AEROSPACE MATERIAL SPECIFICATION

AMS4027™	REV. P

Issued 1942-12
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Superseding AMS4027N

Aluminum Alloy, Sheet and Plate
1.0Mg - 0.60Si - 0.28Cu - 0.20Cr (6061; -T6 Sheet, -T651 Plate)
Solution and Precipitation Heat Treated

(Composition comparable to UNS A96061)

RATIONALE

AMS4027P is the result of a Five-Year Review and update of the specification. The revision prohibits unauthorized exceptions (3.3.4, 3.6, 4.4.1, 5.1.1, 8.5), updates Form (1.1), Applicable Documents (2, 3.2, 3.3.3, 8.3), and Ordering Information (8.6), and allow the use of the immediate prior specification revision (8.4).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of sheet and plate from 0.006 to 6.000 inches (0.15 to 152.40 mm), inclusive, in nominal thickness (see 8.6).

1.2 Application

These products have been used typically for parts where strength is required and limited formability is acceptable, but usage is not limited to such applications.

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.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2355 Quality Assurance, Sampling and Testing, Aluminum Alloys and Magnesium Alloy, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings

AMS2772 Heat Treatment of Aluminum Alloy Raw Materials

AS7766 Terms Used in Aerospace Metals Specifications

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS4027P/

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 B660 Packaging/Packing of Aluminum and Magnesium Products

ASTM B666/B666M Identification of Aluminum and Magnesium Alloy Products

2.3 ANSI Accredited Publications

Copies of these documents are available online at http://webstore.ansi.org/.

ANSI H35.1/H35.1M Standard Alloy and Temper Designation System for Aluminum

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 as shown in Table 1, determined in accordance with AMS2355.

Table 1 - Composition

Element	Min	Max
Silicon	0.40	0.8
Iron	--	0.7
Copper	0.15	0.40
Manganese	--	0.15
Magnesium	0.8	1.2
Chromium	0.04	0.35
Zinc	--	0.25
Titanium	--	0.15
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Sheet

Solution and precipitation heat treated to the T6 temper (refer to ANSI H35.1/H35.1M) in accordance with AMS2772.

3.2.2 Plate

Solution heat treated, stretched to produce a nominal a permanent set of 1-1/2% to 3%, and precipitation heat treated in accordance with AMS2772 to the T651 temper (refer to ANSI H35.1/H35.1M).

3.3 Properties

The product shall conform to the following with AMS2355 on the mill produced size.

3.3.1 Tensile Properties

Shall be as shown in Table 2.

Table 2A - Minimum tensile properties, inch/pound units

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
0.006 to 0.007, incl	42.0	35.0	4
Over 0.007 to 0.009, incl	42.0	35.0	6
Over 0.009 to 0.020, incl	42.0	35.0	8
Over 0.020 to 0.499, incl	42.0	35.0	10
Over 0.499 to 1.000, incl	42.0	35.0	9
Over 1.000 to 2.000, incl	42.0	35.0	8
Over 2.000 to 4.000, incl	42.0	35.0	6
Over 4.000 to 6.000, incl	40.0	35.0	6

Table 2B - Minimum tensile properties, SI units

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 or 4D mm
0.15 to 0.18, incl	290	241	4
Over 0.18 to 0.23, incl	290	241	6
Over 0.23 to 0.51, incl	290	241	8
Over 0.51 to 12.67, incl	290	241	10
Over 12.67 to 25.40, incl	290	241	9
Over 25.40 to 50.80, incl	290	241	8
Over 50.80 to 101.60, incl	290	241	6
Over 101.60 to 152.40, incl	276	241	6

3.3.2 Bending

Product 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 parameters

Nominal Thickness Inches	Nominal Thickness Millimeters	Bend Factor
0.006 to 0.020, incl	0.15 to 0.51, incl	2
Over 0.020 to 0.036, incl	Over 0.51 to 0.91, incl	3
Over 0.036 to 0.064, incl	Over 0.91 to 1.63, incl	4
Over 0.064 to 0.128, incl	Over 1.63 to 3.25, incl	5
Over 0.128 to 0.249, incl	Over 3.25 to 6.32, incl	6
Over 0.249 to 0.499, incl	Over 6.32 to 12.67, incl	7

3.3.3 Response to Heat Treatment

3.3.3.1 Response to Heat Treatment (T62 Condition)

When specified, the product, as received by purchaser, shall, without the subsequent imposition of cold working or forming operations, develop these properties after being solution heat treated and aged in accordance with AMS2772 to the -T62 condition (refer to ANSI H35.1/H35).

3.3.3.1.1 Tensile properties shall be as shown in Table 4.

Table 4A - Minimum tensile properties, inch/pound units

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
0.006 to 0.007, incl	42.0	35.0	4
Over 0.007 to 0.009, incl	42.0	35.0	6
Over 0.009 to 0.020, incl	42.0	35.0	8
Over 0.020 to 0.499, incl	42.0	35.0	10
Over 0.499 to 1.000, incl	42.0	35.0	9
Over 1.000 to 2.000, incl	42.0	35.0	8
Over 2.000 to 4.000, incl	42.0	35.0	6

Table 4B - 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
0.15 to 0.18, incl	290	241	4
Over 0.18 to 0.23, incl	290	241	6
Over 0.23 to 0.51, incl	290	241	8
Over 0.51 to 12.67, incl	290	241	10
Over 12.67 to 25.40, incl	290	241	9
Over 25.40 to 50.80, incl	290	241	8
Over 50.80 to 101.60, incl	290	241	6

3.3.3.1.2 Product 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 direction of rolling.

3.3.3.2 Response to Heat Treatment (T42 Condition)

When specified, the product, as received by purchaser, shall, without the subsequent imposition of cold working or forming operations, develop these properties after proper solution heat treatment and natural aging in accordance with AMS2772 to the -T42 condition (refer to ANSI H35.1/H35.1M).

3.3.3.2.1 Aging Period Before Testing

Specimens in the T42 condition will not be required to be tested within 4 days after completion of the solution heat treatment. If, within this period, the manufacturer elects to test specimens, which thereupon fail to meet the requirements, they can discard these original test results and test additional specimens selected after 4 days of aging. These specimens shall be selected from the same location in the production lot or sample as those tested previously in accordance with AMS2355.

3.3.3.2.2 Tensile properties shall be as shown in Table 5.

Table 5A - Minimum tensile properties, inch/pound units

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
Over 0.006 to 0.007, incl	30.0	14.0	10
Over 0.007 to 0.009, incl	30.0	14.0	12
Over 0.009 to 0.020, incl	30.0	14.0	14
Over 0.020 to 0.249, incl	30.0	14.0	16
Over 0.249 to 1.000, incl	30.0	14.0	18
Over 1.000 to 3.000, incl	30.0	14.0	16

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
0.15 to 0.18, incl	207	97	10
Over 0.18 to 0.23, incl	207	97	12
Over 0.23 to 0.51, incl	207	97	14
Over 0.51 to 6.32, incl	207	97	16
Over 6.32 to 25.40, incl	207	97	18
Over 25.40 to 76.20, incl	207	97	16

3.3.3.2.3 Product 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 product with axis of bend parallel to direction of rolling.

Table 6 - Bending parameters

Nominal Thickness Inches	Nominal Thickness Millimeters	Bend Factor
0.006 to 0.020, incl	0.15 to 0.51, incl	2
Over 0.020 to 0.036, incl	Over 0.51 to 0.91, incl	3
Over 0.036 to 0.064, incl	Over 0.91 to 1.63, incl	3
Over 0.064 to 0.128, incl	Over 1.63 to 3.25, incl	3
Over 0.128 to 0.249, incl	Over 3.25 to 6.32, incl	3
Over 0.249 to 0.499, incl	Over 6.32 to 12.67, incl	4

3.3.4 Mechanical property requirements for sheet and plate outside the thickness range of 1.1 shall be as agreed upon by purchaser and producer and reported per 4.4.1.

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 ANSI H35.2 or ANSI H35.2M.

3.6 Exceptions

Any exceptions shall be authorized by purchaser and reported as in 4.4.1.

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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements of this specification.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (3.1), tensile properties (3.3.1), and tolerances (3.5) are acceptance tests and, except for composition, shall be performed on each lot.