



AEROSPACE MATERIAL SPECIFICATION

AMS4424™**REV. M**

Issued	1939-12
Noncurrent	1992-08
Reaffirmed	2008-05
Revised	2025-10

Superseding AMS4424L

Magnesium Alloy Castings, Sand,
6.0Al - 3.0Zn (AZ63-T6),
Solution and Precipitation Heat Treated
(Composition similar to UNS M11630)

RATIONALE

AMS4424M results from a Five-Year Review and update of this specification to clarify that casting approval and reapproval actions are to be carried out by the cognizant engineering organization (see 4.2.2 and 4.4), update wording to prohibit unauthorized exceptions (see 3.8, 4.5.3, and 8.5), relocate Definitions (see 2.3), update Applicable Documents (see Section 2 and 3.2), Condition (see 3.2), Packaging (see 5.2.1), sampling for chemical analysis (see 4.3.1), Control Factors (see 4.4.2.1), Reports (see 4.5.1), presentation for tensile properties (see Tables 2, 3, and 4), and Ordering Information (see 8.6), and allow use of the immediate prior revision of this specification (see 8.4).

1. SCOPE

1.1 Form

This specification covers a magnesium alloy in the form of sand castings (see 8.6).

1.2 Application

Primarily for parts operating in service up to 300 °F (150 °C).

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (U.S. and Canada only) or +1 724-776-4970 (outside U.S. and Canada), www.sae.org.

AMS2360 Room Temperature Tensile Properties of Castings

AMS2475 Protective Treatments, Magnesium Alloys

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Documents

Standard, visit Sharing Hub

AMS2694	In-Process Welding of Castings
AMS2768	Heat Treatment of Magnesium Alloy Castings
AMS2804	Identification, Castings
AS7766	Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B557	Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products
ASTM B660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B953	Sampling Magnesium and Magnesium Alloys for Spectrochemical Analysis
ASTM B954	Analysis of Magnesium and Magnesium Alloys by Atomic Emission Spectrometry
ASTM E10	Standard Test Method for Brinell Hardness of Metallic Materials
ASTM E155	Reference Radiographs for Inspection of Aluminum and Magnesium Castings
ASTM E1220	Visible Penetrant Testing Using Solvent-Removable Process
ASTM E1417/E1417M	Liquid Penetrant Testing
ASTM E1742/E1742M	Radiographic Examination

2.3 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the following percentages by weight, determined by spectrochemical methods in accordance with ASTM B954 or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Aluminum	5.3	6.7
Zinc	2.5	3.5
Manganese	0.15	--
Silicon	--	0.30
Copper	--	0.10
Nickel	--	0.01
Other Impurities, total	--	0.30
Magnesium	remainder	

3.2 Condition

Solution and precipitation heat treated in accordance with AMS2768 to the T6 temper.

3.3 Castings

Castings shall be produced from metal conforming to 3.1. Metal remelted from previously analyzed ingot may be poured directly into castings. Furnace or ladle additions of grain-refining elements or alloys are permissible. If grain-refining elements or alloys are not added, the molten metal shall be subjected to superheating or other grain-refining treatment. Molten metal taken from alloying furnaces, with or without addition of foundry operating scrap (gates, sprues, risers, and rejected castings), shall not be poured into castings unless first converted to ingot, analyzed, and remelted or unless the composition of a sample taken after the last addition to the melt conforms to 3.1.

3.3.1 A melt shall be the metal withdrawn from a batch-furnace charge of 2000 pounds (907 kg) or less as melted for pouring castings or, when permitted by the purchaser, a melt shall be 4000 pounds (1814 kg) or less of metal withdrawn from one continuous furnace in not more than 8 consecutive hours.

3.3.2 A lot shall be all castings poured from a single melt in not more than 8 consecutive hours and solution and precipitation heat treated in the same heat-treatment batch.

3.4 Cast Test Specimens

Chemical analysis specimens and tensile specimens shall be cast as follows and, when requested, shall be supplied with the castings:

3.4.1 Chemical Analysis Specimens

Shall be cast from each melt after the last melt addition and shall be tested to qualify the melt lot as in 3.1.

3.4.2 Tensile Specimens

Shall be cast with each lot of castings, shall be of standard proportions conforming to ASTM B557 with 0.500-inch (12.70-mm) diameter at the reduced parallel gauge section, and shall be cast to size in molds made with the regular foundry mix of sand without using chills. Metal for the specimens shall be part of the metal that is used for the castings and shall be subjected to the same grain-refining or alloying treatment given the metal for the castings. The temperature of the metal during pouring of the specimens shall be not lower than that during pouring of the castings.

3.5 Heat Treatment

Castings and representative separately cast tensile specimens shall be solution and precipitation heat treated in accordance with AMS2768; at least one set of tensile specimens shall, during each stage of heat treatment, be put into a batch-type furnace with each load of castings or into a continuous furnace at intervals of not longer than 3 hours.

3.6 Properties

Castings, integrally cast coupons, and representative separately cast tensile specimens produced in accordance with 3.4.2 shall conform to the following requirements:

3.6.1 Tensile Properties

Shall be as follows, determined in accordance with ASTM B557; conformance to the requirements of 3.6.1.1 shall be used as the basis for acceptance of castings except when the purchaser specifies that the requirements of 3.6.1.2 apply:

3.6.1.1 Separately Cast Specimens

Table 2 - Minimum tensile properties

Properties	Values
Tensile Strength	34 ksi (235 MPa)
Yield Strength at 0.2% Offset	16 ksi (110 MPa)
Elongation in 4D	3%