



AEROSPACE MATERIAL SPECIFICATION	AMS-WW-T-700™/6	REV. C
	Issued 2001-07 Noncurrent 2007-09 Revised 2011-03 Stabilized 2015-09 Superseding AMS-WW-T-700/6B	
Tube, Aluminum Alloy, Drawn, Seamless, 6061		

RATIONALE

AMS-WW-T-700/6C stabilizes this document because it contains requirements that are no longer state of the art and are also contained in alternate documents that contain technically equivalent requirements.

STABILIZED NOTICE

AMS-WW-T-700/6C has been declared "STABILIZED" by AMS Committee D. This document will no longer be updated and may no longer represent standard industry practice.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 this document contains requirements that are no longer state of the art and there are alternate documents that contain equivalent requirements. Previously this document was revised. The last technical update of this document occurred in July 2001. 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.

- AMS 4080 Aluminum Alloy, Drawn Seamless Tubing, 1.0Mg - 0.06Si - 0.28Cu - 0.20Cr (6061-0) Annealed
- AMS 4082 Aluminum Alloy, Seamless Drawn Tubing, 1.0Mg - 0.06Si - 0.28Cu - 0.20Cr (6061-T6) Solution and Precipitation Heat Treated
- AMS 4480 Aluminum Alloy, Seamless Drawn Tubing 1.0Mg - 0.60Si - 0.28Cu - 0.20Cr (6061-T4) Solution Heat Treated and Naturally Aged.

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NOTICE

The initial SAE publication of this document was taken directly from U.S. Military Standard WWW-T-700/6F, Amendment 2. This SAE Standard may retain the same part numbers established by the original military document. Any requirements associated with Qualified Products Lists (QPL) may continue to be mandatory for DoD contracts. Requirements relating to QPLs have not been adopted by the SAE for this standard and are not part of this SAE document.

The complete requirements for procuring seamless tube drawn from aluminum alloy 6061 described herein shall consist of this document and the latest issue of WW-T-700/GEN (See 2.1).

1. SCOPE AND CLASSIFICATION

1.1 Scope

This specification covers the specific requirements for seamless tube drawn from aluminum alloy 6061.

1.2 Classification

1.2.1 Tempers

The drawn seamless tube shall be of the following tempers: 0, T4, T42, T6, T62, or F, as specified (See 6.2 and 6.3). The definition of these tempers shall be as specified in WW-T-700/GEN.

1.2.2 Types

The tube shall be of the following types:

Type	Appearance
I	- Round
II	- Rectangular and square
III	- Streamline
IV	- Oval
V	- Odd shapes

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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 U.S. Government Publications

Available from the document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, <http://assist.daps.dla.mil/quicksearch/>.

WW-T-700/GEN Tube, Aluminum and Aluminum Alloy, Drawn, Seamless, General Specification for

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3. REQUIREMENTS

3.1 Chemical Composition

The chemical composition shall conform to the requirements specified in Table 1.

TABLE 1 - CHEMICAL COMPOSITION ^{1/}

Element	min	max
Silicon	0.40	0.8
Iron	--	0.7
Copper	0.15	0.40
Manganese	--	0.15
Magnesium	0.8	1.2
Chromium	0.04	0.35
Zinc	--	0.25
Titanium	--	0.15
Other Elements, each	--	0.05
Other Elements, total ^{2/}	--	0.15
Aluminum	remainder	

^{1/} Except for "Aluminum" and "Others", analysis normally is made for elements for which specific limits are shown.

^{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 Tensile Strength, Yield Strength and Elongation Properties

The tensile strength, yield strength and elongation mechanical properties parallel to the direction of drawing shall conform to the requirements specified in Table 2.

TABLE 2 - TENSILE STRENGTH, YIELD STRENGTH AND ELONGATION PROPERTIES

Temper	Wall thickness, inch	Tensile strength, minimum, ksi	Yield strength		Percent elongation in 2 inches or 4D ^{1/} , minimum, kind of specimen	
			At 0.2 per- cent, offset, minimum, ksi	At extens- ion under load, inch per inch	Full section	Cut-out
0	0.018 to 0.500, incl	22.0 ^{2/}	14.0 ^{2/}	0.0024	15	15
T4	0.025 to 0.049, incl.	30.0	16.0	0.0036	16	14
	0.050 to 0.259, incl.	30.0	16.0	0.0036	18	16
	0.260 to 0.500, incl.	30.0	16.0	0.0036	20	18
T42 ^{3/}	0.025 to 0.049, incl.	30.0	14.0	0.0024	16	14
	0.050 to 0.259, incl.	30.0	14.0	0.0024	18	16
	0.260 to 0.500, incl.	30.0	14.0	0.0024	20	18
T6 and T62 ^{3/}	0.025 to 0.049, incl.	42.0	35.0	0.0055	10	8
	0.050 to 0.259, incl.	42.0	35.0	0.0055	12	10
	0.260 to 0.500, incl.	42.0	35.0	0.0055	14	12
F	All	4/	4/	4/	4/	4/

- ^{1/} Round tube 2 inches or less in outside diameter and square tube 1-1/2 inches or less on a side shall be tested in full section unless the limitations of the testing machine preclude the use of such a specimen. For round tube over 2 inches in diameter, for square tube over 1-1/2 inches on a side, for all sizes of tube other than round or square, or in those cases when a full section specimen cannot be used, a cut-out specimen shall be used. D represents diameter of cut-out specimen
- ^{2/} Maximum
- ^{3/} Material in the T42 or T62 tempers is not available from the materials producers
- ^{4/} No requirements

3.2.2 Flattening

When specified (See 6.2), round tube (type 1) in 0, T4, and T6 tempers shall withstand, without cracking, the flattening test or the alternative bend test specified in WW-T-700/GEN. The values for flattening factor "F" are specified in Table 3.

TABLE 3 - FLATTENING FACTOR

Temper	Wall thickness, inch	F
0	Up through 0.120	3
	0.121 to 0.238, incl.	4
	0.239 to 0.500, incl.	6
T4	0.025 to 0.500, incl.	6
T6	0.025 to 0.500, incl.	8

3.2.2.1 Alternative Bending Factor "N"

The values for the alternative bending factor "N" are specified in Table 4.

TABLE 4 - BENDING FACTOR

Temper	Wall thickness, inch	N
0	0.120 and less	1
	Over 0.120 to 0.238, incl.	2
	Over 0.238 to 0.500, incl.	4
T4	0.025 to 0.500, incl.	4
T6	0.025 to 0.500, incl.	6

3.2.3 Cleanliness

When specified (See 6.2), the internal surface of the tube shall be examined for cleanliness as specified in WW-T-700/GEN.

3.2.4 Leak Test

When specified (See 6.2), round tube (type I) shall withstand either the pressure test or the electromagnetic (eddy current) test specified in WW-T-700/GEN.

3.2.5 Flaring

When specified (See 6.2), round tube (type I) in the 0, T4 and T42 tempers shall be capable of being flared as specified in WW-T-700/GEN.

3.2.6 Mechanical Properties After Heat Treatment

In addition to conforming to the requirements of 3.2.1, material in the tempers identified in the following paragraphs shall, after having been processed to tempers also specified therein, have properties conforming to those specified in Table 2, as applicable.