Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4340

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Revised

UNS A97050

ALUMINUM ALLOY EXTRUSIONS
62Zn - 2.3Cu - 2.2Mg - 0.12Zr (7050-T76511)

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 mechanical 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 Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2205 - Tolerances, Aluminum-Base and Magnesium Base 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 G34 - Exfoliation-Corrosion Susceptibility in 7XXX Series Copper Containing Aluminum Alloys (EXCO Test)
ASTM G47 - Determining Susceptibility to Stress Corrosion Cracking of High Strength 7XXX Aluminum Alloy Products

2.3 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

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.

3.2.1 Extrusions shall be supplied with an as-extruded surface finish; light polishing to remove minor surface imperfections is permissable 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: The product shall be solution heat treated by heating to 890°F ± 10 (477°C ± 6), holding at heat for a time commensurate with section thickness, and quenching in agitated water at a temperature not higher than 100°F (38°C), and precipitation heat treated by heating to 250°F ± 10 (121°C ± 6), holding at heat for 3 - 24 hr, heating to 350°F ± 10 (177°C ± 6), holding at heat for approximately 8 hr, and cooling in air. Heat treatments shall be performed in accordance with MIL-H-6088.

3.4 Properties: Product 5.000 in. (127.00 mm) and under in nominal diameter or thickness (wall thickness of tubing) shall conform to the following requirements, determined in accordance with AMS 2355; requirements for product over 5.000 in. (127.00 mm) in nominal diameter or thickness (wall thickness of tubing) shall be as agreed upon by purchaser and vendor:

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

Tensile Strength, min	79,000 psi (545 MPa)
Yield Strength at 0.2% Offset, min	69,000 psi (476 MPa)
Elongation in 2 in. (50.8 mm) or 4D, min	7%

3.4.2 Conductivity: Shall be not lower than 39% IACS (International Annealed Copper Standard).

3.4.3 Exfoliation-Corrosion Resistance: Product shall show a level of exfoliation-corrosion, at a T/10 plane, less than that illustrated in Photo B, Fig. 2 of ASTM G34.

3.4.4 Stress-Corrosion Resistance: Specimens, cut from product processed to meet the tensile property requirements of 3.4.1 and the conductivity requirements of 3.4.2 and stressed at 17,000 psi (117 MPa), shall meet the requirements of ASTM G47.

3.5 Quality: The product, as received by the 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 product.

3.6 Tolerance: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2205.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples 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 perform such confirmatory testing as he deems necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to composition (3.1), tensile property (3.4.1), conductivity (3.4.2), exfoliation-corrosion (3.4.3), and tolerance (3.6) requirements are classified as acceptance tests.

4.2.2 Periodic Tests: Tests to determine conformance to stress-corrosion resistance (3.4.4) requirements are classified as periodic tests.

4.3 Sampling: Shall be in accordance with AMS 2355. Frequency and extent of sampling for periodic tests shall be as agreed upon by purchaser and vendor.

4.4 Reports:

4.4.1 The vendor of the product shall furnish with each shipment three copies of a report stating that the product conforms to the chemical composition and other technical requirements of this specification. This report shall include the purchase order number, material specification number, size or section identification number, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number, 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 a statement that the extrusions conform, or shall include copies of laboratory reports showing the result of tests to determine conformance.

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

5. PREPARATION FOR DELIVERY:

5.1 Identification: The product shall be identified as follows:

5.1.1 Each straight bar, rod, and tube 0.500 in. (12.70 mm) and over in OD or least width of flat surface and each straight shape with configuration allowing access to a flat surface at least 0.500 in. (12.70 mm) wide recessed not more than 1/8 in. (3.2 mm) below the outline of the shape shall be marked in a row of characters recurring at intervals not greater than 3 ft (914 mm) with the alloy number and temper, AMS 4340, and manufacturer's identification. The inspection lot number shall be included in the row marking or shall be marked near one end. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be sufficiently stable to withstand normal handling. The markings shall have no deleterious effect on the product or its performance.