

AEROSPACE MATERIAL SPECIFICATION



AMS-QQ-A-225/9

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Aluminum Alloy 7075, Bar, Rod, Wire, and Special Shapes;
Rolled, Drawn, or Cold Finished

A97075

RATIONALE

This document has been reaffirmed to comply with the SAE 5-year Review policy.

NOTICE

This document has been taken directly from Federal Specification QQ-A-225/9E and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards.

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The complete requirements for procuring 7075 aluminum alloy bar, rod, wire, and special shapes described herein shall consist of this document and the latest issue of AMS-QQ-A-225.

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1. SCOPE AND CLASSIFICATION:

1.1 Scope:

This specification covers the specific requirements for 7075 aluminum alloy bar, rod, wire, and special shapes produced by rolling, drawing, or cold finishing.

1.2 Classification:

1.2.1 Tempers: Bar, rod, wire, and special shapes are of the following tempers, as specified (See 6.2): O, T6, T62, T651, T73, or T7351 temper. Definitions of these tempers are specified in AMS-QQ-A-225.

2. APPLICABLE DOCUMENTS:

See AMS-QQ-A-225.

3. REQUIREMENTS:

3.1 Chemical Composition:

The chemical composition shall conform to the requirements specified in Table I.

Chemical Composition ^{1/}

Element	Percent	
	Minimum	Maximum
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 Elements, each	-	0.05
Other Elements, total	-	0.15
Aluminum	Remainder	

^{1/} Analysis shall routinely be made only for the elements specifically mentioned in Table I. If, however, the presence of other elements is indicated or suspected in the course of routine analysis, further analysis shall be made to determine conformance to the limits specified for other elements.

3.2 Mechanical Properties:

3.2.1 Mechanical Properties of Material as Supplied: The mechanical properties in the direction of working shall conform to the requirements of Table II for the temper specified.

TABLE I. Mechanical Properties (See 6.4)

Temper	Diameter or Thickness Inches	Tensile Strength minimum ksi	Yield Strength at 0.2 percent Offset or at Extension Indicated <u>6/</u>		Elongation in 2 in. or 4 times diameter <u>6/</u> minimum, percent
			Minimum, ksi	Extension under load, inch/inch	
O	Up to 8.000, incl <u>3/</u>	40.0 <u>2/</u>	12.0	--	10
T6 and T62 <u>4/</u>	Up to 4.000, incl <u>3/</u>	77.0	66.0	0.0084	7
T651 <u>1/</u>	0.500 to 4.000, incl <u>3/</u>	77.0	66.0	0.0084	7
T73 <u>5/</u>	Up to 3.000, incl <u>3/</u>	68.0	56.0	0.0074	10
T7351 <u>1/ 5/</u>	0.500 to 3.000, incl <u>3/</u>	68.0	56.0	0.0074	10

1/ Tempers T651 and T7351 are available only in rod, bar and shapes

2/ Maximum

3/ For rounds (rods), maximum diameter is 3 or 4 inches, whichever is applicable; for square, hexagonal, or octagonal bar, maximum thickness is 3 or 3-1/2 inches, whichever is applicable; for rectangular bar, maximum thickness is 3 inches with corresponding maximum width of 6 inches; for rectangular bar less than 3 inches in thickness, maximum width of 10 inches.

4/ Material in the T62 temper is not available from the materials producers

5/ Definition of T73 and T7351 tempers: The T73 temper applies to material which has been solution heat-treated and stabilized to develop the required mechanical properties and resistance to stress-corrosion cracking. The T7351 temper applies to material which has been solution heat-treated, stress-relieved by stretching to produce a permanent set of 1-1/2 percent nominal, but not less than 1 nor more than 3 percent, and stabilized to develop the required mechanical properties and resistance to stress-corrosion cracking.

6/ See AMS-QQ-A-225 for yield strength and elongation requirement exceptions

- 3.2.2 Mechanical Properties After Heat Treatment: In addition to conforming to the requirements of 3.2.1, the mechanical properties in the direction of working of material ordered in the annealed (O) temper, and without subsequent cold-working or forming operations, and subsequently solution heat-treated and artificially aged shall conform to the requirements specified in Table II for the T6, T62, and T73 tempers. Material as received in the T6, T651, T73, and T7351 tempers shall, after proper re-solution heat treatment and aging, be capable of conforming to the requirements specified in Table II for the T6, T62, and T73 tempers. Material in the T6, T62, and T651 tempers shall after proper aging be capable of conforming to the requirements specified in Table II for the T73 or T7351 tempers, as applicable. See AMS-QQ-A-225 for the solution and aging treatments.
- 3.3 Finish:
- Unless otherwise specified in the contract or purchase order (See 6.2), rod up to and including 3 inches in diameter, and bar up to and including 2 inches thick (with maximum width for rectangles of 4 inches) shall be processed to size by cold finishing.
- 3.4 Stress-Corrosion Cracking (SCC):
- 3.4.1 Resistance to SCC: Material in the T73 or T7351 tempers shall be capable of exhibiting no evidence of stress-corrosion cracking when subjected to the test specified in 4.2. The supplier shall maintain records of the performance of all lots so tested.
- 3.4.2 Acceptance Criteria: Susceptibility to stress corrosion cracking for each lot of 7075-T73 and T7351 material shall be established by testing the previously selected tensile specimens to the following criteria:
- Determine electrical conductivity and tensile properties
 - If the conductivity is below 38.0 percent International Annealed Copper Standard (IACS), the material is considered unsatisfactory and must be reprocessed, regardless of property level
 - If the conductivity is 40 percent IACS or higher and tensile properties meet the minimum values specified herein, the material is considered to be satisfactory
 - If conductivity is 38 to 40 percent IACS, if tensile properties meet the minimum limits specified herein, and if the yield strength does not exceed the specified minimum by more than 11.9 ksi, the material is considered to be satisfactory
 - If conductivity is below 40 percent IACS and the yield strength exceeds the specified minimum value by 12.0 ksi or more, the material is considered suspect
 - When material is considered suspect, it may be reprocessed or a sample of the material may be heat-treated for not less than 30 minutes at $870^{\circ}\text{F} \pm 10$, quenched in cold water. Conductivity shall then be measured within 15 minutes after quenching. If the difference between this measurement and the original measurement on the T73 or T7351 material is 6 percentage points or more, the T73 or T7351 temper material is satisfactory. If the difference is less than 6 percentage points, the T73 or T7351 material must be reprocessed