AEROSPACE MATERIAL SPECIFICATION

AMS4343™	REV. G

Issued 1980-01
Reaffirmed 2012-02
Revised 2024-01

Superseding AMS4343F

Aluminum Alloy, Extrusions
7.7Zn - 2.4Mg - 1.6Cu - 0.16Cr (7149-T73511)
Solution Heat Treated, Stress Relieved by Stretching, and Overaged
(Composition similar to UNS A97149)

RATIONALE

AMS4343G results from a Five-Year Review and update of this specification with changes to correct test orientations for Fracture Toughness (see 3.3.4), update wording to prohibit unauthorized exceptions (see 3.3.1.1, 3.6, and 8.4), relocate Definitions (see 2.4), update Applicable Documents (see Section 2), and allow use of the immediate prior revision of the specification (see 8.3).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of extruded bars, rods, wire, shapes, and tubing up to 5.000 inches, (127.00 mm), inclusive, in nominal diameter or least thickness (see 8.5).

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 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.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS4343G

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

AS7766 Terms Used in Aerospace Metals Specifications

2.2 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)

2.3 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 B660 Packaging/Packing of Aluminum and Magnesium Products

ASTM B666/B666M Identification Marking of Aluminum and Magnesium Products

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

ASTM G47 Determining Susceptibility to Stress-Corrosion Cracking of 2XXX and 7XXX Aluminum Alloy Products

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	--	0.15
Iron	--	0.20
Copper	1.2	1.9
Manganese	--	0.20
Magnesium	2.0	2.9
Chromium	0.10	0.22
Zinc	7.2	8.2
Titanium	--	0.10
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 to the -T73511 temper (refer to ANSI H35.1/H35.1M). Solution and overaging heat treatments shall be in accordance with AMS2772.

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

Extrusions, 5.000 inches (127.00 mm) and under in nominal diameter or thickness (wall thickness of tubing) shall conform to the following requirements, determined on the mill produced size in accordance with AMS2355:

3.3.1 Tensile Properties

Shall be as shown in Table 2A or 2B.

Table 2A - Minimum tensile properties, inch/pound units

Nominal Diameter or Least Thickness (Bars, Rods, Wire, Profiles) 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 2B - Minimum tensile properties, SI units

Nominal Diameter or Least Thickness (Bars, Rods, Wire, Profiles) 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

3.3.1.1 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 8.5).

3.3.2 Electrical 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 mechanical properties and a 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 tested in the short-transverse (perpendicular to grain flow) direction to 65% of the specified minimum longitudinal (parallel to grain flow) yield strength per ASTM G47.

3.3.4 Fracture Toughness

When specified, the minimum K_{Ic} shall be 26 ksi $\sqrt{\text{inch}}$ (29 MPa $\sqrt{\text{m}}$) in the L-T direction and 19 ksi $\sqrt{\text{inch}}$ (21 MPa $\sqrt{\text{m}}$) in the T-L and S-T directions, determined in accordance with ASTM E399. A compact tension specimen 1.000 inch ± 0.025 inch (25.40 mm ± 0.64 mm) is recommended. Testing shall be in air at room temperature (see 8.5).

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 the purchaser for disposition.

3.4 Quality

Extrusions, 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.

3.4.1 When specified, extrusions shall be subjected to ultrasonic inspection in accordance with ASTM B594. Standards for acceptance shall be specified by the cognizant engineering organization (see 8.5).

3.5 Tolerances

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

3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.1.