

UNS A96061

ALUMINUM ALLOY SHEET AND PLATE
1.0Mg - 0.60Si - 0.28Cu - 0.20Cr (6061-0)
Annealed

1. SCOPE:

- 1.1 Form: This specification covers an aluminum alloy in the form of sheet and plate.
- 1.2 Application: Primarily for parts where moderate formability and response to heat treatment are required.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

- 2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

- AMS 2202 - Tolerances, Aluminum Alloy and Magnesium Alloy Sheet and Plate
AMS 2350 - Standards and Test Methods
AMS 2355 - Quality Assurance Sampling and Testing of Aluminum-Base and Magnesium-Base Alloys, Wrought Products (Except Forgings and Forging Stock) and Flash Welded Rings
AMS 2770 - Heat Treatment of Aluminum Alloy Parts

- 2.2 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

SAE Technical Board rules provide that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade or their use by governmental agencies is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

AMS4025G

2.2.1 Military Specifications:

MIL-H-6088 - Heat Treatment of Aluminum Alloys

2.2.2 Military Standards:

MIL-STD-649 - Aluminum and Magnesium Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined in accordance with AMS 2355:

	min	max
Magnesium	0.8	1.2
Silicon	0.40	0.8
Copper	0.15	0.40
Chromium	0.04	0.35
Iron	--	0.7
Zinc	--	0.25
Manganese	--	0.15
Titanium	--	0.15
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:

3.3.1 As Annealed:

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

TABLE I

Nominal Thickness Inches	Tensile Strength psi, max	Elongation in 2 in. or 4D %, min
0.006 to 0.007, incl	22,000	10
Over 0.007 to 0.009, incl	22,000	12
Over 0.009 to 0.020, incl	22,000	14
Over 0.020 to 0.128, incl	22,000	16
Over 0.128 to 1.000, incl	22,000	18
Over 1.000 to 3.000, incl	22,000	16

TABLE I (SI)

Nominal Thickness Millimetres	Tensile Strength MPa, max	Elongation in 50 mm or 4D %, min
0.15 to 0.18, incl	150	10
Over 0.18 to 0.23, incl	150	12
Over 0.23 to 0.50, incl	150	14
Over 0.50 to 3.25, incl	150	16
Over 3.25 to 25.00, incl	150	18
Over 25.00 to 75.00, incl	150	16

3.3.1.1.1 Tensile properties of plate over 3.000 in. (75.00 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.1.2 Bending: The product shall withstand, without cracking, bending at room temperature though an angle of 180 deg around a diameter equal to the bend factor times the nominal thickness of the product with axis of bend parallel to direction of rolling.

Nominal Thickness Inch	(Millimetres)	Bend Factor
0.006 to 0.020, incl	(0.15 to 0.50, incl)	0
Over 0.020 to 0.128, incl	(Over 0.50 to 3.25, incl)	1
Over 0.128 to 0.249, incl	(Over 3.25 to 6.25, incl)	2
Over 0.249 to 0.499, incl	(Over 6.25 to 12.50, incl)	3

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

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

TABLE II

Nominal Thickness Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset psi, min	Elongation in 2 in. or 4D %, min
0.006 to 0.007, incl	42,000	35,000	4
Over 0.007 to 0.009, incl	42,000	35,000	6
Over 0.009 to 0.020, incl	42,000	35,000	8
Over 0.020 to 0.499, incl	42,000	35,000	10
Over 0.499 to 1.000, incl	42,000	35,000	9
Over 1.000 to 2.000, incl	42,000	35,000	8
Over 2.000 to 3.000, incl	42,000	35,000	6

AMS4025G

TABLE II (SI)

Nominal Thickness Millimetres	Tensile Strength MPa, min	Yield Strength at 0.2% Offset MPa, min	Elongation in 50 mm or 4D %, min
0.15 to 0.18, incl	290	240	4
Over 0.18 to 0.23, incl	290	240	6
Over 0.23 to 0.50, incl	290	240	8
Over 0.50 to 12.50, incl	290	240	10
Over 12.50 to 25.00, incl	290	240	9
Over 25.00 to 50.00, incl	290	240	8
Over 50.00 to 75.00, incl	290	240	6

3.3.2.1.1 Tensile properties of plate over 3.000 in. (75.00 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.2.2 Bending: The product shall withstand, 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 product with axis of bend parallel to direction of rolling.

Nominal Thickness		Bend Factor
Inch	(Millimetres)	
0.006 to 0.020, incl	(0.15 to 0.50, incl)	2
Over 0.020 to 0.036, incl	(Over 0.50 to 0.90, incl)	3
Over 0.036 to 0.064, incl	(Over 0.90 to 1.60, incl)	4
Over 0.064 to 0.128, incl	(Over 1.60 to 3.25, incl)	5
Over 0.128 to 0.249, incl	(Over 3.25 to 6.25, incl)	6
Over 0.249 to 0.499, incl	(Over 6.25 to 12.50, incl)	7

3.4 Quality: The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to usage of the product.

3.5 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2202.

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. Results of such tests shall be reported to the purchaser as required by 4.4. 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.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.1), tensile properties as annealed (3.3.1.1), tensile properties after heat treatment (3.3.2.1), and tolerances (3.5) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for bending as annealed (3.3.1.2) and bending after heat treatment (3.3.2.2) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling: Shall be in accordance with AMS 2355.

4.4 Reports:

4.4.1 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 other technical requirements of this specification. This report shall include the purchase order number, AMS 4025G, size, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, AMS 4025G, 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.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2355.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Each sheet and plate shall be marked on one face, in the respective location indicated below, with the alloy number and temper, AMS 4025 or applicable Federal or Military specification designation, manufacturer's identification, and nominal thickness. The characters shall be of such size as to be legible, shall be applied using a suitable marking fluid, and shall be sufficiently stable to withstand normal handling. The markings shall have no deleterious effect on the product or its performance.

5.1.1 Flat Sheet and Plate Under 6 In. (150 mm) Wide: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 ft (900 mm).