

## MAGNESIUM METAL<sup>1</sup>

(Data in thousand metric tons unless otherwise specified)

**Domestic Production and Use:** One company in Utah had a smelter to recover primary magnesium from brines from the Great Salt Lake in Utah by an electrolytic process but production was estimated to have stopped in 2022. Secondary magnesium was recovered from scrap at smelters that produced magnesium ingot and castings and from aluminum alloy scrap at secondary aluminum smelters. Castings, principally used for the automotive industry, accounted for 65% of reported consumption. Aluminum-base alloys that were used for packaging, transportation, and other applications accounted for 22% of primary magnesium metal consumption; desulfurization of iron and steel, 6%; and all other uses, 7%. About 45% of secondary magnesium was consumed for structural uses, and about 55% was used in aluminum alloys.

### **Salient Statistics—United States:**

|  | <b>2020</b> | <b>2021</b> | <b>2022</b> | <b>2023</b> | <b>2024<sup>e</sup></b> |
|--|-------------|-------------|-------------|-------------|-------------------------|
| Production:  |             |             |             |             |                         |
| Primary  | W           | W           | W           | —           | —                       |
| Secondary (new and old scrap)  | 95          | 103         | 115         | 108         | 110                     |
| Imports for consumption  | 65          | 50          | 107         | 88          | 90                      |
| Exports  | 15          | 10          | 9           | 5           | 3                       |
| Consumption:   |             |             |             |             |                         |
| Reported, primary  | 54          | 48          | 50          | 53          | 50                      |
| Apparent <sup>2</sup>  | W           | W           | W           | W           | W                       |
| Price, annual average: <sup>3</sup>                                      |             |             |             |             |                         |
| U.S. spot Western, dollars per pound                                     | 2.48        | 3.73        | 7.59        | 5.00        | 3.50                    |
| European free market, dollars per metric ton                             | 2,149       | 5,011       | 5,206       | 3,240       | 2,900                   |
| Stocks, producer, yearend  | W           | W           | W           | W           | W                       |
| Employment, number <sup>e</sup>  | 400         | 400         | 400         | 200         | 200                     |
| Net import reliance <sup>4</sup> as a percentage of apparent consumption | >25         | >25         | >75         | >75         | >75                     |

**Recycling:** In 2024, about 27,000 tons of secondary magnesium was recovered from old scrap and 86,000 tons was recovered from new scrap. Aluminum-base alloys accounted for about 50% of the secondary magnesium recovered, and magnesium-based castings, ingot, and other materials accounted for about 50%.

**Import Sources (2020–23):** Magnesium metal (99.8% purity): Israel, 40%; Turkey, 34%; Russia, 12%; China, 5%; and other, 9%. Magnesium alloys (magnesium content): Czechia, 27%; Taiwan, 16%; Israel, 12%; Republic of Korea, 12%; and other, 33%. Sheet, powder, and other (magnesium content): Austria, 25%; Mexico, 25%; China,<sup>5</sup> 17%; Taiwan, 12%; and other, 21%. Scrap: Canada, 37%; Mexico, 16%; China, 15%; India, 8%; and other, 24%. Combined total (includes magnesium content of alloys, metal, powder, scrap, sheet, and other): Israel, 17%; Canada, 15%; Turkey, 12%; Czechia, 9%; and other, 47%.

| <b>Tariff:</b> | <b>Item</b>          | <b>Number</b> | <b>Normal Trade Relations</b>                    |
|----------------|----------------------|---------------|--|
|                |                      |               | <b>12–31–24</b>                                  |
|                | Unwrought metal      | 8104.11.0000  | 8% ad valorem.                                   |
|                | Unwrought alloys     | 8104.19.0000  | 6.5% ad valorem.                                 |
|                | Waste and scrap      | 8104.20.0000  | Free.  |
|                | Powders and granules | 8104.30.0000  | 4.4% ad valorem.                                 |
|                | Wrought metal        | 8104.90.0000  | 14.8¢/kg on magnesium content + 3.5% ad valorem. |

**Depletion Allowance:** Dolomite, 14% (domestic and foreign); magnesium chloride (from brine wells), 5% (domestic and foreign).

**Government Stockpile:** None.

**Events, Trends, and Issues:** Production capacity was idle throughout 2024 at the only U.S. primary magnesium smelter. On September 29, 2021, the producer of primary magnesium in Utah declared force majeure on supply contracts, citing equipment failures. Details on the expected restart date were not reported by the company. According to information from the State of Utah, royalty payments for magnesium metal production ceased in 2022. At the end of November 2024, the company laid off 186 employees. The announcement cited discontinuation of lithium carbonate production from its lake brine; many of these employees were likely to have worked on magnesium production prior to the equipment failures in 2021.

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Magnesium prices in the United States generally decreased throughout the year. Import prices in the United States started the year at \$3.80 per pound and gradually decreased to \$3.25 per pound at the end of November. The price decrease was attributed to decreased demand from aluminum smelters, many of which had significant stocks at the start of the year, as well as secondary aluminum smelters preferring to consume scrap with a high magnesium content. Also, one primary aluminum smelter in Missouri ceased production in January, further decreasing demand for magnesium for aluminum alloys.

Magnesium prices in Europe generally decreased throughout the year. Prices in Europe started the year in a range of \$3,050 to \$3,200 per ton and gradually decreased to a range of \$2,700 to \$2,800 per ton at the end of November. The price decrease in Europe was attributed to decreased demand and steady production in China, without major disruption for environmental regulatory enforcement or shortages of coke gas, as was experienced in recent prior years. Coke gas is the energy source used by many magnesium producers in China, the leading supplier of magnesium to consumers in Europe. The 2024 annual average price range for magnesium in Europe was estimated to be 10% less than that in 2023.

In February, the U.S. Department of Defense awarded \$28 million in financing through the Defense Production Act Title III program to a company developing a pilot plant in California to produce magnesium metal from sea brine. In April, the company signed an agreement to purchase magnesium chloride from a company that produces salt from seawater. In June, the company announced that it had produced and sold commercial quality magnesium metal from its pilot-plant operations.

### World Primary Production and Reserves:

|                       | <b>Smelter production<sup>e</sup></b> |                    | <b>Smelter capacity<sup>e</sup></b> |
|-----------------------|---------------------------------------|--------------------|-------------------------------------|
|                       | <b><u>2023</u></b>                    | <b><u>2024</u></b> | <b><u>2024</u></b>                  |
| United States         | —                                     | —                  | <sup>6</sup> 64                     |
| Brazil                | 20                                    | 20                 | 22                                  |
| China                 | <sup>6</sup> 805                      | 950                | 1,800                               |
| Iran                  | 5                                     | 5                  | 6                                   |
| Israel                | <sup>6</sup> 17                       | 20                 | <sup>6</sup> 34                     |
| Kazakhstan            | 22                                    | 20                 | 30                                  |
| Russia                | 18                                    | 15                 | 81                                  |
| Turkey                | 13                                    | 15                 | <sup>6</sup> 15                     |
| Other countries       | —                                     | —                  | <sup>5</sup> 2                      |
| World total (rounded) | 900                                   | 1,000              | 2,100                               |

**World Resources:**<sup>7</sup> Resources from which magnesium may be recovered range from large to virtually unlimited and are globally widespread. Resources of dolomite, serpentine, and magnesium-bearing evaporite minerals are enormous. Magnesium-bearing brines are estimated to constitute a resource in the billions of tons, and magnesium could be recovered from seawater along world coastlines.

**Substitutes:** Aluminum and zinc may substitute for magnesium in castings and wrought products. The relatively light weight of magnesium is an advantage over aluminum and zinc in castings and wrought products in most applications; however, its high cost is a disadvantage relative to these substitutes. For iron and steel desulfurization, calcium carbide may be used instead of magnesium. Magnesium is preferred to calcium carbide for desulfurization of iron and steel because calcium carbide produces acetylene in the presence of water.

<sup>e</sup>Estimated. W Withheld to avoid disclosing company proprietary data. — Zero.

<sup>1</sup>See also the Magnesium Compounds chapter.

<sup>2</sup>Defined as primary production + secondary production from old scrap + imports – exports ± adjustments for industry stock changes.

<sup>3</sup>Source: S&P Global Platts Metals Week.

<sup>4</sup>Defined as imports – exports ± adjustments for industry stock changes.

<sup>5</sup>Includes Hong Kong.

<sup>6</sup>Reported.

<sup>7</sup>See Appendix C for resource and reserve definitions and information concerning data sources.