

 <p><b>SAE</b> The Engineering Society For Advancing Mobility Land Sea Air and Space® <b>INTERNATIONAL</b></p> <p>400 Commonwealth Drive, Warrendale, PA 15096-0001</p> <p style="text-align: center;"><b>AEROSPACE MATERIAL SPECIFICATION</b></p> <p style="text-align: center;">Submitted for recognition as an American National Standard</p>	 <p style="text-align: center;"><b>AMS 4069C</b></p>
<p style="text-align: center;"><b>ALUMINUM ALLOY, DRAWN, ROUND SEAMLESS TUBING</b></p> <p style="text-align: center;">Close Tolerance 2.5Mg - 0.25Cr (5052-0) Annealed</p>	<p>Issued JUN 1959 Revised SEP 1995</p> <p style="text-align: center;">Superseding AMS 4069B</p>
	<p style="text-align: right;">UNS A95052</p>
<p>1. SCOPE:</p> <p>1.1 Form:</p> <p style="padding-left: 40px;">This specification covers an aluminum alloy in the form of drawn, round seamless tubing.</p> <p>1.2 Application:</p> <p style="padding-left: 40px;">This tubing has been used typically for ducts requiring small radius bends, but usage is not limited to such applications.</p> <p>2. APPLICABLE DOCUMENTS:</p> <p style="padding-left: 40px;">The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.</p> <p>2.1 SAE Publications:</p> <p style="padding-left: 40px;">Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.</p> <p>AMS 2355 Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings</p> <p>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</p> <p>AMS 2811 Identification, Aluminum and Magnesium Alloy Wrought Products</p>	

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright 1995 Society of Automotive Engineers, Inc.  
All rights reserved.

Printed in U.S.A.

AMS 4069C

SAE

AMS 4069C

## 2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products

## 2.3 ANSI Publications:

Available from American National Standards Institute, Inc., 11 West 42nd Street, New York, NY 10036-8002.

ANSI H35.2 Dimensional Tolerances for Aluminum Mill Products

## 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
Magnesium	2.2	2.8
Chromium	0.15	0.35
Iron	--	0.40
Silicon	--	0.25
Zinc	--	0.10
Manganese	--	0.10
Copper	--	0.10
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

## 3.2 Condition:

Annealed.

## 3.3 Properties:

Tubing shall conform to the following requirements, determined 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.

AMS 4069C

SAE

AMS 4069C

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:

(R)

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

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

AMS 4069C

SAE

AMS 4069C

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 performing 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 requirements of this specification.

##### 4.2 Classification of Tests:

4.2.1 Acceptance Tests: Composition (3.1), tensile properties (3.3.1), and tolerances (3.5) are (R) 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.

##### 4.3 Sampling and Testing:

Shall be in accordance with AMS 2355 or MAM 2355.

##### 4.4 Reports:

(R)

The vendor of tubing shall furnish with each shipment a report stating that the tubing conforms to the chemical composition and showing the results of tests on each lot to determine conformance to the other acceptance test requirements. This report shall include the purchase order number, inspection lot number, AMS 4069C, size, and quantity.

##### 4.5 Resampling and Retesting:

Shall be in accordance with AMS 2355 or MAM 2355.