SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4278

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Submitted for recognition as an American National Standard

Aluminum Alloy, Alclad Sheet
5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (Alclad 7075-0)
Annealed, Fine Grained

UNS A87075

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of alclad sheet whose core grain size shall be ASTM No. 6 or finer.

1.2 Application:

This sheet has been used typically for severely formed structural parts which will be subsequently heat treated and painted or otherwise protected from corrosion, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause this sheet to become susceptible to stress-corrosion cracking after heat treatment; 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.

QUESTIONS REGARDING THIS DOCUMENT: (412) 772-7154 FAX: (412) 776-0243
TO PLACE A DOCUMENT ORDER: (412) 776-4970 FAX: (412) 776-0790

2.1 SAE Publications:

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

AMS 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
MAM 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings, Metric (SI) Units
AMS 2770	Heat Treatment of Wrought Aluminum Alloy Parts
AMS 2772	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, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B 666/B 666M	Identification Marking of Aluminum and Magnesium Products
ASTM E 112	Determining the Average Grain Size

2.3 ANSI Publications:

Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

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 or MAM 2355.

TABLE 1 - Composition, Core (7075)

Element	min	max
Zinc	5.1	6.1
Magnesium	2.1	2.9
Copper	1.2	2.0
Chromium	0.18	0.28
Iron	--	0.50
Silicon	--	0.40
Manganese	--	0.30
Titanium	--	0.20
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

TABLE 2 - Composition, Cladding (7072)

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

3.2 Condition:

Annealed in accordance with AMS 2772.

3.3 Properties:

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

3.3.1 As Annealed:

3.3.1.1 Average Grain Size: Shall be ASTM No. 6 or finer, determined in accordance with ASTM E 112 or by a technique agreed upon by purchaser and vendor.

3.3.1.2 Tensile Properties: Shall be as shown in Table 3.

TABLE 3A - Tensile Properties, Inch/Pound Units

Nominal Thickness Inch	Tensile Strength ksi, max	Yield Strength at 0.2% Offset ksi, maximum	Elongation in 2 Inches or 4D %, minimum
Over 0.039 to 0.062, incl	36.0	20.0	10
Over 0.062 to 0.126, incl	38.0	20.0	10

TABLE 3B - Tensile Properties, SI Units

Nominal Thickness Millimeters	Tensile Strength MPa, max	Yield Strength at 0.2% Offset MPa, maximum	Elongation in 50.8 mm or 4D %, minimum
Over 0.99 to 1.57, incl	248	138	10
Over 1.57 to 3.20, incl	262	138	10

3.3.1.3 Bending: Sheet 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 4 times the nominal thickness of the sheet with axis of bend parallel to the direction of rolling.

TABLE 4 - Bending Parameters

Nominal Thickness Inch	Nominal Thickness Millimeters	Bend Factor
0.008 to 0.062, incl	0.20 to 1.57, incl	0
Over 0.062 to 0.126, incl	Over 1.57 to 3.20, incl	1

3.3.2 Response to Heat Treatment: Sheet shall have the following properties after being solution and precipitation heat treated to the -T62 temper in accordance with AMS 2770.

3.3.2.1 Tensile Properties: Shall be as specified in Table 5.

TABLE 5A - Minimum Tensile Properties

Nominal Thickness Inch	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
Over 0.039 to 0.062, incl	72.0	62.0	9
Over 0.062 to 0.126, incl	74.0	64.0	9

TABLE 5B - 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 %
Over 0.99 to 1.57, incl	496	427	9
Over 1.57 to 3.20, incl	510	441	9

3.3.2.2 Bending: Sheet 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 6 times the nominal thickness of the sheet with axis of bend parallel to the direction of rolling.

TABLE 6 - Bending Parameters

Nominal Thickness Inch	Nominal Thickness Millimeters	Bend Factor
0.008 to 0.020, incl	0.20 to 0.51, incl	6
Over 0.020 to 0.062, incl	Over 0.51 to 1.57, incl	7
Over 0.062 to 0.091, incl	Over 1.57 to 2.31, incl	8
Over 0.091 to 0.126, incl	Over 2.31 to 3.20, incl	9

3.3.2.3 Cladding Thickness: After rolling, the average cladding thickness shall conform to the requirements shown in Table 7.

TABLE 7 - Average Cladding Thickness

Nominal Thickness Inch	Nominal Thickness Millimeters	Average Cladding Thickness Per Side % of Total Thickness minimum
0.008 to 0.062, incl	0.20 to 1.57, incl	3.2
Over 0.062 to 0.126, incl	Over 1.57 to 3.20, incl	2.0

3.4 Quality:

Sheet, 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 sheet.

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 vendor of sheet shall supply all samples for vendor'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 sheet conforms to specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Composition (3.1), average grain size (3.3.1.1), tensile properties as annealed (3.3.1.2), and after solution and precipitation heat treatment (3.3.2.1), and tolerances (3.5) are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests: Bending as annealed (3.3.1.3) and after solution and precipitation heat treatment (3.3.2.2) and cladding thickness (3.3.2.3) 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:

Shall be in accordance with AMS 2355 or MAM 2355 except that average grain size shall be determined on one sample from each inspection lot.