AEROSPACE MATERIAL SPECIFICATION

AMS4476™	REV. A

Issued 2013-11
Revised 2021-02

Superseding AMS4476

Aluminum Alloy, Extrusions
5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (7075-O)
Annealed
(Composition similar to UNS A97075)

RATIONALE

AMS4476A prohibits unauthorized exceptions (1.1, 3.7, 4.4.1, 5.1.1, 8.5, 8.6), revises condition reference (3.2, 3.3.2.1, 3.3.3), eliminates weight restriction on UT testing (3.4.1), allows prior revisions (8.4), adds AS6279 as a requirement (3.6), 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, wire, profiles, and tubing up to 5.000 inches (127.00 mm), inclusive in nominal diameter or least thickness (bars, rods, wire, profiles) or nominal wall thickness (tubing) (see 8.6).

1.1.1 Tubing shall be additionally classified as follows:

Type I: Tubing extruded from hollow billets using die and mandrel
Type II: Tubing extruded from solid billets using porthole or spider die or similar tooling

When no Type is specified, Type I shall apply.

1.2 Application

These products have been used typically for parts requiring high strength after heat treatment (see 3.3.2) and whose fabrication does not involve welding or forming, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause these extrusions 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.

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**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS4476A/

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

ARP1917 Clarification of Terms Used in Aerospace Metals Specifications

AS6279 Standard Practice for Production, Distribution, and Procurement of Metal Stock

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

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	--	0.40
Iron	--	0.50
Copper	1.2	2.0
Manganese	--	0.30
Magnesium	2.1	2.9
Chromium	0.18	0.28
Zinc	5.1	6.1
Titanium	--	0.20
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition

Extruded and annealed in accordance with AMS2772 to the O temper (refer to ANSI H35.1/H35.1M).

3.2.1 Extrusions shall be supplied with the as-extruded surface finish; light polishing to remove minor surface imperfections is permissible provided such imperfections can be removed within specified dimensional tolerances.

3.3 Properties

Extrusions shall conform to the following requirements, determined on the mill produced size in accordance with AMS2355.

3.3.1 As Annealed

3.3.1.1 Tensile Properties

Shall be as shown in Table 2.

Table 2 -Tensile properties

Property	Value
Tensile Strength, max	40.0 ksi (276 MPa)
Yield Strength at 0.2% Offset, max	24.0 ksi (165 MPa)
Elongation in 2 Inches (50.8 mm) or 4D, min	10%

NOTE: Properties shown were taken directly from AMS-QQ-A-200/11 and have not been substantiated using SAE AMS statistical procedures.

3.3.2 Response to Heat Treatment

3.3.2.1 After Heat Treatment to the -T62 Temper

Extrusions, as received by purchaser in the Annealed (O) or As Fabricated (F) condition, shall have the properties of Table 3, after solution heat treatment and artificial aging to the -T62 temper (refer to ANSI H35.1/H35.1M) in accordance with AMS2772.

3.3.2.2 Tensile Properties

Shall be as shown in Table 3.

Table 3A - Minimum longitudinal tensile properties, inch/pound units

Nominal Diameter or Least Thickness (Bars, Rods, Wire, Profiles) or Nominal Wall Thickness (Tubing) Inches	Nominal Cross-Sectional Area Square Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
Up to 0.249, incl	All	78.0	70.0	7
Over 0.249 to 0.499, incl	All	81.0	73.0	7
Over 0.499 to 2.999, incl	All	81.0	72.0	7
Over 2.999 to 4.499, incl	Up to 20, incl	81.0	71.0	7
Over 2.999 to 4.499, incl	Over 20 to 32, incl	78.0	70.0	6
Over 4.499 to 5.000, incl	Up to 32, incl	78.0	68.0	6

NOTE: Properties shown were taken directly from AMS-QQ-A-200/11 and have not been substantiated using SAE AMS statistical procedures.

Table 3B - Minimum longitudinal tensile properties, SI units

Nominal Diameter or Least Thickness (Bars, Rods, Wire, Profiles) or Nominal Wall Thickness (Tubing) Millimeters	Nominal Cross-Sectional Area Square Centimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Up to 6.32, incl	All	538	483	7
Over 6.32 to 12.67, incl	All	558	503	7
Over 12.67 to 76.17, incl	All	558	496	7
Over 76.17 to 114.27, incl	Up to 129, incl	558	490	7
Over 76.17 to 114.27, incl	Over 129 to 206, incl	538	483	6
Over 114.27 to 127.00, incl	Up to 206, incl	538	469	6

NOTE: Properties shown were taken directly from AMS-QQ-A-200/11 and have not been substantiated using SAE AMS statistical procedures.

3.3.3 Mechanical property requirements for product outside the range covered by 1.1 shall be agreed upon between purchaser and producer.

3.4 Quality

Extrusions, 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 extrusions. Discoloration due to thermal treatment shall not be cause for rejection.

3.4.1 When specified, extrusions shall be subjected to ultrasonic inspection in accordance with ASTM B594 and shall meet the following requirements.

3.4.1.1 Extrusions, with nominal thickness of 0.500 to 1.499 inches (12.70 to 38.07 mm), not exceeding a 10 to 1 width-to-thickness ratio, shall meet ultrasonic Class B.

3.4.1.2 Extrusions, with nominal thickness 1.500 inches (38.07 mm) and over, not exceeding a 10 to 1 width-to-thickness ratio, shall meet ultrasonic Class A.

3.5 Tolerances

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

3.6 Production, distribution, and procurement of metal stock shall comply with AS6279. This requirement becomes effective 08/01/2022.

3.7 Exceptions

Any exceptions shall be authorized by purchaser and reported as in 4.4.1.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of extrusions 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 extrusions conform to specified requirements.