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

AEROSPACE MATERIAL SPECIFICATION

AMS 4376D
Superseding AMS 4376C

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MAGNESIUM ALLOY PLATE
3.0Al - 1.0Zn (AZ31B-H26)

1. SCOPE:

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

1.2 Application: Primarily for moderate-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

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 Plate 0.500 In. (12.70 mm) and Under in Nominal Thickness: Cold rolled, partially annealed, and pickled.

3.2.2 Plate Over 0.500 In. (12.70 mm) in Nominal Thickness: Cold rolled and partially annealed.

Ø 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, min	Yield Strength at 0.2% Offset psi, min	Elongation in 2 in. or 4D %, min
0.250 to 0.375, incl	39,000	27,000	6
Over 0.375 to 0.500, incl	38,000	26,000	6
Over 0.500 to 0.750, incl	37,000	25,000	6
Over 0.750 to 1.000, incl	37,000	23,000	6
Over 1.000 to 1.500, incl	35,000	22,000	6
Over 1.500 to 2.000, incl	35,000	21,000	6

TABLE I (SI)

Nominal Thickness Millimetres	Tensile Strength MPa, min	Yield Strength at 0.2% Offset MPa, min	Elongation in 50 mm or 4D %, min
6.35 to 9.52, incl	269	186	6
Over 9.52 to 12.70, incl	262	179	6
Over 12.70 to 19.05, incl	255	172	6
Over 19.05 to 25.40, incl	255	159	6
Over 25.40 to 38.10, incl	241	152	6
Over 38.10 to 50.80, incl	241	145	6

3.3.1.1 Tensile property requirements for plate over 2.000 in. (50.80 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
0.250 to 0.375, incl	22,000
Over 0.375 to 0.438, incl	21,000
Over 0.438 to 0.500, incl	18,000
Over 0.500 to 0.750, incl	17,000
Over 0.750 to 1.000, incl	16,000
Over 1.000 to 1.500, incl	15,000
Over 1.500 to 2.000, incl	14,000

TABLE II (SI)

Nominal Thickness Millimetres	Compressive Yield Strength at 0.2% Offset MPa, min
6.35 to 9.52, incl	152
Over 9.52 to 11.13, incl	145
Over 11.13 to 12.70, incl	124
Over 12.70 to 19.05, incl	117
Over 19.05 to 25.40, incl	110
Over 25.40 to 38.10, incl	103
Over 38.10 to 50.80, incl	97

3.3.2.1 Compressive property requirements for plate over 2.000 in. (50.80 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

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

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 plate shall supply all samples and shall be responsible for Ø 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 plate conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Test to determine conformance to composition (3.1), tensile property (3.3.1), Ø 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 Ø as periodic tests.

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

4.4 Reports:

4.4.1 The vendor of plate shall furnish with each shipment three copies of a report stating that the plate conforms to the chemical composition and other technical 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 plate, part number, and quantity. When plate for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of plate to determine conformance to the requirements of this specification, and shall include in the report a statement that the plate 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 plate shall be marked on one face, in the respective location indicated below, with the alloy number and temper, AMS 4376 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 plate or its performance.

5.1.1 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 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 4376 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 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 4376 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 plates are supplied, an arrow shall also be applied near one corner indicating the direction of rolling.

5.1.4 Circles: Shall be marked with the information of 5.1 if the circle is 24 in. (610 mm) or more in 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: Plate shall be oiled, prior to shipment, with a light corrosion-inhibiting oil.

5.3 Packaging:

5.3.1 Plate shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of Ø the plate to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.3.2 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-649, Level A Ø or Level C, as specified in the request for procurement. Commercial packaging as in 5.3.1 will be acceptable if it meets the requirements of Level C.

6. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Plate not conforming to this specification or to authorized modifications will be subject to rejection.

8. NOTES:

8.1 Marginal Indicia: The phi (Ø) symbol is used to indicate technical changes from the previous issue of this specification.