

Aluminum Alloy Sheet and Plate
(2014; -T6 Sheet, -T651 Plate)
Solution and Precipitation Heat Treated

(Composition similar to UNS A92014)

RATIONALE

AMS4029L revises Condition (3.2) and Packaging (5.2), and is a Five Year Review and update of this specification.

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 structural parts of good strength, 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; 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.

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.

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

ARP823 Minimizing Stress-Corrosion Cracking in Wrought Heat-Treatable Aluminum Alloy Products

AS1990 Aluminum Alloy Tempers

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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 Products

2.3 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

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 shown in Table 1, determined in accordance with AMS2355.

TABLE 1 - COMPOSITION

Element	min	max
Silicon	0.50	1.2
Iron	--	0.7
Copper	3.9	5.0
Manganese	0.40	1.2
Magnesium	0.20	0.8
Chromium	--	0.10
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 in accordance with AMS2772 to the T6 temper (See AS1990).

3.2.2 Plate

Solution heat treated, stretched to produce a nominal permanent set of 2% but not less than 1-1/2% nor more than 3%, and precipitation heat treated to T651 (See AS1990). Both solution heat treatment and precipitation heat treatment shall be in accordance with AMS2772.

3.2.2.1 Plate shall receive no further straightening operations after stretching.

3.3 Properties

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

3.3.1 Tensile Properties

Shall be as specified 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 %
0.020 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
Over 1.000 to 2.000, incl	67.0	59.0	4
Over 2.000 to 2.500, incl	65.0	58.0	2
Over 2.500 to 3.000, incl	63.0	57.0	2
Over 3.000 to 4.000, incl	59.0	55.0	1

TABLE 2B - 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 %
0.51 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
Over 25.40 to 50.80, incl	462	407	4
Over 50.80 to 63.50, incl	448	400	2
Over 63.50 to 76.20, incl	434	393	2
Over 76.20 to 101.60, incl	407	379	1

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 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

3.4 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.

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.

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.

4.2.2 Periodic Tests

Bending (3.3.2) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing

Shall be in accordance with AMS2355.

4.4 Reports

The vendor of product shall furnish with each shipment a report stating that the product conforms to the composition and tolerances and showing numerical results of tests for the other acceptance test requirements and periodic test requirements when performed. This report shall include the purchase order number, inspection lot number(s), AMS4029L, size, and quantity. The report shall also identify the producer, the product form, and the size of the mill product.

4.5 Resampling and Retesting

Shall be in accordance with AMS2355.

5. PREPARATION FOR DELIVERY

5.1 Identification

Shall be in accordance with ASTM B 666/B 666M.