AEROSPACE MATERIAL SPECIFICATION

AMS4028	REV. H

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Superseding AMS4028G

Aluminum Alloy Sheet and Plate
4.4Cu - 0.85Si - 0.80Mn - 0.50Mg (2014-O)
Annealed

UNS A92014

RATIONALE

AMS4028H restores this document to active status, and revises Condition (3.2), Properties (3.3), Reports (4.4), Identification (5.1), and Packaging (5.3), and corrects errors (3.3.2, Table 4).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of sheet and plate from 0.020 to 1.000 inches (0.51 to 25.4 mm) thick (See 8.3).

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 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.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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http://www.sae.org/technical/standards/AMS4028H

2.1 SAE Publications

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

AMS2202 Tolerances, Aluminum Alloy and Magnesium Alloy Sheet and Plate

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

AMS2770 Heat Treatment of Wrought Aluminum Alloy Parts

AMS2772 Heat Treatment of Aluminum Alloy Raw Materials

AMS2811 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 International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, 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

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS2355.

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 AMS2772.

3.3 Properties:

The product shall conform to the following requirements, determined in accordance with AMS2355 on the mill produced size:

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 sheet under 0.020 inch (0.51 mm) and 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 under 0.020 inch (0.51 mm) and over 0.499 inch (12.67 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.2 Response to Heat Treatment

The product after solution and precipitation heat treatment to the -T62 temper (See AS1990) in accordance with AMS 2772 shall have the following properties:

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 4D %, 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 sheet under 0.020 inch (0.51 mm) and 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 to 0.499 inch (0.51 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 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 AMS2202.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

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.