SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS4252 | REV. B

Issued 1989-10
Revised 2005-03
Reaffirmed 2012-04

Superseding AMS4252A

Aluminum Alloy, Plate
6.4Zn - 2.4Mg - 2.2Cu - 0.12Zr (7150-T7751)
Solution Heat Treated, Stress Relieved, and Overaged
(Composition Similar to UNS A97150)

RATIONALE

AMS4252B has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of plate.

1.2 Application:

This plate has been used typically for structural applications requiring a combination of high tensile strength and compressive properties and good exfoliation corrosion resistance, 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, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org

AMS 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
AMS 2772	Heat Treatment of Aluminum Alloy Raw Materials

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

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4252B

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM B 594	Ultrasonic Examination of Aluminum-Alloy Wrought Products for Aerospace Applications
ASTM B 666/B 666M	Identification Marking of Aluminum and Magnesium Products
ASTM B 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM E 9	Compression Testing of Metallic Materials at Room Temperature

2.3 ANSI Publications:

Available from ANSI, 25 West 43rd Street, New York, NY 10036 or www.ansi.org.

ANSI H35.2M	Dimensional Tolerances for Aluminum Mill Products (Metric)
ANSI H35.2	Dimensional Tolerances for Aluminum Mill Products

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS 2355:

TABLE 1 - Composition

Element	min	max
Silicon	--	0.12
Iron	--	0.15
Copper	1.9	2.5
Manganese	--	0.10
Magnesium	2.0	2.7
Chromium	--	0.04
Zinc	5.9	6.9
Titanium	--	0.06
Zirconium	0.08	0.15
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition:

Solution heat treated, stretched to produce a nominal permanent set of 2% but not less than 1-1/2% nor more than 3%, and overaged.

3.3 Heat Treatment:

Plate shall be solution heat treated in accordance with AMS 2772. Overaging shall be performed at a temperature, for a time, and cooling as required to meet requirements of 3.4 (See 8.2).

3.4 Properties:

Plate shall conform to the following requirements, determined on the mill product size in accordance with AMS 2355 except as specified in 3.4.2.

3.4.1 Tensile Properties: Shall be as shown in Table 2.

TABLE 2A - Minimum Tensile Properties, Inch/Pound Units

Nominal Thickness Inches	Specimen Orientation	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
0.250 to 0.500, excl	Longitudinal	80.0	74.0	8
	Long-Transverse	80.0	74.0	8
0.500 to 0.750, excl	Longitudinal	83.0	77.0	8
	Long-Transverse	83.0	76.0	8
0.750 to 1.500, incl	Longitudinal	84.0	78.0	8
	Long-Transverse	84.0	77.0	8
Over 1.500 to 3.000, incl	Longitudinal	82.0	76.0	7
	Long-Transverse	82.0	75.0	6
	Short-Transverse	77.0	67.0	1

TABLE 2B - Minimum Tensile Properties, SI Units

Nominal Thickness Millimeters	Specimen Orientation	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
6.35 to 12.70, excl	Longitudinal	552	510	8
	Long-Transverse	552	510	8
12.70 to 19.05, excl	Longitudinal	572	531	8
	Long-Transverse	572	524	8
19.05 to 38.10, incl	Longitudinal	579	538	8
	Long-Transverse	579	531	8
Over 38.10 to 76.20, incl	Longitudinal	565	524	7
	Long-Transverse	565	517	6
	Short-Transverse	531	462	1

3.4.2 Compressive Yield Strength: When specified, the longitudinal compressive strength, determined in accordance with ASTM E 9, shall be as shown in Table 3.

TABLE 3 - Minimum Compressive Yield Strength

Nominal Thickness Inches	Nominal Thickness Millimeters	Compressive Yield Strength ksi	Compressive Yield Strength MPa
0.500 to 0.750, excl	12.70 to 19.05, excl	76.0	524
0.750 to 1.500, incl	19.05 to 38.10, incl	77.0	531
Over 1.500 to 3.000, incl	Over 38.10 to 76.20, incl	75.0	517

3.4.3 Corrosion Resistance:

3.4.3.1 Exfoliation-Corrosion Resistance: Specimens from plate shall show exfoliation corrosion equal to or less than EB when tested at the T/10 plane.

3.4.3.2 Stress-Corrosion Cracking: Specimens, cut from plate 0.750 inch (19.05 mm) and over in nominal thickness, shall show no evidence of stress-corrosion cracking when stressed in the short-transverse direction to 25.0 ksi (172 MPa).

3.4.4 Fracture Toughness: When specified, plane-strain fracture toughness (K_{IC}) for the L-T and T-L specimen orientations shall be not lower than the values shown in Table 4 for plate 0.750 to 3.000 inches (19.05 to 76.20 mm) in nominal thickness. Fracture toughness values for plate 0.500 to 0.749 inch (12.70 to 19.02 mm) in nominal thickness shall be reported.

TABLE 4 - Fracture Toughness Values

Nominal Thickness Inches	Nominal Thickness Millimeters	Specimen Orientation	K_{IC} ksi $\sqrt{in}$	K_{IC} MPa $\sqrt{m}$
0.750 to 1.000, incl	19.05 to 25.40, incl	L-T	20	22.0
		T-L	18	19.8
Over 1.000 to 1.500, incl	Over 25.40 to 38.10, incl	L-T	22	24.2
		T-L	20	22.0
Over 1.500 to 3.000, incl	Over 38.10 to 76.20, incl	L-T	21	23.1
		T-L	19	20.9

3.5 Quality:

Plate, 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 plate.

3.5.1 Each plate 0.500 inch (12.70 mm) and over in nominal thickness shall be ultrasonically inspected in accordance with ASTM B 594 and shall meet ultrasonic Class A requirements.

3.6 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 plate 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 plate conforms to specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Composition (3.1), long-transverse tensile properties (3.4.1), exfoliation corrosion resistance (3.4.3.1), ultrasonic soundness (3.5.1), tolerances (3.6), and, when specified, longitudinal tensile properties (3.4.1), compressive yield strength (3.4.2), and fracture toughness (3.4.4) are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests: Stress-corrosion cracking (3.4.3.2) 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 AMS 2355.

4.4 Reports:

The vendor of the product shall furnish with each shipment a report stating the product conforms to the composition, showing the numerical results of tests on each inspection lot to determine conformance to the acceptance test requirements and stating that the product conforms to any other technical requirements. This report shall include the purchase order number, inspection lot number, AMS 4252B, size, and quantity. The report shall include the identity of the producer, the mill product form and the size of the mill product.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2355.

5. PREPARATION FOR DELIVERY:

5.1 Identification:

Shall be in accordance with ASTM B 666.