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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4341C

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Superseding AMS 4341B

Submitted for recognition as an American National Standard

ALUMINUM ALLOY EXTRUSIONS
6.2Zn - 2.3Cu - 2.2Mg - 0.12Zr (7050-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:

This product has been used typically for structural applications requiring a combination of high mechanical properties and good resistance to stress-corrosion cracking, 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 2205 Tolerances, Aluminum Alloy and Magnesium Alloy Extrusions
MAM 2205 Tolerances, Metric, Aluminum Alloy and Magnesium Alloy Extrusions
AMS 2355 Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings
MAM 2355 Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings, Metric (SI) Units
AMS 2750 Pyrometry
AMS 2811 Identification, Aluminum and Magnesium Alloy Wrought Products

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 594 Ultrasonic Inspection of Aluminum-Alloy Products for Aerospace Applications
ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products
ASTM G 34 Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO Test)

2.3 U.S. Government Publications:

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-H-6088 Heat Treatment of Aluminum Alloys

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	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 permitted provided such imperfections can be removed within the dimensional tolerances.

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

3.3 Heat Treatment:

(R) Shall be performed as follows; pyrometry shall be in accordance with AMS 2750.

3.3.1 Solution Heat Treatment: Heat to 890°F ± 10 (477°C ± 6), hold at heat for a time commensurate with section thickness but not less than 15 minutes, and quench in water.

3.3.2 Overaging Heat Treatment: No specific heat treatment is specified but it is recommended that extrusions be overaged by heating to 250°F ± 5 (121°C ± 3), holding at heat for not less than 4 hours, further heating to 345°F ± 5 (174°C ± 3), holding at heat for not less than 8 hours, and cooling in air.

3.4 Properties:

Extrusions 5.000 inches (127.00 mm) and under in nominal diameter or thickness (wall thickness of tubing) and 32 square inches (206 cm^2) and under in cross-sectional area shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355. For sizes above these limits, requirements shall be as agreed upon by purchaser and vendor:

3.4.1 Tensile Properties: Shall be as specified in Table 2 for specimens taken in the longitudinal direction:

TABLE 2 - Minimum Tensile Properties

Property	Requirement
Tensile Strength	70.0 ksi (483 MPa)
Yield Strength at 0.2% Offset	60.0 ksi (414 MPa)
Elongation in 4D	8%
in 5D	7%

3.4.2 Corrosion Resistance: Resistance to stress-corrosion cracking and to 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
(R) (International Annealed Copper Standard) (23.2 MS/m), determined 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 69.0 ksi (476 MPa), the extrusions are acceptable.

3.4.2.1.4 (R) If electrical conductivity is less than 41.0% IACS (23.8 MS/m) and the longitudinal yield strength exceeds 69.0 ksi (476 MPa), the extrusions are not acceptable and may be given additional overaging heat treatment. If upon completion of such treatment, extrusions conform to 3.4.2.1.2 and/or 3.4.2.1.3, they are acceptable.

3.4.2.2 Exfoliation Corrosion Resistance: Specimens cut from extrusions shall exhibit exfoliation corrosion, at a T/10 plane, not greater than that illustrated by Photo B, Figure 2, of ASTM G 34.

3.4.2.3 Stress-Corrosion Resistance: Specimens, cut from extrusions 0.750 inch (19.05 mm) and over in nominal thickness, shall show no evidence of stress-corrosion cracking when stressed in the short-transverse direction at 45.0 ksi (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 (R) Each bar, rod, and shape shall be subjected to ultrasonic inspection in accordance with ASTM B 594 and shall meet the requirements of Table 3 and 3.5.1.1.

TABLE 3A - Ultrasonic Requirements

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 3B - Ultrasonic Requirements (SI)

Nominal Thickness Millimeters	Maximum Weight per Piece Kilograms	Discontinuity Class
12.70 to 38.10, excl	272	B
38.10 to 127.00, incl	272	A

3.5.1.1 The ultrasonic class for all tubing, and for other extrusions under 0.500 inch (12.70 mm) or over 5.000 inches (127.00 mm) in nominal thickness or over 600 pounds (272 kg), shall be as agreed upon by purchaser and vendor.

3.6 Tolerance:

Shall conform to all applicable requirements of AMS 2205 or MAM 2205.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:
(R)

The vendor of extrusions shall supply all samples for vendor's tests and shall be responsible for performing all required tests. 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 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 acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests for exfoliation corrosion resistance (3.4.2.2) and stress-corrosion resistance (3.4.2.3) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:
(R)

Shall be in accordance with AMS 2355 OR MAM 2355.