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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4206

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Submitted for recognition as an American National Standard

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

UNS A97055

1. SCOPE:

1.1 Form:

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

1.2 Application:

This product has typically been used 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 following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2355 Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings

MAM 2355 Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings, Metric (SI) Units

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 594	Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications
ASTM E 399	Plane Strain Fracture Toughness of Metallic Materials
ASTM B 645	Plane Strain Fracture Toughness Testing of Aluminum Alloys
ASTM E 561	Practice for R-Curve Determination
ASTM G 34-72	Exfoliation Corrosion Susceptibility in 2xxx and 7xxx Series Aluminum Alloys (EXCO Test)
ASTM B 666/B666M	Identification Marking of Aluminum and Magnesium Products

2.3 ANSI Publications:

Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ANSI H35.2	Dimensional Tolerances for Aluminum Mill Products
ANSI H35.2(M)	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 AMS 2355 or MAM 2355.

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 AMS 2772 and as follows:

3.3.1 Solution Heat Treatment: Heat to 860 to 900 °F (460 to 482 °C), hold at heat for a time commensurate with product thickness, rapidly cool in a suitable quenching medium.

3.3.2 Overaging Heat Treatment: Overaging shall be performed at a specific temperature and time as required to meet requirements of 3.4 (See 8.1).

3.4 Properties:

The product shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355 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 %
12.7 to 38.1, 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 34-72.

3.4.4 Fracture Toughness: The product shall meet the values of K_{1c} 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} $ksi\sqrt{inch}$	Minimum K_{Ic} $Mpa\sqrt{m}$
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 (19.1 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 $Mpa\sqrt{m}$) 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 (12.7 to 38.1 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 H35.2(M).

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 the specified requirements.