AEROSPACE
MATERIAL SPECIFICATIONS
SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

AMS 4028A

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ALUMINUM ALLOY SHEET AND PLATE
4.5Cu - 0.8Si - 0.8Mn - 0.5Mg (2014-0)

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

2. APPLICATION: Primarily for formed parts requiring high strength after heat treatment.

3. COMPOSITION:

Copper	3.9 - 5.0
Silicon	0.50 - 1.2
Manganese	0.40 - 1.2
Magnesium	0.20 - 0.8
Iron	1.0 max
Zinc	0.25 max
Titanium	0.15 max
Chromium	0.10 max
Other Impurities, each	0.05 max
Other Impurities, total	0.15 max
Aluminum	remainder

4. CONDITION: Annealed.

5. TECHNICAL REQUIREMENTS:

5.1 Tensile Properties: Test specimens shall conform to ASTM E8-57T except from material less than 3/4 in. wide, and shall be cut across the direction of rolling ℄ except from material less than 9 in. wide. Elongation requirements apply only to material 3/4 in. and over in width.

Nominal Thickness Inch	Tensile Strength psi, max	Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,500,000) psi, max	Extension Under Load in. in 2 in.	Elongation % in 2 in. min
0.020 to 0.499, incl	32,000	16,000	0.0070	16
Over 0.499 to 1.000, incl	32,000	--	--	10

5.1.1 When a dispute occurs between purchaser and vendor over the yield strength value, yield strength determined by the offset method shall apply.

5.1.2 Tensile properties for plate over 1.000 in. in thickness shall be as agreed ℄ upon by purchaser and vendor.

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5.2 Bending: Material 0.499 in. and under in thickness shall be capable of withstanding, without cracking, bending at room temperature through an angle of 180 deg around a diameter equal to the bend factor times the nominal thickness of the material, with axis of bend parallel to direction of rolling.

Nominal Thickness Inch	Bend Factor
0.124 and under	2
Over 0.124 to 0.249, incl	4
Over 0.249 to 0.499, incl	6

5.3 Properties After Heat Treatment: Material after proper solution and precipitation heat treatment shall conform to the following requirements.

5.3.1 Tensile Properties: Test specimens shall conform to ASTM E8-57T except from material less than 3/4 in. wide, and shall be cut across the direction of rolling except from material less than 9 in. wide. Elongation requirements apply only to material 3/4 in. and over in width.

Nominal Thickness Inch	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,500,000)		Elongation % in 2 in. min
		psi, min	Extension Under Load in. in 2 in.	
0.020 to 0.039, incl	64,000	57,000	0.0149	6
Over 0.039 to 0.499, incl	67,000	59,000	0.0152	7
Over 0.499 to 1.000, incl	67,000	59,000	0.0152	6

5.3.1.1 When a dispute occurs between purchaser and vendor over the yield strength value, yield strength determined by the offset method shall apply.

5.3.1.2 Tensile properties of plate over 1.000 in. in thickness shall be as agreed upon by purchaser and vendor.

5.3.2 Bending: Material 0.499 in. and under in thickness shall be capable of withstanding, without cracking, bending at room temperature through an angle of 180 deg around a diameter equal to the bend factor times the nominal thickness of the material, with axis of bend parallel to direction of rolling.

Nominal Thickness Inch	Bend Factor
0.020 to 0.039, incl	5
Over 0.039 to 0.050, incl	6
Over 0.050 to 0.124, incl	8
Over 0.124 to 0.249, incl	10
Over 0.249 to 0.499, incl	12

6. QUALITY: Material shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2202 as applicable.

8. REPORTS:

8.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report stating that the product conforms to the chemical composition and technical requirements of this specification. This report shall include the purchase order number, material specification number, thickness, size, and quantity.

8.2 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

9. IDENTIFICATION: Unless otherwise specified, each sheet and plate shall be marked on one face, in the respective location indicated below. Symbols shall be applied using a suitable marking fluid and shall not be obliterated by normal handling.

9.1 Flat Sheet and Plate 0.375 In. and Under Thick, 6 - 60 In., Incl, Wide, and 36 - 200 In., Incl, Long: Shall be marked in rows of symbols not less than 3/8 in. in height and recurring at intervals not greater than 3 feet. Rows shall run parallel to the direction of rolling of the piece and shall be spaced approximately 6 in. on centers across the width. Every third row shall show the manufacturer's identification and nominal thickness in inches. The other rows shall each show the alloy number and temper, or AMS 4028, and shall be staggered.

9.2 Flat Sheet and Plate Over 0.375 In. Thick, or Over 60 In. Wide, or Over 200 In. Long: Shall be marked as in 9.1 above or, at vendor's discretion, shall be marked in one or two rows of symbols not less than 3/8 in. in height and running around the perimeter of the piece. If one row is used, it shall show the alloy number and temper, or AMS 4028, manufacturer's identification, and nominal thickness in inches. If two rows are used, one row shall show the alloy number and temper, or AMS 4028; the second row shall show the manufacturer's identification and nominal thickness in inches.

9.2.1 If perimetral marking is applied to the full piece as produced but partial sheets or plates are supplied, an arrow shall also be applied near one corner indicating the direction of rolling.

9.3 Coiled Sheet: Shall be marked near the outside end of the coil with the alloy number and temper, or AMS 4028, manufacturer's identification, and nominal thickness in inches.