



AEROSPACE MATERIAL SPECIFICATION

AMS4083™

REV. M

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Superseding AMS4083L

Aluminum Alloy Tubing, Hydraulic, Seamless, Drawn, Round
1.0Mg - 0.60Si - 0.28Cu - 0.20Cr (6061-T6)
Solution and Precipitation Heat Treated
(Composition similar to UNS 96061)

RATIONALE

AMS4083M revises properties (3.3), reports (4.4) and identification (5.1.1), and results from 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 round tubing with wall thickness from 0.025 to 0.500 inch (0.64 to 12.70 mm), inclusive (see 8.6).

1.2 Application

This tubing has been used typically for parts operating under high pressure, such as hydraulic systems and fuel and oil lines, 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.

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 |

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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

ASTM E215 Standardizing Equipment and Electromagnetic Examination of Seamless Aluminum-Alloy Tube

2.3 ANSI Accredited Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

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 |
| Others, each | -- | 0.05 |
| Others, total | -- | 0.15 |
| Aluminum | remainder | |

3.2 Condition

Solution and precipitation heat treated in accordance with AMS2772.

3.2.1 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, except as specified in 3.4.3.2:

3.3.1 Tensile Properties

Shall be as specified in Table 2:

Table 2**Table 2A - Minimum tensile properties, inch/pound units**

| Nominal Wall Thickness Inch | 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 | 42.0 | 35.0 | 8 | 10 |
| Over 0.049 to 0.259, incl | 42.0 | 35.0 | 10 | 12 |
| Over 0.259 to 0.500, incl | 42.0 | 35.0 | 12 | 14 |

Table 2B - Minimum tensile properties, SI units

| Nominal Wall Thickness Millimeters | Tensile Strength MPa | Yield Strength at 0.2% Offset MPa | 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 | 290 | 241 | 8 | 10 |
| Over 1.24 to 6.58, incl | 290 | 241 | 10 | 12 |
| Over 6.58 to 12.70, incl | 290 | 241 | 12 | 14 |

3.3.1.1 Mechanical property requirements for tubing outside the wall thickness range of 1.1 shall be as agreed upon by purchaser and producer.

3.3.2 Flattening

Tubing having nominal wall thickness less than 10% of the nominal OD shall withstand, without cracking, flattening sideways under a load applied gradually at room temperature until the outside dimension under load is equal to eight times the nominal wall thickness. Tubing having nominal wall thickness 10% or more of the nominal OD shall withstand without cracking, flattening sideways under a load applied gradually at room temperature until the outside dimension under load equals 90% of the nominal OD.

3.3.2.1 If tubing does not pass the flattening test of 3.3.2, a section of tube not less than 0.5 inch (12.7 mm) in length and embracing one-third to one-half the circumference of the tube shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a mandrel having a diameter equal to 6 times the nominal wall thickness of the tubing with axis of bend parallel to axis of tube and with inside of tube on inside of bend.

3.3.3 Flarability

Specimens as in 4.3.1 from tubing 0.375 inch (9.52 mm) and under in nominal OD shall withstand being double-flared (see 8.2) and from tubing over 0.375 inch (9.52 mm) in nominal OD shall withstand being single flared without formation of cracks or other visible defects by being forced axially, at room temperature, with steady pressure over a hardened and polished tapered steel pin having a 74-degree included angle to produce a flare having a permanent expanded OD not less than specified in Table 3.