MOLYBDENUM

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

Domestic Production and Use: U.S. mine production of molybdenum in 2020 increased by 13% to 49,000 tons compared with the previous year. Molybdenum ore was produced as a primary product at two mines—both in Colorado—whereas seven copper mines (four in Arizona and one each in Montana, Nevada, and Utah) recovered molybdenite concentrate 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. Metallurgical applications accounted for more than 88% of the total molybdenum consumed.

Salient Statistics—United States:	**2016**	**2017**	**2018**	**2019**	**2020[e]**
Production, mine	36,200	40,700	41,400	43,600	49,000
Imports for consumption	22,800	36,000	37,500	34,200	26,000
Exports	31,200	43,200	48,400	67,200	62,000
Consumption:					
Reported[1]	15,800	17,400	16,700	16,500	14,000
Apparent[2]	27,900	34,100	31,300	10,500	13,000
Price, average value, dollars per kilogram[3]	14.40	18.06	27.04	26.50	20
Stocks, consumer materials	1,910	2,010	1,940	1,980	2,100
Employment, mine and plant, number	920	940	940	950	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 consists of revert, 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 in which molybdenum is contained, such as iron, nickel, and chromium.

Import Sources (2016–19): Ferromolybdenum: Chile, 54%; the Republic of Korea, 38%; Canada, 4%; and other, 4%. Molybdenum ores and concentrates: Peru, 57%; Chile, 22%; Canada, 12%; Mexico, 8%; and other, 1%.

Tariff: Item	**Number**	**Normal Trade Relations 12–31–20**
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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MOLYBDENUM

Events, Trends, and Issues: In 2020, the estimated average molybdic oxide price decreased by 25% compared with that of 2019, and U.S. estimated mine output of molybdenum increased by 13% from that of 2019. The increase in production was mainly the result of one byproduct mine in Utah increasing its production by more than 60%. This increase in production in Utah offset the production delays caused by the global COVID-19 pandemic at other molybdenum producers. Byproduct molybdenum production continued at the Bagdad, Morenci, Pinto Valley, and Sierrita Mines in Arizona; the Continental Pit Mine in Montana; the Robinson Mine in Nevada; and the Bingham Canyon Mine in Utah. Primary molybdenum production continued at the Climax and Henderson Mines in Colorado. The Thompson Creek Mine in Idaho continued to be on care-and-maintenance status in 2020.

Estimated U.S. imports for consumption decreased by 24% compared with those of 2019. U.S. exports decreased by 8% from those of 2019. Apparent consumption increased by 26% compared with that of 2019.

Global molybdenum production in 2020 increased slightly compared with 2019. In descending order of production, China, Chile, the United States, Peru, and Mexico provided more than 90% of total global production.

World Mine Production and Reserves: The reserves estimates for Canada, Mongolia, Peru, and Turkey were revised based on new information from company and Government reports.

	Mine production		Reserves[5]
	2019	2020[e]	(thousand metric tons)
United States	43,600	49,000	2,700
Argentina[e]	—	—	100
Armenia[e]	5,000	7,000	150
Canada	3,900	2,700	96
Chile	56,000	58,000	1,400
China[e]	130,000	120,000	8,300
Iran[e]	3,500	3,500	43
Mexico	16,600	17,000	130
Mongolia	1,800	1,800	370
Peru	30,400	30,000	2,800
Russia[e]	2,800	2,800	1,000
Turkey[e]	400	400	800
Uzbekistan[e]	200	200	60
World total (rounded)	294,000	300,000	18,000

World Resources:[5] Identified resources of molybdenum in the United States are about 5.4 million tons, and in the rest of the world, about 20 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 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 its alloying properties. Potential substitutes 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.

[e]Estimated. E Net exporter. — Zero.

[1]Reported consumption of primary molybdenum products.

[2]Defined as production + imports – exports + adjustments for concentrate, consumer, and product producer stock changes.

[3]Time-weighted average price per kilogram of molybdenum contained in technical-grade molybdic oxide, as reported by CRU Group.

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

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