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AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 4341A

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Superseding AMS 4341

ALUMINUM ALLOY EXTRUSIONS
6.2Zn - 2.3Cu - 2.2Mg - 0.12Zr (7075-T73511)
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 a combination of high mechanical properties and good resistance to stress-corrosion cracking.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications 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 Alloys and Magnesium Alloys, Wrought Products (Except 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 overaged.

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 3.6.

3.3 Heat Treatment: Shall be performed as follows; furnace surveys and calibration of temperature controllers and recorders shall be in accordance with MIL-H-6088:

3.3.1 Solution Heat Treatment: Heat to 890°F ± 10 (475°C ± 5), hold at heat for a time commensurate with thickness but not less than 15 min., and quench in water.

3.3.2 Overaging Heat Treatment: No specific heat treatment is specified but it Ø is recommended that extrusions be overaged by heating to 250°F ± 5 (120°C ± 3), holding at heat for not less than 4 hr, further heating to 345°F ± 5 (175°C ± 3), holding at heat for not less than 8 hr, and cooling in air.

3.4 Properties: Extrusions 5.000 in. (125.00 mm) and under in nominal diameter Ø or thickness (wall thickness of tubing) and 32 sq in. (200 cm^2) and under in cross-sectional area shall conform to the following requirements; for sizes above these limits, requirements shall be as agreed upon by purchaser and vendor:

3.4.1 Tensile Properties: Shall be as follows, determined in accordance with AMS 2355 on specimens taken in the longitudinal direction:

Tensile Strength, min	70,000 psi (485 MPa)
Yield Strength at 0.2% Offset, min	60,000 psi (415 MPa)
Elongation,	
in 2 in. or 4D	8%
in 5D	7%

3.4.2 Corrosion Resistance: Resistance to stress-corrosion cracking and to Ø exfoliation corrosion shall be acceptable if the extrusions conform to the requirements of 3.4.1, and of 3.4.2.1.2 or 3.4.2.1.3.

3.4.2.1 Electrical Conductivity/Mechanical Property Relationship:

3.4.2.1.1 Electrical conductivity shall be not lower than 40.0% IACS Ø (International Annealed Copper Standard) (23.2 MS/m), determined in accordance with MIL-STD-1537 on the samples used for tensile testing.

3.4.2.1.2 If electrical conductivity is 41.0% IACS (23.8 MS/m) or higher and tensile properties meet the requirements of 3.4.1, the extrusions are acceptable.

3.4.2.1.3 If electrical conductivity is at least 40.0% IACS (23.2 MS/m) but not greater than 40.9% (23.7 MS/m) and longitudinal yield strength does not exceed 69,000 psi (475 MPa), the extrusions are acceptable.

3.4.2.1.4 Ø If electrical conductivity is less than 41.0% IACS and the longitudinal yield strength exceeds 69,000 psi (475 MPa), the extrusions are not acceptable and shall be given additional overaging and retested to the requirements of 3.4.1 and of 3.4.2.1.2 or 3.4.2.1.3.

3.4.2.2 Ø 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.

3.4.2.3 Ø Stress-Corrosion Resistance: Specimens cut from extrusions 0.750 in. (18.75 mm) and over in nominal thickness shall meet the requirements of ASTM G47 when stressed in the short-transverse direction at 45,000 psi (310 MPa).

3.5 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.

3.5.1 Ø Unless otherwise specified, each bar, rod, and shape shall be subjected to ultrasonic inspection in accordance with ASTM B594 and shall meet the requirements of Table I and 3.5.1.1.

TABLE I

Nominal Thickness Inches	Maximum Weight per Piece Pounds	Discontinuity Class
0.500 to 1.500, excl	600	B
1.500 to 5.000, incl	600	A

TABLE I (SI)

Nominal Thickness Millimeters	Maximum Weight per Piece Kilograms	Discontinuity Class
12.50 to 37.50, excl	275	B
37.50 to 125.00, incl	275	A

3.5.1.1 Ø The ultrasonic class for all tubing and for other extrusions under 0.500 in. (12.50 mm) or over 5.000 in. (125.00 mm) in nominal thickness or over 600 lb (270 kg) shall be as agreed upon by purchaser and vendor.

3.6 Tolerance: 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 (3.4.1), corrosion-resistance by conductivity/tensile property relationship (3.4.2.1), ultrasonic soundness (3.5.1), and tolerances (3.6) 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 (3.4.2.2) and stress-corrosion resistance (3.4.2.3) are classified as periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling: Shall be in accordance with AMS 2355.

4.4 Reports:

4.4.1 The vendor of extrusions shall furnish with each shipment a report stating that the extrusions conform to the chemical composition and other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 4341A, size or section identification number, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 4341A, contractor or other direct supplier of extrusions, part number, and quantity. When extrusions for making parts are produced or purchased by the parts vendor, that vendor shall inspect each lot of extrusions to determine conformance to the requirements of this specification and shall include in the report either a statement that the extrusions conform or copies of laboratory reports showing the results of tests to determine conformance.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2355.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Extrusions shall be identified as follows: