

MAGNESIUM METAL¹

(Data in thousand metric tons, unless otherwise noted)

Domestic Production and Use: Three companies in Texas, Utah, and Washington produced primary magnesium in 1997 valued at approximately \$378 million. An electrolytic process was used at plants in Texas and Utah to recover magnesium from seawater and lake brines, respectively. A thermic process was used to recover magnesium from dolomite in Washington. The aluminum industry remained the largest consumer of magnesium, accounting for 51% 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 24% of U.S. consumption of primary metal; desulfurization of iron and steel, 13%; cathodic protection, 5%; reducing agent in nonferrous metals production, 2%; and other uses, 5%.

Salient Statistics—United States:	1993	1994	1995	1996	1997^e
Production: Primary	132	128	142	133	120
Secondary	59	62	65	71	70
Imports for consumption	37	29	35	47	59
Exports	39	45	38	41	40
Consumption: Reported, primary	101	112	109	102	105
Apparent	148	149	171	162	166
Price, yearend:					
Metals Week, U.S. spot Western, dollars per pound, average	1.46	1.63	2.09	1.75	1.65
Metal Bulletin, free market, dollars per metric ton, average	2,260	3,125	4,138	2,525	2,700
Stocks, producer and consumer, yearend	26	19	21	26	23
Employment, number ^e	1,400	1,400	1,400	1,400	1,400
Net import reliance ² as a percent of apparent consumption	E	E	E	E	10

Recycling: In 1997, about 30,000 tons of the secondary production was recovered from old scrap.

Import Sources (1993-96): Canada, 44%; Russia, 35%; China, 4%; Mexico, 4%; and other, 13%.

Tariff:	Item	Number	Most favored nation (MFN) 12/31/97	Canada 12/31/97	Mexico 12/31/97	Non-MFN³ 12/31/97
	Unwrought metal	8104.11.0000	8.0% ad val.	0.8% ad val.	Free	100% ad val.
	Unwrought alloys	8104.19.0000	6.5% ad val.	0.6% ad val.	1.3% ad val.	60.5% ad val.
	Wrought metal	8104.90.0000	14.8¢/kg on Mg content + 3.5% ad val.	1.4¢/kg on Mg content + 0.3% ad val.	Free	88¢/kg on Mg content + 20.0% ad val.

Depletion Allowance: Dolomite, 14% (Domestic and Foreign); magnesium chloride, 5% (Domestic and Foreign).

Government Stockpile: None.

Events, Trends, and Issues: Quoted magnesium prices continued the decline begun in 1996 through June 1997 and then began to increase slowly to reach about \$2,600 per ton by the end of October. Price fluctuations, however, were not as wide as they have been in the past 2 years.

The International Trade Administration (ITA) continued to review duties on the largest Canadian magnesium producer. The following countervailing duties on pure and alloy magnesium were finalized: 9.86% ad valorem for the period December 6, 1991, to December 31, 1992; 7.34% ad valorem for the 1993 calendar year; 4.48% ad valorem for the 1994 calendar year; and 3.18% ad valorem for the 1995 calendar year. In the final results of an administrative review of antidumping duties assessed on magnesium imports from Canada, the ITA determined that the duty rate for the company was 0% for the period August 1, 1995, through July 31, 1996.

Automotive industry analysts estimated that the average unit content of magnesium diecastings in North American-built cars and light trucks will increase by 0.3 kilogram per vehicle from the 1997 model year to the 1998 model year. This increase represents an increase of 4,500 tons in total usage. The total magnesium content of each vehicle would average about 3 kilograms. U.S. auto manufacturers continued to incorporate magnesium into many of their new vehicles. Some of the new magnesium components include valve covers, transfer cases, and instrument support beams.

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As a result of the continued interest in magnesium for automotive applications, one of the U.S. auto manufacturers entered into a partnership with the potential Australian magnesium producer. Under terms of an agreement, the automaker will invest \$30 million in a pilot-plant study and will gain a long-term contract for the eventual supply of 45,000 tons per year of magnesium. The Australian firm was scheduled to commission a demonstration plant in early 1998. Commercial plant construction is expected to begin in mid-1999, with start-up by late 2002.

In Canada, work continued on construction of a new magnesium recovery facility and expansion of a second. The largest producer announced that it would double the annual capacity of its Becancour primary magnesium plant to 86,000 tons. Construction of the first phase of 25,000-tons-per-year capacity is scheduled to begin in 1998, with completion expected in 2000. The company also planned to increase its alloy production capacity by 15,000 tons per year. In March, the first magnesium ingot was cast at a new pilot plant in Salaberry-de-Valleyfield, Quebec. This was the first magnesium recovered from the nontraditional source of serpentine residues from asbestos mining. Construction of a commercial plant is scheduled to begin in April 1998, and annual production capacity at the facility will be 58,000 tons when it is fully operational.

By the end of April, 11 of 60 electrolytic cells at the new primary magnesium plant in Sdom, Israel, were operating. By December, the plant was expected to be operating at 80% of its 27,500-ton-per-year capacity; total 1997 production was estimated at 10,000 tons. In Kazakhstan, the sole magnesium producer planned to resume magnesium production by the end of 1997. The company planned to complete construction of a carnallite processing facility by the third quarter and start magnesium production at a level of 5,000 to 10,000 tons per year in the fourth quarter. The magnesium plant has been idle since 1994. Two Canada-based firms announced plans to produce magnesium in Congo (Brazzaville) by 2002. The companies acquired two exploration permits in the Kouili region for areas that contain substantial quantities of magnesium and potassium salts, mainly in the form of carnallite. Carnallite reserves are estimated to be 8 billion tons, containing about 8% magnesium. Initial plans call for a 100,000-ton-per-year magnesium plant to be built near the mine, with a first-phase production capacity of 50,000 tons per year. A feasibility study was expected to be commissioned by the end of 1998, and a search for additional financing would begin after the study's completion. China announced plans to increase annual capacity from 7,000 tons to 10,000 tons by early 1999 at its largest magnesium plant. Investment for the upgrade was estimated to be \$12 million. A 3,000-ton-per-year expansion at the same plant began operating in July 1997.

World Primary Production, Reserves, and Reserve Base:

	Primary production		Reserves and reserve base ⁴
	1996	1997 ^e	
United States	133	120	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	54	55	
China ^e	50	50	
France	14	14	
Israel	—	10	
Kazakstan ^e	—	1	
Norway	30	30	
Russia ^e	35	35	
Serbia and Montenegro	3	2	
Ukraine ^e	13	10	
World total	341	336	

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.

¹See also Magnesium Compounds.

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

³See Appendix B.

⁴See Appendix D for definitions.