

MAGNESIUM METAL¹

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: In 2019, primary magnesium was produced by one company in Utah at an electrolytic process plant that recovered magnesium from brines from the Great Salt Lake. Secondary magnesium was recovered from scrap at plants that produced magnesium ingot and castings, and from aluminum alloy scrap at secondary aluminum smelters. Primary magnesium production in 2019 was estimated to have decreased from that of 2018. Information regarding U.S. primary magnesium production was withheld to avoid disclosing company proprietary data. The leading use for primary magnesium metal, which accounted for 55% of reported consumption, was in castings, principally used for the automotive industry. Aluminum-base alloys that were used for packaging, transportation, and other applications accounted for 28% of primary magnesium metal consumption; desulfurization of iron and steel, 13%; and other uses, 4%. About 33% of the secondary magnesium was consumed for structural uses and about 67% was used in aluminum alloys.

Salient Statistics—United States:	2015	2016	2017	2018	2019^e
Production:					
Primary	W	W	W	W	W
Secondary (new and old scrap)	88	102	114	109	110
Imports for consumption	49	46	42	47	55
Exports	15	19	14	11	10
Consumption:					
Reported, primary	64	69	65	46	55
Apparent ²	W	W	W	W	W
Price, annual average: ³					
U.S. spot Western, dollars per pound	2.15	2.15	2.15	2.17	2.35
China, free on board, dollars per metric ton	2,131	2,195	2,262	2,530	NA ⁴
Stocks, producer, yearend	W	W	W	W	W
Employment, number ^e	420	420	400	400	400
Net import reliance ⁵ as a percentage of apparent consumption	<50	<25	<25	<50	<50

Recycling: In 2019, about 25,000 tons of secondary magnesium was recovered from old scrap and 85,000 tons were recovered from new scrap. Aluminum-base alloys accounted for 67% of the secondary magnesium recovered, and magnesium-based castings, ingot, and other materials accounted for about 33%.

Import Sources (2015–18): Israel, 25%; Canada, 24%; Mexico, 10%; United Kingdom, 10%; and other, 31%.

Tariff: Item	Number	Normal Trade Relations 12–31–19
Unwrought metal	8104.11.0000	8.0% ad val.
Unwrought alloys	8104.19.0000	6.5% ad val.
Scrap	8104.20.0000	Free.
Powders and granules	8104.30.0000	4.4% ad val.
Wrought metal	8104.90.0000	14.8¢/kg on Mg content + 3.5% ad val.

Depletion Allowance: Dolomite, 14% (Domestic and foreign); magnesium chloride (from brine wells), 5% (Domestic and foreign).

Government Stockpile: None.

Events, Trends, and Issues: The sole U.S. producer of primary magnesium temporarily shut down some capacity at the end of 2016 citing the shutdown of a titanium sponge plant that had been a major customer, and this capacity was not expected to restart in the foreseeable future. In May, the U.S. Department of Commerce assigned a preliminary countervailing duty rate of 7.48% on magnesium produced by one company in Israel. In July, the U.S. International Trade Commission issued a preliminary determination that magnesium produced by the same company in Israel would be subject to an antidumping duty rate of 193.24%. In November, an affirmative final determination was announced that found magnesium from Israel was sold at less than fair value in the United States. The final determinations on the antidumping and countervailing duty rates were expected in January 2020. The investigations into magnesium imports from Israel were initiated in November 2018 after a complaint was filed by the sole domestic primary magnesium producer. The investigations and preliminary determinations were cited for price increases and tight supplies of magnesium throughout the year.

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Producers in China dominate global magnesium metal production, but several projects were under development to increase primary magnesium metal capacity elsewhere and in China. In the United States, one company was evaluating a location in Washington for a facility to produce magnesium from a dolomite deposit in Nevada. A company in Quebec, Canada, produced a limited amount of magnesium from serpentine contained in asbestos tailings at its 25-kilogram-per-day pilot plant and planned to start construction of a 16,700-ton-per-year plant in 2020, with completion in about 1 year. Another company was testing its process for producing magnesium from serpentine-bearing asbestos tailings in the same region of Quebec. In August, a company in Australia completed a feasibility study for a 3,000-ton-per-year plant to recover magnesium from coal fly ash and planned to complete construction by yearend 2020. A magnesium smelter in Turkey restarted production in May under new ownership after being closed for 1 year. In China, a 100,000-ton-per-year plant to produce magnesium from lake brines in Qinghai Province continued ramping up to commercial production in 2019. Construction of the facility was completed in 2017.

The use of magnesium in automobile parts continued to increase as automobile manufacturers sought to decrease vehicle weight in response to consumer desires for increased fuel efficiency. Magnesium castings have substituted for aluminum, iron, and steel in some automobiles. The substitution of aluminum for steel in automobile sheet was expected to increase consumption of magnesium in aluminum alloy sheet. Although some magnesium sheet applications have been developed for automobiles, these were generally limited to expensive sports cars and luxury vehicles, automobiles where the higher price of magnesium is not a deterrent to its use.

World Primary Production and Reserves:

	Primary production		Reserves ⁶
	2018	2019 ^e	
United States	W	W	Magnesium metal is derived from seawater, natural brines, dolomite, serpentine, and other minerals. The reserves for this metal are sufficient to supply current and future requirements.
Brazil	15	15	
Canada	(7)	(7)	
China	860	900	
Iran	1	—	
Israel	21	20	
Kazakhstan	17	25	
Russia	70	80	
Turkey	4	5	
Ukraine	8	10	
World total (rounded)	⁸ 996	⁸ 1,100	

World Resources: Resources from which magnesium may be recovered range from large to virtually unlimited and are globally widespread. Resources of dolomite, serpentine, and magnesium-bearing evaporite minerals are enormous. Magnesium-bearing brines are estimated to constitute a resource in the billions of tons, and magnesium could be recovered from seawater along world coastlines.

Substitutes: Aluminum and zinc may substitute for magnesium in castings and wrought products. The relatively light weight of magnesium is an advantage over aluminum and zinc in castings and wrought products in most applications; however, its high cost is a disadvantage relative to these substitutes. For iron and steel desulfurization, calcium carbide may be used instead of magnesium. Magnesium is preferred to calcium carbide for desulfurization of iron and steel because calcium carbide produces acetylene in the presence of water.

^eEstimated. NA Not available. W Withheld to avoid disclosing company proprietary data. — Zero.

¹See also Magnesium Compounds.

²Defined as primary production + secondary production from old scrap + imports – exports + adjustments for industry stock changes.

³Source: Platts Metals Week.

⁴Discontinued.

⁵Defined as imports – exports + adjustments for industry stock changes.

⁶See Appendix C for resource and reserve definitions and information concerning data sources.

⁷Less than ½ unit.

⁸Excludes U.S. production.