

AEROSPACE MATERIAL SPECIFICATION

Aluminum Alloy, Extrusions (2026-T3511)
4.0Cu - 1.3Mg - 0.60Mn
Solution Heat Treated and Stress Relieved by Stretching
(Composition similar to UNS A92026)

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of extruded bars, rods, and profiles (shapes).

1.2 Application:

These extrusions have been used typically for machined parts requiring dimensional stability during machining processes and for parts requiring high strength and damage tolerance, where fabrication does not normally involve welding, but usage is not limited to such applications.

1.3 Certain processing procedures may cause this product to become susceptible to stress-corrosion cracking; ARP823 recommends practices to minimize such conditions.

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.

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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
- 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
- ARP823 Minimizing Stress-Corrosion in Wrought Heat Treatable Aluminum Alloy Products

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 666/B666M Identification Marking of Aluminum and Magnesium Products

2.3 ANSI Publications:

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

- ANSI H35.2 Dimensional Tolerances for Aluminum Mill Products
- ANSI H35.2M 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	--	0.05
Iron	--	0.07
Copper	3.6	4.3
Manganese	0.30	0.80
Magnesium	1.0	1.6
Zinc	--	0.10
Titanium	--	0.06
Zirconium	0.05	0.25
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition:

Extruded, solution heat treated and stress relieved by stretching to produce a nominal permanent set of 1.5%, but not less than 1% nor more than 3%, to the T3511 temper. Solution heat treatment shall be performed in accordance with AMS 2772.

3.2.1 Product shall be supplied with an as-extruded surface finish; light polishing to remove minor surface conditions is permissible provided such conditions can be removed within specified dimensional tolerances.

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

3.3 Properties:

Product 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 of extrusions with a maximum cross-sectional area of 25 square inches (161 cm²) and a maximum circle size of 12 inches (305 mm) shall meet the following requirements:

3.3.1.1 Longitudinal: Shall be as shown in Table 2.

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

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 inches or 4D %
Up to 0.249, incl	66	48.0	11
Over 0.249 to 0.499, incl	70	52	12
Over 0.499 to 1.499, incl	72	53	11
Over 1.499 to 2.249, incl	73	54	11
Over 2.249 to 3.250, incl	73	54	10

TABLE 2B - Minimum Longitudinal Tensile Properties, SI Units

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Up to 6.34, incl	455	331	11
Over 6.34 to 12.68, incl	483	359	12
Over 12.68 to 38.09, incl	496	365	11
Over 38.09 to 57.14, incl	503	372	11
Over 57.14 to 82.54, incl	503	372	10

3.3.1.2 Long-Transverse: Shall be as shown in Table 3.

TABLE 3A - Minimum Long-Transverse Tensile Properties, Inch/Pound Units

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 inches or 4D %
Over 0.499 to 1.499, incl	66	46.0	8
Over 1.499 to 2.249, incl	64	44.0	8
Over 2.249 to 3.250, incl	61	42.0	8

TABLE 3B - Minimum Long-Transverse Tensile Properties, SI Units

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Over 12.68 to 38.09, incl	455	317	8
Over 38.09 to 57.14, incl	441	303	8
Over 57.14 to 82.54, incl	421	290	8

3.4 Quality:

Products, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from conditions detrimental to usage of the extrusions.

- 3.4.1 When specified, each extrusion shall be subjected to ultrasonic inspection in accordance with ASTM B 594. Extrusions, 0.50 inch (12.7 mm) and over in nominal diameter or least distance between parallel sides, weighing 600 pounds (272 kg) and under, and having a maximum width-to-thickness ratio of 10:1 shall meet ultrasonic Class B requirements, as described in ASTM B 594.

3.5 Tolerances:

Shall conform to all applicable requirements of ANSI H35.2 or ANSI H35.2M except that surface roughness tolerances shall be twice those specified therein.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of the products 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 products 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.