

MOLYBDENUM

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

Domestic Production and Use: In 2015, 56,300 metric tons of molybdenum, valued at about \$1.0 billion (based on an average oxide price), was produced at 10 mines. Molybdenum ore was produced as a primary product at two mines—both in Colorado—whereas eight copper mines (five in Arizona, one each in Montana, Nevada, and Utah) recovered molybdenum as a byproduct. Three roasting plants converted molybdenite concentrate to molybdic oxide, from which intermediate products, such as ferromolybdenum, metal powder, and various chemicals, were produced. Iron and steel and superalloy producers accounted for about 74% of the molybdenum consumed.

Salient Statistics—United States:	2011	2012	2013	2014	2015^e
Production, mine	63,700	61,500	61,000	68,200	56,300
Imports for consumption	21,100	19,800	20,200	25,300	22,200
Exports	56,700	48,900	53,100	65,100	63,400
Consumption:					
Reported ¹	19,100	19,400	18,600	19,500	19,000
Apparent ²	26,100	33,100	29,800	27,900	15,600
Price, average value, dollars per kilogram ³	34.34	28.09	22.85	25.84	17.80
Stocks, consumer materials	1,810	1,770	1,820	2,010	1,750
Employment, mine and plant, number	940	940	960	1,000	950
Net import reliance ⁴ as a percentage of apparent consumption	E	E	E	E	E

Recycling: Molybdenum is recycled as a component of catalysts, ferrous scrap, and superalloy scrap. Ferrous scrap comprises revert scrap, and new and old scrap. Revert scrap refers to remnants manufactured in the steelmaking process. New scrap is generated by steel mill customers and recycled by scrap collectors and processors. Old scrap is largely molybdenum-bearing alloys recycled after serving their useful life. 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. There are no processes for the separate recovery and refining of secondary molybdenum from its alloys. Molybdenum is not recovered separately from recycled steel and superalloys, but the molybdenum content of the recycled alloys is significant, and the molybdenum content is reused. Recycling of molybdenum-bearing scrap will continue to be dependent on the markets for the principal alloy metals of the alloys in which molybdenum is found, such as iron, nickel, and chromium.

Import Sources (2011–14): Ferromolybdenum: Chile, 83%; Canada, 9%; United Kingdom, 4%; and other, 4%. Molybdenum ores and concentrates: Mexico, 31%; Canada, 28%; Peru, 23%; Chile, 17%; and other, 1%.

Tariff: Item	Number	Normal Trade Relations 12–31–15
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.

MOLYBDENUM

Events, Trends, and Issues: U.S. estimated mine output of molybdenum in concentrate in 2015 decreased by 17% from that of 2014. U.S. imports for consumption decreased by 12% from those of 2014, and U.S. exports decreased slightly from those of 2014. Reported U.S. consumption of primary molybdenum products decreased slightly from that of 2014. Apparent consumption decreased by 44% from that of 2014.

The average molybdenum price for 2015 was lower than that of 2014. Primary molybdenum production continued at the Climax Mine in Lake County and Summit County, CO, but primary production at the Ashdown Mine in Humboldt County, NV, and at the Questa Mine in Taos County, NM, continued to be suspended. The Thompson Creek Mine in Custer County, ID, and the Mineral Park Mine in Mohave County, AZ, were put on care and maintenance at yearend 2014 and did not reopen in 2015. The decline in U.S. molybdenum production was attributed mainly to the closure of the Thompson Creek Mine. The Chino Mine, a copper mine in Grant County, NM, did not produce molybdenum in 2015. Both the Mission Mine in Pima County, AZ, and the Pinto Valley Mine in Gila County, AZ, produced molybdenum in 2015.

World Mine Production and Reserves: Reserves for Iran were updated from Iran Mines and Mining Industries Summit data.

	Mine production		Reserves ⁵ (thousand metric tons)
	2014	2015 ^e	
United States	68,200	56,300	2,700
Armenia	7,100	7,300	150
Australia	—	—	190
Canada	9,700	9,300	260
Chile	48,800	49,000	1,800
China	103,000	101,000	4,300
Iran	4,000	4,000	43
Kazakhstan	—	—	130
Kyrgyzstan	NA	NA	100
Mexico	14,400	13,000	130
Mongolia	2,000	2,000	160
Peru	17,000	18,100	450
Russia ^e	4,800	4,800	250
Turkey	1,300	1,400	100
Uzbekistan ^e	530	520	60
World total (rounded)	281,000	267,000	11,000

World Resources: Identified resources of molybdenum in the United States are about 5.4 million tons and, in the rest of the world, about 14 million tons. 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 boron, chromium, niobium (columbium), and vanadium in alloy steels; tungsten in tool steels; graphite, tantalum, and tungsten for refractory materials in high-temperature electric furnaces; and cadmium-red, chrome-orange, and organic-orange pigments for molybdenum orange.

^eEstimated. E Net exporter. NA Not available. — Zero.

¹Reported consumption of primary molybdenum products.

²Apparent consumption of molybdenum concentrates roasted to make molybdenum oxide.

³Time-weighted average price per kilogram of molybdenum contained in technical-grade molybdic oxide, as reported by Ryan's Notes.

⁴Defined as imports – exports + adjustments for industry stock changes.

⁵See [Appendix C](#) for resource/reserve definitions and information concerning data sources.