. Mine capacity utilization was 60%.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ⁴ (thousand metric tons)	Reserve base ⁴ (thousand metric tons)
	1994	1995 ^e		
United States	47,000	59,000	2,700	5,400
Armenia	500	500	20	30
Bulgaria	100	100	(5)	10
Canada	10,000	11,000	450	910
Chile	16,000	16,000	1,100	2,500
China	18,000	18,000	500	1,000
Iran	1,000	1,000	50	140
Kazakstan	500	500	130	200
Mexico	2,600	2,600	90	230
Mongolia	1,500	1,500	30	50
Peru	3,000	3,000	140	230
Russia	4,500	4,500	240	360
Uzbekistan	700	700	60	150
Other countries	—	—	—	590
World total (may be rounded)	104,000	118,000	5,500	12,000

World Resources: Identified resources amount to about 5.6 million metric tons of molybdenum in the United States and more than 12 million metric tons in the world. Molybdenum occurs both 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, cast irons, and nonferrous metals. 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 B.

⁴See Appendix C for definitions.

⁵Less than ½ unit.