AEROSPACE MATERIAL SPECIFICATION

AMS4287™	REV. C

Issued 2006-04
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Revised 2025-02

Superseding AMS4287B

Aluminum Alloy, Extrusion,
2.7Cu - 1.8Li - 0.7Zn - 0.3Mn - 0.3Mg - 0.08Zr (2099-T83),
Solution Heat Treated, Stress Relieved by Stretching 1 to 4% and Aged
(Composition similar to UNS A92099)

RATIONALE

AMS4287C results from a Five-Year Review and update of this specification with changes to update standard language related to unauthorized exceptions (see 3.4.1.1, 4.4.1, and 8.6), relocate Definitions (see 2.4), and update Applicable Documents (see Section 2).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of extruded bars, rods, and profiles (shapes) produced with nominal thickness up to 3.000 inches (76.20 mm), inclusive, and having a cross-sectional area of 42 square inches (271 cm^2) maximum and a circumscribing circle diameter (circle size) of 15 inches (38 cm) maximum (see 2.4.1 and 8.8).

1.2 Application

These extrusions have been used typically for machined parts requiring high strength, 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 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

AMS2772 Heat Treatment of Aluminum Alloy Raw Materials

ARP823 Minimizing Stress-Corrosion Cracking in Wrought High-Strength Aluminum Alloy Products

AS7766 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

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 Conducting Exfoliation Corrosion Tests in Aluminum Alloys

2.3 ANSI Accredited Publications

Copies of these documents are available online at https://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)

2.4 Definitions

Terms used in AMS are defined in AS7766.

2.4.1 The circumscribing circle diameter is the diameter of the smallest circle, which completely encloses the cross section of the as-extruded product.

3. TECHNICAL REQUIREMENTS

3.1 Composition

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

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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	0.4	1.0
Titanium	--	0.10
Lithium	1.6	2.0
Zirconium	0.05	0.12
Beryllium	--	0.0003
Other Elements, each	--	0.05
Other Elements, 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 4% and then artificial aged to T83 (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

3.3.1 Heat-treatment procedures shall be in accordance with the requirements of AMS2772 and the following:

3.3.1.1 Solution Heat-Treatment Temperature

Heat to 1010 °F ± 20 °F (543 °C ± 11 °C) (see 8.4).

3.3.1.2 Aging Heat Treatment

Heat to 250 °F ± 10 °F (121 °C ± 6 °C), hold at heat for a time of 10 to 14 hours, then heat to 305 °F ± 10 °F (152 °C ± 6 °C), hold at heat for a time of 42 to 54 hours, and air cool.

3.4 Properties

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

3.4.1 Longitudinal tensile properties shall be as shown in Tables 2A and 2B.

Table 2A - Minimum longitudinal tensile properties, inch/pound units

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
Up to 0.249, incl	75.0	67.0	6
0.250 to 0.499	78.0	69.0	7
0.500 to 0.999	79.0	71.0	7
1.000 to 3.000	80.0	72.0	7

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Table 2B - Minimum longitudinal tensile properties, SI units

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Up to 6.32, incl	517	462	6
Over 6.35 to 12.67	538	476	7
Over 12.70 to 25.37	545	490	7
Over 25.40 to 76.20	552	496	7

3.4.1.1 Mechanical property requirements for product outside the range covered by 1.1 shall be agreed upon between the purchaser and producer and reported per 4.4.1 (see 8.8).

3.4.2 Exfoliation-Corrosion Resistance

Specimens cut from extrusions shall not exhibit exfoliation corrosion at a T/10 plane greater than that illustrated by Photo 2 (EB) from Figure 2 of ASTM G34 when specimens are exposed for 2 weeks according to the procedures in ASTM G85, Annex A2, using dry-bottom condition (see 8.3).

3.4.3 Stress-Corrosion Cracking

When specified, specimens from extrusions with section thickness 0.750 inch (19.05 mm) and greater, tested in accordance with ASTM G47, shall show no evidence of stress-corrosion cracking when stressed in the short-transverse direction (perpendicular to grain flow) to 35 ksi (241 MPa) (see 8.8).

3.5 Quality

Products, as received by the purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from conditions detrimental to usage of the extrusions.

3.5.1 When specified, each extrusion shall be subjected to ultrasonic inspection in accordance with ASTM B594. Extrusions 0.500 inch (12.7 mm) and over in nominal diameter or least distance between parallel sides shall meet ultrasonic Class B requirements, as described in ASTM B594 (see 8.8).

3.6 Tolerances

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

3.7 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 the products 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 products conform to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (see 3.1), longitudinal tensile properties (see 3.4.1), tolerances (see 3.6), and ultrasonic inspection when specified (see 3.5.1), are acceptance tests and, except for composition, shall be performed on each inspection lot.

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