Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4121E
Superseding AMS 4121D

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UNS A92014

ALUMINUM ALLOY BARS, ROLLED, DRAWN, OR COLD FINISHED
4.5Cu - 0.85Si - 0.80Mn - 0.50Mg (2014-T6)

1. SCOPE:

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

1.2 Application: Primarily for parts requiring high strength where limited formability is acceptable. Certain design and processing procedures may cause these products to be susceptible to stress-corrosion cracking; ARP 823 recommends practices to minimize such conditions.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) and Aerospace Recommended Practices (ARP) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2201 - Tolerances, Aluminum and Aluminum Alloy Bar, Rod, Wire, and Forging Stock, Rolled or Drawn
AMS 2350 - Standards and Test Methods
AMS 2355 - Quality Assurance Sampling and Testing of Aluminum-Base and Magnesium-Base Alloys, Wrought Products (Except Forgings and Forging Stock) and Flash Welded Rings

2.1.2 Aerospace Recommended Practices:

ARP 823 - Minimizing Stress Corrosion Cracking in Wrought Heat Treatable Aluminum Alloy Products

2.2 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.2.1 Military Specifications:

MIL-H-6088 - Heat Treatment of Aluminum Alloys

2.2.2 Military Standards:

MIL-STD-649 - Aluminum and Magnesium Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined in accordance with AMS 2355:

	min	max
Copper	3.9	5.0
Silicon	0.50	1.2
Manganese	0.40	1.2
Magnesium	0.20	0.8
Iron	--	0.7
Zinc	--	0.25
Zirconium + Titanium	--	0.20
Titanium	--	0.15
Chromium	--	0.10
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

3.2 Condition: Rolled, drawn, or cold finished, as ordered, and solution and precipitation heat treated in accordance with MIL-H-6088.

3.3 Properties: Rods 8 in. (203 mm) and under in nominal diameter; squares, hexagons, and octagons 4 in. (102 mm) and under across flats; and rectangles with a nominal thickness of 4 in. (102 mm) and under and maximum cross-sectional area of 36 sq in. (232 cm^2) or less, shall conform to the following requirements, determined in accordance with AMS 2355, except as specified in 3.3.1.1:

3.3.1 Tensile Properties:

Tensile Strength, min	65,000 psi (448 MPa)
Yield Strength at 0.2% Offset, min	55,000 psi (379 MPa)
Elongation in 4D, min	8%

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

3.3.1.2 Tensile property requirements for product exceeding the size limits of 3.3 shall be as agreed upon by purchaser and vendor.

3.3.2 Hardness: Should be not lower than 125 HB/10/500, 125 HB/14.3/1000, or 130 HB/10/1000 but the product shall not be rejected on the basis of hardness if the tensile property requirements are met.

3.4 Quality: The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to usage of the product.

3.5 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2201.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to composition (3.1), tensile property (3.3.1), and tolerance (3.5) requirements are classified as acceptance tests.

4.2.2 Periodic Tests: Teste to determine conformance to hardness (3.3.2) requirements are classified Ø as periodic tests.

4.3 Sampling: Shall be in accordance with AMS 2355; frequency and extent of sampling for periodic tests Ø shall be as agreed upon by purchaser and vendor.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment three copies of a report stating that the product conforms to the chemical composition and other technical requirements of this specification. This report shall include the purchase order number, material specification number and its revision letter, size, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

Ø 4.5 Resampling and Retesting: Shall be in accordance with AMS 2355.

5. PREPARATION FOR DELIVERY:

5.1 Identification: The product shall be identified as follows:

5.1.1 Each straight bar and rod 0.500 in. (12.70 mm) and over in nominal diameter or least width of flat surface shall be marked in a row of characters recurring at intervals not greater than 3 ft (914 mm) with the alloy number and temper, AMS 4121 or applicable Federal or Military specification designation, and manufacturer's identification. The inspection lot number shall be included in the row marking or shall be marked near one end. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be sufficiently stable to withstand normal handling. The markings shall have no deleterious effect on the product or its performance.

5.1.2 Smaller straight bars, rods, and wire shall be bundled, boxed, or secured on lifts and identified by two durable tags marked with the information of 5.1.1, including the inspection lot number, and attached, not farther than 2 ft (610 mm) from each end, to the product in each bundle, box, or lift.

5.1.3 Coiled bar, rod, and wire and spooled wire shall be identified with the information of 5.1.1, including the inspection lot number, marked on a durable tag attached to each coil or directly on one flange of each spool.

5.2 Protective Treatment: The product shall be oiled, prior to shipment, with a light corrosion-inhibiting Ø oil.

5.3 Packaging:

5.3.1 The product shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation Ø of the product to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

5.3.2 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-649, Level A Ø or Level C, as specified in the request for procurement. Commercial packaging as in 5.3.1 will be acceptable if it meets the requirements of Level C.