SAE The Engineering Society For Advancing Mobility Land Sea Air and Space

400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4347

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Submitted for recognition as an American National Standard

ALUMINUM ALLOY SHEET
1.0Mg - 0.8Si - 0.8Cu - 0.50Mn (6013-T4)
Solution Heat Treated and Naturally Aged

UNS A96013

1. SCOPE:

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

1.2 Application: Primarily for formed structural parts where good stretch formability is required and where, after precipitation heat treatment, good strength, toughness, and fatigue properties and maximum corrosion resistance are inherent.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications 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

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

ASTM B660 - Packaging/Packing of Aluminum and Magnesium Products

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

2.3.1 Military Specifications:

MIL-H-6088 - Heat Treatment of Aluminum Alloys

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
Magnesium	0.8	1.2
Copper	0.6	1.1
Silicon	0.6	1.0
Manganese	0.20	0.8
Iron	--	0.50
Zinc	--	0.25
Chromium	--	0.10
Titanium	--	0.10
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

3.2 Condition: Solution heat treated and naturally aged. Furnace surveys and calibration of temperature controllers and recorders shall be in accordance with MIL-H-6088.

3.3 Tensile Properties: Sheet shall conform to the following requirements, determined in the long transverse direction in accordance with AMS 2355 or MAM 2355:

3.3.1 As Solution Heat Treated and Naturally Aged:

Tensile Strength, min	40,000 psi (275 MPa)
Yield Strength at 0.2% Offset, min	21,000 psi (145 MPa)
Elongation in 2 in. (50 mm), min	20%

3.3.2 After Precipitation Heat Treatment: Sheet shall have the following properties after being precipitation heat treated. No specific heat treating instructions are specified but the sheet shall be precipitation heat treated to meet the following properties:

Tensile Strength, min	52,000 psi (360 MPa)
Yield Strength at 0.2% Offset, min	46,000 psi (315 MPa)
Elongation in 2 in. (50 mm), min	8%

3.4 Quality: Sheet, 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 sheet.

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 sheet 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 sheet conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each lot.

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

4.4 Reports:

4.4.1 The vendor of sheet shall furnish with each shipment a report stating that the sheet conforms to the chemical composition and other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 4347, 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 4347, contractor or other direct supplier of sheet, part number, and quantity. When sheet for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of sheet to determine conformance to the requirements of this specification and shall include in the report either a statement that the sheet 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 shall be marked on one face, in the respective location indicated below, with the alloy number and temper, AMS 4347, 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 sheet or its performance.

5.1.1 Flat Sheet 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).

5.1.2 Flat Sheet 6 - 60 In. (150 - 1500 mm), Incl. Wide and 36 - 200 In. (900 - 5000 mm), Incl Long: Shall be marked in lengthwise rows of characters recurring at intervals not greater than 3 ft (900 mm), the rows being spaced approximately 6 in. (150 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 4347.

5.1.3 Flat Sheet Over 60 In. (1500 mm) Wide or Over 200 In. (5000 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 (900 mm) and running around the periphery of the piece. If one row is used, it shall show all information of 5.1. If two rows are used, one row shall show the alloy number and temper and AMS 4347, the second row shall show the manufacturer's identification and nominal thickness.

5.1.3.1 If peripheral marking is applied to the full piece as produced but partial sheets 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 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. (600 mm) or over in nominal diameter. Circles under 24 in. (600 mm) in nominal diameter shall be identified as agreed upon by purchaser and vendor.

5.2 Protective Treatment: Flat sheet and circles 12 in. (300 mm) and over in nominal diameter shall be protected, during shipment and storage, by interleaving with suitable paper sheets. Circles under 12 in. (300 mm) in nominal diameter shall be protected as agreed upon by purchaser and vendor.

5.3 Packaging:

5.3.1 Sheet 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 the sheet 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 ASTM B660, Level A or Commercial Level, as specified in the request for procurement. Commercial packaging as in 5.3.1 will be acceptable if it meets the requirements of ASTM B660.