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

AEROSPACE MATERIAL SPECIFICATION

AMS 4154K
Superseding AMS 4154J
Issued 10-1-45
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UNS A97075

ALUMINUM ALLOY EXTRUSIONS
5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-T6)

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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 parts requiring high strength and whose fabrication does not usually involve welding or forming.

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
AMS 2630 - Ultrasonic Inspection

2.2 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.2.1 Military Specifications:

MIL-H-6088 - Heat Treatment of Aluminum Alloys

2.2.2 Military Standards:

MIL-STD-649 - Aluminum and Magnesium Products, Preparation for Shipment and Storage

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3. TECHNICAL REQUIREMENTS:

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

	min	max
Zinc	5.1	6.1
Magnesium	2.1	2.9
Copper	1.2	2.0
Chromium	0.18	0.28
Iron	--	0.50
Silicon	--	0.40
Manganese	--	0.30
Titanium	--	0.20
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

3.2 Condition: Solution and precipitation heat treated in accordance with MIL-H-6088.

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.

3.3 Properties: Extrusions shall conform to the following requirements, determined in accordance with AMS 2355:

3.3.1 Tensile Properties: Shall be as specified in 3.3.1.1, 3.3.1.2, and 3.3.1.3.

3.3.1.1 Longitudinal:

TABLE I

Nominal Dimensions: Diameter or Thickness (rods, bars, wire, shapes) or Nominal Wall Thickness (tubing) Inches	Cross Sectional Area Square Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset psi, min	Elongation in 2 in. or 4D %, min
Up to 0.249, incl	All areas	78,000	70,000	7
Over 0.249 to 0.499, incl	All areas	81,000	73,000	7
Over 0.499 to 2.999, incl	All areas	81,000	72,000	7
Over 2.999 to 4.499, incl	Up to 20, incl	81,000	71,000	7
Over 2.999 to 4.499, incl	Over 20 to 32, incl	78,000	70,000	6
Over 4.499 to 5.000, incl	Up to 32, incl	78,000	68,000	6

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TABLE I (SI)

Nominal Dimensions: Diameter or Thickness (rods, bars, wire, shapes) or Nominal Wall Thickness (tubing) Millimetres	Cross Sectional Area Square Centimetres	Tensile Strength MPa, min	Yield Strength at 0.2% Offset MPa, min	Elongation in 50 mm or 4D %, min
Up to 6.32, incl	All areas	538	483	7
Over 6.32 to 12.67, incl	All areas	558	503	7
Over 12.67 to 76.17, incl	All areas	558	496	7
Over 76.17 to 114.27, incl	Up to 129, incl	558	490	7
Over 76.17 to 114.27, incl	Over 129 to 206, incl	538	483	6
Over 114.27 to 127.00, incl	Up to 206, incl	538	469	6

3.3.1.2 Long-Transverse; Rods, Bars, and Shapes:

TABLE II

Nominal Dimensions: Diameter or Thickness Inches	Cross Sectional Area Square Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset psi, min	Elongation in 2 in. or 4D %, min
Up to 0.249, incl	Up to 20, incl	76,000	64,000	5
Over 0.249 to 0.499, incl	Up to 20, incl	77,000	66,000	5
Over 0.499 to 0.749, incl	Up to 20, incl	73,000	63,000	4
Over 0.749 to 1.499, incl	Up to 20, incl	72,000	62,000	3
Over 1.499 to 2.999, incl	Up to 20, incl	66,000	57,000	1
Over 2.999 to 4.499, incl	Up to 20, incl	65,000	56,000	1
Over 2.999 to 4.499, incl	Over 20 to 32, incl	65,000	55,000	1
Over 4.499 to 5.000, incl	Up to 32, incl	64,000	54,000	1

TABLE II (SI)

Nominal Dimensions: Diameter or Thickness Millimetres	Cross Sectional Area Square Centimetres	Tensile Strength MPa, min	Yield Strength at 0.2% Offset MPa, min	Elongation in 50 mm or 4D %, min
Up to 6.32, incl	Up to 129, incl	524	441	5
Over 6.32 to 12.67, incl	Up to 129, incl	531	455	5
Over 12.67 to 19.02, incl	Up to 129, incl	503	434	4
Over 19.02 to 38.07, incl	Up to 129, incl	496	427	3
Over 38.07 to 76.17, incl	Up to 129, incl	455	393	1
Over 76.17 to 114.27, incl	Up to 129, incl	455	386	1
Over 76.17 to 114.27, incl	Over 129 to 206, incl	448	379	1
Over 114.27 to 127.00, incl	Up to 206, incl	441	372	1

3.3.1.3 Tensile property requirements for extrusions with nominal dimensions and/or areas outside limits of 3.4.1.1 and 3.4.1.2 shall be as agreed upon by purchaser and vendor.

3.3.2 Hardness: Should be not lower than 135 HB/10/500, 135 HB/14.3/1000, or 140 HB/10/1000 but the extrusions shall not be rejected on the basis of hardness if the tensile property requirements are met.

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3.4 Quality: Extrusions, as received by purchaser, shall be uniform in quality and condition, sound, Ø and free from foreign materials and from internal and external imperfections detrimental to usage of the extrusions.

3.4.1 When specified, extrusions shall be subjected to ultrasonic inspection in accordance with Ø AMS 2630. Standards for acceptance shall be as agreed upon by purchaser and vendor.

3.5 Tolerances: 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 extrusions shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the Ø purchaser as required by 4.4. Purchaser reserves the right to perform such confirmatory testing as he deems 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), Ø longitudinal tensile properties (3.3.1.1), 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 requirements for long-transverse tensile Ø properties (3.3.1.2) and hardness (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. Locations from which specimens are taken Ø for periodic tests shall be as agreed upon by purchaser and vendor.

4.4 Reports:

4.4.1 The vendor of extrusions shall furnish with each shipment three copies of 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, material specification number and its revision letter, 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 and its revision letter, 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 results of tests to determine conformance.

Ø 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:

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