

# AEROSPACE MATERIAL SPECIFICATION



AMS 4069D

Issued JUN 1959  
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Reaffirmed APR 2006

Superseding AMS 4069C

Aluminum Alloy, Drawn, Round Seamless Tubing  
Close Tolerance  
2.5Mg - 0.25Cr (5052-0)  
Annealed

(Composition similar to UNS A95052)

## 1. SCOPE:

### 1.1 Form:

This specification covers an aluminum alloy in the form of drawn, round seamless tubing.

### 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 canceled and no superseding document has been specified, the last published issue of that document shall apply.

### 2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or <http://www.sae.org>.

AMS 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
MAM 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings, Metric (SI) Units

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## 2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products  
 ASTM B 666/B666M Identification Marking of Aluminum and Magnesium Products

## 2.3 ANSI Publications:

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

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 AMS 2355 or MAM 2355.

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 AMS 2355 or MAM 2355:

- 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.

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), min	
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 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 Inch 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 Millimeter 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

#### 4. QUALITY ASSURANCE PROVISIONS:

##### 4.1 Responsibility for Inspection:

The vendor of tubing shall supply all samples for vendor'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 the 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) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.