Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10001

AEROSPACE MATERIAL SPECIFICATION

AMS 4096

Issued 11-1-69
Revised

ALUMINUM ALLOY SHEET AND PLATE, ALCLAD
6.3Cu - 0.30Mn - 0.18Zr - 0.10V - 0.06Ti (Alclad 2219-0)

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

2. APPLICATION: Primarily for parts requiring high strength at temperatures up to 600 F (316 C). This material is also well suited for cryogenic applications and where welding and maximum corrosion resistance are required. Certain design and processing procedures may cause this material to be susceptible to stress corrosion cracking after heat treatment; ARP 823 recommends practices to minimize such conditions.

3. COMPOSITION:

Core (2219)	min	max
Copper	5.8	6.8
Manganese	0.20	0.40
Zirconium	0.10	0.25
Vanadium	0.05	0.15
Titanium	0.02	0.10
Iron	--	0.30
Silicon	--	0.20
Zinc	--	0.10
Magnesium	--	0.02
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

Cladding (7072)	min	max
Zinc	0.8	1.3
Magnesium	--	0.10
Copper	--	0.10
Manganese	--	0.10
Silicon + Iron	--	0.7
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

4. CONDITION: Annealed.

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 Inch	Cladding Thickness Per Side % of Total Thickness, min
0.020 - 0.039, incl	8.0
Over 0.039 - 0.099, incl	4.0
Over 0.099	2.0

5.2 Properties As Annealed:

5.2.1 Tensile Properties: The following requirements apply to material 0.020 to 2.000 in., incl, in thickness:

Tensile Strength, psi	32,000 max
Yield Strength at 0.2% Offset or at 0.0070 in. in 2 in. Extension Under Load (E = 10,500,000), psi	16,000 max
Elongation, % in 2 in. or 4D	12 min

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

5.2.2 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 material, with axis of bend parallel to direction of rolling.

Nominal Thickness Inch	Bend Factor
0.020 to 0.249, incl	4
Over 0.249 to 0.499, incl	6

5.3 Properties After Heat Treatment: Material after proper solution and precipitation heat treatment shall conform to the following requirements:

5.3.1 Tensile Properties:

Nominal Thickness 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, min
		psi, min	Extension Under Load in. in 2 in.	
0.020 to 0.039, incl	44,000	29,000	0.0095	6
Over 0.039 to 0.099, incl	49,000	32,000	0.0101	7
Over 0.099 to 0.249, incl	51,000	34,000	0.0105	7
Over 0.249 to 0.499, incl	51,000	34,000	0.0105	8
Over 0.499 to 1.000, incl	54,000	36,000	0.0109	8
Over 1.000 to 2.000, incl	54,000	36,000	0.0109	7

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

5.3.2 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 material, with axis of bend parallel to direction of rolling.

Nominal Thickness Inch	Bend Factor
0.020 to 0.062, incl	8
Over 0.062 to 0.249, incl	12
Over 0.249 to 0.499, incl	16