AEROSPACE MATERIAL SPECIFICATION

AMS4070™	REV. N

Issued 1940-10
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Revised 2015-12

Superseding AMS4070M

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

(Composition similar to UNS A95052)

RATIONALE

AMS4070N revises Properties (3.3.1.1) and Reports (4.4.1) and is a Five Year Review and update of this specification.

1. SCOPE

1.1 Form

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

1.2 Application

This tubing has been used typically for parts, such as brackets, conduits, and low-pressure fluid lines, requiring good weldability, moderate strength, and good resistance to corrosion, 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

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**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4070N

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 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 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 shown in Table 2 for tubing having nominal wall thickness of 0.010 to 0.450 inch (0.25 to 11.43 mm), inclusive.

Table 2 - Tensile properties

Property	Value
Tensile Strength	25.0 to 35.0 ksi (172 to 241 MPa)
Yield Strength at 0.2% Offset, min	10.0 ksi (68.9 MPa)

3.3.1.1 Mechanical property requirements for product outside of the range covered by 1.1 shall be agreed upon between 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 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.

3.3.3 Flarability

Tubing with a nominal OD of 0.125 to 0.312 inch (3.18 to 7.92 mm) and wall thickness up to 0.035 inch (0.89 mm) and tubing with a nominal OD of 0.313 to 0.375 inch (7.95 to 9.52 mm) and nominal wall thickness not greater than 0.049 inch (1.24 mm) shall withstand double-flaring (see 8.2), and tubing with nominal OD over 0.375 inch (9.52 mm) shall withstand single-flaring without formation of cracks or other visible defects by being forced, at room temperature, axially 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.

Table 3A - Minimum flarability, inch/pound units

Nominal OD Inch	Expanded OD Inch	Nominal OD Inches	Expanded OD Inches
0.125	0.200	1.000	1.187
0.188	0.302	1.250	1.500
0.250	0.359	1.500	1.721
0.312	0.421	1.750	2.106
0.375	0.484	2.000	2.356
0.500	0.656	2.500	2.856
0.625	0.781	3.000	3.356
0.750	0.937		

Table 3B - Minimum flarability, SI units

Nominal OD Millimeters	Expanded OD Millimeters	Nominal OD Millimeters	Expanded OD Millimeters
3.18	5.08	25.40	30.15
4.78	7.67	31.75	38.10
6.35	9.12	38.10	43.71
7.92	10.69	44.45	53.49
9.52	12.29	50.80	59.84
12.70	16.66	63.50	72.54
15.88	19.84	76.20	85.24
19.05	23.80		

3.3.3.1 Tubing with nominal OD between any two standard sizes shown in Table 2 shall take the same percentage flare as shown for the larger of the two sizes.

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.

3.5 Tolerances

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

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

4.2.1 Acceptance Tests

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

4.2.2 Periodic Tests

Flattening (3.3.2) and flarability (3.3.3) are periodic tests and shall be performed at a frequency selected by the producer unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing

Shall be in accordance with AMS2355 and the following:

4.3.1 Specimens for flarability test (3.3.3) shall be full tubes or sections cut from a tube. The end of the specimen to be flared shall be cut square, with the cut end smooth and free from burrs, but, except for sizes 0.375 inch (9.52 mm) and under in nominal diameter, not rounded.

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), AMS4070N, size, and quantity. The report shall also identify the producer, the product form, and the size of the mill product.

4.4.1 When product is outside the range covered by 1.1, the report shall contain a statement to that effect.

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.

5.2 Packaging

5.2.1 Tubing shall be oiled, prior to shipment, with a light corrosion-inhibiting oil.

5.2.2 Tubing shall be prepared for shipment in accordance with ASTM B660 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.