AEROSPACE MATERIAL SPECIFICATION

AMS4298™	REV. B

Issued 2004-07
Reaffirmed 2010-05
Revised 2016-04
Stabilized 2024-03

Superseding AMS4298A

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

RATIONALE

AMS4298B hast been declared "STABILIZED" by AMS Committee D Nonferrous Alloys. This document will no longer be updated and may no longer represent standard industry practice. This document was stabilized because Committee D can find no producers for this document.

NOTE: Previously this document was revised. The last technical update of this document occurred in April 2016. Users of this document should refer to the cognizant engineering organization for disposition of any issues with reports/certifications to the specification; including exceptions listed on the certification. In many cases, the purchaser may represent a sub tier supplier and not the cognizant engineering organization.

STABILIZED NOTICE

AMS4298B has been declared “STABILIZED” by SAE AMS Committee D Nonferrous Alloys and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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For more information on this standard, visit
https://www.sae.org/standards/content/AMS4298B/

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of sheet 0.063 to 0.236 inch (1.60 to 6.00 mm), incl, in thickness, clad on both sides (see 8.4).

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 issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2355 Quality Assurance, Sampling and Testing, Aluminum Alloys and Magnesium Alloy, Wrought Products, (Except Forging Stock), and Rolled, Forged, or Flash Welded Rings

AMS2772 Heat Treatment of Aluminum Alloy Raw Materials

ARP823 Minimizing Stress-Corrosion Cracking in Wrought Heat-Treatable Aluminum Alloy Products

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B660 Packaging/Packing of Aluminum and Magnesium Products

ASTM B666/B666M Identification Marking of Aluminum and Magnesium Products

ASTM E647 Measurement of Fatigue Crack Growth Rates

2.3 ANSI Accredited Publications

Copies of these documents are available online at http://webstore.ansi.org/.

ANSI H35.1/H35.1M Alloy and Temper Designation Systems for Aluminum

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 AMS2355.

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	0.6	1.4
Zinc	0.40	0.8
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

Table 2 – Composition, cladding (1050)

Element	min	max
Silicon	--	0.25
Iron	--	0.40
Copper	--	0.05
Manganese	--	0.05
Magnesium	--	0.05
Zinc	--	0.05
Titanium	--	0.03
Vanadium	--	0.05
Other Elements, each	--	0.03
Aluminum, by difference	99.50	--

3.2 Condition

Solution heat treated in accordance with AMS2772 and cold worked and naturally aged to T3 temper (see ANSI H35.1/H35.1M).

3.3 Properties

Product shall conform to the following requirements, determined on the mill product size in accordance with AMS2355.

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 E647, and using the center-cracked tension M(T) specimen, a ΔK (Delta K) of 40 ksi $\sqrt{\text{inch}}$ (44 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

3.3.5 Property requirements for product outside the range covered by 1.1 shall be agreed upon between purchaser and producer.

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.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for producer's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (3.1), tensile properties (3.3.1), fatigue-crack growth rate (3.3.2), and tolerances (3.5) are acceptance tests and, except for composition, shall be performed on each inspection lot.

4.2.2 Periodic Tests

Bending (3.3.3) and cladding thickness (3.3.4) are periodic tests and shall be performed at a frequency selected by the producer unless frequency of testing is specified by purchaser.