SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS4206 REV. B

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Superseding AMS4206A

Aluminum Alloy, Plate (7055-T7751)
8.0Zn - 2.3Cu - 2.0Mg - 0.16Zr
Solution Heat Treated, Stress Relieved, and Overaged

(Composition similar to UNS A97055)

RATIONALE

AMS4206B results from a Five Year Review and update of this specification.

1. SCOPE

1.1 Form

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

1.2 Application

This product has been used typically for parts requiring a high level of mechanical properties and moderate 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 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

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/AMS4206B

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 594	Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications
ASTM B 645	Linear-Elastic Plane Strain Fracture Toughness Testing of Aluminum Alloys
ASTM B 666/B666M	Identification Marking of Aluminum and Magnesium Products
ASTM E 399	Linear-Elastic Plane-Strain Fracture Toughness K_{Ic} of Metallic Materials
ASTM E 561	K-R Curve Determination
ASTM G 34	Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO Test)

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	--	0.10
Iron	--	0.15
Copper	2.0	2.6
Manganese	--	0.05
Magnesium	1.8	2.3
Chromium	--	0.04
Zinc	7.6	8.4
Titanium	--	0.06
Zirconium	0.08	0.25
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition

Solution heat treated, stress relieved by stretching to produce a nominal permanent set of 1.5%, but not less than 1% nor more than 3%, and overaged.

3.2.1 Product shall receive no further straightening operations after stretching.

3.3 Heat Treatment

Shall be in accordance with AMS2772 and as follows:

3.3.1 Overaging Heat Treatment

Overaging shall be performed at a specific temperature and time as required to meet requirements of 3.4 (See 8.2).

3.4 Properties

The product shall conform to the following requirements, determined in accordance with AMS2355 except as specified in 3.4.5.

3.4.1 Tensile Properties

Shall be as specified in Table 2.

TABLE 2A - MINIMUM TENSILE PROPERTIES, INCH/POUND UNITS

Nominal Thickness Inch	Specimen Orientation	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 inches or 4D %
0.500 to 1.500, incl	Long-Transverse	89.0	85.0	8
	Longitudinal	89.0	86.0	7

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 5D %
12.70 to 38.10, incl	Long-Transverse	614	586	8
	Longitudinal	614	593	7

3.4.2 Longitudinal compressive yield strength, when specified, shall be 86.0 ksi (593 MPa), minimum.

3.4.3 Exfoliation Corrosion Test

The product shall exhibit exfoliation-corrosion at a T/10 plane not greater than that illustrated by Photograph EB, Figure 2, of ASTM G 34.

3.4.4 Fracture Toughness

The product shall meet the values of K_{Ic} specified in Table 3, determined using full thickness specimen configurations conforming to ASTM E 399 and ASTM B 645.

TABLE 3 - Fracture Toughness Parameters

Specimen Orientation	Nominal Thickness Inches	Nominal Thickness Millimeters	Minimum K_{Ic} ksi$\sqrt{\text{inch}}$	Minimum K_{Ic} MPa$\sqrt{\text{m}}$
L-T	0.750 to 1.250, incl	19.05 to 31.75, incl	22.0	24.2
L-T	Over 1.250 to 1.500, incl	Over 31.75 to 38.1, incl	21.0	23.1

3.4.4.1 Product with as-rolled thickness less than 0.750 inch (19.05 mm) shall be tested in the L-T orientation using a 16 inch wide (406 mm) panel with a plane-stress fracture toughness (K_c) minimum of 60.0 ksi$\sqrt{inch}$ (417 Mps$\sqrt{m}$) determined using ASTM E 561.

3.5 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.

3.5.1 Each product shall be ultrasonically inspected in accordance with ASTM B 594 and shall meet the following requirements:

3.5.1.1 Products 0.500 to 1.500 inches (12.70 to 38.10 mm), inclusive, in nominal thickness shall meet the requirements for ultrasonic class A in accordance with ASTM B 594.

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 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), long-transverse and longitudinal tensile properties (3.4.1), fracture toughness (3.4.4), ultrasonic soundness (3.5.1), dimensional tolerances (3.6) and, when specified, longitudinal compressive yield strength (3.4.2), are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests

Exfoliation-corrosion resistance (3.4.3) 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 and the following.

4.3.1 Tensile specimens shall be taken at the T/2 location with the axis of specimens in the long-transverse and in the longitudinal direction.

4.4 Reports

The vendor of product shall furnish with each shipment a report stating that the product conforms to the composition, tolerances and ultrasonic inspection; and showing the numerical results of tests on each inspection lot to determine conformance to the other acceptance test requirements and to the periodic test, if performed. This report shall include the purchase order number, inspection lot number(s), AMS4206B, size and quantity.