MAGNESIUM COMPOUNDS[1]

(Data in thousand metric tons of magnesium oxide (MgO) content unless otherwise noted)[2]

Domestic Production and Use: Seawater and natural brines accounted for about 67% of U.S. magnesium compound production in 2016. The value of production of magnesium compounds was $195 million. 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. One company in Washington processed stockpiled olivine that was previously mined. About 60% of the magnesium compounds consumed in the United States were used in agricultural, chemical, construction, environmental, and industrial applications in the form of caustic-calcined magnesia, magnesium chloride, magnesium hydroxide, and magnesium sulfates. The remaining 40% was used for refractories in the form of dead-burned magnesia, fused magnesia, and olivine.

Salient Statistics—United States:	2012	2013	2014	2015	2016[e]
Production	341	324	342	380	390
Imports for consumption	461	407	498	581	500
Exports	56	56	64	70	60
Consumption, apparent	746	675	776	891	830
Employment, plant, number[e]	275	250	250	260	260
Net import reliance[3] as a percentage of apparent consumption	54	52	56	57	53

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

Import Sources (2012–15): China, 52%; Brazil, 17%; Canada, 9%; Australia, 6%; and other, 16%.

Tariff:[4] Item	Number	Normal Trade Relations 12–31–16
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: Global consumption of dead-burned and fused magnesia declined slightly during the first 8 months of 2016 compared with that in the same period of 2015, as world steel production stabilized after declining in 2015. Consumption of magnesia refractory products for glass and nonferrous metals declined significantly during the first 8 months of 2016 compared with that during the same period of 2015, but had little impact on the overall decrease in magnesia consumption because these consumers account for a small share of magnesia consumption. Low prices for magnesium compounds for dead-burned magnesia and caustic-calcined magnesia persisted as steel production decreased slightly from that in 2015 and supplies from China were abundantly available. As a result, prices for magnesia declined throughout the first half of 2016; caustic-calcined magnesia prices did not decrease as much as those of dead-burned magnesia and fused magnesia.

In recent years, fused magnesia has replaced dead-burned magnesia in some steel furnaces, and this trend is expected to continue as more fused magnesia capacity comes on line. Fused magnesia has superior properties to dead-burned magnesia in some refractory applications, owing to higher magnesia content, higher density, and larger crystal size. Although fused magnesia costs more than dead-burned magnesia, its longer campaign life reduces downtime, lowering the overall cost of production. The steel industry in China was expected to continue to become more efficient in its use of refractories, which would result in less magnesia consumed per unit of steel produced.

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MAGNESIUM COMPOUNDS

Domestic consumption of dead-burned magnesia decreased as the use of higher quality fused-magnesia refractories increased and crude steel production in the United States decreased slightly in 2016. Consumption of caustic-calcined magnesia continued to increase for animal feed supplements and fertilizer as the importance of magnesium as a nutrient gained recognition. Environmental applications, such as wastewater treatment, also accounted for increasing consumption of magnesium compounds, including caustic-calcined magnesia and magnesium hydroxide. Increased use in deicing and dust control applications has resulted in increased consumption of magnesium chloride in recent years.

New capacity in China was expected to be limited because concerns about overcapacity deter further investment in the magnesia industry. New capacity currently under construction in other countries, such as Russia and Turkey, was expected to be completed as planned, but further expansions were less likely, especially for dead-burned magnesia.

World Magnesite Mine Production and Reserves:[5]

	Mine production		Reserves[6]
	2015	2016[e]	
United States	W	W	35,000
Australia	420	440	330,000
Austria	760	750	50,000
Brazil	550	500	300,000
China	19,000	19,000	1,700,000
Greece	400	410	270,000
India	230	240	90,000
Korea, North	250	250	1,500,000
Russia	1,300	1,350	2,300,000
Slovakia	650	620	120,000
Spain	640	620	35,000
Turkey	2,800	2,800	390,000
Other countries	670	680	1,400,000
World total (rounded)	[7]27,700	[7]27,700	8,500,000

In addition to magnesite, vast reserves exist 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 magnesite and brucite resources total 12 billion tons and several million tons, respectively. Resources of dolomite, forsterite, magnesium-bearing evaporite minerals, and magnesia-bearing brines are estimated to constitute a resource of billions of tons. Magnesium hydroxide can be recovered from seawater.

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

[e]Estimated. W Withheld to avoid disclosing company proprietary data.
[1]See also Magnesium Metal.
[2]Previously reported as magnesium content. Based on input from consumers, producers, and others involved in the industry, it was determined that reporting magnesium compound data in terms of contained magnesia was more useful than reporting in terms of magnesium content. Conversion factors used: $MgCO_3$, 47.8% MgO; $Mg(OH)_2$, 42.3% MgO; and $MgSO_4$, 18.6% MgO.
[3]Defined as imports – exports + adjustments for industry stock changes.
[4]Tariffs are based on gross weight.
[5]Gross weight of magnesite (magnesium carbonate).
[6]See Appendix C for resource and reserve definitions and information concerning data sources.
[7]Excludes U.S. production.