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400 Commonwealth Dr., Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 4340B

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Superseding AMS 4340A

ALUMINUM ALLOY EXTRUSIONS
6.2Zn - 2.3Cu - 2.2Mg - 0.12Zr (7050-T76511)
Solution Heat Treated, Stress Relieved, and Overaged

UNS A97050

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: Primarily for structural applications requiring high tensile properties and good exfoliation-corrosion resistance.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2205 - Tolerances, Aluminum Alloy and Magnesium Alloy Extrusions
MAM 2205 - Tolerances, Metric, Aluminum Alloy and Magnesium Alloy Extrusions
AMS 2350 - Standards and Test Methods
AMS 2355 - Quality Assurance Sampling and Testing of Aluminum-Base and Magnesium-Base Alloys, Wrought Products (Except Forgings and Forging Stock) and Flash Welded Rings

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM B594 - Ultrasonic Inspection of Aluminum-Alloy Products for Aerospace Applications
ASTM G34 - Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO Test)
ASTM G47 - Determining Susceptibility to Stress-Corrosion Cracking of High-Strength Aluminum Alloy Products

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Specifications:

MIL-H-6088 - Heat Treatment of Aluminum Alloys

2.3.2 Military Standards:

MIL-STD-649 - Aluminum and Magnesium Products, Preparation for Shipment and Storage
MIL-STD-1537 - Electrical Conductivity Test for Measurement of Heat Treatment of Aluminum Alloys, Eddy Current Method

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined in accordance with AMS 2355:

	min	max
Zinc	5.7	6.7
Copper	2.0	2.6
Magnesium	1.9	2.6
Zirconium	0.08	0.15
Iron	--	0.15
Silicon	--	0.12
Manganese	--	0.10
Titanium	--	0.06
Chromium	--	0.04
Other Impurities, each	--	0.05
Other Impurities, 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 precipitation treated. Solution and precipitation heat treatments shall be performed in accordance with MIL-H-6088.

3.2.1 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.

3.2.2 The product may receive minor straightening, after stretching, of an amount necessary to meet the requirements of 3.5.

3.3 Properties: Product 5.000 in. (125.00 mm) and under in nominal diameter or Ø least thickness (wall thickness of tubing) shall conform to the following requirements; tensile properties and exfoliation corrosion shall be determined in accordance with AMS 2355; requirements for product over 5.000 in. (125.00 mm) in nominal diameter or least thickness (wall thickness of tubing) shall be as agreed upon by purchaser and vendor:

3.3.1 Tensile Properties: Shall be as follows, determined on test specimens Ø taken in the longitudinal direction:

Tensile Strength, min	79,000 psi (545 MPa)
Yield Strength at 0.2% Offset, min	69,000 psi (475 MPa)
Elongation in 4D, min	7%

3.3.2 Corrosion Resistance: Resistance to stress-corrosion cracking and to exfoliation-corrosion shall be acceptable if the extrusions conform to the requirements of 3.3.2.1 and 3.3.2.2.

3.3.2.1 Electrical Conductivity: Shall be not lower than 37.0% IACS (International Annealed Copper Standard) (21.5 MS/m), determined in accordance with MIL-STD-1537 on the surface of the test coupon prior to turning.

3.3.2.2 Stress-Corrosion Susceptibility Factor (SCF): Shall be not greater than Ø 39.0 (270), determined by subtracting the electrical conductivity, AA.A IACS (12 times BB.B MS/m) from the longitudinal yield strength, XX.X ksi (YYY MPa).

Examples:

Inch/Pound Units	78.0 ksi - 37.5% IACS = 40.5	Unacceptable
	74.0 ksi - 38.5% IACS = 35.5	Acceptable
SI Units	538 MPa - (12 X 21.8 MS/m) = 276	Unacceptable
	510 MPa - (12 X 22.3 MS/m) = 242	Acceptable

3.3.2.3 Extrusions not conforming to 3.3.2.1 or 3.3.2.2 may be given additional precipitation heat treatment and retested to determine conformance to 3.3.1, 3.3.2.1, and 3.3.2.2.

3.3.3 Exfoliation-Corrosion Resistance: Specimens cut from extrusions shall show a level of exfoliation corrosion, at a T/10 plane, not greater than that pictured in Photo B, Fig. 2, of ASTM G34-72.

3.3.4 Stress-Corrosion Resistance: Specimens cut from extrusions 0.750 in. (18.75 mm) and over in thickness shall meet the requirements of ASTM G47 when stressed in the short-transverse direction at 17,000 psi (120 MPa).

3.4 Quality: Extrusions, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to usage of the extrusions.

3.4.1 When specified, bars, rods, and shapes 0.500 in. (12.50 mm) and over in nominal diameter or least thickness shall be subjected to ultrasonic inspection in accordance with ASTM B594.

3.4.1.1 Each bar, rod, or shape weighing 600 lb (300 kg) and under and having a maximum width-to-thickness ratio of 10:1 shall meet the requirements for ultrasonic class as follows:

Nominal Thickness		Ultrasonic Class
Inches	Millimetres	
0.500 - 1.500, excl	12.50 - 37.50, excl	B
1.500 and over	37.50 and over	A

3.4.1.2 The ultrasonic class for extrusions weighing over 600 lb (300 kg) or in excess of a 10:1 maximum width-to-thickness ratio shall be as agreed upon by purchaser and vendor.

3.5 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2205 or MAM 2205.

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 performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the extrusions conform to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to requirements for composition (3.1), tensile properties (3.3.1), corrosion resistance (3.3.2), tolerances (3.5) and, when specified, ultrasonic inspection (3.4.1) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformance to requirements for exfoliation-corrosion resistance (3.3.3) and stress-corrosion resistance (3.3.4) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.