



AEROSPACE MATERIAL SPECIFICATION

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

AMS4007A

Superseding AMS 4007

Issued 3-1-74

Revised 1-15-80

ALUMINUM ALLOY FOIL 4.4Cu - 1.5Mg - 0.60Mn (2024-0)

1. SCOPE:

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

1.2 Application: Primarily for fabrication of diffusion-bonded, fiber-reinforced-composite tape, sheet, plate, and other structural forms.

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 2350 - Standards and Test Methods

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

AMS 2770 - Heat Treatment of Aluminum and Aluminum Alloys

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

ASTM E252 - Thickness of Thin Foil and Film by Weighing

ASTM E345 - Tension Testing of Metallic Foil

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:

Ø	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.

- 3.3 Properties: Foil shall conform to the following requirements; tensile strength shall be determined in accordance with ASTM E345 and bending shall be performed in accordance with AMS 2355.

3.3.1 Tensile Properties As Annealed:

Tensile Strength, max 32,000 psi (221 MPa)

- 3.3.2 Properties After Solution Heat Treatment: Foil after solution heat treatment in accordance with AMS 2770 and aging for not less than 4 days at room temperature shall have the following properties:

3.3.2.1 Tensile Properties:

Tensile Strength, min 62,000 psi (427 MPa)

- 3.3.2.2 Bending: Foil shall withstand, without cracking, bending through an angle of 180 deg around a diameter equal to four times the nominal thickness of the foil with axis of bend parallel to the direction of rolling.

- 3.4 Quality: Foil, as received by purchaser, shall be uniform in quality and condition, sound, and free from holes, tears, and other discontinuities and from internal imperfections detrimental to usage of the foil. Dents, ripples, kinks, and sharp bends in the foil are acceptable provided they are located within 0.050 in. (1.27 mm) of an edge or are less than 0.30 in. (0.76 mm) deep.

- 3.4.1 Foil shall be free from oil, grease, and dirt to the extent that a clean, white rag wiped on the foil for several passes shall pick up no perceptible liquid or solid contaminants.

3.5 Tolerances:

- 3.5.1 Thickness: Shall not deviate from the specified thickness by more than $\pm 10\%$, determined on two specimens for each nominal thickness by instrument measurement or by the weighing method specified for thin foil in ASTM E252.

- Ø 3.5.1.1 When a dispute occurs between purchaser and vendor over thickness values, thickness determined by the weighing method of ASTM E252 shall apply. For such calculations, density shall be taken as 0.101 lb per cu in. (2.80 Mg/m³).

3.5.2 Width: Shall be within ± 0.032 in. (0.81 mm) of that specified.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of foil 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 foil 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: One sample shall be selected for each 2000 lb (908 kg) or fraction thereof from each lot; however, not more than one sample is required from a coil.

4.3.1 An inspection lot shall consist of an identifiable quantity of foil of the same alloy, temper, finish, and nominal dimensions subjected to vendor's inspection at one time.

4.4 Reports:

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

4.5 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the foil may be based on the results of testing two additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the foil represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 Foil shall be furnished in rolls, wound on 3 in. (75 mm) diameter cores; the diameter of the rolls shall be not less than 6 in. (150 mm) nor more than 34 in. (865 mm). The foil in each roll, when possible, shall be in one continuous length but may contain a maximum of one splice for every 3000 lineal feet (915 m) or fraction thereof per roll. Unless otherwise specified, the splices shall be made with pressure-sensitive tape or by electric or ultrasonic welding. Splices shall be marked with a colored tape or equivalent that shall extend over the edge of the roll so as to be easily seen at the edges of the roll. Foil condition and coiling shall be such that complete uncoiling may be accomplished with no resulting tearing or other damage to the foil. Each roll shall be closely wrapped in waterproof paper.