



SURFACE VEHICLE INFORMATION REPORT

J464™

DEC2017

Issued 1940-01
Reaffirmed 1989-01
Stabilized 2017-12

Superseding J464 JAN1989

Magnesium Alloys

RATIONALE

The technical report covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

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Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. Scope—This report on magnesium alloys covers those alloys which have been more commonly used in the United States for automotive, aircraft, and missile applications. Basic information on nomenclature and temper designation is given. Design data and many characteristics covered by a purchase specification are not included.

2. References

2.1 Applicable Publications—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

2.1.1 ASTM PUBLICATIONS—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 275—Recommended Practice for Codification of Light Metals and Alloys, Cast and Wrought

ASTM B 296—Recommended Practice for Temper Designation of Magnesium Alloys, Cast and Wrought

3. Sources Of Magnesium—Magnesium is the third most abundant structural element in the earth's crust, and considered inexhaustible. Common sources are sea water, natural brines, magnesite, and dolomite. Three methods of extraction are used in the United States. One method involves treating sea water with a source of alkalinity (lime or caustic soda) to precipitate the magnesium as hydroxide, which is then mixed with hydrochloric acid to produce magnesium chloride. The magnesium chloride is reduced electrolytically to produce magnesium metal and a mixture of chlorine and hydrochloric acid. A second method produces coproduct magnesium metal and pure chlorine in the electrolytic cell by the reduction of anhydrous magnesium chloride. The anhydrous cell feed results from the dehydration of natural brines. Another method of extraction which is also used in the United States and in other countries is a thermal reduction method, generally referred to as the ferro-silicon process, employing an alloy of iron and silicon to reduce magnesium oxide. Most of the magnesium ingot sold is of 99.80% purity. Grades of magnesium of 99.90, 99.95, and 99.98% purity are also available. The higher purity grades are used mostly in nuclear applications and for reduction purposes.