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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4116F

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Superseding AMS 4116E

Submitted for recognition as an American National Standard

ALUMINUM ALLOY, BARS, RODS, AND WIRE
1.OMg - 0.60Si - 0.30Cu - 0.20Cr (6061 -T4)
Cold Finished, Solution Heat Treated

UNS A96061

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of bars, rods, and wire.

1.2 Application:

These products have been used typically for parts requiring moderate ductility, formability, and response to precipitation heat treatment, 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, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
MAM 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings, Metric (SI) Units
AMS 2770	Heat Treatment of Wrought Aluminum Alloy Parts
AMS 2811	Identification, Aluminum and Magnesium Alloy Wrought Products

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-H-6088 Heat Treatment of Aluminum Alloys

2.4 ANSI Publications:

Available from American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036-8002.

ANSI H35.2 Dimensional Tolerances for Aluminum Mill Products
ANSI H35.2M Dimensional Tolerances for Aluminum Mill Products (Metric)

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:

(R) Cold finished and solution heat treated in accordance with MIL-H-6088 to the T4 temper (See 8.2).

3.3 Properties:

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

3.3.1 As Solution Heat Treated:

3.3.1.1 Tensile Properties: Shall be as shown in Table 2, except as specified in 3.3.1.1.1 and 3.3.1.1.2.

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	30.0 ksi (207 Mpa)
Yield Strength at 0.2% Offset	16.0 ksi (110 MPa)
Elongation in 4D	18%

3.3.1.1.1 (R) Tensile property requirements shown in Table 2 apply to rounds 8.000 inches (203.20 mm) and under in nominal diameter and to squares, rectangles, hexagons, and octagons having a cross-sectional area of 50 square inches (323 cm²) and under.

3.3.1.1.2 Yield strength and elongation requirements do not apply to product under 0.125 inch (3.18 mm) in nominal diameter or least distance between parallel sides.

3.3.2 Response to Heat Treatment: The product shall have the following properties after precipitation heat treatment to the T6 temper in accordance with the time and temperature parameters of AMS 2770:

3.3.2.1 Tensile Properties: Shall be as shown in Table 3, except as specified in 3.3.2.1.1 and 3.3.2.1.2.

TABLE 3 - Minimum Tensile Properties

Property	Value
Tensile Strength	42.0 ksi (290 Mpa)
Yield Strength at 0.2% Offset	35.0 ksi (241 MPa)
Elongation in 4D	10%

3.3.2.1.1 Tensile property requirements shown in Table 3 apply to rounds 8.000 inches (203.20 mm) and under in nominal diameter and to squares, rectangles, hexagons, and octagons having a cross-sectional area over 50 square inches (323 cm²) and under.

3.3.2.1.2 Yield strength and elongation requirements do not apply to product under 0.125 inch (3.18 mm) in nominal diameter or least distance between parallel sides.

3.3.2.2 Hardness: Shall be not lower than 80 HB/10/500 or 85 HB/10/1000, or equivalent (See 8.3), but product shall not be rejected on the basis of hardness if the specimen on which hardness was measured meets the tensile properties of 3.3.2.1.

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:
(R)

Shall conform to all applicable requirements of ANSI H35.2 or ANSI H35.2M.

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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Composition (3.1), tensile properties as solution heat treated (3.3.1.1),
(R) and tolerances (3.5) are acceptance tests and, except for composition, shall be performed on each inspection lot.

4.2.2 Periodic Tests: Tensile properties (3.3.2.1) and hardness (3.3.2.2) after precipitation heat treatment are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2355 or MAM 2355.