AEROSPACE MATERIAL SPECIFICATION

AMS4337™	REV. C

Issued 1998-11
Reaffirmed 2011-11
Revised 2023-12

Superseding AMS4337B

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

AMS4337C results from a Five-Year Review and update of this specification with changes to update wording to prohibit unauthorized exceptions (see 3.4.3, 3.7, 4.4.1, and 8.5), relocate Definitions (see 2.4), update Applicable Documents (see Section 2 and 3.2) and Ordering Information (see 8.7), and allow the use of the immediate prior specification revision (see 8.6).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of extruded profiles (shapes) 0.500 to 1.500 inch (12.7 to 38.1 mm), inclusive, in nominal thickness, and having a maximum cross-sectional area of 20 square inches (129 cm^2) and a maximum circle size of 10 inches (254 mm) (see 8.7).

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 +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

AMS2772 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**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS4337C

AS7766 Terms Used in Aerospace Metals Specifications

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 B594 Ultrasonic Inspection of Aluminum-Alloy Wrought Products

ASTM B660 Packaging/Packing of Aluminum and Magnesium Products

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

ASTM B666/B666M Identification Marking of Aluminum and Magnesium Products

2.3 ANSI Accredited Publications

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

ANSI H35.1/H35.1M Standard Alloy and Temper Designation System for Aluminum

ANSI H35.2 Dimensional Tolerances for Aluminum Mill Products

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

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% or more than 3%, and overaged (refer to ANSI H35.1/H35.1M).

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 AMS2772 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 AMS2355 on the mill produced size.

3.4.1 Tensile Properties

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 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	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 Compressive Yield Strength

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

3.4.3 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 8.7).

3.4.4 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.

3.4.5 Exfoliation Corrosion Resistance

Specimens cut from extrusions and tested per ASTM G34 shall not exhibit exfoliation corrosion at a T/10 plane greater than that illustrated by Photograph B, Figure 2, of ASTM G34.

3.4.6 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).

3.4.6.1 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).

3.4.6.2 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 the 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 B594 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 B594.

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 producer (see 8.7).

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 products 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 products conform to the specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (see 3.1), tensile properties (see 3.4.1), electrical conductivity (see 3.4.4), tolerances (see 3.6), and, when specified, compressive yield strength (see 3.4.2) and ultrasonic soundness (see 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 (see 3.4.5) and residual strength (see 3.4.6) are periodic tests and shall be performed at a frequency selected by the producer unless frequency of testing is specified by the purchaser.