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400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 4307

Issued 10-1-88

ALUMINUM ALLOY EXTRUSIONS
6.4Zn - 2.4Mg - 2.2Cu - 0.12Zr (7150-T61511)
Solution Heat Treated, Stress Relieved, and Precipitation Heat Treated

UNS A97150

1. SCOPE:

1.1 Form: This specification covers an aluminum alloy in the form of extruded bars, rods, shapes, and tubing.

1.2 Application: Primarily for structural parts requiring a combination of high strength, moderate fatigue strength, and moderate exfoliation corrosion resistance (See 8.1).

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
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

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 B645 - Plane Strain Fracture Toughness Testing of Aluminum Alloys
ASTM B660 - Packaging/Packing of Aluminum and Magnesium 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

3. TECHNICAL REQUIREMENTS:

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

	min	max
Zinc	5.9	6.9
Magnesium	2.0	2.7
Copper	1.9	2.5
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: Extruded, solution heat treated, stress relieved by stretching to produce a permanent set of not less than 1% nor more than 3%, and precipitation heat treated (See 8.2). Heat treating furnace surveys and calibrations of temperature controllers and recorders shall be in accordance with MIL-H-6088 except that solution heat treating time and temperature shall be as shown for alloy 7050.

3.2.1 Extrusions shall be supplied with an as-extruded surface finish; light polishing to remove surface imperfections is permissible.

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

3.3 Properties: Extrusions 0.250 - 2.000 inches (6.35 - 50.80 mm) in nominal diameter or section thickness (wall thickness of tubing) shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355; properties of extrusions under 0.250 inch (6.35 mm) or over 2.000 inches (50.80 mm) in nominal diameter or section thickness shall be as agreed upon by purchaser and vendor.

3.3.1 Tensile Properties: Shall be as specified in Table I, determined on specimens taken in the longitudinal direction.

TABLE I

Nominal Diameter or Least Thickness (bars, rods, wire, shapes) or Nominal Wall Thickness (tubing) inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset psi, min	Elongation in 2 in. or 4D %, min
0.250 - 0.499, incl	87,000	82,000	8
Over 0.499 - 0.749, incl	88,000	83,000	9
Over 0.749 - 2.000, incl	89,000	84,000	8

TABLE I (SI)

Nominal Diameter or Least Thickness (bars, rods, wire, shapes) or Nominal Wall Thickness (tubing) Millimetres	Tensile Strength MPa, min	Yield Strength at 0.2% Offset MPa, min	Elongation in 50 mm or 4D %, min
6.35 - 12.67, incl	600	565	8
Over 12.67 - 19.05, incl	605	570	9
Over 19.05 - 50.80, incl	615	580	8

3.3.2 Corrosion Resistance: Electrical conductivity, determined at the T/10 plane on the tensile specimens, shall be 29.0 - 32.5% IACS (International Annealed Copper Standard) (16.8 - 18.8 MS/m) (See 8.1).

3.4 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.

3.4.1 When specified, extrusions 0.500 inch (12.70 mm) and over in nominal thickness shall be subjected to ultrasonic inspection in accordance with ASTM B594. Standards for acceptance shall be as follows:

Nominal Thickness		Ultrasonic Class
Inches	Millimetres	
0.500 - 1.500, excl	12.70 - 38.10, excl	B
1.500 - 2.000, incl	38.10 - 50.80, incl	A

3.5 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), ultrasonic inspection (3.4.1) when specified, and tolerances (3.5) are classified as acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Tests to determine conformance to corrosion resistance (3.3.2) 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 or MAM 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 the other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 4307, 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 4307, 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: Shall be in accordance with AMS 2355 or MAM 2355.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Shall be as follows: