Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10000

AEROSPACE MATERIAL SPECIFICATION

AMS 4046C
Superseding AMS 4046B
Issued 1-15-61
Revised 5-1-69

ALUMINUM ALLOY SHEET AND PLATE, ALCLAD ONE SIDE
5.6Zn - 2.5Mg - 1.6Cu - 0.30Cr (Alclad One Side 7075; -T6 Sheet, -T651 Plate)

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 structural use including chemically milled or machined parts subject to excessive warpage during machining. 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
Ø Zinc	5.1	6.1	0.8	1.3
Magnesium	2.1	2.9	--	0.7
Copper	1.2	2.0	--	0.10
Chromium	0.18	0.35	--	0.10
Iron	--	0.50	--	0.10
Silicon	--	0.40	--	0.05
Manganese	--	0.30	--	0.15
Titanium	--	0.20	remainder	
Other Impurities, each	--	0.05		
Other Impurities, total	--	0.15		
Aluminum	remainder			

4. CONDITION:

4.1 Sheet: Solution and precipitation heat treated.

Ø 4.2 Plate: Solution heat treated, stress relieved by stretching, and precipitation heat treated.

4.2.1 Plate shall be stretched in the solution treated condition to produce a nominal permanent set of 2% Ø but not less than 1-1/2% nor more than 3%.

Ø 4.2.2 Plate 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 on the clad side shall be as shown. Routine measurements are not required.

Total Thickness of Composite Product Inches	Cladding Thickness % of Total Thickness min	max
0.012 to 0.062, incl	3.2	--
Ø Over 0.062 to 0.187, incl	2.0	--
Over 0.187 to 0.499, incl	1.2	--
Over 0.499 to 2.000, incl	1.2	3.0

5.2 Tensile Properties:

Nominal Thickness Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (See 5.2.1) psi, min	Extension Under Load in. in 2 in.	Elongation % in 2 in. or 4D, min
0.012 to 0.039, incl	73,000	63,000	0.0173	7
Ø Over 0.039 to 0.062, incl	74,000	64,000	0.0175	8
Over 0.062 to 0.187, incl	75,000	65,000	0.0173	8
Over 0.187 to 0.249, incl	76,000	66,000	0.0172	8
Over 0.249 to 0.499, incl	76,000	66,000	0.0172	9
Over 0.499 to 1.000, incl	78,000	68,000	0.0172	7
Over 1.000 to 2.000, incl	77,000	67,000	0.0170	6

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

Nominal Thickness Inches	E
0.012 to 0.062, incl	9,500,000
Ø Over 0.062 to 0.187, incl	9,800,000
Over 0.187 to 0.499, incl	10,000,000
Over 0.499 to 2.000, incl	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.

5.3 Bending: Material shall be capable of withstanding, without cracking, bending at room temperature through an angle of 180 deg around a diameter equal to the bend factor times the nominal thickness of the Ø material, with axis of bend parallel to direction of rolling. The bare (unclad) surface shall be on the outside of the bend.

Nominal Thickness Inch	Bend Factor
0.012 to 0.032, incl	7
Over 0.032 to 0.062, incl	8
Over 0.062 to 0.091, incl	9
Over 0.091 to 0.125, incl	10
Over 0.125 to 0.249, incl	11
Over 0.249 to 0.499, incl	13

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 and its revision letter, 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 and its revision letter, 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 sheet and plate shall be marked on the bare (unclad) face, in the respective location indicated below, with the alloy number and temper, AMS 4046 or applicable Federal or Military specification designation, inspection lot number, manufacturer's identification, and nominal thickness in inches. The alloy number and temper shall include the words "Alclad one side". An inspection lot shall be material of the same alloy, temper, section, and size traceable to a heat treatment lot or lots and subjected to inspection at one time. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be sufficiently stable to withstand normal handling.

9.1 Flat Sheet and Plate Under 6 In. Wide: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 feet. The inspection lot number may appear in the row marking or may appear at only one location on the piece.

9.2 Flat Sheet and Plate 0.375 In. and Under Thick, 6 - 60 In., Incl, Wide, and 36 - 200 In., Incl, Long: Shall be marked in lengthwise rows of characters recurring at intervals not greater than 3 ft, the rows being spaced approximately 6 in. on centers across the width and staggered. Every third row shall show the manufacturer's identification and nominal thickness in inches. The other rows shall show the alloy number and temper and AMS 4046 or applicable Federal or Military specification designation. The inspection lot number may be included in the rows with the alloy, temper, and specification designations or may appear at only one location on each piece.

9.3 Flat Sheet and Plate Over 0.375 In. Thick, or Over 60 In. Wide, or Over 200 In. Long: Shall be marked as in 9.2 above or, at vendor's discretion, shall be marked in one or two rows of characters recurring at intervals not greater than 3 ft around the periphery of the piece. If one row is used, it shall show all information of Paragraph 9 above except that inspection lot number may be omitted. If two rows are used, one row shall show the alloy number and temper and AMS 4046 or applicable Federal or Military specification designation; the second row shall show the manufacturer's identification and nominal thickness in inches. The inspection lot number may be included in the line with the manufacturer's identification and nominal thickness or may appear at only one location on each piece.

9.3.1 If peripheral marking is applied to the full piece as produced but partial sheets or plates are supplied, an arrow shall also be applied near one corner indicating the direction of rolling.

9.4 Coiled Sheet: Shall be marked near the outside end of the coil. The inside end of the coil shall also be marked or shall have a tag or label attached marked with the information of Paragraph 9 above.

9.5 Circles: Shall be marked with the information of Paragraph 9 above if the circle is 24 in. or more in diameter. Circles less than 24 in. in diameter shall be identified as agreed upon by purchaser and vendor.