

MOLYBDENUM

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

Domestic Production and Use: In 2007, molybdenum, valued at about \$3.8 billion (based on average oxide price), was produced by nine mines. Molybdenum ore was produced as a primary product at four mines, one each in Colorado, Idaho, Nevada, 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 concentrate to molybdc oxide, from which intermediate products, such as ferromolybdenum, metal powder, and various chemicals, were produced. Iron and steel and superalloy producers accounted for about 81% of the molybdenum consumed.

Salient Statistics—United States:	2003	2004	2005	2006	2007^e
Production, mine	33,500	41,500	58,000	59,800	59,400
Imports for consumption	11,900	17,300	20,700	16,700	19,500
Exports	21,900	34,500	42,100	34,500	35,200
Consumption:					
Reported	16,400	17,400	18,900	19,200	20,100
Apparent	26,200	24,100	34,600	43,900	44,000
Price, average value, dollars per kilogram ¹	11.75	36.73	70.11	54.62	64.68
Stocks, mine and plant concentrates, product, and consumer materials	7,200	7,500	9,400	7,400	7,100
Employment, mine and plant, number	510	630	880	910	940
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 (2003-06): Ferromolybdenum: China, 82%; Chile 7%; Canada, 4%; United Kingdom, 4%; and other, 3%. Molybdenum ores and concentrates: Canada, 33%; Chile, 31%; Mexico, 26%; Peru, 7%; and other, 3%.

Tariff: Item	Number	Normal Trade Relations 12-31-07
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 concentrate in 2007 decreased slightly from that of 2006. U.S. imports for consumption increased an estimated 17% from those of 2006, while the U.S. exports increased only about 2% from those of 2006. Domestic roasters operated at full production levels in 2006 and 2007. U.S. reported consumption increased 5% from that of 2006 while apparent consumption was about level, owing to reduced destocking offsetting increased imports. Mine capacity utilization in 2007 was about 80%.

China's high level of steel production and consumption continued to generate strong internal consumption of molybdenum. This consumption, coupled with limited production in the Huludao area of Liaoning Province, led to reduced Chinese exports in 2006 and 2007, and continued to support historically high molybdenum prices. Most byproduct and primary molybdenum mines in the United States maintained high production levels in 2007. Production capacity at the Henderson Mine, Empire, CO, was expanded to about 18,100 tons per year of contained molybdenum in 2006 and mine production approached that level in 2007. The Ashdown Mine, near Denio, NV, started molybdenum operations in 2007.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves ³	Reserve base ³
	2006	2007 ^e	(thousand metric tons)	
United States	59,800	59,400	2,700	5,400
Armenia	3,000	3,000	200	400
Canada	7,270	8,000	450	910
Chile	43,278	41,100	1,100	2,500
China	43,900	46,000	3,300	8,300
Iran	2,000	2,500	50	140
Kazakhstan	250	400	130	200
Kyrgyzstan	250	250	100	180
Mexico	2,500	4,000	135	230
Mongolia	1,200	1,500	30	50
Peru	17,209	17,500	140	230
Russia ^e	3,100	3,100	240	360
Uzbekistan ^e	600	500	60	150
World total (rounded)	184,000	187,000	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, niobium (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.

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.