

# AEROSPACE

# AMS 4153B

## MATERIAL SPECIFICATIONS

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

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### ALUMINUM ALLOY EXTRUSIONS 4.5Cu - 0.9Si - 0.8Mn - 0.5Mg (2014-T6)

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
- ∅ 2. FORM: Bars, rods, shapes, and tubing.
3. APPLICATION: Primarily for parts requiring good strength and whose fabrication does not usually involve welding.

4. COMPOSITION:

Copper	3.9 - 5.0
Silicon	0.50 - 1.2
Manganese	0.40 - 1.2
Magnesium	0.20 - 0.8
∅ Iron	1.0 max
Zinc	0.25 max
Titanium	0.15 max
Chromium	0.10 max
Other Impurities, each	0.05 max
Other Impurities, total	0.15 max
Aluminum	remainder

5. CONDITION: Solution and precipitation heat treated.

- 5.1 ∅ Unless otherwise specified, extrusions shall be supplied with an as-extruded surface finish; light polishing to remove minor surface imperfections is permissible provided such imperfections can be removed within the dimensional tolerances.

6. TECHNICAL REQUIREMENTS:

6.1 Longitudinal Tensile Properties:

∅ Nominal Diameter or Thickness, and Area (rods, bars, shapes) or Nominal Wall Thickness and Area (tubing) Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,500,000)		Elongation % in 2 in. or 4D
		psi, min	in. in 2 in.	
0.124 and under, all areas (rods, bars, and shapes only)	60,000	53,000	0.0141	7
Over 0.124 to 0.499, incl, all areas	60,000	53,000	0.0141	7
Over 0.499 to 0.749, incl, all areas	64,000	58,000	0.0150	7
Over 0.749				
Area 25 sq in. and under	68,000	60,000	0.0154	7
Area over 25 to 32 sq in., incl	68,000	58,000	0.0150	6

Section 8.3 of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only. They are not intended to be used by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and issuing technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the reports are responsible for protecting themselves against liability for infringement of patents."

- 6.1.1 When a dispute occurs between purchaser and vendor over the yield strength value,  $\phi$  yield strength determined by the offset method shall apply.
- 6.1.2 The tensile property requirements for bars, rods, and shapes shall be based on the thickness of the portion of the extrusion from which the test specimens are taken. Specimens from sections over 1.5 in. in diameter or thickness shall be taken midway between center and surface.
- 6.1.3 If sizes other than those shown above are ordered, tensile properties shall be as agreed upon by purchaser and vendor.
- 6.1.4 For bars, rods, and shapes of such dimensions that a standard test specimen cannot be taken, or for material under 0.062 in. in thickness, the test for elongation is not required.

6.2 Long Transverse Tensile Properties: Rods, bars, and shapes, when tested in the  $\phi$  long transverse direction, shall be capable of meeting the following requirements:

Nominal Diameter or Thickness, and Area Inches	Tensile Strength		Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,500,000)		Elongation % in 2 in. or 4D min
	psi, min	psi, min	psi, min	in. in 2 in.	
0.125 to 0.499, incl Area 25 sq in. and under	60,000	53,000	60,000	0.0141	5
Over 0.499 to 0.749, incl Area 25 sq in. and under	64,000	55,000	64,000	0.0145	5
Over 0.749 to 1.499, incl Area 25 sq in. and under	63,000	54,000	63,000	0.0143	2
Over 0.749 to 4.499, incl Area over 25 to 32 sq in. incl	56,000	47,000	56,000	0.0129	1
Over 1.499 to 2.999, incl Area 25 sq in. and under	61,000	52,000	61,000	0.0139	2
Over 2.999 to 4.499, incl Area 25 sq in. and under	58,000	49,000	58,000	0.0133	1

- 6.3 Hardness: Material should have hardness not lower than Brinell 125 using 500 kg load and 10 mm ball or 1000 kg load and 9/16 in. ball, or not lower than Brinell 130 using 1000 kg load and 10 mm ball, but shall not be rejected on the basis of hardness if the tensile property requirements are met.
- 7. QUALITY: Material 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.
- 8. TOLERANCES: Unless otherwise specified, tolerances shall conform to all applicable requirements of the latest issue of AMS 2205.
- 9. REPORTS:
  - 9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report stating that the chemical composition and tensile properties of the product conform to the requirements specified. This report shall include the purchase order number, material specification number, size or section identification number, and quantity.