SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS4124 | REV. E

Issued 1967-04
Revised 2012-09

Superseding AMS4124D

Aluminum Alloy, Rolled or Cold Finished Bars, Rods, and Wire
5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-T73, T7351)
Solution Heat Treated, Stress Relieved by Stretching, and Overaged
(Composition similar to UNS A97075)

RATIONALE

AMS4124E adds coverage for T73 temper (Title, 3.2.1, 3.2.2) to facilitate cancellation of AMS-QQ-A-225/9.

1. SCOPE

1.1 Form

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

1.2 Application

These products have been used typically for machined parts subject to excessive warpage during machining due to residual stresses and for parts requiring high strength and resistance to stress-corrosion cracking and whose fabrication does not involve forming or welding, 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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS2355 Quality Assurance, Sampling and Testing, Aluminum Alloys and Magnesium Alloy Wrought Products (Except Forging Stock), and Rolled, Forged, or Flash Welded Rings

AMS2772 Heat Treatment of Aluminum Alloy Raw Materials

AS1990 Aluminum Alloy Tempers

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4124E

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B 594 Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications

ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products

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

2.3 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

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 AMS2355.

TABLE 1 - COMPOSITION

Element	min	max
Silicon	--	0.40
Iron	--	0.50
Copper	1.2	2.0
Manganese	--	0.30
Magnesium	2.1	2.9
Chromium	0.18	0.28
Zinc	5.1	6.1
Titanium	--	0.20
Titanium + Zirconium	--	0.25
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition

3.2.1 Bar and Rod

Rolled or cold finished, followed by solution heat treating and subsequent processing as in 3.2.1.1 or 3.2.1.2.

3.2.1.1 T73: Precipitation hardened to the T73 temper (See AS1990).

3.2.1.2 T7351: Stress-relieved by stretching to produce a nominal permanent set of 1-1/2%, but not less than 1% nor more than 3%, then precipitation hardened to the T7351 temper (See AS1990).

3.2.1.3 When T73 product is specified, T7351 product may be supplied unless specifically prohibited by the purchaser.

3.2.1.4 All heat treatments shall be performed in accordance with AMS2772.

3.2.1.5 Product shall receive no further straightening operations after stretching, unless specifically authorized.

3.2.2 Wire

Rolled or cold finished, as ordered, and solution and precipitation heat treated to the T73 temper in accordance with AMS2772 (See AS1990).

3.3 Properties

The product shall conform to the following requirements, determined on the mill produced size in accordance with AMS2355:

3.3.1 Tensile Properties

Shall be as shown in Table 2 for product 4.000 inches (101.60 mm) and under in nominal diameter, and squares, hexagons, octagons, and rectangles 4.000 inches (101.60 mm) and under in least nominal dimension.

TABLE 2 - MINIMUM TENSILE PROPERTIES

Property	Value
Tensile Strength	68.0 ksi (469 MPa)
Yield Strength at 0.2% Offset	56.0 ksi (386 MPa)
Elongation in 2 Inches (50.8 mm) or 4D	10%

3.3.1.1 Shall be as shown in Table 3 for product over 4.000 to 5.000 inches (over 101.60 to 127.00 mm) in nominal diameter and squares, hexagons, octagons, and rectangles over 4.000 to 5.000 inches (101.60 to 127.00 mm) in least nominal dimension.

TABLE 3 - MINIMUM TENSILE PROPERTIES

Property	Value
Tensile Strength	66.0 ksi (455 MPa)
Yield Strength at 0.2% Offset	55.0 ksi (379 MPa)
Elongation in 2 Inches (50.8 mm) or 4D	8%

3.3.1.2 Shall be as shown in Table 4 for product rounds 5.000 to 6.000 inches (127.00 to 152.40 mm) in least nominal dimension.

TABLE 4 - MINIMUM TENSILE PROPERTIES

Property	Value
Tensile Strength	64.0 ksi (441 MPa)
Yield Strength at 0.2% Offset	52.0 ksi (359 MPa)
Elongation in 2 Inches (50.8 mm) or 4D	8%

3.3.2 Conductivity

Shall be as follows:

3.3.2.1 If the conductivity is 40% IACS (International Annealed Copper Standard) (23.2 MS/m) or higher and tensile properties meet specified requirements, the product is acceptable.

3.3.2.2 If the conductivity is 38.0 to 39.9% IACS (22.0 to 23.1 MS/m), if the tensile properties meet specified requirements, and if the yield strength does not exceed the specified minimum by more than 11.9 ksi (82 MPa), the product is acceptable.

3.3.2.3 If the conductivity is between 38.0 to 39.9% IACS (22.0 to 23.1 MS/m) and the yield strength exceeds the specified minimum value by more than 11.9 ksi (82 MPa), the product shall be given additional overaging heat treatment as in 3.2. If, after such treatment, the product meets the requirements of 3.3.1 and 3.3.2.1 or 3.3.2.2, the product is acceptable.

3.3.2.4 If the conductivity is below 38% IACS, (22.0 MS/m) the product is not acceptable and must be reprocessed regardless of tensile property level.

3.3.3 Stress-Corrosion Cracking Resistance

Specimens, cut from product 0.750 inch (19.05 mm) and over in nominal thickness, shall show no evidence of stress-corrosion cracking when stressed in the short-transverse (perpendicular to grain flow) direction to 75% of the specified minimum longitudinal (parallel to grain flow) yield strength.

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.

3.4.1 When specified, the product shall be subjected to ultrasonic inspection in accordance with ASTM B 594 and shall meet Class A, unless otherwise specified.

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 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 (3.3.1), conductivity (3.3.2), ultrasonic inspection (3.4.1) when specified, and tolerances (3.5) are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests

Stress-corrosion cracking resistance (3.3.3) is a periodic test 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 AMS2355.