

# Mineral Industry Surveys

**For information, contact:**

Deborah A. Kramer, Magnesium Commodity Specialist  
 U.S. Geological Survey  
 983 National Center  
 Reston, VA 20192  
 Telephone: (703) 648-7719, Fax: (703) 648-7975  
 E-mail: dkramer@usgs.gov

Nicholas A. Muniz (Data)  
 Telephone: (703) 648-7980  
 Fax: (703) 648-7975  
 E-mail: nmuniz@usgs.gov

**Internet:** <http://minerals.usgs.gov/minerals>

## MAGNESIUM IN THE FOURTH QUARTER 2005

Exports of magnesium from January through November 2005 were about 21% lower than those in the same period of 2004. Magnesium imports through November 2005 were about 13% less than those in the corresponding period of 2004. Russia (40%), Israel (33%), and Canada (17%) were the principal sources of imported magnesium metal, and Canada (61%) and Israel (14%) were the principal sources of imported alloys.

Quoted magnesium prices are shown in the table at the bottom of the page. All the magnesium prices fell in the fourth quarter with recycled magnesium competing with pure magnesium, particularly in the U.S. market.

The NAFTA Secretariat announced its decision on the second remand of the U.S. International Trade Commission's (ITC) 5-year review of the antidumping and countervailing duties on pure and alloy magnesium from Canada. The Panel concluded that the ITC should revisit its determination on remand for alloy magnesium. The ITC must provide further evidence to support its conclusion that Magnolia Metallurgy Inc. would enter the market by underselling in order to establish export volumes that would be significant in relation to anticipated demand increases (NAFTA Secretariat, 2006§<sup>1</sup>).

The ITC also announced that it would be conducting full 5-year reviews of antidumping duties on pure magnesium from China and antidumping and countervailing duties on imports of pure and alloy magnesium from Canada. These reviews were scheduled to be completed by June 20, 2006 (U.S. International Trade Commission, 2006).

<sup>1</sup>References that include a section mark (§) are found in the Internet References Cited section.

China's National Bureau of Statistics reported that the country produced about 469,000 metric tons (t) of pure magnesium in 2005, an 8% increase from that in 2004. Exports of pure magnesium totaled 182,000 t, and exports of magnesium alloys were 93,000 t (Beijing Antaike Information Development Co., Ltd., 2006).

Beginning on January 1, 2006, China will reduce the export tax rebates on many of its commodities including magnesium metal. The Government announced that it would cut the magnesium export rebate to 5% from 13% in an attempt to control exports. Analysts expected that prices for magnesium exports from China would increase in response to the rebate cut (Mok and McBeth, 2005).

Meridian Technologies Inc. opened a new magnesium diecasting plant, Shanghai Meridian Magnesium Products Co. Ltd., in Shanghai, China, in September 2005. The new facility, with a capacity of 3,500 metric tons per year (t/yr), will produce transmission cases and covers, steering column housings and supports, seat frames, instrument panel reinforcements, and other parts for domestic consumption and export. The plant's customers include Shanghai General Motors Co. Ltd., Shanghai Volkswagen Co. Ltd., DaimlerChrysler AG, and Delphi Corp. (Meridian Technologies Inc., 2005§).

Hydro Magnesium began a review of operations at its 25,000-t/yr magnesium remelting foundry in Porsgrunn, Norway, which primarily serves the European market. This possibly could lead to the closure of the plant, the loss of about 60 jobs and the transfer of alloy customers to plants in Germany and China. A final decision is pending (Hydro Magnesium, 2006§).

	Unit	Beginning of quarter	End of quarter
Metals Week U.S. spot Western	Dollars per pound	\$1.35-\$1.48	\$1.15-\$1.30
Metals Week U.S. spot dealer import	do.	1.26-1.38	1.14-1.24
Metals Week European free market	Dollars per metric ton	1,600-1,750	1,560-1,700
Metal Bulletin European free market	do.	1,660-1,710	1,590-1,600
Metal Bulletin China free market	do.	1,530-1,550	1,500-1,520

Egyptian Magnesium Co. (EMAG), jointly owned by Magnesium International Ltd. (MIL) and Amiral Overseas Magnesium Ltd., expected that the total construction cost of the first module (43,000 t/yr) of its proposed 88,000-t/yr magnesium plant in Port Sokhna, Egypt, will be higher than had been forecast in the company's internal feasibility study. EMAG cited the high level of global demand for equipment and services, high raw material prices, including steel and copper, both of which are major components, and the relatively high European content of some materials for the project as reasons for the high construction costs. Because of the higher than anticipated costs, EMAG planned to delay construction until it can reduce capital costs. In addition, funding for EMAG will need to be resolved between MIL and Amiral and before the project progresses further (Magnesium International Ltd., 2005§).

A team of research engineers from Australia's CSIRO developed a new permanent-mold magnesium casting technology, called T-Mag. This technology can produce high-integrity magnesium alloy castings, free of the porosity that has restricted the use of magnesium in the past. T-Mag has several advantages over traditional casting technologies, such as high-pressure casting. For example, with current casting technology 6 to 7 kilograms (kg) of metal are needed to produce a 3.5-kg casting. T-Mag requires only 3.7 kg of alloy for the same weight casting. The T-Mag permanent-mold casting process requires neither high pressure nor a vacuum to fill the die, which fills smoothly from the bottom. This minimizes air entrapment and oxidation and produces castings that are virtually free of defects. T-Mag combines melting and casting in a single unit, which is hermetically sealed to protect the magnesium from oxidation and to minimize gas usage. Using the T-Mag process, CSIRO scientists have cast lightweight magnesium alloy engine blocks that are only two-thirds the weight of current aluminum alloy blocks. The new process also may enable casting of high-integrity magnesium alloy wheels, powertrain components, and other load-critical applications, which are not economically feasible with current casting technologies (CSIRO, 2005§).

Engineers at BMW AG manufactured a cast magnesium water-cooled engine block. Because magnesium alloys cannot be used as material for cylinder liners, aluminum is used and

integrated in the magnesium housing. Magnesium alloy  $MgAl_6Sr_2$  is used for the block jacket, and the insert section consists of aluminum alloy  $AlSi_{17}Cu_4Mg$ . By replacing gray iron with aluminum, the weight was reduced by almost 30%. By using magnesium, the total weight reduction achieved, when compared with the original gray iron product, was almost 50%. The composite block has been on the market in the 630i coupe since autumn 2004. BMW has the capacity to produce more than 500,000 6-cylinder composite blocks per year (Hydro Magnesium, 2005§).

## References Cited

- Beijing Antaika Information Development Co., Ltd., 2006, [untitled]: China Metal Market—Precious & Minor Metals Monthly, no. 72, February, p. 9-12.
- Mok, Yuencheng, and McBeth, Karen, 2005, Chinese magnesium prices seen rising on export tax rebate cuts: *Platts Metals Week*, v. 76, no. 52, December 26, p. 7-8.
- U.S. International Trade Commission, 2006, Pure and alloy magnesium from Canada and pure magnesium from China: *Federal Register*, v. 71, no. 8, January 12, p. 2065-2066.

## Internet References Cited

- CSIRO, 2005, Travelling light with T-Mag, accessed February 10, 2006, at URL <http://www.csiro.au/csiro/content/standard/pswc,,.html>.
- Hydro Magnesium, 2005 (September 23), BMW engine block—Marriage of metals, accessed January 10, 2006, via URL <http://www.magnesium.hydro.com>.
- Hydro Magnesium, 2006 (February 8), Hydro Magnesium considers further restructuring of its metal production system, accessed February 10, 2006, at URL [http://www.hydro.com/magnesium/en/news\\_events/news/2006\\_02/further\\_restructuring\\_en.html](http://www.hydro.com/magnesium/en/news_events/news/2006_02/further_restructuring_en.html).
- Magnesium International Ltd., 2005 (December 15), Project update - EMAG magnesium smelter project, accessed December 21, 2005, at URL <http://www.mgil.com.au/investor/documents/Announcement-ProjectUpdate-EMAGmagnesiumsmelterproject.pdf>.
- Meridian Technologies Inc., 2005 (September 20), Shanghai Meridian Magnesium Products is pleased to announce grand opening of its new facility....., accessed December 6, 2005, at URL <http://www.meridian-mag.com/news/?id=22>.
- NAFTA Secretariat, 2006 (January 16), Decision of the panel reviewing the decision of the International Trade Commission on remand, accessed February 3, 2006, at URL [http://www.nafta-sec-alena.org/app/DocRepository/1/Dispute/english/NAFTA\\_Chapter\\_19/USA/ua00091e.pdf](http://www.nafta-sec-alena.org/app/DocRepository/1/Dispute/english/NAFTA_Chapter_19/USA/ua00091e.pdf).

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

(Metric tons)

	2005					
	2004	January- August	September	October	November	January- November
<b>Imports:</b>						
Metal	34,300	20,800	2,550	1,470	2,430	27,300
Waste and scrap	11,700	8,830	1,340	1,350	1,620	13,100
Alloys (magnesium content)	51,500	28,500	3,150	2,990	2,660	37,300
Sheet, tubing, ribbons, wire, powder, and other (magnesium content)	1,180	730	62	96	88	976
Total	<u>98,600</u>	<u>58,900</u>	<u>7,100</u>	<u>5,910</u>	<u>6,800</u>	<u>78,700</u>
<b>Exports:</b>						
Metal	1,760	430	62	65	73	631
Waste and scrap	4,790	4,000	351	436	487	5,280
Alloys (gross weight)	1,750	689	135	159	163	1,150
Sheet, tubing, ribbons, wire, powder, and other (gross weight)	3,530	1,360	174	215	153	1,910
Total	<u>11,800</u>	<u>6,490</u>	<u>722</u>	<u>875</u>	<u>876</u>	<u>8,960</u>

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

Source: U.S. Census Bureau.