



<b>AEROSPACE MATERIAL SPECIFICATION</b>	<b>AMS-QQ-A-200/11</b>	<b>REV. A</b>
	Issued 1997-07 Reaffirmed 2007-04 Stabilized 2014-10	
Superseding AMS-QQ-A-200/11		
Aluminum Alloy 7075, Bar, Rod, Shapes, Tube, and Wire, Extruded		

#### RATIONALE

AMS-QQ-A200/11A stabilizes this document because equivalent technical requirements are contained in AMS4154, AMS4476, and AMS4617.

#### STABILIZATION NOTICE

AMS-QQ-A-200/11A has been declared "STABILIZED" by AMS Committee D. This document will no longer be updated and may no longer represent standard industry practice. This document was stabilized because it contains requirements that are no longer state of the art and are also contained in alternate documents that contain equivalent requirements. Previously this document was reaffirmed. AMS Committee D has never performed a technical update of this document. Users of this document should refer to the cognizant engineering organization for disposition of any issues with reports/certifications to this specification; including exceptions listed on the certification. NOTE: In many cases, the purchaser may represent a sub tier supplier and not the cognizant engineering organization.

AMS Committee D recommends that the following technically equivalent specifications be used for future procurement. This listing does not constitute authority to substitute these specifications for the "STABILIZED" specification.

- AMS4154 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
- AMS4476 Aluminum Alloy, Extrusions 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-O), Annealed
- AMS4617 Aluminum Alloy, Extrusions, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-T73, 7075-T73511, 7075-T73510) Solution Heat Treated, Stress Relieved by Stretching When Required, and Overaged

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## NOTICE

This document has been taken directly from Federal Specification QQ-A-200/11E and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards.

The original Federal Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, (b) the use of the existing government specification or standard format, and (c) the exclusion of any qualified product list (QPL) sections.

The complete requirements for procuring aluminum alloy 7075 bar, rod, shapes, tube, and wire extruded described herein shall consist of this document and the latest issue of AMS-QQ-A-200.

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## 1. SCOPE AND CLASSIFICATION:

### 1.1 Scope:

This specification covers the specific requirements for aluminum alloy 7075 bar, rod, shapes, tube, and wire produced by extrusion.

### 1.2 Classification:

1.2.1 Tempers: Bar, rod, shapes, tube, and wire are classified in the following tempers as specified (See 6.2): O, T6, T62, T6510, T6511, T73, T73510, or T73511. Definitions of tempers are specified in AMS-QQ-A-200.

1.2.2 Tubing: Tubing shall be additionally classified as follows:

<u>Type</u>	<u>Description</u>
I	- Tubing extruded from hollow billets using die and mandrel (See AMS-QQ-A-200).
II	- Tubing extruded from solid billets using a porthole or spider die or similar tooling (See AMS-QQ-A-200) <u>1/</u> .

1/ Type II tubing is not commonly available from the producers.

## 2. APPLICABLE DOCUMENTS:

See AMS-QQ-A-200.

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### 3. REQUIREMENTS:

#### 3.1 Chemical Composition:

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

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 <u>2/</u>		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 amounts greater than the specified limits, further analysis shall be made to determine that these elements are not present in excess of specified limits.

2/ The sum of those "Others" metallic elements 0.010 percent or more each, expressed to the second decimal before determining the sum.

#### 3.2 Mechanical Properties:

3.2.1 Mechanical Properties of Material as Supplied: Mechanical properties of as-supplied material shall, in the longitudinal (extrusion) direction, conform to property requirements specified in Table II, except as exempted in AMS-QQ-A-200.

TABLE II. Mechanical Properties

Temper	Thickness, (bar and shapes); diameter, (rod and wire); wall thickness, (tube) Inches	Area Square Inches	Tensile Strength Minimum ksi	Yield Strength at 0.2 percent Offset or at extension indicated		Elongation in 2 inches or 4 times D <sup>1/</sup> Minimum percent
				Minimum ksi	Extension under load inch per inch	
O	All	All	<u>2/</u>	<u>2/</u>	--	10
T6, T62 <sup>3/</sup> ,	Up to 0.249, incl	All	78.0	70.0	0.0088	7
T6510 and	0.250 to 0.499, incl	All	81.0	73.0	0.0090	7
T6511 <sup>4/</sup>	0.500 to 2.999, incl	All	81.0	72.0	0.0090	7
	3.000 to 4.499, incl	Up thru 20	81.0	71.0	0.0088	7
	3.000 to 4.499, incl	Over 20 thru 32	78.0	70.0	0.0088	6
	4.500 to 5.000, incl	Up thru 32	78.0	68.0	0.0086	6
T73,	0.062 to 0.249, incl	Up thru 20	68.0	58.0	0.0076	7
T73510,	0.250 to 1.499, incl	Up thru 25	70.0	61.0	0.0079	8
T73511 <sup>4/</sup>	1.500 to 2.999, incl	Up thru 25	69.0	59.0	0.0077	8
	3.000 to 4.499, incl	Up thru 20	68.0	57.0	0.0075	7
	3.000 to 4.499, incl	Over 20 thru 32	65.0	55.0	0.0073	7

<sup>1/</sup> D represents specimen diameter.

<sup>2/</sup> No minimum required. Maximum tensile and yield strengths shall be 40.0 ksi and 24.0 ksi, respectively.

<sup>3/</sup> Material in the T62 temper is not available from material producers.

<sup>4/</sup> For stress-relieved tempers, the characteristics and properties, other than those specified, may differ somewhat from the corresponding characteristics and properties of the material in the basic temper.

- 3.2.2 Mechanical Properties After Heat Treatment: In addition to conforming to the requirements of 3.2.1, materials identified in the following paragraphs shall, after having been heat-treated to other tempers also identified therein, have properties in the longitudinal (extrusion) direction conforming to those specified in Table II, as applicable.

- 3.2.2.1 Material in the O Temper: Material in the O temper, without the subsequent imposition of cold work or forming operations, shall, after proper solution heat treatment and artificial aging, develop the properties specified in Table II for the T62 temper. Material in the O temper, without the subsequent imposition of cold work or forming operations, shall be capable of being solution heat-treated and overaged (stabilized) to the properties specified for the T73 temper. Such capability shall be demonstrated when specified (See 6.2).
- 3.2.2.2 Material in the T6, T6510, T6511, T73, T73510, and T73511 Tempers: Material in the T6, T6510, T6511, T73, T73510, and T73511 tempers, without the subsequent imposition of cold work or forming operations, shall be capable of being solution heat-treated and artificially aged or overaged, as applicable, to the properties specified for the T62 and T73 tempers. Such capability shall be demonstrated when specified (See 6.2).

### 3.3 Internal Defects:

When specified (See 6.2), bar, rod, tube, and shapes shall be ultrasonically inspected (See AMS-QQ-A-200). Acceptance limits shall be as specified in Table III. The technique for inspection of tube shall be as agreed upon by the procuring activity and the contractor (See 6.2).

TABLE III. Ultrasonic Discontinuity Acceptance Limits <sup>1/</sup>

Thickness, (bar and shapes); diameter (rod); wall thickness, (tube); inches <sup>2/</sup>	Maximum weight per piece pounds	Maximum width to thickness ratio <sup>3/</sup>	Discontinuity class <sup>4/</sup>
0.500 to 1.499	600	10 to 1	B
1.500 and over	600	10 to 1	A

<sup>1/</sup> Discontinuities in excess of those listed in Table III may be allowed subject to approval of the procuring activity, if it is established that they will be removed by machining or that they are in noncritical areas.

<sup>2/</sup> The thickness of any element of a shape shall be deemed to be the smallest dimension of that element, and the discontinuity class applicable to that particular thickness shall apply to that element of the shape.

<sup>3/</sup> Not applicable to rod and tube.

<sup>4/</sup> Discontinuity class limits are defined in MIL-STD-2154.

### 3.4 Resistance to Stress-Corrosion Cracking:

Material supplied in the T73, T73510, and T73511 tempers shall exhibit no evidence of stress-corrosion cracking when subjected to the test specified in 4.2. Sampling frequency shall be in accordance with AMS-QQ-A-200.

- 3.4.1 Lot Acceptance Criteria for Stress-Corrosion Cracking: Resistance to stress-corrosion cracking for each inspection lot of 7075-T73, T73510, and T73511 material shall be established by testing the previously selected tensile test 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 40.0 percent IACS or higher and tensile properties meet the minimum values specified herein, the material is considered to be satisfactory.

If conductivity is 38.0 through 39.9 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 38.0 through 39.9 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 either be given additional second step aging or be reprocessed.

- 3.5 Marking:

In addition to the marking required by AMS-QQ-A-200, material in the T6, T6510, T6511, T73, T73510, and T73511 tempers shall be identified by an inspection lot number marked in at least one location on each piece.

#### 4. QUALITY ASSURANCE PROVISIONS:

See AMS-QQ-A-200 and the following:

##### 4.1 Mechanical Tests After Heat Treatment:

- 4.1.1 Material in the O Temper: From material in the O temper, an additional number of specimens, equal to that required by AMS-QQ-A-200, shall be taken and tested after solution heat treatment and artificial aging to determine compliance with 3.2.2.1 relative to the T62 temper. When specified (See 6.2), from material in the O temper, a number of specimens, equal to that required by AMS-QQ-A-200, shall be taken and tested after solution heat treatment and over-aging to determine compliance with 3.2.2.1 relative to the T73 temper.
- 4.1.2 Material in Tempers Other Than O: When specified (See 6.2), from material in a temper other than the O temper, an additional number of specimens, equal to that required by AMS-QQ-A-200, shall be taken and tested after the appropriate solution heat treatment and aging treatment to determine compliance with 3.2.2.2.