



AEROSPACE MATERIAL SPECIFICATION

AMS4480™**REV. A**Issued 2015-01
Revised 2020-11

Superseding AMS4480

Aluminum Alloy, Seamless Drawn Tubing
1.0Mg - 0.60Si - 0.28Cu - 0.20Cr (6061-T4)
Solution Heat Treated and Naturally Aged
(Composition similar to UNS A96061)

RATIONALE

AMS4480A prohibits unauthorized exceptions Form (1.1), Exceptions (3.6), revises Properties (3.2, 3.3.2.1), Reports (4.4.1), and Identification (5.1.1). It also identifies the difference between extruded and drawn tubing (1.1.1 and 8.9) and is the result of a Five-Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of seamless, drawn tubing from 0.025 to 0.500 inches (0.64 to 12.70 mm) in wall thickness (see 8.6).

1.1.1 See 8.9 for how this product differs from extruded tubing.

1.2 Application

This tubing has been used typically for parts, such as brackets, conduits, and low-pressure liquid lines, requiring moderate strength at ambient temperatures, 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.

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<https://www.sae.org/standards/content/AMS4480A/>

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

AMS2772 Heat Treatment of Aluminum Alloy Raw Materials

ARP1917 Clarification of 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 B660 Packaging/Packing of Aluminum and Magnesium Products

ASTM B666/B666M Identification Marking of Aluminum Products

2.3 ANSI Accredited Publications

Copies of these documents are available online at <http://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)

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	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	--	0.15
Aluminum	remainder	

3.2 Condition

Solution heat treated and naturally aged in accordance with AMS2772 to the T4 temper (refer to ANSI H35.1/H35.1M).

Tubing shall be supplied unground with an as-drawn surface finish, unless otherwise specified by purchaser.

3.3 Properties

Tubing shall conform to the following requirements, determined on the mill produced size in accordance with AMS2355:

3.3.1 Mechanical property requirements for product outside of the range covered by Table 2 shall be agreed upon between purchaser and producer.

3.3.2 Tensile Properties

Shall be as shown in Table 2 (see 8.6).

Table 2A - Minimum tensile properties, inch/pound units (see 8.8)

Nominal Wall Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D % Cut Out Specimen	Elongation in 2 Inches or 4D % Full Section Specimen
0.025 to 0.049, incl	30.0	16.0	14	16
Over 0.049 to 0.259, incl	30.0	16.0	16	18
Over 0.259 to 0.500, incl	30.0	16.0	18	20

Table 2B - Minimum tensile properties, SI units (see 8.8)

Nominal Wall Thickness Millimeters	Tensile Strength MPa, Min	Yield Strength at 0.2% Offset MPa, Min	Elongation in 50.8 mm or 4D % Cut Out Specimen	Elongation in 50.8 mm or 4D % Full Section Specimen
0.64 to 1.24, incl	207	110	14	16
Over 1.24 to 6.58, incl	207	110	16	18
Over 6.58 to 12.70, incl	207	110	18	20

3.3.2.1 Mechanical property requirement for product outside the range covered by 1.1 or Table 2 shall be agreed upon between purchaser and producer and reported per 4.4.1.

3.4 Quality

Tubing, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the tubing.

3.4.1 Detrimental imperfections include, but are not limited to, cracks, splits, seams, inclusions, or severe crosshatching (surface breaks) that cannot be removed by light hand sanding using 180 grit or finer sandpaper.

3.5 Tolerances

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

3.6 Exceptions

Any exceptions shall be authorized by purchaser and reported as in 4.4.1.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of tubing shall supply all samples for producer'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 tubing conforms to specified requirements.

4.2 Classification of Tests

All technical requirements are acceptance tests and, except for composition, shall be performed on each lot.

4.3 Sampling and Testing

Shall be in accordance with AMS2355.

4.4 Reports

The producer of tubing shall furnish with each shipment a report stating that the tubing conforms to the composition and tolerances, and showing the numerical results of tests on each inspection lot to determine conformance to the other acceptance test requirements and periodic test requirements when performed. This report shall include the purchase order number, inspection lot number(s), AMS4480A, size, and quantity. The report shall also identify the producer, the product form, and the size of the mill product.

4.4.1 When material produced to this specification is outside the size range specified in 1.1 or Table 2, or has exceptions authorized by purchaser taken in the technical requirements list in Section 3, the report shall contain a statement "This material is certified as AMS4480A(EXC) because of the following exceptions:" and the specific exceptions shall be listed (see 5.1.1).

4.5 Resampling and Retesting

Shall be in accordance with AMS2355.

5. PREPARATION FOR DELIVERY

5.1 Identification

Shall be in accordance with ASTM B666/B666M.

5.1.1 When technical exceptions are taken (see 4.4.1) the material shall be marked with AMS4480(EXC).

5.2 Packaging

5.2.1 When specified, tubing shall be coated, prior to shipment, with a light corrosion-inhibiting oil.

5.2.2 Tubing shall be prepared for shipment in accordance with ASTM B660, Commercial Practice, and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the tubing to ensure carrier acceptance and safe delivery.

6. ACKNOWLEDGMENT

A producer shall include this specification number in all quotations and when acknowledging purchase orders.

7. REJECTIONS

Tubing not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.

8. NOTES

8.1 Revision Indicator

A change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

8.2 Terms used in AMS are clarified in ARP1917.