

**AEROSPACE  
MATERIAL  
SPECIFICATION**

**SAE AMS 4341**

**REV. E**

Issued	1978-04
Revised	2006-09
Reaffirmed	2011-11
Superseding AMS 4341D	

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**

This document has been reaffirmed to comply with the SAE five-year review policy.

**1. SCOPE**

**1.1 Form**

This specification covers an aluminum alloy in the form of extruded bars, rods, wire, profiles, and tubing.

**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 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

AMS 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
AMS 2772	Heat Treatment of Aluminum Alloy Raw Materials
ARP1917	Clarification of Terms Used in Aerospace Materials Specifications

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## 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](http://www.astm.org).

ASTM B 594	Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications
ASTM B 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B 666/B 666M	Identification Marking of Aluminum and Magnesium Products
ASTM G 34	Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO Test)
ASTM G 47	Determining Susceptibility to Stress-Corrosion Cracking of 2xxx and 7xxx Aluminum Alloys

## 2.3 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036, Tel: 212-642-4900, [www.ansi.org](http://www.ansi.org).

ANSI H 35.2	Dimensional Tolerances for Aluminum Mill Products
ANSI H 35.2M	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 AMS 2355.

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

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.

- 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 AMS 2772:

3.3.1 Solution Heat Treatment: In accordance with AMS 2772.

3.3.2 Overaging Heat Treatment

Recommended practice is heating to 250 °F ± 5 (121 °C ± 3), holding at heat for not less than 4 hours, further heating to 345 °F ± 10 (174 °C ± 6), 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<sup>2</sup>) and under in cross-sectional area, shall conform to the following requirements, determined in accordance with AMS 2355: 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 2 - MINIMUM LONGITUDINAL TENSILE PROPERTIES

Property	Value
Tensile Strength	70.0 ksi (483 MPa)
Yield Strength at 0.2% Offset	60.0 ksi (414 MPa)
Elongation in 4D	8%
5D	7%

#### 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 and/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 G 34, at a T/10 plane, not greater than that illustrated by Photo EB, Figure 2, of ASTM G 34.

### 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 stressed in the short-transverse (perpendicular to grain flow) direction at 45.0 ksi (310 MPa) when tested per ASTM G 47.

### 3.5 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.

3.5.1 Each bar, rod, and profile shall be subjected to ultrasonic inspection in accordance with ASTM B 594 and shall meet the requirements shown in Table 3A or 3B.

TABLE 3A - ULTRASONIC REQUIREMENTS

Nominal Thickness Inches	Maximum Weight per Piece	Discontinuity Class
	Pounds	
0.500 to 1.500, excl	600	B
1.500 to 5.000, incl	600	A

TABLE 3B - ULTRASONIC REQUIREMENTS (SI)

Nominal Thickness Millimeters	Maximum Weight per Piece	Discontinuity Class
	Kilograms	
12.70 to 38.10, excl	272	B
38.10 to 127.00, incl	272	A

### 3.6 Tolerances

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

## 4. QUALITY ASSURANCE PROVISIONS

### 4.1 Responsibility for Inspection

The vendor of extrusions shall supply all samples for vendor'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.

### 4.2 Classification of Tests

#### 4.2.1 Acceptance Tests

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

#### 4.2.2 Periodic Tests

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

### 4.3 Sampling and Testing

Shall be in accordance with AMS 2355.