

MOLYBDENUM

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

Domestic Production and Use: In 2005, molybdenum, valued at about \$4.1 billion (based on average oxide price), was produced by eight mines. Molybdenum ore was produced at three primary molybdenum mines, one each in Colorado, Idaho, and New Mexico, whereas five copper mines (two in Arizona, one each in Montana, New Mexico, 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:	2001	2002	2003	2004	2005^e
Production, mine	37,600	32,300	33,500	41,500	56,900
Imports for consumption	12,800	11,500	11,900	17,100	23,600
Exports	31,500	23,800	21,900	34,400	45,900
Consumption:					
Reported	15,800	15,300	16,400	17,400	19,200
Apparent	19,600	20,700	26,300	23,900	34,200
Price, average value, dollars per kilogram ¹	5.20	8.27	11.65	29.67	72.07
Stocks, mine and plant concentrates, product, and consumer materials	10,700	10,000	7,200	7,500	7,900
Employment, mine and plant, number	518	489	510	630	810
Net import reliance ² as a percentage of apparent consumption	E	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.

Import Sources (2001-04): Ferromolybdenum: China, 85%; United Kingdom, 11%; and other, 4%. Molybdenum ores and concentrates: Canada, 41%; Mexico, 39%; Chile, 17%; and other, 3%.

Tariff: Item	Number	Normal Trade Relations 12-31-05
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	8102.94.0000	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.

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Events, Trends, and Issues: U.S. mine output of molybdenum in 2005 increased about 37% from that of 2004. U.S. imports for consumption increased an estimated 38% from those of 2004, while the U.S. exports increased 33% from those of 2004. The increase in exports reflects the return to full production levels by the beginning of 2005 of most byproduct molybdenum producers and increased production by primary producers. U.S. reported consumption increased 10% from that of 2004. Mine capacity utilization in 2005 was about 77%.

China continued its high level of steel production and consumption, thus providing strong demand for molybdenum. High 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 Bingham Canyon Mine near Salt Lake City, UT, optimized its mill operation to maximize molybdenum recovery and began mining a high-molybdenum zone of the deposit. The mine was expected to triple its output of molybdenum in 2005 as compared with that of 2004. With the continuing high price of nickel-bearing stainless steel in 2005, consumers increasingly considered use of duplex stainless steel, with higher molybdenum content.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ³	Reserve base ³
	2004	2005 ^e	(thousand metric tons)	
United States	41,500	56,900	2,700	5,400
Armenia	3,000	2,800	200	400
Canada	5,700	9,800	450	910
Chile	41,483	45,500	1,100	2,500
China	29,000	28,500	3,300	8,300
Iran	1,500	1,500	50	140
Kazakhstan	230	210	130	200
Kyrgyzstan	250	250	100	180
Mexico	3,700	3,500	90	230
Mongolia	1,700	1,300	30	50
Peru	9,600	9,700	140	230
Russia ^e	2,900	3,000	240	360
Uzbekistan ^e	500	500	60	150
World total (rounded)	141,000	163,000	8,600	19,000

World Resources: 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.

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 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.