



AEROSPACE MATERIAL SPECIFICATIONS

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc.

485 Lexington Ave., New York, N. Y. 10017

AMS 4039A

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ALUMINUM ALLOY PLATE

5.6Zn - 2.5Mg - 1.6Cu - 0.30Cr (Alclad 7075-T651)

Stress-Relief Stretched

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **APPLICATION:** Primarily for machined parts subject to excessive warpage during machining due to residual stresses, and for structural parts of good strength which are required to exhibit maximum corrosion resistance. Certain design and processing procedures may cause this material to be susceptible to stress corrosion cracking; ARP 823 recommends practices to minimize such conditions.

3. COMPOSITION:

Core (7075)		Cladding (7072)	
	min max		min max
Zinc	5.1 - 6.1	Zinc	0.8 - 1.3
Magnesium	2.1 - 2.9	Silicon + Iron	-- 0.7
Copper	1.2 - 2.0	Magnesium	-- 0.10
Chromium	0.18 - 0.40	Copper	-- 0.10
Iron	-- 0.7	Manganese	-- 0.10
Silicon	-- 0.50	Other Impurities, each	-- 0.05
Manganese	-- 0.30	Other Impurities, total	-- 0.15
Titanium	-- 0.20	Aluminum	remainder
Other Impurities, each	-- 0.05		
Other Impurities, total	-- 0.15		
Aluminum	remainder		

4. **CONDITION:** Solution heat treated, stress-relieved by stretching, and precipitation heat treated.
 - 4.1 Material shall be stretched in the solution heat treated condition to produce a nominal permanent set of 2%, but not less than 1-1/2% nor more than 3%.
 - 4.2 Material shall receive no further straightening operations after stretching.
5. **TECHNICAL REQUIREMENTS:** The product shall conform to the following requirements; tensile properties shall be determined in accordance with the latest issue of AMS 2355.
 - 5.1 **Cladding Thickness:** After rolling, the average cladding thickness shall be as shown. Routine measurements are not required.

Total Thickness of Composite Product Inches	Cladding Thickness Per Side % of Total Thickness	
	min	max
0.250 to 0.499, incl	1.2	--
Over 0.499	1.2	3.0

5.2 Tensile Properties:

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Nominal Thickness Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (See 5.2.1)		Elongation % in 2 in. or 4D, min
		Extension Under Load		
		psi, min	in. in 2 in.	
0.250 to 0.499, incl	75,000	64,000	0.0168	8
Over 0.499 to 1.000, incl	77,000	66,000	0.0168	6
Over 1.000 to 2.000, incl	77,000	66,000	0.0168	4
Over 2.000 to 2.500, incl	73,000	62,000	0.0160	3
Over 2.500 to 3.000, incl	70,000	60,000	0.0157	3
Over 3.000 to 3.500, incl	70,000	57,000	0.0151	3
Over 3.500 to 4.000, incl	67,000	53,000	0.0143	2

5.2.1 Extension under load is based upon the following values of E:

Nominal Thickness Inches	E
0.250 to 0.499, incl	10,000,000
Over 0.499	10,300,000

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

5.2.3 Tensile properties of plate thicker than 4.000 in. shall be as agreed upon by purchaser and vendor.

5.3 Bending: Material 0.500 in. and under in thickness shall be capable of withstanding, without cracking, bending at room temperature through an angle of 180 deg around a diameter equal to 12 times the nominal thickness of the material, with axis of bend parallel to direction of rolling.

6. 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.

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to all applicable requirements of the latest issue of AMS 2202.

8. REPORTS:

8.1 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, thickness, size, and quantity.

8.2 Unless otherwise specified, 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, 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.

9. IDENTIFICATION: Unless otherwise specified, each plate shall be marked on one face, in the respective location indicated below. Symbols shall be applied using a suitable marking fluid and shall be sufficiently stable to withstand normal handling.