



# AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

**AMS 4375G**  
Superseding AMS 4375F

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## MAGNESIUM ALLOY SHEET AND PLATE 3.0Al - 1.0Zn (AZ31B-0)

### 1. SCOPE:

1.1 Form: This specification covers a magnesium alloy in the form of sheet and plate.

1.2 Application: Primarily for low-strength parts requiring rigidity with low density.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

#### 2.1.1 Aerospace Material Specifications:

AMS 2202 - Tolerances, Aluminum-Base and Magnesium-Base Alloy Sheet and Plate

AMS 2350 - Standards and Test Methods

AMS 2355 - Quality Assurance Sampling and Testing of Aluminum-Base and Magnesium-Base Alloys, Wrought Products (Except Forgings and Forging Stock) and Flash Welded Rings

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E9 - Compression Testing of Metallic Materials at Room Temperature

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

#### 2.3.1 Military Standards:

MIL-STD-649 - Aluminum and Magnesium Products, Preparation for Shipment and Storage

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### 3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined in accordance with AMS 2355:

	min	max
Aluminum	2.5	3.5
Zinc	0.7	1.3
Manganese	0.20	--
Ø Silicon	--	0.05
Copper	--	0.05
Calcium	--	0.04
Iron	--	0.005
Nickel	--	0.005
Other Impurities, total	--	0.30
Magnesium	remainder	

3.2 Condition: The product shall be supplied in the following condition:

3.2.1 Product 0.500 In. (12.70 mm) and Under in Nominal Thickness: Annealed, recrystallized, and pickled.

3.2.2 Product Over 0.500 In. (12.70 mm) in Nominal Thickness: Annealed and recrystallized.

3.3 Properties: The product shall conform to the following requirements:

3.3.1 Tensile Properties: Shall be as specified in Table I and 3.3.1.1, determined in accordance with AMS 2355.

TABLE I

Nominal Thickness Inches	Tensile Strength psi	Yield Strength at 0.2% Offset psi, min	Elongation in 2 in. or 4D %, min
0.016 to 0.060, incl	32,000 - 40,000	18,000	12
Over 0.060 to 0.500, incl	32,000 - 40,000	15,000	12
Over 0.500 to 2.000, incl	32,000 - 40,000	15,000	10
Over 2.000 to 3.000, incl	32,000 - 40,000	15,000	9

TABLE I (SI)

Nominal Thickness Millimetres	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa, min	Elongation in 50 mm or 4D %, min
0.41 to 1.52, incl	221 - 276	124	12
Over 1.52 to 12.70, incl	221 - 276	103	12
Over 12.70 to 50.80, incl	221 - 276	103	10
Over 50.80 to 76.20, incl	221 - 276	103	9

3.3.1.1 Tensile property requirements for product under 0.016 in. (0.41 mm) or over 3.000 in. (76.20 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.2 Compressive Properties: Shall be as specified in Table II and 3.3.2.1, determined in the longitudinal direction in accordance with ASTM E9.

TABLE II

Nominal Thickness Inches	Compressive Yield Strength at 0.2% Offset psi, min
0.063 to 0.250, incl	12,000
Over 0.250 to 2.000, incl	10,000
Over 2.000 to 3.000, incl	8,000

TABLE II (SI)

Nominal Thickness Millimetres	Compressive Yield Strength at 0.2% Offset MPa, min
1.60 to 6.35, incl	83
Over 6.35 to 50.80, incl	69
Over 50.80 to 76.20, incl	55

3.3.2.1 Compressive property requirements for product under 0.063 in. (1.60 mm) or over 3.000 in. (76.20 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.4 Quality: The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to usage of the product.

3.5 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2202.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to composition (3.1), tensile property (3.3.1), and tolerance (3.5) requirements are classified as acceptance tests.

4.2.2 Periodic Tests: Tests to determine conformance to compressive properties (3.3.2) are classified as periodic tests.

4.3 Sampling: Shall be in accordance with AMS 2355; frequency and extent of sampling for periodic tests shall be as agreed upon by purchaser and vendor.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment three copies of a report stating that the product conforms to the chemical composition and other acceptance test requirements of this specification. This report shall include the purchase order number, material specification number and its revision letter, size, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

Ø 4.5 Resampling and Retesting: Shall be in accordance with AMS 2355.

5. PREPARATION FOR DELIVERY:

- 5.1 Identification: Each sheet and plate shall be marked on one face, in the respective location indicated below, with the alloy number and temper, AMS 4375 or applicable Federal or Military specification designation, inspection lot number, manufacturer's identification, and nominal thickness. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be sufficiently stable to withstand normal handling. The markings shall have no deleterious effect on the product or its performance.
- 5.1.1 Flat Sheet and Plate Under 6 In. (152 mm) Wide: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 ft (914 mm). The inspection lot number may appear in the row marking or may appear at only one location on each piece.
- 5.1.2 Flat Sheet and Plate 0.375 In. (9.52 mm) and Under Thick, 6 to 60 In. (152 to 1524 mm), Incl, Wide, and 36 to 200 In. (914 to 5080 mm), Incl, Long: Shall be marked in lengthwise rows of characters recurring at intervals not greater than 3 ft (914 mm), the rows being spaced approximately 6 in. (152 mm) on centers across the width and staggered. Every third row shall show the manufacturer's identification and nominal thickness. The other rows shall show the alloy number and temper and AMS 4375 or applicable Federal or Military specification designation. The inspection lot number may be included in the rows with the alloy, temper, and specification designations or may appear at only one location on each piece.
- 5.1.3 Flat Sheet and Plate Over 0.375 In. (9.52 mm) Thick, or Over 60 In. (1524 mm) Wide, or Over 200 In. (5080 mm) Long: Shall be marked as in 5.1.2 or, at vendor's discretion, shall be marked in one or two rows of characters recurring at intervals not greater than 3 ft (914 mm) and running around the periphery of the piece. If one row is used, it shall show all information of 5.1 except that the inspection lot number may be omitted. If two rows are used, one row shall show the alloy number and temper and AMS 4375 or applicable Federal or Military specification designation; the second row shall show the manufacturer's identification and nominal thickness. The inspection lot number may be included in the line with the manufacturer's identification and nominal thickness or may appear at only one location on each piece.
- 5.1.3.1 If peripheral marking is applied to the full piece as produced but partial sheets or plates are supplied, an arrow shall also be applied near one corner indicating the direction of rolling.
- 5.1.4 Coiled Sheet: Shall be marked near both the outside and inside ends of the coil; the markings shall be applied as in 5.1 or shall appear on a durable tag or label attached to the coil and marked with the information of 5.1. When the inside end of the coil is inaccessible, as when the sheet is wound on cores, the tag or label may be attached to the core.
- 5.1.5 Circles: Shall be marked with the information of 5.1 if the circle is 24 in. (610 mm) or more in nominal diameter. Circles less than 24 in. (610 mm) in nominal diameter shall be identified as agreed upon by purchaser and vendor.
- 5.2 Protective Treatment: The product shall be oiled, prior to shipment, with a light corrosion-inhibiting oil.