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

AEROSPACE MATERIAL SPECIFICATION

An American National Standard

SAE AMS 4028F

Issued 15 AUG 1958
Revised 1 OCT 1991
Superseding AMS 4028E

ALUMINUM ALLOY SHEET AND PLATE
4.4Cu - 0.85Si - 0.80Mn - 0.50Mg (2014-O)
Annealed

UNS A92014

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 formed parts requiring high strength after heat treatment, 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 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.

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
AMS 2355 Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings

2.1 SAE Publications (Continued):

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 2770 Heat Treatment of Wrought Aluminum Alloy Parts
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:

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

TABLE 1 - Composition

Element	min		max
Copper	3.9	-	5.0
Silicon	0.50	-	1.2
Manganese	0.40	-	1.2
Magnesium	0.20	-	0.8
Iron	--		0.7
Zinc	--		0.25
Titanium	--		0.15
Chromium	--		0.10
Other Impurities, each	--		0.05
Other Impurities, total	--		0.15
Aluminum	remainder		

3.2 Condition:

Annealed in accordance with MIL-H-6088.

3.3 Properties:

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

3.3.1 As Annealed:

3.3.1.1 Tensile Properties: Shall be as specified in Table 2 and 3.3.1.1.1.

TABLE 2A - Tensile Properties, Inch/Pound Units

Nominal Thickness Inch	Tensile Strength ksi, max	Yield Strength at 0.2% Offset ksi, max	Elongation in 2 Inches or 4D %, min
0.020 to 0.499, incl	32.0	16.0	16
Over 0.499 to 1.000, incl	32.0	--	10

TABLE 2B - Tensile Properties, SI Units

Nominal Thickness Millimeters	Tensile Strength MPa, max	Yield Strength at 0.2% Offset MPa, max	Elongation in 50.8 mm or 4D %, min
0.51 to 12.67, incl	221	110	16
Over 12.67 to 25.40, incl	221	--	10

3.3.1.1.1 Tensile properties of plate over 1.000 inch (25.40 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.1.2 Bending: Product 0.020 - 0.499 inch (0.51 - 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.

TABLE 3 - Bending Requirements

Nominal Thickness Inch	Nominal Thickness Millimeters	Bend Factor
0,020 to 0.124, incl	0.51 to 3.15, incl	2
Over 0.124 to 0.249, incl	Over 3.15 to 6.32, incl	4
Over 0.249 to 0.499, incl	Over 6.32 to 12.67, incl	6

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

3.3.2 After Solution and Precipitation Heat Treatment: The product, as received by purchaser, shall have the following properties after solution and precipitation heat treatment to the -T62 temper in accordance with AMS 2770:

3.3.2.1 Tensile Properties: Shall be as specified in Table 4 and 3.3.2.1.1.

TABLE 4A - Tensile Properties, Inch/Pound Units

Nominal Thickness Inch	Tensile Strength ksi, min	Yield Strength at 0.2% Offset ksi, min	Elongation in 2 Inches or %, min
0.020 to 0.039, incl	64.0	57.0	6
Over 0.039 to 0.249, incl	66.0	58.0	7
Over 0.249 to 0.499, incl	67.0	59.0	7
Over 0.499 to 1.000, incl	67.0	59.0	6

TABLE 4B - 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
0.51 to 0.99, incl	441	393	6
Over 0.99 to 6.32, incl	455	400	7
Over 6.32 to 12.67, incl	462	407	7
Over 12.67 to 25.40, incl	462	407	6

3.3.2.1.1 Tensile properties of plate over 1.000 inch (25.40 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.2.2 Bending: Product 0.020 - 0.499 inch (0.51 - 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 5 times the nominal thickness of the product with axis of bend parallel to the direction of rolling.

TABLE 5 - Bending Requirements

Nominal Thickness Inch			Nominal Thickness Millimeters			Bend Factor
	0.020 to 0.039, incl			0.51 to 0.99, incl		5
Over	0.039 to 0.050, incl		Over	0.99 to 1.27, incl		6
Over	0.050 to 0,124, incl		Over	1.27 to 3.15, incl		8
Over	0.124 to 0.249, incl		Over	3.15 to 6.32, incl		10
Over	0.249 to 0.499, incl		Over	6.32 to 12.67, incl		12

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

3.4 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:

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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 of this specification.