SAE INTERNATIONAL

AEROSPACE MATERIAL SPECIFICATION

AMS4341™ REV. H

Issued 1978-04
Reaffirmed 2011-11
Revised 2024-01

Superseding AMS4341G

Aluminum Alloy, Extrusions, 6.2Zn - 2.3Cu - 2.2Mg - 0.12Zr (7050-T73511), Solution Heat Treated, Stress Relieved by Stretching, Straightened, and Overaged (Composition similar to UNS A97050)

RATIONALE

AMS4341H results from a Five-Year Review and update of this specification with changes to add provisions for use of AS6279 (see 3.8), update wording to prohibit unauthorized exceptions (see 3.4.1.1, 3.7, and 8.3), update Applicable Documents (see Section 2), Condition (see 3.2), presentation of tensile properties (see Table 2) and Ultrasonic requirements (see Table 3), and Packaging (see 5.2), relocate Definitions (see 2.4), remove the weight criteria related to ultrasonic testing (see 3.5.1), and allow the use of the immediate prior specification revision (see 8.4).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of extruded bars, rods, wire, profiles, and tubing 5.000 inches (127.00 mm) and under in nominal diameter or thickness (wall thickness of tubing) and 32 square inches (206 cm^2) and under in cross-sectional area (see 8.5).

1.2 Application

These extrusions have been used typically for structural applications requiring a combination of high mechanical properties and good resistance to stress-corrosion cracking, 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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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

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For more information on this standard, visit
https://www.sae.org/standards/content/AMS4341H

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

AS7766 Terms Used in Aerospace Metals Specifications

2.2 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 Systems For Aluminum

ANSI H35.2 Dimensional Tolerances for Aluminum Mill Products

ANSI H35.2M Dimensional Tolerances for Aluminum Mill Products (Metric)

2.3 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 G34 Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO Test)

ASTM G47 Determining Susceptibility to Stress-Corrosion Cracking of 2XXX and 7XXX Aluminum Alloy Products

2.4 Definitions

Terms used in AMS are defined in AS7766.

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	--	0.12
Iron	--	0.15
Copper	2.0	2.6
Manganese	--	0.10
Magnesium	1.9	2.6
Chromium	--	0.04
Zinc	5.7	6.7
Titanium	--	0.06
Zirconium	0.08	0.15
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition

Extruded, solution heat treated, stress relieved by stretching to produce a nominal permanent set of 1.5%, but not less than 1% nor more than 3%, and overaged to the T73511 temper (refer to ANSI H35.1/H35.1M).

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

3.2.2 Extrusions shall be supplied with an 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 Heat Treatment

Shall be performed as follows; heat treatment shall be in accordance with AMS2772:

3.3.1 Solution Heat Treatment

In accordance with AMS2772.

3.3.2 Overaging Heat Treatment

Recommended practice is heating to 250 °F ± 5 °F (121 °C ± 3 °C), holding at heat for not less than 4 hours, further heating to 345 °F ± 10 °F (174 °C ± 6 °C), holding at heat for not less than 8 hours, and cooling in air.

3.4 Properties

Extrusions, 5.000 inches (127.00 mm) and under in nominal diameter or thickness (wall thickness of tubing) and 32 square inches (206 cm^2) and under in cross-sectional area, shall conform to the following requirements, determined in accordance with AMS2355 on the mill produced size.

3.4.1 Tensile Properties

Shall be as shown in Table 2 for specimens taken in the longitudinal direction:

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

Property	Value
Tensile Strength	70.0 ksi
Yield Strength at 0.2% Offset	60.0 ksi
Elongation in 4D	8%
5D	7%

Table 2B - Minimum longitudinal tensile properties, SI units

Property	Value
Tensile Strength	483 MPa
Yield Strength at 0.2% Offset	414 MPa
Elongation in 4D	8%
5D	7%

3.4.1.1 Mechanical property requirements for product outside of the range covered by 1.1 shall be agreed upon between the purchaser and producer and reported per 4.4.1. (see 8.5)

3.4.2 Corrosion Resistance

Resistance to stress-corrosion cracking and to exfoliation-corrosion shall be acceptable if the extrusions conform to the requirements of 3.4.1 and of 3.4.2.1.2 or 3.4.2.1.3.

3.4.2.1 Electrical Conductivity/Mechanical Property Relationship

3.4.2.1.1 Electrical conductivity shall be not lower than 40.0% IACS (International Annealed Copper Standard) (23.2 MS/m), determined on the samples used for tensile testing.

3.4.2.1.2 If electrical conductivity is 41.0% IACS (23.8 MS/m) or higher and tensile properties meet the requirements of 3.4.1, the extrusions are acceptable.

3.4.2.1.3 If electrical conductivity is at least 40.0% IACS (23.2 MS/m), but not greater than 40.9% (23.7 MS/m), and longitudinal yield strength does not exceed 69.0 ksi (476 MPa), the extrusions are acceptable.

3.4.2.1.4 If electrical conductivity is less than 41.0% IACS (23.8 MS/m) and the longitudinal yield strength exceeds 69.0 ksi (476 MPa), the extrusions are not acceptable and may be given additional overaging heat treatment. If upon completion of such treatment, extrusions conform to 3.4.2.1.2 or 3.4.2.1.3, they are acceptable.

3.4.2.2 Exfoliation Corrosion Resistance

Specimens, cut from extrusions, shall exhibit exfoliation corrosion when tested per ASTM G34, at a T/10 plane, not greater than that illustrated by Photo EB, Figure 2, of ASTM G34.

3.4.2.3 Stress-Corrosion Resistance

Specimens, cut from extrusions 0.750 inch (19.05 mm) and over in nominal diameter or section thickness, shall show no evidence of stress-corrosion cracking when tested in the short-transverse (perpendicular to grain flow) direction at 45.0 ksi (310 MPa) per ASTM G47.

3.5 Quality

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

3.5.1 Each bar, rod, and profile shall be subjected to ultrasonic inspection in accordance with ASTM B594 and shall meet the requirements shown in Table 3A or 3B.

Table 3A - Ultrasonic requirements, inch/pound units

Nominal Thickness Inches	Discontinuity Class
0.500 to 1.500, excl	B
1.500 to 5.000, incl	A

Table 3B - Ultrasonic requirements, SI units

Nominal Thickness Millimeters	Discontinuity Class
12.70 to 38.10, excl	B
38.10 to 127.00, incl	A

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 purchaser and reported as in 4.4.1.

3.8 Production, distribution, and procurement of metal stock shall comply with AS6279. This requirement becomes effective 18 months after publication of AMS4341H.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of extrusions 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 extrusions conform to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (see 3.1), tensile properties (see 3.4.1), corrosion resistance by conductivity/tensile property relationship (3.4.2.1), ultrasonic soundness (see 3.5.1), and tolerances (see 3.6) are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests

Exfoliation-corrosion resistance (see 3.4.2.2) and stress-corrosion resistance (see 3.4.2.3) are periodic tests and shall be performed at a frequency selected by the producer unless frequency of testing is specified by the purchaser.

4.3 Sampling and Testing

Shall be in accordance with AMS2355.

4.4 Reports

The producer of extrusions shall furnish with each shipment a report stating that the extrusions conform to the composition, ultrasonic inspection, and tolerances and showing the numerical results of tests on each inspection lot to determine conformance to the other acceptance test requirements. This report shall include the purchase order number, inspection lot number, AMS4341H, size or section identification number, and quantity. The report shall also identify the producer, the mill product form, and the mill produced size.

4.4.1 When material produced to this specification is beyond the sizes allowed in the scope or tables, or other exceptions are taken to the technical requirements listed in Section 3 (see 5.1.1), the report shall contain a statement "This material is certified as AMS4341H(EXC) because of the following exceptions:" and the specific exceptions shall be listed.

4.5 Resampling and Retesting

Shall be in accordance with AMS2355.

5. PREPARATION FOR DELIVERY

5.1 Identification

Shall be in accordance with ASTM B666/B666M.

5.1.1 When technical exceptions are taken (see 4.4.1), the material shall be marked with AMS4341(EXC).

5.2 Packaging

Shall be in accordance with ASTM B660 and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the product to ensure carrier acceptance and safe delivery.

6. ACKNOWLEDGMENT

A producer shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS

Extrusions not conforming to this specification, or to modifications authorized by the purchaser, will be subject to rejection.

8. NOTES

8.1 Revision Indicator

A change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

8.2 Dimensions and properties in inch/pound units and the Fahrenheit temperatures are primary; dimensions and properties in SI units and the Celsius temperatures are shown as the approximate equivalents of the primary units and are presented only for information.

8.3 It is the purchaser's obligation to ensure that product they procure or resell as AMS4341 has exceptions approved by their subsequent purchaser.

8.4 Unless otherwise specified, the material producer shall work to the revision of this specification (AMS4341) in effect on the date of order placement. Unless otherwise specified, material manufactured and certified to the immediately previous revision of this specification (AMS4341) may be procured and used until inventory is depleted.

8.5 Purchase documents should specify not less than the following:

AMS4341H
Form and size or section identification number of extrusions desired
Property and acceptance requirements from the cognizant engineering organization applicable to sizes outside the range listed in 1.1 (see 3.4.1.1)
Quantity of extrusions desired

PREPARED BY SAE AMS D NONFERROUS ALLOYS COMMITTEE