

MAGNESIUM METAL¹

(Data in thousand metric tons, unless otherwise noted)

Domestic Production and Use: Two companies in Utah and Washington produced primary magnesium in 1999. An electrolytic process was used at the plant in Utah to recover magnesium from lake brines, and a thermic process was used to recover magnesium from dolomite in Washington. The aluminum industry remained the largest consumer of magnesium, accounting for 48% of domestic primary metal use. Magnesium was a constituent in aluminum-base alloys that were used for packaging, transportation, and other applications. Castings and wrought magnesium products accounted for 31% of U.S. consumption of primary metal; desulfurization of iron and steel, 11%; cathodic protection, 3%; reducing agent in nonferrous metals production, 3%; and other uses, 4%.

Salient Statistics—United States:	1995	1996	1997	1998	1999^e
Production: Primary	142	133	125	106	W
Secondary (new and old scrap)	65	71	78	76	80
Imports for consumption	35	47	65	83	80
Exports	38	41	41	35	30
Consumption: Reported, primary	109	102	100	103	105
Apparent	171	162	185	185	174
Price, yearend:					
Metals Week, U.S. spot Western, dollars per pound, average	2.09	1.75	1.65	1.57	1.50
Metal Bulletin, free market, dollars per metric ton, average	4,138	2,525	2,525	1,975	2,450
Stocks, producer and consumer, yearend	21	26	21	22	W
Employment, number ^e	1,400	1,400	1,400	800	800
Net import reliance ² as a percent of apparent consumption	E	E	16	25	29

Recycling: In 1999, about 32,000 tons of the secondary production was recovered from old scrap.

Import Sources (1995-98): Canada, 52%; Russia, 22%; China, 12%; Israel, 5%; and other, 9%.

Tariff:	Item	Number	Normal Trade Relations 12/31/99	Canada and Israel 12/31/99
	Unwrought metal	8104.11.0000	8.0% ad val.	Free.
	Unwrought alloys	8104.19.0000	6.5% ad val.	Free.
	Wrought metal	8104.90.0000	14.8¢/kg on Mg content + 3.5% ad val.	Free.

Depletion Allowance: Dolomite, 15% (Domestic and foreign); magnesium chloride (from brine wells), 5% (Domestic and foreign).

Government Stockpile: None.

Events, Trends, and Issues: Free market magnesium prices generally trended slightly upward during 1999. At the beginning of the year, free market prices were about \$2,300 per ton; by the end of October, this price had increased to about \$2,500 per ton.

One of the U.S. magnesium producers experienced delays in its cell upgrade program at its Rowley, UT, facility. Originally scheduled for completion by the end of 2000, the upgrading program is not expected to be completed until mid-2001 or 2002.

The International Trade Administration (ITA) established the following antidumping duties for pure magnesium from Canada: 0% for August 1, 1996, to July 31, 1997, and 0% for August 1, 1997, to July 31, 1998. The countervailing duty for pure and alloy magnesium from Canada was established at 2.02% ad valorem for calendar year 1997. The ITA also determined that the company to which the duties apply does not qualify for revocation of the antidumping order because the company does not have 3 consecutive years of sales in commercial quantities at fair market values. The ITA began administrative reviews of the aforementioned determinations in October; antidumping duties for pure magnesium are to be reviewed for August 1, 1998, to July 31, 1999, and countervailing duties for pure and alloy magnesium are to be reviewed for calendar year 1998.

The largest Canadian magnesium producer postponed the proposed expansion of its Becancour, Quebec, primary

MAGNESIUM METAL

magnesium plant. The 25,000-ton-per-year expansion, which was originally announced in June 1997, to be completed in 2000, has been delayed by 1 to 2 years. Three firms are investigating recovery of magnesium from asbestos mine tailings in Canada. One firm plans to begin production at a 58,000-ton-per-year facility in Asbestos, Quebec, by the second half of 2000.

In China, several of the larger magnesium producers in China announced plans to increase production capacity for magnesium and magnesium alloys in 1999, but at the same time, many small plants that had closed during 1998 remained closed because of low prices. Of the estimated 200 magnesium plants in China, only about 50 to 60 were operating by yearend.

Both of the Russian magnesium producers planned to increase production capacity in 2000. One of the producers signed a long-term agreement with an aluminum producer to supply magnesium to its worldwide operations. The additional capacity is needed to supply the contract. The other producer plans to install new technology that is claimed to be about \$300 per ton less in production costs and also is less polluting. One of the two Ukrainian magnesium producers closed because it was \$226 million in debt.

In Australia, development continued on a number of new magnesium projects. Six new projects have been proposed for the country, with a total of 438,000 tons of annual capacity, most of which are planned to begin commercial production in 2003 or 2004. One company produced its first magnesium test ingot at a demonstration plant near Gladstone, Queensland, in September. The company plans to study and refine its patented production technology over the next 6 months with the goal of completing construction of a 90,000-ton-per-year plant by 2002, with commercial production scheduled for 2004.

Studies continued for construction of new magnesium plants in the Netherlands and Congo (Brazzaville). Results of a prefeasibility study of a magnesium plant in the Netherlands indicate that a demonstration plant with a capacity of 10,000 to 15,000 tons per year can be operating by 2005, and a full-scale plant of 40,000 tons per year can be in operation by 2008 for a total investment of \$10 million. A feasibility study completed for the proposed 60,000-ton-per-year magnesium plant in Congo (Brazzaville) indicated that magnesium could be produced at an operating cost of 55 cents per pound, assuming electrical rates of 16 cents per kilowatt hour. In addition to building new magnesium plants around the world, new recycling capacity was planned in Germany, Japan, and the United Kingdom.

World Primary Production, Reserves, and Reserve Base:

	Primary production		Reserves and reserve base ³
	1998	1999 ^e	
United States	106	W	Domestic magnesium metal production is derived from natural brines and dolomite, and the reserves and reserve base for this metal are sufficient to supply current and future requirements. To a limited degree, the existing natural brines may be considered a renewable resource wherein any magnesium removed by humans may be renewed by nature in a short span of time.
Brazil	9	9	
Canada ⁴	77	80	
China ^e	67	55	
France	14	14	
Israel	15	20	
Kazakhstan ^e	9	10	
Norway	28	30	
Russia ^e	42	45	
Serbia and Montenegro	1	1	
Ukraine ^e	1	1	
World total	369	⁵ 265	

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

Substitutes: Aluminum and zinc may substitute for magnesium castings and wrought products. For iron and steel desulfurization, calcium carbide may be used instead of magnesium.

^eEstimated. E Net exporter. W Withheld to avoid disclosing company proprietary data.

¹See also Magnesium Compounds.

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

³See Appendix C for definitions.

⁴Includes secondary.

⁵Excludes the United States.