AEROSPACE MATERIAL SPECIFICATION

AMS4324™	REV. C

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Superseding AMS4324B

Aluminum Alloy, Extruded Rod, Bar and Profiles, 8.0Zn - 2.3Cu - 2.0Mg - 0.16Zr (7055-T74511), Solution Heat Treated, Stress-Relieved, and Overaged (Composition similar to UNS A97055)

RATIONALE

AMS4324C results from a Five-Year Review and update of this specification with changes to update wording to prohibit unauthorized exceptions (see 3.4.3, 4.4.1, and 8.5), remove obsolete weight criteria and clarify product size for Ultrasonic Testing (see 3.5.1), relocate Definitions (see 2.4), and update Applicable Documents (see Section 2).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of extruded bars, rods, and profiles (shapes) produced with a cross-sectional area of 24 square inches (155 cm^2), maximum, and a circumscribing circle (see 2.4.1) diameter (circle size) of 10.5 inches (267 mm), maximum, with a nominal thickness up to 3.000 inch (76.20 mm), inclusive (see 8.6).

1.2 Application

These extrusions have been used typically for machined parts 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

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https://www.sae.org/standards/content/AMS4324C/

AMS2772 Heat Treatment of Aluminum Alloy Raw Materials

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 B666/B666M Identification Marking of Aluminum and Magnesium Products

ASTM E1004 Determining Electrical Conductivity using the Electromagnetic (Eddy Current) Method

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

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

2.4.1 The circumscribing circle diameter is the diameter of the smallest circle, which completely encloses the cross section of the as-extruded product.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS2355.

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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

Extruded, solution heat treated, and 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 T74511 temper (refer to ANSI H35.1/H35.1M).

3.2.1 The product shall be supplied with an as-extruded surface finish; light polishing to remove minor surface conditions is permissible provided such conditions can be removed within specified dimensional tolerances.

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

3.3 Heat Treatment

Extrusions shall conform to the following requirements, determined on the mill-produced size, in accordance with AMS2355 and as specified herein:

3.3.1 Solution heat treatment shall be in accordance with the requirements of AMS2772.

3.3.2 Overaging Heat Treatment

Heat to 250 °F ± 10 °F (121 °C ± 6 °C), hold at heat for a time of 4 to 6 hours, then heat to 320 °F ± 10 °F (160 °C ± 6 °C), hold at heat for a time of 11 to 12 hours, and air cool. Alternate temperatures and times may be used provided the aged materials meet the specified requirements of 3.4.

3.4 Properties

The product shall conform to the following requirements, determined in accordance with AMS2355 on the mill-produced size.

3.4.1 Longitudinal tensile properties shall be as shown in Tables 2A and 2B.

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

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
Up to 0.249, incl	83.0	76.0	8
Over 0.249 to 0.499, incl	84.0	77.0	8
Over 0.499 to 3.000, incl	85.0	78.0	8

Table 2B - Minimum longitudinal tensile properties, SI units

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Up to 6.34, incl	572	524	8
Over 6.34 to 12.68, incl	579	531	8
Over 12.68 to 76.20, incl	586	538	8

3.4.2 Longitudinal compressive yield strength, when specified, shall be as shown in Tables 3A and 3B (see 8.6).

Table 3A - Minimum longitudinal compressive yield strength, inch/pound units

Nominal Thickness Inches	Compressive Yield Strength ksi
Over 0.499 to 3.00, incl	79.0

Table 3B - Minimum longitudinal compressive yield strength, SI units

Nominal Thickness Millimeters	Compressive Yield Strength MPa
Over 12.68 to 76.20, incl	545

3.4.3 Mechanical property requirements for product outside the range covered by 1.1 shall be agreed upon between the purchaser and producer and reported per 4.4.1 (see 8.6).

3.4.4 Electrical Conductivity

Shall be not lower than 37.5% IACS (International Annealed Copper Standard) (21.8 MS/m), determined on the surface of the test coupon prior to turning.

3.4.5 Exfoliation-Corrosion Resistance

Specimens cut from extrusions shall not exhibit exfoliation corrosion at a T/10 plane greater than EB as illustrated by Figure 2 of ASTM G34.

3.4.6 Stress-Corrosion Cracking

Specimens from extrusions with section thickness 0.750 inches (19.05 mm) and greater, tested in accordance with ASTM G47, shall show no evidence of stress-corrosion cracking when stressed in the short-transverse direction (perpendicular to grain flow) to 35 ksi (241 MPa).

3.5 Quality

Product, as received by the purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from conditions detrimental to usage of the extrusions.

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