

Aluminum Alloy, Extrusions
5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-T6)
Solution and Precipitation Heat Treated

(Composition similar to UNS A97075)

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 extrusions have been used typically for parts requiring high strength and whose fabrication does not usually involve welding or forming, 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 supplied 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 cancelled 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 or www.sae.org.

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

AS1990 Aluminum Alloy Tempers

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2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM B 594	Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications
ASTM B 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B 666/B 666M	Identification Marking of Aluminum and Magnesium Products

2.3 ANSI Publications:

Available from ANSI, 25 West 43rd Street, New York, NY 10036 or www.ansi.org.

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.

TABLE 1 - Composition

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

3.2 Condition:

Solution and precipitation heat treated to the T6 temper (See AS1990) in accordance with AMS 2772.

- 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 specified dimensional tolerances.

3.3 Properties:

Extrusions shall conform to the following requirements, determined in accordance with AMS 2355 on the mill product.

3.3.1 Tensile Properties: Shall be as shown in 3.3.1.1 (Table 2) and 3.3.1.2 (Table 3).

3.3.1.1 Longitudinal:

TABLE 2A - Minimum Longitudinal Tensile Properties, Inch/Pound Units

Nominal Dimensions Diameter or Thickness (rods, bars, wire, profiles) or Nominal Wall Thickness (tubing) Inches	Nominal Dimensions Cross-Sectional Area Square Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 inches or 4D %
Up to 0.249, incl	All areas	78.0	70.0	7
Over 0.249 to 0.499, incl	All areas	81.0	73.0	7
Over 0.499 to 2.999, incl	All areas	81.0	72.0	7
Over 2.999 to 2.999, incl	Up to 20, incl	81.0	71.0	7
Over 2.999 to 4.499, incl	Over 20 to 32, incl	78.0	70.0	6
Over 4.499 to 5.000, incl	Up to 32, incl	78.0	68.0	6

TABLE 2B - Minimum Longitudinal Tensile Properties, SI Units

Nominal Dimensions Diameter or Thickness (rods, bars, wire, profiles) or Nominal Wall Thickness (tubing) Millimeters	Nominal Dimensions Cross-Sectional Area Square Centimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
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 76.17, 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 Profiles:

TABLE 3A - Minimum Longitudinal Tensile Properties, SI Units

Nominal Dimensions Diameter or Thickness Inches	Nominal Dimensions		Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 inches or 4D %
	Cross-Sectional Area Square Inches				
Up to 0.249, incl	Up to 20, incl		76.0	66.0	5
Over 0.249 to 0.499, incl	Up to 20, incl		78.0	68.0	5
Over 0.499 to 0.749, incl	Up to 20, incl		76.0	66.0	4
Over 0.749 to 1.499, incl	Up to 20, incl		74.0	65.0	3
Over 1.499 to 2.999, incl	Up to 20, incl		70.0	61.0	1
Over 2.999 to 4.499, incl	Up to 20, incl		67.0	56.0	1
Over 2.999 to 4.499, incl	Over 20 to 32, incl		65.0	55.0	1

TABLE 3B - Minimum Longitudinal Tensile Properties, SI Units

Nominal Dimensions Diameter or Thickness Millimeters	Nominal Dimensions		Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
	Cross-Sectional Area Square Centimeters				
Up to 6.32, incl	Up to 129, incl		524	455	5
Over 6.32 to 12.67, incl	Up to 129, incl		538	469	5
Over 12.67 to 19.02, incl	Up to 129, incl		524	455	4
Over 19.02 to 38.07, incl	Up to 129, incl		510	448	3
Over 38.07 to 76.17, incl	Up to 129, incl		483	421	1
Over 76.17 to 114.27, incl	Up to 129, incl		462	386	1
Over 76.17 to 114.27, incl	Over 129 to 206, incl		448	379	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 shall be subjected to ultrasonic inspection in accordance with ASTM B 594. Extrusions 0.500 to 1.499 inches (12.70 to 38.07 mm), inclusive, in nominal thickness, not exceeding 600 pounds (272 kg) per piece, or a 10 to 1 width-to-thickness ratio shall meet ultrasonic class B. Extrusions 1.500 inches (38.10 mm) and over in nominal thickness, not exceeding 600 pounds (272 kg) per piece, or a 10 to 1 width-to-thickness ratio shall meet ultrasonic class 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), longitudinal tensile properties (3.3.1.1), 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: Long-transverse tensile properties (3.3.1.2) 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.

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 4154N, size or section identification number, and quantity. The report shall also identify the producer, product form, producer lot number, and the size of the mill product.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2355.

5. PREPARATION FOR DELIVERY:

5.1 Identification:

Shall be in accordance with ASTM B 666/B 666M.