SAE The Engineering Resource For Advancing Mobility
400 COMMONWEALTH DRIVE WARRENDALE PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4187A
Superseding AMS 4187

Issued 6-1-74
Revised 1-1-83

UNS A97075

ALUMINUM ALLOY BARS AND RODS, ROLLED, DRAWN, OR COLD FINISHED
5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-O)
Annealed

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 forming and as stock for flash welded rings which are to be subsequently solution and precipitation heat treated. Certain design and processing procedures may cause these products to become susceptible to stress-corrosion cracking after solution and precipitation heat treatment; 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 SAE, 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
AMS 2770 - Heat Treatment of Aluminum Alloy Parts

2.1.2 Aerospace Recommended Practices:

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

2.2 U.S. 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
Zinc	5.1	6.1
Magnesium	2.1	2.9
Copper	1.2	2.0
Chromium	0.18	0.28
Iron	--	0.50
Silicon	--	0.40
Manganese	--	0.30
Titanium	--	0.20
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

3.2 Condition: Annealed in accordance with MIL-H-6088.

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

3.3.1 As Annealed:

3.3.1.1 Tensile Properties: Product 8 in. (200 mm) and under in nominal diameter or distance between parallel sides shall have the following properties:

Tensile Strength, max	40,000 psi (275 MPa)
Elongation in 2 in. (50 mm) or 4D, min	10%

3.3.1.1.1 Tensile property requirements for product over 8 in. (200 mm) in nominal diameter or distance between parallel sides shall be as agreed upon by purchaser and vendor.

3.3.2 After Solution and Precipitation Heat Treatment: Rods 4 in. (100 mm) and under in nominal diameter; square, hexagonal, and octagonal bar 3-1/2 in. (90 mm) and under in nominal thickness; and rectangular bar 3 in. (75 mm) and under in nominal thickness and 6 in. (150 mm) and under in nominal width or 10 in. (250 mm) and under in nominal width when nominal thickness is under 3 in. (75 mm), and wire shall have the following properties after solution and precipitation heat treatment in accordance with AMS 2770 to the T62 temper:

3.3.2.1 Tensile Properties:

Tensile Strength, min	77,000 psi (530 MPa)
Yield Strength at 0.2% Offset, min	66,000 psi (455 MPa)
Elongation in 2 in. (50 mm) or 4D, min	7%

3.3.2.2 Hardness: Should be not lower than 135 HB/10/500 or 140 HB/10/1000 but the product shall not be rejected on the basis of hardness if the tensile property requirements of 3.3.2.1 are met.

3.3.2.3 Tensile property and hardness requirements for bars and rods exceeding the size limits of 3.3.2 shall be as agreed upon by purchaser and vendor.

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 for vendor's tests 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 sample and to perform any confirmatory testing deemed 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 requirements for composition (3.1), tensile properties as annealed (3.3.1.1) and after solution and precipitation heat treatment (3.3.2.1), and tolerances (3.5) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for hardness after solution and precipitation heat treatment (3.3.2.2) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling: Shall be in accordance with AMS 2355.

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, AMS 4187A, 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, AMS 4187A, 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 either a statement that the material conforms or copies of laboratory reports showing the results of tests to determine conformance.

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. (12.50 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 (900 mm) with the alloy number and temper, AMS 4187 or applicable Federal or Military specification designation, and manufacturer's identification. The characters shall be of such size as to be 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 and attached, not farther than 2 ft (600 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 marked on a durable tag attached to each coil or directly on one flange of each spool.

5.2 Packaging:

5.2.1 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 of the product to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.