

MAGNESIUM COMPOUNDS¹

(Data in thousand metric tons of magnesium content unless otherwise noted)

Domestic Production and Use: Seawater and natural brines accounted for about 69% of U.S. magnesium compounds production in 2013. Magnesium oxide and other compounds were recovered from seawater by one company in California and another company in Delaware; from well brines by one company in Michigan; and from lake brines by two companies in Utah. Magnesite was mined by one company in Nevada, and olivine was mined by one company in Washington. About 53% of the magnesium compounds consumed in the United States was used for refractories. The remaining 47% was used in agricultural, chemical, construction, environmental, and industrial applications.

Salient Statistics—United States:	2009	2010	2011	2012	2013^e
Production	239	261	306	244	250
Imports for consumption	173	279	316	264	240
Exports	16	19	26	20	18
Consumption, apparent	396	521	596	488	472
Stocks, producer, yearend	NA	NA	NA	NA	NA
Employment, plant, number ^e	300	300	300	275	250
Net import reliance ² as a percentage of apparent consumption	40	50	49	50	47

Recycling: Some magnesia-based refractories are recycled, either for reuse as refractory material or for use as construction aggregate.

Import Sources (2009–12): China, 56%; Brazil, 9%; Canada, 8%; Australia, 7%; and other, 20%.

Tariff:³ Item	Number	Normal Trade Relations 12–31–13
Crude magnesite	2519.10.0000	Free.
Dead-burned and fused magnesia	2519.90.1000	Free.
Caustic-calcined magnesia	2519.90.2000	Free.
Kieserite	2530.20.1000	Free.
Epsom salts	2530.20.2000	Free.
Magnesium hydroxide	2816.10.0000	3.1% ad val.
Magnesium chloride	2827.31.0000	1.5% ad val.
Magnesium sulfate (synthetic)	2833.21.0000	3.7% ad val.

Depletion Allowance: Brucite, 10% (Domestic and foreign); dolomite, magnesite, and magnesium carbonate, 14% (Domestic and foreign); magnesium chloride (from brine wells), 5% (Domestic and foreign); and olivine, 22% (Domestic) and 14% (Foreign).

Government Stockpile: None.

Events, Trends, and Issues: A magnesium chloride producer in Utah revised plans to expand production citing environmental and wildlife concerns. New solar evaporation ponds would be constructed on the north and west sides of the Great Salt Lake instead of on the east side of the lake, pending regulatory review. In 2012, the company increased its capacity to 750,000 tons per year of magnesium chloride brine from 550,000 tons per year.

In recent years, several companies throughout the world have made acquisitions to secure supplies of magnesium compounds, as well as expanding existing operations, trends which were expected to continue because demand was projected to increase in many end uses. A French-based company purchased one-half of a magnesia producer in Brazil to secure raw materials for its refractory and agricultural supply businesses. A Russian-based company started a project to double its magnesium chloride capacity from bischofite deposits near Volgograd to 60,000 tons per year for use in producing magnesium hydroxide and magnesia. Russia's leading magnesite producer continued construction of a 100,000-ton-per-year furnace at its magnesia plant in Siberia that would double the plant's calcined magnesia capacity. The Government of China ordered some magnesite mines in Liaoning Province to shut down, resulting in production decreasing in 2013 compared with that in 2012.

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An Austrian-based magnesia and refractories producer purchased an idled 60,000-ton-per-year magnesite operation in Turkey and planned to reopen the facility and expand its capacity to 100,000 tons per year during the next few years. The company also installed a 76,000-ton-per-year rotary kiln at another Turkish operation, increasing the dead-burned magnesia production capacity to 216,000 tons per year in 2011.

The expansion of fused-magnesia production capacity in recent years continued. In Russia, the leading magnesia producer was increasing its fused magnesia capacity by 50,000 tons per year. The leading magnesia producer in Iran completed a 5,000-ton-per-year fused-magnesia plant in the first half of 2013. Dead-burned magnesia was being replaced with fused magnesia in some steel furnaces. Fused magnesia has superior properties to dead-burned magnesia in some refractory applications, owing to a higher magnesia content, a higher density, and a larger crystal size. New production capacity also provides consumers with an alternative to fused magnesia produced in China.

World Magnesite Mine Production and Reserves:

	Mine production		Reserves ⁴
	2012	2013 ^e	
United States	W	W	10,000
Australia	86	90	95,000
Austria	250	250	15,000
Brazil	140	140	86,000
China	4,600	4,000	500,000
Greece	86	100	80,000
India	100	100	20,000
Korea, North	45	150	450,000
Russia	350	400	650,000
Slovakia	170	200	35,000
Spain	120	120	10,000
Turkey	300	300	49,000
Other countries	100	110	390,000
World total (rounded)	⁵ 6,350	⁵ 5,960	2,400,000

In addition to magnesite, there are vast reserves of well and lake brines and seawater from which magnesium compounds can be recovered.

World Resources: Resources from which magnesium compounds can be recovered range from large to virtually unlimited and are globally widespread. Identified world resources of magnesite total 12 billion tons, and of brucite, several million tons. Resources of dolomite, forsterite, magnesium-bearing evaporite minerals, and magnesia-bearing brines are estimated to constitute a resource in billions of tons. Magnesium hydroxide can be recovered from seawater.

Substitutes: Alumina, chromite, and silica substitute for magnesia in some refractory applications.

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

¹See also Magnesium Metal.

²Defined as imports – exports + adjustments for Government and industry stock changes.

³Tariffs are based on gross weight.

⁴[See Appendix C for resource/reserve definitions and information concerning data sources.](#)

⁵Excludes U.S. production.