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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4342D

Issued APR 1978
Revised AUG 2000

Superseding AMS 4342C

Aluminum Alloy, Extrusions
6.2Zn - 2.3Cu - 2.2Mg - 0.12Zr (7050-T74511)
Solution Heat Treated, Stress Relieved, Straightened, and Overaged

UNS A97050

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of extruded bars, rods, wire, profiles, and tubing.

1.2 Application:

These products have 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 issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2355 Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
MAM 2355 Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings, Metric (SI) Units
AMS 2772 Heat Treatment of Aluminum Alloy Raw Materials

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7154 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 594	Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications
ASTM B 666/B 666M	Identification Marking of Aluminum and Magnesium Products
ASTM G 34-72	Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO Test) Aerospace Applications

2.3 ANSI Publications:

Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ANSI H 35.2 Dimensional Tolerances for Aluminum Mill Products
ANSI H 35.2M Dimensional Tolerances for Aluminum Mill Products (Metric)

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
Silicon	--	0.12
Iron	--	0.15
Copper	2.0	2.6
Manganese	--	0.10
Magnesium	1.9	2.6
Chromium	--	0.04
Zinc	5.7	6.7
Titanium	--	0.06
Zirconium	0.08	0.15
Other Elements, each	--	0.05
Other Elements, 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 to the T74511 temper in accordance with AMS 2772 as applicable to forgings.

3.2.1 Extrusions may receive minor straightening, after stretching, of an amount necessary to meet the requirements of 3.5.

3.2.2 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 specified dimensional tolerances.

3.3 Properties:

Extrusions, other than tubing, 5.000 inches (127.00 mm) and under in nominal diameter or thickness and 32 square inches (206 cm^2) and under in cross-sectional area and tubing 3.000 inches (76.20 mm) and under in wall thickness and 20 square inches (129 cm^2) and under in cross-sectional area, shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355 on the mill produced size.

3.3.1 Tensile Properties: Shall be as shown in Table 2, determined on specimens taken in the longitudinal direction.

TABLE 2 - Minimum Longitudinal Tensile Properties

Tensile Strength	73.0 ksi (503 MPa)
Yield Strength at 0.2% Offset	63.0 ksi (434 MPa)
Elongation in 4D	7%
Elongation in 5D	6%

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 38.0% International Annealed Copper Standard (IACS) (22.0 MS/m), determined on the surface of the test coupon prior to machining of the tensile specimens.

3.3.2.2 Stress-Corrosion Susceptibility Factor (SCF): Shall be not greater than 32.0 (220), determined by subtracting the electrical conductivity, AA.A% IACS (12 x BB.B MS/m) from the longitudinal yield strength, XX.X ksi (YYY MPa).

Examples:

Inch/Pound Units:68.2 ksi - 38.1% IACS = 30.1 - Acceptable
71.5 ksi - 38.2% IACS = 33.3 - Unacceptable

SI Units:470 MPa - 12 x 22 MS/m = 206 - Acceptable
493 MPa - 12 x 22 MS/m = 229 - Unacceptable

3.3.2.3 Extrusions not conforming to 3.3.2.1 or 3.3.2.2 are not acceptable and may be given additional overaging heat treatment. If, upon completion of such treatment, extrusions conform to 3.3.2.1 and 3.3.2.2, they are acceptable.

3.3.3 Exfoliation-Corrosion Resistance: Specimens, cut from extrusions, shall not exhibit exfoliation corrosion, at a T/10 plane, greater than that illustrated by Photo B, Figure 2, of ASTM G 34-72.

3.3.4 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 35.0 ksi (241 MPa).

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 shall be subjected to ultrasonic inspection in accordance with ASTM B 594 and shall meet the following requirements:

3.4.1.1 Each bar, rod, and profile, weighing 600 pounds (272 kg) and under and having a maximum width-to-thickness ratio of 10:1, shall meet the ultrasonic class requirements shown in Table 3.

TABLE 3 - Ultrasonic Inspection Parameters

Nominal Thickness Inches	Nominal Thickness Millimeters	Ultrasonic Class
0.500 to 1.500, excl	12.70 to 38.10, incl	B
1.500 and over	38.10 and over	A

3.5 Tolerances:

Shall conform to all applicable requirements of ANSI H35.2 or ANSI H35.2M.

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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the extrusions conform to specified requirements.

4.2 Classification of Tests:

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

4.2.2 Periodic Tests: Exfoliation-corrosion resistance (3.3.3) and stress-corrosion resistance (3.3.4) 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:

Shall be in accordance with AMS 2355 or MAM 2355.

4.4 Reports:

The vendor of extrusions shall furnish with each shipment a report stating that the extrusions conform to the chemical composition, ultrasonic inspection when specified, and tolerances and showing the numerical results of tests on each inspection lot to determine conformance to the other acceptance test requirements. This report shall include the purchase order number, inspection lot number, AMS 4342D, size or section identification number, and quantity. The report shall also identify the producer, the product form, and the size of the mill product.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2355 or MAM 2355.