AEROSPACE MATERIAL SPECIFICATION

AMS4613™	REV. B
Issued 2011-07 Revised 2022-11 Superseding AMS4613A	

Aluminum Alloy, Sheet and Plate
6.3Cu - 0.30Mn - 0.06Ti - 0.10V - 0.18Zr
Solution Heat Treated, Cold Worked (8%) and Precipitation Heat Treated (2219 -T87)
(Composition similar to UNS A92219)

RATIONALE

AMS4613B results from a Five-Year Review and update of this specification with changes to update language to prohibit unauthorized exceptions (3.3.1.1, 3.5, 8.4), update applicable documents (Section 2) and ordering information (8.5), relocate statement regarding statistical properties (3.3.1.2), and allow the use of the immediate prior specification revision (8.3).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of sheet and plate from 0.020 to 5.000 inches (0.51 to 127.00 mm), inclusive, in nominal thickness (see 8.5).

1.2 Application

These products have been used typically for parts requiring high strength up to 500 °F (260 °C), but usage is not limited to such applications. Material may be welded in the specified condition, but properties are improved by reheat treatment after welding. Reheat treatment after welding, however, may reduce resistance to stress-corrosion cracking.

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.

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/AMS4613B/

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

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

AS7766 Terms Used in Aerospace Metals Specifications

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 B594 Ultrasonic Inspection of Aluminum-Alloy Wrought Products

ASTM B666/B666M Identification Marking of Aluminum and Magnesium Products

2.3 ANSI Accredited Publications

Copies of these documents are available online at https://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)

2.4 Definitions

Terms used in AMS are defined in AS7766.

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	--	0.20
Iron	--	0.30
Copper	5.8	6.8
Manganese	0.20	0.40
Magnesium	--	0.02
Zinc	--	0.10
Titanium	0.02	0.10
Vanadium	0.05	0.15
Zirconium	0.10	0.25
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition

Product shall be supplied in the T87 condition. All heat treatment shall be performed in accordance with AMS2772.

3.2.1 Sheet and Plate

Solution heat treated, cold worked to produce a nominal permanent set of 8%, and precipitation heat treated to temper T87 (refer to ANSI H35.1/H35.1M).

3.2.1.1 Plate shall receive no further straightening operations after stretching.

3.3 Properties

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

3.3.1 Tensile Properties

Shall be as shown in Table 2 (see 3.3.1.2). All values are minimum, unless otherwise specified.

Table 2A - Tensile properties, inch/pound units

Temper	Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
T87	0.020 to 0.039, incl	64.0	52.0	5
	Over 0.039 to 0.249, incl	64.0	52.0	6
	Over 0.249 to 1.000, incl	64.0	51.0	7
	Over 1.000 to 3.000, incl	64.0	51.0	6
	Over 3.000 to 4.000, incl	62.0	50.0	4
	Over 4.000 to 5.000, incl	61.0	49.0	3

Table 2B - Tensile properties, SI units

Temper	Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
T87	0.51 to 0.99, incl	441	359	5
	Over 0.99 to 6.32, incl	441	359	6
	Over 6.32 to 25.40, incl	441	352	7
	Over 25.40 to 76.20, incl	441	352	6
	Over 76.20 to 101.60, incl	427	345	4
	Over 101.60 to 127.00, incl	421	338	3

3.3.1.1 Mechanical property requirements for product outside of the range covered by Table 2 shall be agreed upon between purchaser and producer and reported per 4.4.1 (see 8.5).

3.3.1.2 Properties in Tables 2 were not substantiated according to AMS statistical analysis procedures, but were taken from U.S. Federal Specification QQ-A-250/30.

3.3.2 Stress-Corrosion Cracking Resistance

Specimen, cut from plate 0.750 inch (19.05 mm) and over in nominal thickness, supplied in the T87 condition, shall show no evidence of stress-corrosion cracking when stressed in the short-transverse direction (perpendicular to grain flow) to 75% of the yield strength shown in Table 2.

3.4 Quality

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.

3.4.1 When specified, plate 0.500 inch (12.70 mm) and over in thickness shall be subjected to ultrasonic inspection in accordance with ASTM B594, Class A (see 8.5).

3.4.2 Tolerances

Shall conform to all applicable requirements of ANSI H35.2 or ANSI H35.2M.

3.5 Exceptions

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

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for producer'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), tolerances (3.5), and, when specified, ultrasonic inspection (3.4.1) are acceptance tests and, except for composition, shall be performed on each inspection lot.

4.2.2 Periodic Tests

Stress-corrosion cracking resistance (3.3.2) is a periodic test and shall be performed at a frequency selected by the producer unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing

Shall be in accordance with AMS2355.

4.4 Reports

The producer of the product shall furnish with each shipment a report stating that the product conforms to the composition, tolerances, and ultrasonic testing when specified, and showing the numerical results of tests on each inspection lot to determine conformance to the other acceptance test requirements. This report shall include the purchase order number, inspection lot numbers, condition, AMS4613B, size, and quantity. The report shall also identify the producer, the product form, and the size of the mill product.

4.4.1 When material produced to this specification is beyond the sizes allowed in the scope or tables, or other exceptions are taken to the technical requirements listed in Section 3 (see 5.1.1), the report shall contain a statement "This material is certified as AMS4613B(EXC) because of the following exceptions:" and the specific exceptions shall be listed.

4.5 Resampling and Retesting

Shall be in accordance with AMS2355.