AEROSPACE MATERIAL SPECIFICATION

AMS4206™	REV. D
Issued 1999-01 Revised 2023-09 Superseding AMS4206C	

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

AMS4206D results from a Five-Year Review and update of this specification with changes to update wording to prohibit unauthorized exceptions (see 3.4.5, 3.7, and 8.5), update Applicable Documents (see Section 2), and allow the use of the immediate prior specification revision (see 8.4).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of plate 0.500 to 1.500 inches (12.70 to 38.10 mm), inclusive, in thickness (see 8.6).

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 +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

AS7766 Terms Used in Aerospace Metals Specifications

2.2 ANSI Accredited Publications

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

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/AMS4206D/

ANSI H35.2 Dimensional Tolerances for Aluminum Mill Products

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

2.3 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 B645 Linear-Elastic Plane-Strain Fracture Toughness Testing of Aluminum Alloys

ASTM B646 Fracture Toughness Testing of Aluminum Alloys

ASTM B666/B666M Identification Marking of Aluminum and Magnesium Products

ASTM E399 Linear-Elastic Plane-Strain Fracture Toughness of Metallic Materials

ASTM E561 K-R Curve Determination

ASTM G34 Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO Test)

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	--	0.10
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.

3.4.1 Tensile Properties

Shall be as specified 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 %
0.500 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 Compressive Yield Strength

When specified, longitudinal compressive yield strength 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 G34.

3.4.4 Fracture Toughness

3.4.4.1 Plane-Strain Fracture Toughness

Plane-strain fracture toughness shall be tested in the L-T orientation in accordance with ASTM E399 and ASTM B645 for plate 0.750 to 1.500 inches (19.05 to 38.1 mm), inclusive, in nominal thickness. A valid K_{Ic} meeting the requirements of ASTM E399 or a K_Q "useable for lot release" in accordance with ASTM B645 shall meet or exceed the values specified in Table 3.

Table 3 - Plane-strain fracture toughness parameters

Specimen Orientation	Nominal Thickness Inches	Nominal Thickness Millimeters	Minimum K_{Ic} or K_Q "Useable for Lot Release" ksi √inch	Minimum K_{Ic} or K_Q Useable for Lot Release" MPa √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

3.4.4.2 Plane-stress fracture Toughness

For plate less than 0.750 inches (19.05 mm), plane-stress fracture toughness (K_c) shall be tested in accordance with ASTM E561 and ASTM B646. Plane-stress fracture toughness (K_c) shall meet or exceed the values specified in Table 4.

Table 4 - Plane-stress fracture toughness parameters

Specimen Orientation	Nominal Thickness Inches	Nominal Thickness Millimeters	Minimum K_c ksi √inch	Minimum K_c MPa √m
L-T	Less than 0.750	Less than 19.05	60.0	65.9

3.4.5 Mechanical property requirements for product outside of the range covered by 1.1 shall be agreed upon between the purchaser and producer and reported per 4.4.1 (see 8.6).

3.5 Quality

The product, as received by the 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 B594 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 B594.

3.6 Tolerances

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

3.7 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 the producer's tests and shall be responsible for the performance of all required tests. The 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 (see 3.1), long-transverse and longitudinal tensile properties (see 3.4.1), fracture toughness (see 3.4.4), ultrasonic soundness (see 3.5.1), dimensional tolerances (see 3.6), and, when specified, longitudinal compressive yield strength (see 3.4.2) are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests

Exfoliation-corrosion resistance (see 3.4.3) is a periodic test and shall be performed at a frequency selected by the producer unless frequency of testing is specified by the purchaser.