SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4337 | REV. A

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Superseding AMS 4337

Aluminum Alloy, Extruded Profiles (7055-T77511)
8.0Zn - 2.3Cu - 2.0Mg - 0.16Zr
Solution Heat Treated, Stress Relieved, and Overaged

(Composition similar to UNS A97055)

RATIONALE

This document 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 extruded profiles (shapes).

1.2 Application

This product has been used typically for structural applications requiring a combination of high mechanical properties and good resistance to exfoliation corrosion, 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.

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
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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/AMS4337A

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 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM G 34	Exfoliation Corrosion Susceptibility in 2xxx and 7xxx Series Aluminum Alloys (EXCO Test)
ASTM B 666/B666M	Identification Marking of Aluminum Products

2.3 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036, 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 AMS 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% or more than 3%, and overaged.

3.2.1 Product shall be supplied with an as-extruded surface finish; light polishing to remove minor surface imperfections is permissible provided such imperfections can be removed within the dimensional tolerances.

3.2.2 Product may receive minor straightening, after stretching, of an amount necessary to meet the requirements of 3.6.

3.3 Heat Treatment

Shall be in accordance with AMS 2772 and as follows:

3.3.1 Overaging Heat Treatment

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

3.4 Properties

Product shall conform to the following requirements, determined in accordance with AMS 2355 on the mill produced size.

3.4.1 Longitudinal and long transverse tensile properties of extrusions, with a maximum cross-sectional area of 20 square inches (129 cm^2) and a maximum circle size of 10 inches (254 mm), shall be as specified in Table 2A or 2B.

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	Longitudinal	94.0	90.0	9
	Long-Transverse	88.0	84.0	5

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 %
12.7 to 38.1, incl	Longitudinal	648	621	9
	Long-Transverse	607	579	5

3.4.2 Longitudinal compressive yield strength, when specified, shall be 92.0 Ksi (634 MPa), minimum.

3.4.3 Electrical Conductivity

Shall be not lower than 35.5% IACS (International Annealed Copper Standard) (20.6 MS/m), determined on the surface of the test coupon prior to turning.

3.4.4 Exfoliation Corrosion Resistance

Specimens cut from extrusions and tested per ASTM G 34 shall not exhibit exfoliation corrosion at a T/10 plane greater than that illustrated by Photograph B, Figure 2, of ASTM G 34.

3.4.5 Residual Strength

The net area residual strength of the product (with sufficient size to accommodate the test specimen), when tested in ambient air, shall be not lower than 45 ksi (310 MPa).

3.4.5.1 Test Specimen

Shall be a 4-inch (102-mm) wide by 0.25 inch (6.4-mm) thick center cracked panel machined from the mid-thickness of the extruded leg. The length of the specimen shall be such that the central 11.0 inches (279 mm) are exposed between test machine grips. The center notch shall consist of a 0.1875 inch (4.8-mm) drilled central hole, a 0.75 inch (19.0-mm) long center cut 0.062 inch (1.6-mm) wide, and extension cuts on both ends of approximately 0.125 inch (3.2-mm) length and maximum width of 0.012 inch (0.3 mm). The total length of the fabricated center notch should be approximately 1.0 inch (25 mm).

3.4.5.2 Test Procedure

Measure panel width, thickness and total crack length to the nearest 0.001 inch (0.025 mm); fatigue precrack from a 1.0 to 1.1-inch (25 to 28-mm) long center notch to a total crack length of 1.25 inches (31.8 mm), using constant amplitude cycling (f=5 Hz, R=+0.06) and a maximum gross area stress of 15.3 ksi (106 MPa); ramp load to fracture at a rate of 1.0 gross ksi per second (6.9 MPa/s); determine the total non-precracked cross-sectional area after fracture; calculate the peak net area stress at fracture (Residual Strength) and record to ±0.1 ksi (0.7 MPa).

3.5 Quality

Products, 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 extrusions.

3.5.1 When specified, each extruded profile (shape) shall be subjected to ultrasonic inspection in accordance with ASTM B 594 and shall meet the following requirements:

3.5.1.1 Each extruded profile (shape) weighing 600 pounds (272 kg) and under and having a maximum width-to-thickness ratio of 10:1 shall meet ultrasonic class B requirements, as described in ASTM B 594.

3.5.1.2 The ultrasonic class for all tubing and for other extruded profiles weighing over 600 pounds (272 kg), or in excess of 10:1 maximum width-to-thickness ratio shall be as agreed upon by purchaser and vendor.

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 products 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 products conform to the specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (3.1), tensile properties (3.4.1), electrical conductivity (3.4.3), tolerances (3.6), and when specified, ultrasonic soundness (3.5.1) are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests

Tests for exfoliation-corrosion resistance (3.4.4) and residual strength (3.4.5) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.