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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4009A

Issued MAR 1974
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Reaffirmed MAY 1995

Submitted for recognition as an American National Standard

Superseding AMS 4009

Aluminum Alloy Foil
1.0Mg - 0.6Si - 0.30Cu - 0.20Cr (6061-0)
Annealed

UNS A96061

1. SCOPE:

1.1 Form:

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

1.2 Application:

This product has been used typically for fabrication of diffusion-bonded, fiber-reinforced-composite tape, sheet, plate, and other structural forms, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

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

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7154 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM E 525	Thickness of Thin Foil and Film by Weighing
ASTM E 345	Tension Testing of Metallic Foil

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS 2355 or MAM 2355.

TABLE 1 - Composition

Element	min	max
Magnesium	0.8	1.2
Silicon	0.40	0.8
Copper	0.15	0.40
Chromium	0.04	0.35
Iron	--	0.7
Zinc	--	0.25
Manganese	--	0.15
Titanium	--	0.15
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

3.2 Condition:

Annealed.

3.3 Properties:

The product shall conform to the following requirements; tensile strength shall be determined in accordance with ASTM E 345 and bending shall be performed in accordance with AMS 2355 or MAM 2355.

3.3.1 Tensile Properties As Annealed: The maximum tensile strength shall be 22.0 ksi (152 MPa).

3.3.2 Properties After Solution Heat Treatment: The foil, after solution heat treatment and aging for not less than 4 days at room temperature, shall meet the requirements of 3.3.2.1 and 3.3.2.2.

3.3.2.1 Tensile Properties: Tensile strength shall be not lower than 30.0 ksi (207 MPa).

3.3.2.2 Bending: The foil shall withstand, without cracking, bending through an angle of 180 degrees around a diameter equal to two times the nominal thickness 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 imperfections detrimental to usage of the foil. Dents, ripples, kinks, and other sharp bends in the foil shall be unacceptable unless they are located with 0.050 inch (1.27 mm) from an edge or are less than 0.030 inch (0.76 mm) deep.

3.4.1 Cleanliness of Foil: 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 10%, determined on two specimens for each nominal thickness by instrument measurement or by the weighing method specified for thin foil in ASTM E 252.

3.5.1.1 When a dispute occurs between purchaser and vendor over the thickness values, thickness determined by the weighing method of ASTM E 252 shall apply. For such calculations, density shall be taken as 0.0976 pounds per cubic inch (2.702 Mg/m^3).

3.5.2 Width: Shall be within ±0.032 inch (±0.81 mm) of width specified.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of foil shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the foil conforms to the requirements of this specification.

4.2 Classification of Tests:

Tests for all technical requirements are acceptance tests and shall be performed on each lot.

4.3 Sampling and Testing:

One sample for each 2000 pounds (907 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:

The vendor of the product shall furnish with each shipment a report showing the results of tests to determine conformance to the technical requirements. This report shall include the purchase order number, lot number, AMS 4009A, size, and quantity.

4.5 Resampling and Retesting:

If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Sizes:

5.1.1 Foil shall be furnished in rolls, wound on 3-inch (76 mm) diameter cores; the diameter of the rolls shall be not less than 6 inches (152 mm) nor more than 34 inches (864 mm). The foil in each roll, when possible, shall be in one continuous length but may contain a maximum of one splice for each 3000 lineal feet (914 m) or fraction thereof per roll. 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 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.

5.1.2 Each wrapped coil shall be legibly identified with not less than the following information either stencilled on the outer layer of the wrapping or on a suitable tag attached to the roll, preferably to the core. The marking shall not be obliterated by normal handling.

ALUMINUM ALLOY FOIL, 6061-0
AMS 4009A
PURCHASE ORDER NUMBER _____
MANUFACTURER'S IDENTIFICATION _____
THICKNESS _____
WIDTH _____
WEIGHT OR LENGTH _____

5.1.3 Each wrapped roll shall be packed in a suitable shipping container in such a manner that the weight of the coil is supported by the core and the coil is restrained to prevent telescoping.