



AEROSPACE MATERIAL SPECIFICATION	AMS4154™	REV. S
	Issued 1945-10 Reaffirmed 2008-05 Revised 2023-11	
Superseding AMS4154R		
Aluminum Alloy, Extrusions 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-T6, 7075-T6510, 7075-T6511) Solution Heat Treated, Stress Relieved by Stretching when Required and Precipitation Heat Treated (Composition similar to UNS A97075)		

RATIONALE

AMS4154S results from a Five-Year Review and update of this specification with changes to add AS6279 controls (see 3.6), update terminology, wording to prohibit unauthorized exceptions (see 3.3.3, 3.7, 4.4.1, 5.1.1, and 8.5), relocate Definitions (see 2.4), Applicable Documents (see Section 2 and 3.2), remove obsolete weight limit from ultrasonic testing (see 3.4.1), and allow use of the immediate prior specification revision (see 8.4).

1. SCOPE

1.1 Form

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

1.1.1 This specification covers products up to 5.000 inches (127.00 mm) in nominal diameter or thickness, or wall thickness (see 8.5).

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 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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2355 Quality Assurance, Sampling and Testing, Aluminum Alloys and Magnesium Alloy, Wrought Products (Except Forging Stock), and Rolled, Forged, or Flash Welded Rings

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SAE WEB ADDRESS:

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS4154S>

- AMS2772 Heat Treatment of Aluminum Alloy Raw Materials
- AS6279 Standard Practice for Production, Distribution, and Procurement of Metal Stock
- AS7766 Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

- ASTM B594 Ultrasonic Inspection of Aluminum-Alloy Wrought Products
- ASTM B660 Packaging/Packing of Aluminum and Magnesium Products
- ASTM B666/B666M Identification Marking of Aluminum and Magnesium Products

2.3 ANSI Accredited Publications

Copies of these documents are available online at <https://webstore.ansi.org/>.

- ANSI H35.1/H35.1M Standard Alloy and Temper Designation System for Aluminum
- ANSI H35.2 Dimensional Tolerances for Aluminum Mill Products
- ANSI H35.2M Dimensional Tolerances for Aluminum Mill Products (Metric)

2.4 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS2355.

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
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 heat treated to the T6511 or T6510 temper (refer to ANSIH35.1/H35.1M). Heat treatments shall be performed in accordance with AMS2772.

- 3.2.1 The T6511 temper shall be supplied unless T6510 is specified. When T6 is specified, the stress relief by stretching may be omitted and the T6 temper supplied if the stretching is not practical due to the shape of the extrusion.
- 3.2.2 Extrusions supplied in the T6 or T6511 temper may receive minor straightening, after stretching, of an amount necessary to meet the requirements of 3.5.
- 3.2.3 Extrusions supplied in the T6510 temper shall receive no straightening after stretching.
- 3.2.4 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 AMS2355 on the mill product:

- 3.3.1 Mechanical properties requirements for product outside of the range covered by Tables 2 and 3 shall be agreed upon between the purchaser and producer.

3.3.2 Tensile Properties

Shall be as shown in 3.3.2.1 (Table 2) and 3.3.2.2 (Table 3).

3.3.2.1 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 4.499, 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 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

3.3.2.2 Long-Transverse; Rods, Bars, and Profiles

Long-transverse tensile requirements apply only to extrusions from which a test specimen not less than 2.50 inches (63.5 mm) in length can be taken.

Table 3A - Minimum long transverse tensile properties, inch/pound 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 long transverse 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

3.3.3 Mechanical property requirements for product outside the size range covered by Table 2 or Table 3 shall be agreed upon between the purchaser and producer and reported per 4.1.1 (see 8.5).

3.4 Quality

Extrusions, as received by the 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 B594. Extrusions 0.500 to 1.499 inches (12.70 to 38.07 mm), inclusive, in nominal thickness, not exceeding 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 a 10 to 1 width-to-thickness ratio shall meet ultrasonic class A (see 8.5).

3.5 Tolerances

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

3.6 Production, Distribution, and Procurement

Production, distribution, and procurement of metal stock shall comply with AS6279. This requirement becomes effective 18 months after publication of AMS4154S.