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

AMS 4168A

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ALUMINUM ALLOY EXTRUSIONS
5.6Zn - 2.5Mg - 1.6Cu - 0.3Cr (7075-T6510)
Stress-Relief Stretched, Unstraightened

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

Ø 2. FORM: Bars, rods, shapes, and round tubing.

3. APPLICATION: Primarily for parts subject to excessive warpage during machining due to residual stresses, and for parts requiring high strength and whose fabrication does not involve welding or forming.

4. COMPOSITION:

Zinc	5.1 - 6.1
Magnesium	2.1 - 2.9
Copper	1.2 - 2.0
Chromium	0.18 - 0.40
Iron	0.7 max
Silicon	0.50 max
Manganese	0.30 max
Titanium	0.20 max
Other Impurities, each	0.05 max
Other Impurities, total	0.15 max
Aluminum	remainder

5. CONDITION: Solution heat treated, stress-relieved by stretching, 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.

5.2 Material shall be stretched in the solution heat treated condition to produce a nominal permanent set of 1.5%, but not less than 1% nor more than 3%.

5.3 Material shall receive no straightening after stretching.

6. TECHNICAL REQUIREMENTS:

6.1 Longitudinal Tensile Properties:

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6.1.1 Bars, Rods, and Shapes:

Nominal Diameter or Least Thickness or Area Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,300,000)		Elongation % in 2 in. or 4D min
		psi, min	Extension Under Load in. in 2 in.	
Up to 0.250, excl, all areas	78,000	70,000	0.0176	7
0.250 to 0.500, excl, all areas	81,000	73,000	0.0182	7
0.500 to 3.000, excl, all areas	81,000	72,000	0.0180	7
3.000 to 4.500, excl				
Area 20 sq in. and under	81,000	71,000	0.0178	7
Area over 20 to 32 sq in., incl	78,000	70,000	0.0176	6
4.500 to 5.000, incl				
Area 32 sq in. and under	78,000	68,000	0.0172	6

6.1.2 Round Tubing:

Nominal Wall Thickness Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,300,000)		Elongation % in 2 in. or 4D(a) min
		psi, min	Extension Under Load in. in 2 in.	
Up to 0.250, excl, all areas	78,000	70,000	0.0176	7
0.250 to 3.000, excl				
Areas 32 sq in. and under	80,000	72,000	0.0180	7

(a) Elongation of full section and cut-out sheet type specimens shall be measured on a 2 in. gage length; for cut-out round specimens, elongation shall be measured on a gage length of 4D where D represents diameter of specimen.

6.1.3 When a dispute occurs between purchaser and vendor over the yield strength value, yield strength determined by the offset method shall apply.

6.1.4 The tensile property requirements shall be based on the thickness of the portion of the extrusion from which the tensile test specimens are taken. For material 1.500 in. and under in thickness not tested in full section, the tensile test specimen is taken from the center of the section; for material over 1.500 in. in thickness, the specimen is taken midway between the center and the surface.

6.1.5 If sizes other than those shown are ordered, tensile property requirements shall be as agreed upon by purchaser and vendor.

6.1.6 For material of such thickness that a standard specimen cannot be taken, or for material thinner than 0.062 in., the test for elongation is not required.

6.2 ϕ Long Transverse Tensile Properties: Rod, bar, and shapes when tested in the long transverse direction shall be capable of meeting the following properties:

Nominal Diameter or Least Thickness or Area Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,300,000) Extension Under Load		Elongation % in 2 in. or 4D min
		psi, min	in. in 2 in.	
Up to 0.250, excl Area to 20 sq in. incl	76,000	64,000	0.0164	5
0.250 to 0.499, incl Area 20 sq in. and under	77,000	66,000	0.0168	5
Over 0.499 to 0.749, incl Area 20 sq in. and under	73,000	63,000	0.0162	4
Over 0.749 to 1.499, incl Area 20 sq in. and under	72,000	62,000	0.0160	3
Over 1.499 to 2.999, incl Area 20 sq in. and under	66,000	56,000	0.0149	1
Over 2.999 to 4.499, incl Area 32 sq in. and under	62,000	54,000	0.0145	1
Over 4.499 to 5.000, incl Area 32 sq in. and under	60,000	53,000	0.0143	1

6.3 Hardness: Not lower than Brinell 135 using 500 kg load and 10 mm ball or 1000 kg load and 9/16 in. ball, or not lower than Brinell 140 using 1000 kg load and 10 mm ball, but material 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, smooth, 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 following:

8.1 Bars and Rods: The latest issue of AMS 2205.

8.2 Tubing and Shapes: As agreed upon by purchaser and vendor.

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 product conforms to the chemical composition and technical requirements of this specification. This report shall include the purchase order number, material specification number, size or section identification number, and quantity.