



AEROSPACE MATERIAL SPECIFICATION

AMS4431™

Issued 2019-05

Magnesium Alloy, Direct Chill Strand Cast
2.8Nd - 1.4Gd - 0.4Zn - 0.6Zr (EV31A - T6)
Solution and Precipitation Heat Treated
(Composition similar to UNS M12310)

RATIONALE

AMS4431 is a new specification for a magnesium alloy in the form of direct chill strand cast material.

1. SCOPE

1.1 Form

This specification covers a magnesium alloy in the form of direct chill strand cast round material up to 9.0 inch diameter and rectangular material up to 10 inch by 27.5 inch cross-section (see 8.4) for the purpose of machine from solid applications (see 8.2.1).

1.2 Application

This alloy has been used typically for parts requiring a combination of light weight, high yield strength up to 400 °F (204 °C), and relatively high corrosion resistance, but usage is not limited to such applications.

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 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2175	Casting, Classification and Inspection of
AMS2475	Protective Treatments, Magnesium Alloys
AMS2750	Pyrometry
ARP1917	Clarification of Terms Used in Aerospace Metals Specifications

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Documents
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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 B117	Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM B557	Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products
ASTM B557M	Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products (Metric)
ASTM B953	Sampling Magnesium and Magnesium Alloys for Spectrochemical Analysis
ASTM B954	Analysis of Magnesium and Magnesium Alloys by Atomic Emission Spectrometry
ASTM E155	Reference Radiographs for Inspection of Aluminum and Magnesium Castings
ASTM E1742/E1742M	Radiographic Examination

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined by spectrochemical methods in accordance with ASTM B954, or by other analytical methods acceptable to purchaser.

Table 1 - Composition

Element	Min	Max
Neodymium	2.6	3.1
Gadolinium	1.0	1.7
Zinc	0.20	0.50
Zirconium	0.4	1.0
Other Rare Earths (3.1.1)	--	0.4
Silver	--	0.05
Copper	--	0.01
Iron	--	0.010
Nickel	--	0.0020
Other Elements, each (3.1.2)	--	0.01
Magnesium	remainder	

3.1.1 Other rare earths shall principally be the total of cerium, lanthanum, and praseodymium. The supplier shall analyze for the presence of these three elements when determining acceptance but the presence of additional rare earth elements shall not be cause for rejection provided the total remains less than 0.4%.

3.1.2 Determination not required for routine acceptance.

3.2 Condition

Solution and precipitation heat treated to the T6 temper.

3.2.1 Direct chill strand cast material shall be supplied with a surface finish as agreed upon between the purchaser and producer.