

# Mineral Industry Surveys

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## MAGNESIUM IN THE FOURTH QUARTER 2000

Domestic production of primary magnesium in the fourth quarter of 2000 declined by 15% from that in the third quarter, according to the U.S. Geological Survey. Total production in 2000 was 23% lower than that in 1999. Producers' stocks in the fourth quarter increased by 9%, and shipments were 14% less than those in the third quarter. Some of the production decrease can be attributed to increased energy costs, particularly in the Pacific Northwest. Aluminum production in this area has also declined, resulting in reduced need for magnesium for aluminum alloying.

Exports of magnesium through November 2000 were 18% lower

than those in the same period of 1999. Magnesium imports through November 2000 were slightly higher than those in the corresponding period of 1999. Russia (45%), Israel (29%), and Canada (14%) were the principal sources of imported metal. Canada (48%) and China (36%) were the principal sources of imported alloys.

Quoted prices of primary magnesium continued to decline. Fourth quarter prices are shown in the following table. Magnesium prices for 2000 are shown in the graph on page 3.

	Units	Beginning of quarter	End of quarter
Metals Week U.S. spot Western	Dollars per pound	\$1.32-\$1.44	\$1.23-\$1.30
Metals Week U.S. spot dealer import	do.	1.12-1.15	1.05-1.15
Metals Week European free market	Dollars per metric ton	2,000-2,200	1,800-2,000
Metal Bulletin free market	do.	1,950-2,000	1,900-2,000
Metal Bulletin China free market	do.	1,355-1,420	1,300-1,310

Based on information supplied by the petitioner, the International Trade Administration (ITA) initiated a countervailing duty investigation of pure magnesium from Israel and antidumping duty investigations of pure magnesium from China, Israel, and Russia. The principal material under concern in these investigations is pure magnesium in granular or powder form, which was specifically excluded from earlier antidumping investigations on magnesium from China and Russia. Antidumping duties for other forms of pure magnesium from China and Russia were established in 1995 and remain in effect. This is the first investigation of magnesium imported from Israel. In its preliminary review, the ITA determined that conditions in the magnesium industry have changed since the initial duties were established, and it is appropriate to include granules and powder in the investigations (U.S. Department of Commerce, 2000a, b).

The U.S. Department of Justice filed a lawsuit against Magnesium Corp. of America (Magcorp) alleging that the

company is mishandling hazardous waste at its primary magnesium facility in Rowley, UT. The suit, which was brought on behalf of the U.S. Environmental Protection Agency, charges that Magcorp violates Resource Conservation and Recovery Act (RCRA) standards by disposing of thousands of gallons of liquid and solid wastes in unlined ditches and ponds on its property without proper treatment. In a separate action, the United States also moved to expand a 1998 lawsuit that sued Magcorp for trespass and conversion of minerals contained in brines located on Federal lands in the west desert of Utah. This lawsuit seeks to recover the value of the magnesium chloride and other minerals allegedly taken (U.S. Department of Justice, January 16, 2001, U.S. files suit against Magnesium Corporation of America for toxic pollution near Great Salt Lake, accessed January 26, 2001, at URL <http://www.usdoj.gov/opa/pr/2001/January/021enrd.htm>).

Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Queensland government each plan

to contribute A\$50 million to assist Australia's fledgling magnesium industry. CSIRO's contribution will assist in the commercialization of Australian Magnesium Corp. Ltd.'s (AMC) process technology, and the Queensland government's contribution will be used to develop a light metals industry precinct in Stanwell, the location of AMC's proposed magnesium plant. The Stanwell Energy Park is expected to be developed over the next decade to include magnesium production, diecasting, chemical, and associated service industries (Australian Magnesium Corp. Ltd., November 14, 2000, \$100 million federal & Queensland government commitment, accessed December 9, 2000, via URL <http://www.austmg.com>). AMC also plans to outsource its research and development activities to CSIRO as part of a 4-year agreement. The new agreement will cover two major research areas—improving primary magnesium process technologies and developing new value-added applications and improved methods for producing magnesium components such as alloys, casting, melt, and recycling systems (Australian Magnesium Corp. Ltd., December 7, 2000, AMC to contract CSIRO in research & development alliance, accessed December 9, 2000, via URL <http://www.austmg.com>).

Golden Triangle Resources NL produced its first magnesium metal in November. The company is using serpentinite tailings from the former Woodsreef Mine in New South Wales, Australia, as feedstock. Golden Triangle also announce the development of a new electrolysis system, for which it has applied for a patent. According to the company, the new system will combine magnesium chloride dehydration, electrolyte purification, and electrolysis in one apparatus. Additionally, the apparatus will include the preparation of magnesium alloys. The new electrolytic system, which was developed by the Joint Israeli-Russian Laboratory for Energy Research at Ben Gurion University, will also have the added advantage of significant energy savings in the magnesium production process (Golden Triangle Resources NL, November 28, 2000, Re: revolutionary new magnesium electrolyzer, accessed January 8, 2001, at URL <http://goldentriangle.com.au/28Nov00.htm>).

SAMAG Ltd. purchased the Myrtle Springs and Huandot magnesite deposits from Unimin Australia Ltd., which increases SAMAG's total magnesite resources in the Leigh Creek, Northern Territory, area to 579 million metric tons. This magnesite will provide additional resources for the planned 52,500-ton-per-year primary magnesium plant that SAMAG expects to construct in South Australia (Pima Mining NL, November 28, 2000, SAMAG purchases additional magnesite resources, accessed January 8, 2001, at URL <http://www.pima.com.au/temp.asp?t=asx28nov00>). The company also entered into a long-term sales agreement with Germany's ThyssenKrupp Metallurgie GmbH for all of SAMAG's proposed output of magnesium metal and alloys. The agreement allows SAMAG to receive a guaranteed base price that is sufficient to service the project's debt finance requirements (Pima Mining NL, November 16, 2000, SAMAG signs metal sale agreement with German industrial giant Thyssen Krupp, accessed November 28, 2000, at URL <http://www.pima.com.au/temp.asp?t=asx16nov00>). The company has licensed electrolytic technology from Dow Chemical Co. to use in its magnesium production process.

An official from the Chinese Magnesium Association stated that China plans to construct a 50,000-ton-per-year magnesium plant

in Qinghai by 2005 using the salt lake resources in the area as feedstock. New plant construction would be funded by the government and by Minhe Magnesium Co., who operates a 7,000-ton-per-year magnesium plant in the province (Platt's Metals Week, 2000). This plant, if constructed, would be China's largest individual plant.

Canada's Timminco Ltd. plans to reduce its workforce by 10% in an attempt to reduce costs, because the firm anticipates losses for fiscal year 2000. The company will be closing corporate offices in Haley and Toronto, Canada, and its main sales office in Illinois as part of its restructuring (Timminco Ltd., October 31, 2000, Timminco announces restructuring, accessed January 26, 2001, at URL <http://www.timminco.com/pr111100.pdf>). The company also had a fire at its new casthouse on November 27. The fire caused extensive damage to one of the two melting furnaces and caused collateral damage to other equipment. The company plans to rebuild the furnace and will supply customers with material from an older furnace until repairs are completed, which is estimated to be by the second quarter of 2001 (Platt's Metals Week, 2001).

A Ukrainian firm, MMD-Mineral, hopes to restart the Kalush magnesium plant, which has been idle since 1998. The 10,000-ton-per-year plant had operated using byproduct magnesium chloride salt from a nearby fertilizer operation as its raw material before it closed because of lack of raw material and high operating costs. MMD-Mineral plans to use bischofite ( $MgCl_2 \cdot 6H_2O$ ), which it extracts at a nearby operation, as an alternative raw material source and use technology similar to that used by Dead Sea Magnesium Co. in Israel. Much of the magnesium plant is owned by the Ukrainian Government and a tender for the magnesium plant, which needs about a \$50 million investment for refurbishment, is expected sometime in 2001 (Metal Bulletin, 2000b).

A working group for Russia's Sverdlovsk region plans to raise \$300 million to construct a 50,000-ton-per-year magnesium plant at the Uralsbest asbestos works. Uralsbest reportedly developed a method to recover magnesium from the asbestos tailings and have produced metal at an experimental facility. The site has proximity to a nuclear power plant and some infrastructure, which would give this project several advantages (Interfax Mining & Metals Report, 2001).

Taiwan's Sheng Yu Steel Co. announced that it would complete construction of a magnesium alloy casting plant in Pingnan by early 2001. The plant will produce magnesium alloy covers for computer laptops, digital cameras, and electronic appliances (Metal Bulletin, 2000a).

Ford Motor Co. is sponsoring research, through the Department of Commerce's Advanced Technology Program, to develop an innovative magnesium diecasting process that can be used to cast large components from magnesium alloys. The objective of the 4-year project is to develop a multiport injection "hot runner" system for introducing magnesium into die cavities at a controlled temperature and flow rate. The new process is expected to increase yields and reduce scrap by 10%, thus lowering diecasting production costs (National Institute of Standards, October 2000, Cost-reduced magnesium die castings using heated runners (CORMAG), accessed January 26, 2001, at URL [http://www.nist.gov/public\\_affairs/atp2000/00004334.htm](http://www.nist.gov/public_affairs/atp2000/00004334.htm)).

DaimlerChrysler AG plans to convert the rear seat frames in its

V-class Mercedes models from steel to a combination of aluminum and magnesium components. This change will reduce the seat frame weight by about 11 kilograms (24 pounds) (American Metal Market, 2001).

Magnesium also is being used for large components in concept and limited-production vehicles. BMW AG of Germany has equipped its Z22 concept car with a cast magnesium cylinder block. Saleen Inc., a specialty vehicle manufacturer based in California, created a high-performance, light metals-intensive production car called the S7. Magnesium is used as engine components in the vehicle, along with materials such as beryllium and titanium. Only 300 to 400 vehicles are expected to be produced over the 4-year production run (Light Metal Age, 2000). DaimlerChrysler Corp. is also using significant quantities of magnesium in its ESX3 concept hybrid-electric family vehicle. Magnesium components are substituted for steel as a radiator enclosure, as an instrument panel support beam, and as A pillars (Wrigley, 2000).

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## Average primary magnesium prices in 2000

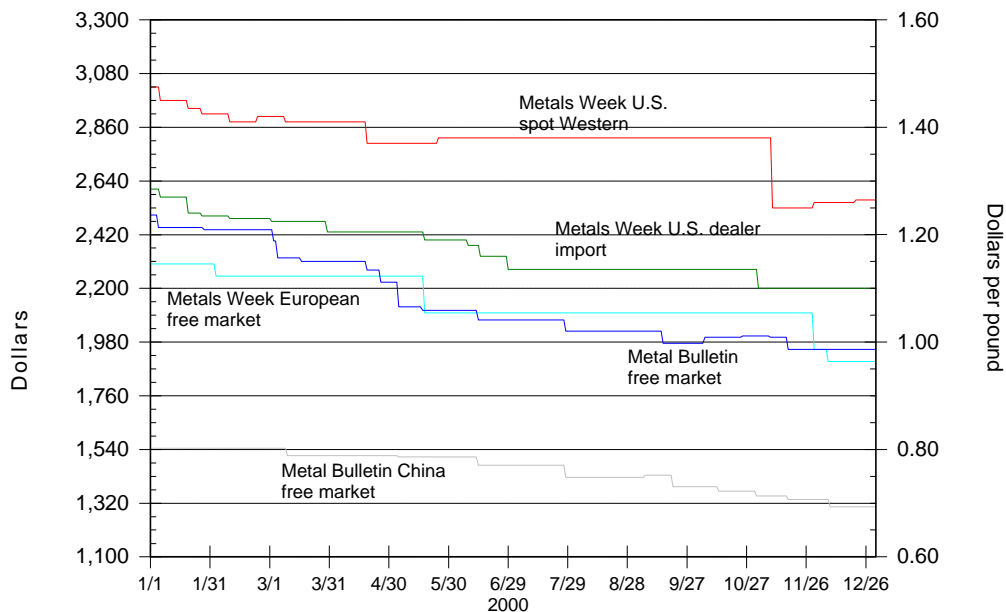


TABLE 1  
U.S. IMPORTS FOR CONSUMPTION AND EXPORTS OF MAGNESIUM 1/

(Metric tons)

	2000					
	1999	January- August	September	October	November	January- November
<b>Imports:</b>						
Metal	26,900	16,200	1,620	1,380	1,060	20,200
Waste and scrap	6,780	5,960	1,220	1,010	981	9,170
Alloys (magnesium content)	56,500	38,100	4,400	4,380	5,020	51,900
Sheet, tubing, ribbons, wire, powder, other (magnesium content)	593	492	222	551	758	2,020
<b>Total</b>	<b>90,700</b>	<b>60,700</b>	<b>7,470</b>	<b>7,320</b>	<b>7,820</b>	<b>83,300</b>
<b>Exports:</b>						
Metal	4,790	4,210	865	1,440	505	7,030
Waste and scrap	16,500	3,750	331	388	1,360	5,830
Alloys (gross weight)	2,760	4,180	503	507	526	5,710
Sheet, tubing, ribbons, wire, powder, other (gross weight)	4,990	2,700	427	303	279	3,710
<b>Total</b>	<b>29,000</b>	<b>14,800</b>	<b>2,130</b>	<b>2,640</b>	<b>2,670</b>	<b>22,300</b>

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

Source: U.S. Census Bureau.