SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4298

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Aluminum Alloy, Alclad Sheet
3.8Cu - 1.0Mg - 0.30Mn - 0.60Zn (Alclad 2056-T3)
Solution Heat Treated and Cold Worked

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of sheet clad on both sides.

1.2 Application:

These products have been used typically for formed structural aircraft parts requiring improved resistance to fatigue crack growth and high toughness with strength similar to Alclad 2024-T3, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause these products to become susceptible to stress-corrosion cracking; ARP823 recommends practices to minimize such conditions.

2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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http://www.sae.org/technical/standards/AMS4298

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
AMS 2772	Heat Treatment of Aluminum Alloy Raw Materials
ARP823	Minimizing Stress-Corrosion Cracking in Wrought Heat-Treatable Aluminum Alloy Products
AS1990	Aluminum Alloy Tempers

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM B 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B 666/B 666M	Identification Marking of Aluminum and Magnesium Products
ASTM E 647	Measurement of Fatigue Crack Growth Rates

2.3 ANSI Publications:

Available from ANSI, 25 West 43rd Street, New York, NY 10036 or www.ansi.org.

ANSI H35.2	Dimensional Tolerances for Aluminum Mill Products
ANSI H35.2M	Dimensional Tolerances for Aluminum Mill Products (Metric)

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Tables 1 and 2, determined in accordance with AMS 2355.

TABLE 1 – Composition, Core (2056)

Element	min	max
Silicon	--	0.10
Iron	--	0.12
Copper	3.3	4.3
Manganese	0.10	0.50
Magnesium	0.60	1.4
Chromium	--	0.05
Zinc	0.40	0.80
Titanium	--	0.10
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

TABLE 2 – Composition, Cladding (1050)

Element	min	max
Silicon + Iron	--	0.7
Copper	--	0.10
Manganese	--	0.05
Magnesium	--	0.05
Zinc	--	0.10
Titanium	--	0.03
Vanadium	--	0.05
Other Elements, each	--	0.03
Aluminum, by difference	99.3	--

3.2 Condition:

Solution heat treated in accordance with AMS 2772 and cold worked to T3 temper. (See AS1990).

3.3 Properties:

Product shall conform to the following requirements, determined on the mill product size in accordance with AMS 2355.

3.3.1 Long-Transverse Tensile Properties: Shall be as shown in Table 3.

TABLE 3A – Minimum Tensile Properties, Inch/Pound Units

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 inches or 4D %
0.063 to 0.126, incl	62.0	41.0	15
Over 0.126 to 0.236, incl	62.0	40.0	16

TABLE 3B – Minimum Tensile Properties, SI Units

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
1.60 to 3.25, incl	427	283	15
Over 3.25 to 6.00, incl	427	276	16

3.3.2 Fatigue Crack Growth Rate (FCGR): Shall be not higher than the rate (da/dN) shown in Table 4, determined in the T-L orientation in accordance with ASTM E 647, and using the center-cracked tension M(T) specimen, a DK of 30 ksi $\sqrt{\text{inch}}$ (33 MPa $\sqrt{\text{m}}$), a K gradient of zero, a stress ratio (R) of plus 0.1, and a testing frequency between 2 to 10 Hertz.

TABLE 4 – Maximum Fatigue Crack Growth Rate

Nominal Thickness Inch	Nominal Thickness Millimeters	da/dN inch/cycle	da/dN mm/cycle
0.063 to 0.236, incl	1.60 to 6.00, incl	1.2×10^{-4}	3.05×10^{-3}

3.3.3 Bending: Product shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a diameter equal to the bend factor shown in Table 5 times the nominal thickness of the product with axis of bend parallel to the direction of rolling.

TABLE 5 – Bending Parameters

Nominal Thickness Inch	Nominal Thickness Millimeters	Bend Factor
0.063 to 0.128, incl	1.60 to 3.25, incl	4
Over 0.128 to 0.236, incl	Over 3.25 to 6.00, incl	5

3.3.4 Minimum Average Cladding Thickness: Shall be as shown in Table 6.

TABLE 6 – Minimum Average Cladding Thickness

Nominal Thickness Inch	Nominal Thickness Millimeters	Cladding Thickness Per Side % of Total Thickness
0.063 to 0.236, incl	1.60 to 6.0, incl	2.0

3.4 Quality:

Product, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the product.

3.5 Tolerances:

Shall conform to all applicable requirements of ANSI H35.2 or ANSI H35.2M.