

## MAGNESIUM COMPOUNDS<sup>1</sup>

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

**Domestic Production and Use:** Seawater and natural brines accounted for about 43% of U.S. magnesium compounds production in 2008. Magnesium oxide and other compounds were recovered from seawater by three companies in California, Delaware, and Florida; from well brines by two companies in Michigan; and from lake brines by two companies in Utah. Magnesite was mined by one company in Nevada, brucite was mined by one company in Texas, and olivine was mined by two companies in North Carolina and Washington. About 60% of the magnesium compounds consumed in the United States was used for refractories. The remaining 40% was used in agricultural, chemical, construction, environmental, and industrial applications.

<b>Salient Statistics—United States:</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008<sup>e</sup></b>
Production	292	301	282	342	340
Imports for consumption	356	391	371	357	390
Exports	35	31	28	26	26
Consumption, apparent	613	661	624	673	704
Stocks, producer, yearend	NA	NA	NA	NA	NA
Employment, plant, number <sup>e</sup>	370	370	370	370	370
Net import reliance <sup>2</sup> as a percentage of apparent consumption	52	54	55	49	52

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

**Import Sources (2004-07):** China, 78%; Canada, 6%; Austria, 5%; Australia, 3%; and other, 8%.

<b>Tariff:<sup>3</sup> Item</b>	<b>Number</b>	<b>Normal Trade Relations 12-31-08</b>
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.

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**Events, Trends, and Issues:** Production capacity at the caustic-calcined magnesia plant in Queensland, Australia, was set to increase by 100,000 tons per year from its current capacity of 80,000 tons per year in response to growth in the world steel, nickel, cobalt, copper, and agricultural markets. Installation of a third multiple-hearth furnace was scheduled to be completed by September 2009. The company also has the capacity to produce 110,000 tons per year of dead-burned magnesia and 30,000 tons per year of fused magnesia. In Canada, the magnesite producer announced that it would double the production capacity for caustic-calcined magnesia at its Exshaw, Alberta, plant to 50,000 tons per year by adding another furnace and was considering restarting production at its 14,000-ton-per-year fused magnesia plant.

After being purchased by a private equity firm in 2007, Brazil's leading magnesite producer announced plans to triple its dead-burned magnesia production and double its refractories production. Based on first quarter 2008 production data, the company would increase dead-burned magnesia production to 360,000 tons per year, a small increase from the plant's current production capacity of 320,000 tons per year. However, the company planned to increase its refractories production capacity to 580,000 tons per year by 2009 from its current level of 335,000 tons per year. Most of the company's refractory products are used by Brazil's steel industry. The company also acquired a German refractories company in September 2008; the combination of the two refractories groups would create the world's third ranked refractories company in terms of revenue.

The leading magnesite producer in Turkey planned to start production of fused magnesia and increase production capacity for dead-burned magnesia and magnesia-base refractories by yearend. A smaller producer in Turkey planned to increase production capacity for dead-burned magnesia to 35,000 tons per year from the current level of 12,000 tons per year and begin producing fused magnesia by 2009. In February, Russia's leading magnesite producer acquired one of two magnesite producers in Slovakia and, later in 2008, announced plans to acquire the other producer.

### **World Mine Production, Reserves, and Reserve Base:**

	Magnesite production		Magnesite reserves and reserve base <sup>4</sup>	
	2007	2008 <sup>e</sup>	Reserves	Reserve base
United States	W	W	10,000	15,000
Australia	130	140	100,000	120,000
Austria	202	200	15,000	20,000
Brazil	93	100	45,000	65,000
China	1,960	2,000	380,000	860,000
Greece	144	150	30,000	30,000
India	103	105	14,000	55,000
Korea, North	346	350	450,000	750,000
Russia	346	350	650,000	730,000
Slovakia	173	170	45,000	320,000
Spain	144	150	10,000	30,000
Turkey	605	600	65,000	160,000
Other countries	145	140	390,000	440,000
World total (rounded)	<sup>5</sup> 4,390	<sup>5</sup> 4,460	2,200,000	3,600,000

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.

<sup>e</sup>Estimated. NA Not available. W Withheld to avoid disclosing company proprietary data.

<sup>1</sup>See also Magnesium Metal.

<sup>2</sup>Defined as imports – exports + adjustments for Government and industry stock changes.

<sup>3</sup>Tariffs are based on gross weight.

<sup>4</sup>See Appendix C for definitions.

<sup>5</sup>Excludes the United States.