AEROSPACE MATERIAL SPECIFICATION

AMS4069™	REV. G

Issued 1959-06
Reaffirmed 2006-04
Revised 2023-09

Superseding AMS4069F

Aluminum Alloy, Drawn, Round Seamless Tubing
Close Tolerance
2.5Mg - 0.25Cr (5052-O)
Annealed

(Composition similar to UNS A95052)

RATIONALE

AMS4069G is the result of a Five-Year Review and update of this specification with changes to update wording to prohibit unauthorized exceptions (see 3.3.1.1, 3.6, 4.4.1, 5.1.1, and 8.3), relocate Definitions (see 2.4), update Applicable Documents (see Section 2), and allow the use of the immediate prior revision of this specification (see 8.4).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of drawn, round seamless tubing 0.010 to 0.450 inch (0.25 to 11.43 mm), inclusive, in wall thickness (see 8.5).

1.2 Application

This tubing has been used typically for ducts requiring small radius bends, 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

AS7766 Terms Used in Aerospace Metals Specifications

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS4069G

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 and Magnesium Products

2.3 ANSI Accredited Publications

Copies of these documents are available online at https://webstore.ansi.org/.

ANSI H35.2 Dimensional Tolerances for Aluminum Mill Products

ANSI H35.2M Dimensional Tolerances for Aluminum Mill Products (Metric)

2.4 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight as shown in Table 1, determined in accordance with AMS2355.

Table 1 - Composition

Element	Min	Max
Silicon	--	0.25
Iron	--	0.40
Copper	--	0.10
Manganese	--	0.10
Magnesium	2.2	2.8
Chromium	0.15	0.35
Zinc	--	0.10
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition

Annealed.

3.3 Properties

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

3.3.1 Tensile Properties

Shall be as shown in Table 2 for tubing 0.010 to 0.450 inch (0.25 to 11.43 mm), inclusive, in specified wall thickness.

3.3.1.1 Mechanical property requirements for product outside the range covered by 1.1 shall be agreed upon between the purchaser and producer and reported as in 4.4.1 (see 8.5).

Table 2 - Tensile properties

Property	Value
Tensile Strength	25.0 to 35.0 ksi (172 to 241 MPa)
Yield Strength at 0.2% Offset	10.0 to 20.0 ksi (68.9 to 138 MPa)
Elongation in 2 Inches (50.8 mm), Minimum	
Strip	10%
Full Section	12%

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 three times the nominal wall thickness.

3.3.2.1 If tubing does not pass the flattening test of 3.3.2, a section of tube not less than 1/2 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 diameter equal to 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.

3.4 Quality

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

3.5 Tolerances

Except as specified in 3.5.1 for mean diameter, tolerances shall conform to all applicable requirements of ANSI H35.2 or ANSI H35.2M.

3.5.1 Mean Diameter

Shall be as shown in Table 3. Mean diameter is the average of two measurements taken at right angles to each other at the same longitudinal location on the tube.

Table 3A - Mean diameter, inch/pound units

Nominal OD Inches	Tolerance Inches Plus and Minus
0.500 to 1.000, incl	0.002
Over 1.000 to 3.000, incl	0.003
Over 3.000 to 5.000, incl	0.004
Over 5.000 to 6.000, incl	0.005
Over 6.000 to 8.000, incl	0.008
Over 8.000 to 10.000, incl	0.010
Over 10.000 to 12.000, incl	0.013

Table 3B - Mean diameter, SI units

Nominal OD Millimeters	Tolerance Millimeters Plus and Minus
12.70 to 25.40, incl	0.05
Over 25.40 to 76.20, incl	0.08
Over 76.20 to 127.00, incl	0.10
Over 127.00 to 152.40, incl	0.13
Over 152.40 to 203.20, incl	0.20
Over 203.20 to 254.00, incl	0.25
Over 254.00 to 304.80, incl	0.33

3.6 Exceptions

Any exceptions shall be authorized by the 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 the producer's tests and shall be responsible for the performance of all required tests. The 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

4.2.1 Acceptance Tests

Composition (see 3.1), tensile properties (see 3.3.1), and tolerances (see 3.5) are acceptance tests and, except for composition, shall be performed on each inspection lot.

4.2.2 Periodic Tests

Flattening (see 3.3.2) is a periodic test and shall be performed at a frequency selected by the producer unless frequency of testing is specified by the purchaser.

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 product conforms to the chemical composition and tolerances, and showing the numerical results of tests on each inspection lot to determine conformance to the other acceptance test requirements. This report shall include the purchase order number, inspection lot number(s), AMS4069G, 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 beyond the sizes allowed in the scope or tables, or other exceptions are taken to the technical requirements listed in Section 3, the report shall contain a statement "This material is certified as AMS4069G(EXC) because of the following exceptions:" and the specific exceptions shall be listed (see 5.1.1).