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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4046E

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An American National Standard

Superseding AMS 4046D

ALUMINUM ALLOY SHEET AND PLATE, ALCLAD ONE SIDE
5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr
(Alclad One Side 7075; -T6 Sheet -T651 Plate)
Solution and Precipitation Heat Treated

UNS A87075

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of sheet and plate.

1.2 Application:

These products have been used typically for structural components, including chemically milled and machined parts subject to excessive warpage during machining, but usage is not limited to such application.

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 following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2202 Tolerances, Aluminum Alloy and Magnesium Alloy Sheet and Plate
MAM 2202 Tolerances, Metric, Aluminum Alloy and Magnesium Alloy Sheet and Plate

2.1 SAE Publications (Continued):

AMS 2355 Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings
MAM 2355 Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings, Metric (SI) Units
AMS 2811 Identification, Aluminum and Magnesium Alloy Wrought Products
ARP823 Minimizing Stress-Corrosion Cracking in Wrought Heat-Treatable Aluminum Alloy Products

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products

2.3 U.S. Government Publications:

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-H-6088 Heat Treatment of Aluminum Alloys

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

(R)

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS 2355 or MAM 2355.

TABLE 1 - Composition

Core (7075) Element	min	max	Cladding (7072) Element	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	0.28	Copper	--	0.10
Iron	--	0.50	Manganese	--	0.10
Silicon	--	0.40	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				

3.2 Condition:

The product shall be supplied in the following condition; heat treatments shall be performed in accordance with MIL-H-6088:

3.2.1 Sheet: Solution and precipitation heat treated.

3.2.2 Plate: Solution heat treated, stretched to produce a nominal permanent set of 2% but not less than 1-1/2% nor more than 3%, and precipitation heat treated.

3.2.2.1 Plate shall receive no further straightening operations after stretching.

3.3 Properties:

The product shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355:

3.3.1 Tensile Properties: Shall be as specified in Table 2 and 3.3.1.1.

TABLE 2A - Tensile Properties, Inch/Pound Units

Nominal Thickness Inches	Tensile Strength ksi, min	Yield Strength at 0.2% Offset ksi, min	Elongation in 2 Inches or 4D %, min
0.012 to 0.039 incl	73.0	63.0	7
Over 0.039 to 0.062, incl	74.0	64.0	8
Over 0.062 to 0.187, incl	75.0	65.0	8
Over 0.187 to 0.249, incl	76.0	66.0	8
Over 0.249 to 0.499, incl	76.0	66.0	9
Over 0.499 to 1.000, incl	78.0	68.0	7
Over 1.000 to 2.000, incl	77.0	67.0	6

TABLE 2B - Tensile Properties, SI Units

Nominal Thickness Millimeters	Tensile Strength MPa, min	Yield Strength at 0.2% Offset MPa, min	Elongation in 50.8 mm or 4D %, min
0.30 to 0.99, incl	503	434	7
Over 0.99 to 1.57, incl	510	441	8
Over 1.57 to 4.75, incl	517	448	8
Over 4.75 to 6.32, incl	524	455	8
Over 6.32 to 12.67, incl	524	455	9
Over 12.67 to 25.40, incl	538	469	7
Over 25.40 to 50.80, incl	531	462	6

3.3.1.1 Tensile property requirements for plate over 2.000 inches (50.80 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.2 Bending: Product 0.012 to 0.499 inch (0.30 to 12.67 mm), inclusive, in nominal thickness 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 3 times the nominal thickness of the product with axis of bend parallel to the direction of rolling. The bare (unclad) face shall be on the outside of the bend.

TABLE 3 - Bending Requirements

Nominal Thickness Inch	Nominal Thickness Millimeters	Bend Factor
0.012 to 0.032, incl	0.30 to 0.81, incl	7
Over 0.032 to 0.062, incl	Over 0.81 to 1.57, incl	8
Over 0.062 to 0.091, incl	Over 1.57 to 2.31, incl	9
Over 0.091 to 0.125, incl	Over 2.31 to 3.18, incl	10
Over 0.125 to 0.249, incl	Over 3.18 to 6.32, incl	11
Over 0.249 to 0.499, incl	Over 6.32 to 12.67, incl	13

3.3.2.1 Bending requirements for product over 0.499 inch (12.67 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.3 Cladding Thickness: The average cladding thickness shall be as shown in (R) Table 4.

TABLE 4 - Cladding Thickness, Percent of Total Thickness

Thickness of Product Inches	Thickness of Product Millimeters	Cladding Thickness %, min	Cladding Thickness %, max
0.012 to 0.062, incl	0.30 to 1.57, incl	3.2	--
Over 0.062 to 0.187, incl	Over 1.51 to 4.75, incl	2.0	--
Over 0.187 to 0.499, incl	Over 4.75 to 12.67, incl	1.2	--
Over 0.499 to 4.000, incl	Over 12.67 to 101.60, incl	1.2	3.0

3.4 Quality:

The 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 AMS 2202 or MAM 2202.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:
(R)

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

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for composition (3.1), tensile properties (3.3.1), and tolerances (3.5) are acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests for bending (3.3.2) and cladding thickness (3.3.3) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:
(R)

Shall be in accordance with AMS 2355 or MAM 2355.