SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4116G

Issued JUN 1960
Revised SEP 2002
Reaffirmed APR 2007

Superseding AMS 4116F

Aluminum Alloy, Bars, Rods, and Wire
1.0Mg - 0.60Si - 0.30Cu - 0.20Cr (6061-T4)
Cold Finished, Solution Heat Treated

(Composition similar to UNS A96061)

RATIONALE

This document has been reaffirmed to comply with the SAE 5-year Review policy.

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 issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: custsvc@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

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 2772	Heat Treatment of Aluminum Alloy Raw Materials
AS1990	Aluminum Alloy Temper

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
ASTM B 666/B 666M	Identification Marking of Aluminum and Magnesium Products

2.3 ANSI Publications:

Available from ANSI, 25 West 43rd Street, New York, NY 10036-7406.

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

3.2 Condition:

Cold finished and solution heat treated in accordance with AMS 2772 to the T4 temper (See AS1990)

3.3 Properties:

The product shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355 on the mill produced size.

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 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 cm^2) 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 2772.

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 of 50 square inches (323 cm^2) 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:

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), 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.

4.4 Reports:

The vendor of the product shall furnish with each shipment a report stating that the product conforms to the composition and tolerances and showing the numerical results of tests on each inspection lot to determine conformance to the other acceptance test requirements and to the periodic tests, when performed. This report shall include the purchase order number, inspection lot number(s), AMS 4116G, size, and quantity. This report shall also identify the producer, the producer lot number(s) and the size of the mill product