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INTERNATIONAL
400 Commonwealth Drive. Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4343C

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Superseding AMS 4343B

Submitted for recognition as an American National Standard

ALUMINUM ALLOY, EXTRUSIONS
7.7Zn - 2.4Mg - 1.6Cu - 0.16Cr (7149-T73511)
Solution Heat Treated, Stress Relieved by Stretching, and Overaged

UNS A97149

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of extruded bars, rods, wire, shapes, and tubing.

1.2 Application:

These extrusions have been used typically for structural parts requiring a combination of high strength, moderate fatigue strength, good stress-corrosion resistance, and good fracture toughness, 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

AMS 2811 Identification, Aluminum and Magnesium Alloy Wrought Products

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 B 660 Packaging/Packing of Aluminum and Magnesium Products
ASTM E 399 Plane-Strain Fracture Toughness of Metallic Materials

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-H-6088 Heat Treatment of Aluminum Alloys

2.4 ANSI Publications:

Available from American National Standards Institute, Inc, 11 West 42nd Street, New York, NY 10036-8002.

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 or MAM 2355.

TABLE 1 - Composition

Element	min	max
Zinc	7.2	8.2
Magnesium	2.0	2.9
Copper	1.2	1.9
Chromium	0.10	0.22
Iron	--	0.20
Manganese	--	0.20
Silicon	--	0.15
Titanium	--	0.10
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

3.2 Condition:

(R)

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 to the -T73511 temper. Solution and overaging heat treatments shall be in accordance with MIL-H-6088.

3.2.1 Extrusions may receive minor straightening, after stretching, of an amount necessary to meet the tolerance requirements of 3.5.

3.2.2 Extrusions 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.

3.3 Properties:

(R)

Extrusions shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355:

3.3.1 Tensile Properties: Shall be as shown in Table 2.

TABLE 2A - Minimum Tensile Properties, Inch/Pound Units

Nominal Diameter or Least Thickness (bars, rods, wire, shapes) or Nominal Wall Thickness (tubing) Inches	Specimen Orientation	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 inches or 4D %
Up to 2.999, incl	Longitudinal	74.0	64.0	7
	Long-Trans.	70.0	60.0	5
2.500 to 2.999, incl	Short-Trans.	70.0	60.0	5
Over 2.999 to 5.000, incl	Longitudinal	72.0	62.0	7
	Long-Trans.	68.0	58.0	5
	Short-Trans.	68.0	58.0	5

TABLE 28 - Minimum Tensile Properties, SI Units

Nominal Diameter or Least Thickness (bars, rods, wire, shapes) or Nominal Wall Thickness (tubing) Millimeters	Specimen Orientation	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Up to 76.17, incl	Longitudinal	510	441	7
	Long-Trans.	483	414	5
Over 63.50 to 76.17, incl	Short-Trans.	483	414	5
Over 76.17 to 127.00, incl	Longitudinal	496	427	7
	Long-Trans.	469	400	5
	Short-Trans.	469	400	5

3.3.2 Conductivity: Shall be not lower than 40.0% IACS (International Annealed Copper Standard) (23.2 MS/m).

3.3.2.1 If the conductivity is below 40.0% IACS (23.2 MS/m), the extrusions are not acceptable. Extrusions found to be unacceptable may be given additional overaging heat treatment; if, upon completion of such treatment, they develop conductivity conforming to 3.3.1 and 3.3.2, they shall be acceptable.

3.3.3 Stress-Corrosion Resistance: Specimens, cut from extrusions 0.750 inch (19.05 mm) and over in nominal diameter or section thickness, shall show no evidence of stress-corrosion cracking when stressed in the short-transverse (perpendicular to grain flow) direction to 65% of the specified minimum longitudinal (parallel to grain flow) yield strength.

3.3.4 Fracture Toughness: When specified, the minimum K_{Ic} shall be 26 ksi $\sqrt{\text{inch}}$ (28.6 MPa $\sqrt{\text{m}}$) in the longitudinal (LT) direction and 19 ksi $\sqrt{\text{inch}}$ (21 MPa $\sqrt{\text{m}}$) in the transverse (TL and ST) directions, determined in accordance with ASTM E 399. A compact tension specimen 1.000 inch ± 0.025 (25.40 mm ± 0.64) is recommended. Testing shall be in air at room temperature.

3.3.4.1 If a test is invalid due to any single ASTM validity criterion, the test shall be interpreted as having met the requirement if the calculated K_Q is equal to or higher than the minimum K_{Ic} required. If a test fails two ASTM validity requirements, one additional test shall be conducted before submittal to purchaser for disposition.

3.4 Quality:

Extrusions, 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.

3.4.1 (R) When specified, extrusions shall be subjected to ultrasonic inspection in accordance with ASTM B 594. Standards for acceptance shall be specified by the cognizant engineering organization.

3.5 Tolerances:

(R)

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 extrusions 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 extrusions conform to specified requirements.

4.2 Classification of Tests:

4.2.1 (R) Acceptance Tests: Composition (3.1), tensile properties (3.3.1), conductivity (3.3.2), fracture toughness (3.3.4) and ultrasonic inspection (3.4.1) when specified, and tolerances (3.5) are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests: Stress-corrosion resistance (3.3.3) 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 AMS 2355 or MAM 2355.

4.3.1 When specified, one fracture toughness specimen shall be tested for each orientation specified in 3.3.4.

4.4 Reports:

The vendor of extrusions shall furnish with each shipment a report stating that the extrusions conform to the chemical composition and other technical requirements. This report shall include the purchase order number, inspection lot number, AMS 4343C, size or section identification number, and quantity.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2355 or MAM 2355.