



AEROSPACE MATERIAL SPECIFICATION

AMS4459™

REV. B

Issued 2012-03

Revised 2018-08

Superseding AMS4459A

Aluminum Alloy, Extrusion
2.7Cu - 1.8Li - 0.7Zn - 0.3Mn - 0.3Mg - 0.08Zr (2099-T81)
Solution Heat Treated, Stress Relieved by Stretching 1 to 3% and Aged

RATIONALE

AMS4459B prohibits unauthorized exceptions (3.7), revises Composition (Table 1), Condition (3.2), Properties (3.4.3), Reports (4.4.1), 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 extruded bars, rods, and profiles (shapes) from 0.375 to 1.300 inches (9.53 to 33.02 mm) in diameter or thickness, produced with cross sectional area of 22.5 in² (145 cm²) maximum, and a circumscribing circle diameter (circle size) of 17.4 inches (44.2 cm) maximum. See 8.3 for definition of circumscribing circle size.

1.2 Application

These extrusions have been used typically for machined parts requiring high strength with high toughness, but usage is not limited to such applications.

1.3 Certain processing procedures may cause this product to become susceptible to stress-corrosion cracking; ARP823 recommends practices to minimize such conditions.

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.

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2.1 SAE Documents

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
ARP823	Minimizing Stress-Corrosion Cracking in Wrought Heat-Treatable Aluminum Alloy Products
ARP1917	Clarification of Terms Used in Aerospace Metals Specifications

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 B594	Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications
ASTM B660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B666/B666M	Identification Marking of Aluminum and Magnesium Products
ASTM E1004	Determining Electrical Conductivity Using the Electromagnetic (Eddy-Current) Method
ASTM G34	Exfoliation Corrosion Susceptibility in 2xxx and 7xxx Aluminum Alloys (EXCO Test)
ASTM G47	Determining Susceptibility to Stress-Corrosion Cracking of 2XXX and 7XXX Aluminum Alloy Products
ASTM G85	Modified Salt Spray (Fog) Testing, Annex A2 (Cyclic Acidified Salt Spray Test)
ASTM G112	Guide for Conducting Exfoliation Corrosion Tests in Aluminum Alloys

2.3 ANSI Accredited Publications

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

ANSI H35.1/H35.1M	Standard Alloy and Temper Designation System for Aluminum
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	--	0.05
Iron	--	0.07
Copper	2.4	3.0
Manganese	0.10	0.50
Magnesium	0.10	0.50
Zinc	0.40	1.0
Titanium	--	0.10
Lithium	1.6	2.0
Zirconium	0.05	0.12
Beryllium	--	0.0001
Other Impurities - each	--	0.05
Other Impurities - total	--	0.15
Aluminum	remainder	

3.2 Condition

Extruded, solution heat-treated, and stress-relieved by stretching to produce a nominal permanent set of 1 to 3% (target of 2%) and then artificially aged to T81 (refer to ANSI H35.1/H35.1M).

3.2.1 Product shall be supplied with an as-extruded surface finish; light polishing to remove minor surface conditions is permissible, provided such conditions can be removed within specified dimensional tolerances.

3.2.2 Product may receive minor straightening, after stretching, of an amount necessary to meet the requirements of 3.6.

3.3 Heat Treatment

Heat Treatment procedures shall be in accordance with the requirements of AMS2772 and the following:

3.3.1 Solution Heat Treatment Temperature

960 to 1020 °F (516 to 549 °C).

3.3.2 Aging Heat Treatment

Heat to 250 °F ± 10 °F (121 °C ± 6 °C), hold at temperature for a time of 10 to 14 hours, then heat to 305 °F ± 10 °F (152 °C ± 6 °C), hold at temperature for a time of 14 to 19 hours, and air cool.

3.4 Properties

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