



# AEROSPACE MATERIAL

# AMS 4186

## Society of Automotive Engineers, Inc. SPECIFICATION

TWO PENNSYLVANIA PLAZA, NEW YORK, N. Y. 10001

Issued 6-1-74

Revised

### ALUMINUM ALLOY BARS AND RODS, ROLLED, DRAWN, OR COLD FINISHED 5.6Zn - 2.5Mg - 1.6Cu - 0.26Cr (7075-F)

#### 1. SCOPE:

- 1.1 Form: This specification covers an aluminum-base alloy in the form of rolled, drawn, or cold finished 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 this material to be 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.

- 2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, New York, 10001.

#### 2.1.1 Aerospace Material Specifications:

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

#### 2.1.2 Aerospace Recommended Practices:

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

#### 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	0.35
Iron	--	0.50
Silicon	--	0.40
Manganese	--	0.30
Titanium	--	0.20
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

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- 3.2 Condition: Rolled, drawn, or cold finished, as ordered, in the as-fabricated condition.
- 3.3 Properties: The product shall conform to the following requirements, determined in accordance with AMS 2355:
- 3.3.1 As Fabricated: No requirements.
- 3.3.2 After Solution and Precipitation Heat Treatment: Rods 4 in. (102 mm) and under in diameter; square, hexagonal, and octagonal bar 3-1/2 in. (88.9 mm) and under in thickness; and rectangular bar 3 in. (76 mm) and under in thickness and 6 in. (152 mm) and under in width or 10 in. (254 mm) and under in width when thickness is less than 3 in. (76 mm) as received by the purchaser shall, after proper solution heat treatment at  $915^{\circ}\text{F} \pm 10$  ( $490.6^{\circ}\text{C} \pm 5.6$ ) and proper precipitation heat treatment at  $250^{\circ}\text{F} \pm 10$  ( $121.1^{\circ}\text{C} \pm 5.6$ ) for 24 hr, have the following properties:
- 3.3.2.1 Tensile Properties:
- |  |                      |
|--|----------------------|
| Tensile Strength, min                    | 77,000 psi (531 MPa) |
| Yield Strength at 0.2% Offset, min       | 66,000 psi (455 MPa) |
| Elongation in 2 in. (50.8 mm) or 4D, min | 7%                   |
- 3.3.2.2 Hardness: Should be not lower than 135 HB/10/500 or 135 HB/14.3/1000, or not lower than 140 HB/10/1000, but the product shall not be rejected on the basis of hardness if the tensile property requirements 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 shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.
- 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 assure 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 properties after solution and precipitation heat treatment (3.3.2.1), and tolerance (3.5) requirements are classified as acceptance or routine control tests.
- 4.2.2 Qualification Tests: Tests to determine conformance to hardness after solution and precipitation heat treatment (3.3.2.2) requirements are classified as qualification or periodic control tests.
- 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, material specification number, size, and quantity.