

**AEROSPACE
MATERIAL
SPECIFICATION**

Submitted for recognition as an American National Standard

SAE AMS 4035H

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Superseding AMS 4035G

ALUMINUM ALLOY SHEET AND PLATE
4.4Cu - 1.5Mg - 0.60Mn (2024-0)
Annealed

UNS A92024

1. SCOPE:

1.1 Form: This specification covers an aluminum alloy in the form of sheet and plate.

1.2 Application: Primarily for formed structural parts which will be subsequently heat treated. Certain design and processing procedures may cause these products to become susceptible to stress-corrosion cracking after heat treatment; ARP 823 recommends practices to minimize such conditions.

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

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

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

MAM 2202 - Tolerances, Metric, Aluminum Alloy and Magnesium Alloy Sheet and Plate

AMS 2350 - Standards and Test Methods

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

MAM 2355 - Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings, Metric (SI) Units

AMS 2770 - Heat Treatment of Aluminum and Aluminum Alloys

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2.1.2 Aerospace Recommended Practices:

ARP 823 - Minimizing Stress Corrosion Cracking in Wrought Heat Treatable Aluminum Alloy Products

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

2.2.1 Military Specifications:

MIL-H-6088 - Heat Treatment of Aluminum Alloys

2.2.2 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 or MAM 2355:

	min	max
Copper	3.8	4.9
Magnesium	1.2	1.8
Manganese	0.30	0.9
Iron	--	0.50
Silicon	--	0.50
Zinc	--	0.25
Titanium	--	0.15
Chromium	--	0.10
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

3.2 Condition: Annealed in accordance with MIL-H-6088.

3.3 Properties: The product shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355:

3.3.1 As Annealed:

3.3.1.1 Tensile Properties: Shall be as specified in Table I and 3.3.1.1.1.

TABLE I

Nominal Thickness Inches	Tensile Strength psi, max	Yield Strength at 0.2% Offset psi, max	Elongation in 2 in. or 4D %, min
0.010 to 0.499, incl	32,000	14,000	12
Over 0.499 to 1.750, incl	32,000	--	12

TABLE I (SI)

Nominal Thickness Millimetres	Tensile Strength MPa, max	Yield Strength at 0.2% Offset MPa, max	Elongation in 50 mm or 4D %, min
0.25 to 12.50, incl	220	95	12
Over 12.50 to 43.75, incl	220	--	12

3.3.1.1.1 Tensile property requirements for product under 0.010 in. (0.25 mm) or over 1.750 in. (43.75 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.1.2 Bending: Product 0.010 to 0.499 in. (0.25 to 12.50 mm), incl, in nominal thickness shall withstand, without cracking, bending at room temperature through an angle of 180 deg around a diameter equal to the bend factor times the nominal thickness of the product with axis of bend parallel to the direction of rolling.

Nominal Thickness		Bend Factor
Inch	Millimetres	
0.010 to 0.032, incl	0.25 to 0.80, incl	0
Over 0.032 to 0.063, incl	Over 0.80 to 1.60, incl	1
Over 0.063 to 0.128, incl	Over 1.60 to 3.20, incl	4
Over 0.128 to 0.499, incl	Over 3.20 to 12.50, incl	6

3.3.1.2.1 Bending requirements for product under 0.010 in. (0.25 mm) or over 0.499 in. (12.50 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.2 After Solution Heat Treatment: The product, as received by purchaser, shall have the following properties after solution heat treatment in accordance with AMS 2770 and aging for not less than 4 days at room temperature:

3.3.2.1 Tensile Properties: Shall be as specified in Table II and 3.3.2.1.1.

TABLE II

Nominal Thickness Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset psi, min	Elongation in 2 in. or 4D %, min
0.010 to 0.020, incl	62,000	38,000	12
Over 0.020 to 0.249, incl	62,000	38,000	15
Over 0.249 to 0.499, incl	62,000	38,000	12
Over 0.499 to 1.000, incl	61,000	38,000	8
Over 1.000 to 1.500, incl	60,000	38,000	7
Over 1.500 to 1.750, incl	60,000	38,000	6

TABLE II (SI)

Nominal Thickness Millimetres	Tensile Strength MPa, min	Yield Strength at 0.2% Offset MPa, min	Elongation in 50 mm or 4D %, min
0.25 to 0.50, incl	425	260	12
Over 0.50 to 6.25, incl	425	260	15
Over 6.25 to 12.50, incl	425	260	12
Over 12.50 to 25.00, incl	420	260	8
Over 25.00 to 37.50, incl	415	260	7
Over 37.50 to 43.75, incl	415	260	6

3.3.2.1.1 Tensile property requirements for product under 0.010 in. (0.25 mm) or over 1.750 in. (43.75 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.2.2 Bending: Product 0.010 to 0.499 in. (0.25 to 12.50 mm), incl, in nominal thickness shall withstand without cracking, bending at room temperature through an angle of 180 deg around a diameter equal to the bend factor times the nominal thickness of the product with axis of bend parallel to the direction of rolling.

Nominal Thickness		Bend Factor
Inch	Millimetres	
0.010 to 0.020, incl	0.25 to 0.50, incl	4
Over 0.020 to 0.051, incl	Over 0.50 to 1.25, incl	5
Over 0.051 to 0.128, incl	Over 1.25 to 3.20, incl	6
Over 0.128 to 0.249, incl	Over 3.20 to 6.25, incl	8
Over 0.249 to 0.499, incl	Over 6.25 to 12.50, incl	10

3.3.2.2.1 Bending requirements for product under 0.010 in. (0.25 mm) or over 0.499 in. (12.50 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 imperfections detrimental to usage of the product.

3.5 Tolerances: Shall conform to all applicable requirements of AMS 2202 or MAM 2202.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples for vendor's tests 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 sample and to perform any confirmatory testing deemed 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 requirements for composition (3.1), tensile properties as annealed (3.3.1.1), properties after solution heat treatment (3.2.2), and tolerances (3.5) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for bending as annealed (3.3.1.2) are classified as periodic tests and shall be performed at a frequency selected by vendor unless frequency of testing is specified by purchaser.

4.3 Sampling: Shall be in accordance with AMS 2355 or MAM 2355.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment a report stating that the product conforms to the chemical composition and other technical requirements of this specification. This report shall include the purchase order number, AMS 4035H, size, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 4035H, 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 either a statement that the material conforms or copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2355 or MAM 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 4035 or applicable Federal specification designation, manufacturer's identification, and nominal thickness. The characters shall be of such size as to be 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. (150 mm) Wide: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 ft (900 mm).