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400 Commonwealth Dr., Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 4003F

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Superseding AMS 4003E

ALUMINUM SHEET AND PLATE
0.12 Cu (1100-H14)
Strain Hardened

UNS A91100

1. SCOPE:

1.1 Form: This specification covers aluminum in the form of sheet and plate 1.000 in. (25.00 mm) and under in nominal thickness.

1.2 Application: Primarily for formed parts and for parts requiring welding.

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

2.2.1 Military Standards:

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

REAFFIRMED 10/91

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
Aluminum	99.00	--
Copper	0.05	0.20
Iron + Silicon	--	0.95
Zinc	--	0.10
Mangananese	--	0.05
Other impurities, each	--	0.05
Other impurities, total	--	0.15

3.2 Condition: Strain hardened to H14 temper.

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

3.3.1 Tensile Properties: Shall be as shown in Table I.

TABLE I

Nominal Thickness Inch	Tensile Strength psi	Yield Strength At 0.2% Offset psi, min	Elongation in 2 in. or 4D %, min
0.009 to 0.012, incl	16,000 - 21,000	14,000	1
Over 0.012 to 0.019, incl	16,000 - 21,000	14,000	2
Over 0.019 to 0.031, incl	16,000 - 21,000	14,000	3
Over 0.031 to 0.050, incl	16,000 - 21,000	14,000	4
Over 0.050 to 0.113, incl	16,000 - 21,000	14,000	5
Over 0.113 to 0.499, incl	16,000 - 21,000	14,000	6
Over 0.499 to 1.000, incl	16,000 - 21,000	14,000	10

TABLE I (SI)

Nominal Thickness Millimetres	Tensile Strength MPa	Yield Strength At 0.2% Offset MPa, min	Elongation in 50 mm or 4D %, min
0.22 to 0.30, incl	110 - 145	97	1
Over 0.30 to 0.48, incl	110 - 145	97	2
Over 0.48 to 0.78, incl	110 - 145	97	3
Over 0.78 to 1.25, incl	110 - 145	97	4
Over 1.25 to 2.82, incl	110 - 145	97	5
Over 2.82 to 12.50, incl	110 - 145	97	6
Over 12.50 to 25.00, incl	110 - 145	97	10

3.3.2 Bending: Product 0.249 in. (6.25 mm) and under in nominal thickness shall withstand, without cracking, bending at room temperature flat on itself with axis of bend parallel to the direction of rolling.

3.3.2.1 Bending requirements for plate over 0.249 in. (6.25 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 Ø 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 Ø composition (3.1), tensile properties (3.3.1), 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 Ø bending (3.3.2) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

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

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 4003F, 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 4003F, 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 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 4003 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).

5.1.2 Flat Sheet and Plate 0.375 In. (9.50 mm) and Under Thick, 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 4003 or applicable Federal specification designation.

5.1.3 Flat Sheet and Plate Over 0.375 In. (9.50 mm) Thick, or 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 4003 or applicable Federal specification designation; 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 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 sheet is wound on cores, the tag or label may be attached to the core.

5.1.1 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, plate, and circles 12 in. (300 mm) or 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.