AEROSPACE MATERIAL SPECIFICATION

AMS4121™	REV. K

Issued 1946-11
Reaffirmed 2007-11
Revised 2023-11

Superseding AMS4121J

Aluminum Alloy Bars, Rods, and Wire, Rolled, Drawn, or Cold Finished 4.5Cu - 0.85Si - 0.80Mn - 0.50Mg (2014-T6, -T651) Solution and Precipitation Heat Treated

(Composition similar to UNS A92014)

RATIONALE

AMS4121K results from a Five-Year Review and update of this specification with changes to prohibit unauthorized exceptions (see 3.3.2, 3.6, 4.4.1, 5.1.1, and 8.5), relocate Definitions (see 2.4), update Applicable Documents (see Section 2), Hardness (see 8.2), Ordering Information (see 8.6), and allow the use of the immediate prior specification revision (see 8.4).

1. SCOPE

1.1 Form

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

1.1.1 This specification covers rounds 8 inches (203 mm) and under in specified diameter; square, hexagonal, and octagonal bars 4 inches (102 mm) and under across flats; and rectangular bar with a nominal thickness of 4 inches (102 mm) and under and a maximum cross-sectional area of 36 square inches (232 cm^2) (see 8.6).

1.2 Application

These products have been used typically for parts requiring high strength where limited formability is acceptable, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause these products to become susceptible to stress-corrosion cracking; ARP823 recommends practices to minimize such conditions.

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.

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**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS4121K

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (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
ARP823	Minimizing Stress-Corrosion Cracking in Wrought, High-Strength Aluminum Alloy Products
AS7766	Terms Used in Aerospace Metals Specifications

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 B660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B666/B666M	Identification Marking of Aluminum and Magnesium Products

2.3 ANSI Accredited Publications

Copies of these documents are available online at https://webstore.ansi.org/.

ANSI H35.1/H35.1M	Alloy and Temper Designation Systems for Aluminum
ANSI H35.2	Dimensional Tolerances for Aluminum Mill Products
ANSI H35.2M	Dimensional Tolerances for Aluminum Mill Products (Metric)

2.4 Definitions

Terms used in AMS are defined in AS7766.

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	0.50	1.2
Iron	--	0.7
Copper	3.9	5.0
Manganese	0.40	1.2
Magnesium	0.20	0.8
Chromium	--	0.10
Zinc	--	0.25
Titanium	--	0.15
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	--

3.2 Condition

Rolled, drawn, or cold finished, as ordered, and solution and precipitation heat treated to the T6 or T651 temper (refer to ANSI H35.1/H351M) in accordance with AMS2772. When T6 temper is ordered, T651 temper may be supplied.

3.3 Properties

Rods 8 inches (203 mm) and under in nominal diameter; squares, hexagons, and octagons 4 inches (102 mm) and under across flats; and rectangles with a nominal thickness of 4 inches (102 mm) and under and a maximum cross-sectional area of 36 square inches (232 cm^2) shall, except as specified in 3.3.1.1, conform to the requirements shown in Table 2, determined in accordance with AMS2355.

3.3.1 T6 and T651 Temper Tensile Properties

Shall be as shown in Table 2, except as specified in 3.3.1.1.

Table 2 - T6 and T651 temper, minimum tensile properties (see 8.4)

Property	Value
Tensile Strength	65.0 ksi (448 MPa)
Yield Strength at 0.2% Offset	55.0 ksi (379 MPa)
Elongation in 4D	8%

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

3.3.2 Mechanical property requirements for product outside of the range covered by 1.1.1 shall be agreed upon between the purchaser and producer and reported per 4.4.1 (see 8.6).

3.4 Quality

The product, as received by the 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.

3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.1.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for the producer's tests and shall be responsible for the performance of all required tests. The 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 (see 3.1), tensile properties (see 3.3.1), and tolerances (see 3.5) are acceptance tests and except for composition, shall be performed on each lot.

4.3 Sampling and Testing

Shall be in accordance with AMS2355.

4.4 Reports

The producer of 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. This report shall include the purchase order number, lot number, AMS4121K, form and size or part number, and quantity. The report shall also identify the producer, the product form, and the size of the mill product.

4.4.1 When material produced to this specification is beyond the sizes allowed in the scope or tables, or other exceptions are taken to the technical requirements listed in Section 3, the report shall contain a statement “This material is certified as AMS4121K(EXC) because of the following exceptions:” and the specific exceptions shall be listed (see 5.1.1).

4.5 Resampling and Retesting

Shall be in accordance with AMS2355.

5. PREPARATION FOR DELIVERY

5.1 Identification

Shall be in accordance with ASTM B666/B666M.

5.1.1 When technical exceptions are taken (see 4.4.1), the material shall be identified with AMS4121(EXC).

5.2 Packaging

The product shall be prepared for shipment in accordance with ASTM B660 and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the product to ensure carrier acceptance and safe delivery.

5.2.1 Protective Treatment

When specified, the product shall be oiled, prior to shipment, with a light corrosion-inhibiting oil.

6. ACKNOWLEDGMENT

A producer shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS

Product not conforming to this specification, or to modifications authorized by the purchaser, will be subject to rejection.

8. NOTES

8.1 Revision Indicator

A change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.