SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS4303 | REV. B

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Reaf Nonc 2012-09

Superseding AMS4303A

Aluminum Alloy Plate
2.7Cu - 2.2Li - 0.12Zr (2090-T81)
Solution Heat Treated, Cold Worked, and Aged

RATIONALE

AMS4303B has been reaffirmed to comply with the SAE five-year review policy.

NONCURRENT NOTICE

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of April, 2007. It is recommended, therefore, that this specification not be specified for new designs.

"NONCURRENT" refers to those specifications which have previously been widely used and which may be required for production or processing of existing designs in the future. The Aerospace Materials Division, however, does not recommend these specifications for future use in new designs.

"NONCURRENT" specifications are available from SAE upon request.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
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SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4303B

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of plate.

1.2 Application:

This plate has been used typically for aerospace structural parts requiring strength similar to that of 7075-T651 but having 7.8% lower nominal density, 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 canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
MAM 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings, Metric (SI) Units
AMS 2750	Pyrometry

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19429-2859.

ASTM B 594	Ultrasonic Inspection of Aluminum-Alloy Products for Aerospace Applications
ASTM B 645	Plane Strain Fracture Toughness Testing of Aluminum Alloys
ASTM B 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B 666/B 666M	Identification Marking of Aluminum and Magnesium Products
ASTM E 399	Plane Strain Fracture Toughness of Metallic Materials
ASTM G 34-72	Exfoliation Corrosion Susceptibility in 2xxx and 7xxx Series Aluminum Alloys (EXCO Test)
ASTM G 38	Making and Using C-Ring Stress Corrosion Cracking Test Specimen
ASTM G 44	Alternate Immersion Stress Corrosion Testing in 3.5% Sodium Chloride Solution
ASTM G 85	Modified Salt Spray (Fog) Testing

2.3 ANSI Publications:

Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

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 AMS 2355 or MAM 2355.

TABLE 1 - Composition

Element	min	max
Silicon	--	0.10
Iron	--	0.12
Copper	2.4	3.0
Manganese	--	0.05
Magnesium	--	0.25
Chromium	--	0.05
Zinc	--	0.10
Titanium	--	0.15
Lithium	1.9	2.6
Zirconium	0.08	0.15
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition:

Solution heat treated, cold worked, and precipitation heat treated (See 8.2). Pyrometry shall be in accordance with AMS 2750.

3.3 Properties:

The product shall conform to the following requirements, determined on the mill produced size, in accordance with AMS 2355 or MAM 2355:

3.3.1 Tensile Properties: Shall be as shown in Table 2.

TABLE 2A - Minimum Tensile Properties, Inch/Pound Units

Nominal Thickness Inches	Specimen Orientation	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
0.500 to 1.500, incl	Longitudinal	75.0	70.0	4
0.500 to 1.500, incl	Long-Trans.	75.0	68.0	3

TABLE 2B - Minimum Tensile Properties, SI Units

Nominal Thickness Millimeters	Specimen Orientation	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
12.70 to 38.10, incl	Longitudinal	517	483	4
12.70 to 38.10, incl	Long-Trans.	517	469	3

3.3.2 Exfoliation Corrosion Resistance: Plate shall not show exfoliation corrosion more severe than rating EB in accordance with Figure 4 of ASTM G 34-72, when exposed for two weeks to test conditions of ASTM G 85, Annex A2.

3.3.3 Stress-Corrosion Resistance: C-Ring specimens machined and used in accordance with ASTM G 38, cut from plate 0.750 inch (19.05 mm) and over in nominal thickness, shall show no evidence of stress corrosion failure when stressed in the short-transverse direction at 20.0 ksi (138 MPa) and exposed for 20 days to test conditions of ASTM G 44.

3.3.4 Fracture Toughness: Plate, 1.000 to 1.500 inches (25.40 to 38.10 mm) in nominal thickness, shall have fracture toughness not lower than 25 ksi $\sqrt{\text{inch}}$ (27.5 MPa $\sqrt{\text{m}}$), determined in accordance with ASTM B 645 using specimen orientation L-T in accordance with ASTM E 399. L-T stress is applied in the longitudinal grain direction with crack propagating in the long-transverse direction.

3.4 Quality:

Plate, 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 plate.

3.4.1 Each plate weighing 2000 pounds (907 kg) or under shall be ultrasonically inspected in accordance with ASTM B 594 and shall meet the Class B acceptance limits of that specification.

3.5 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 plate 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 plate conforms to the specified requirements.

4.2 Classification of Tests:

All technical requirements are acceptance tests and except for composition, shall be performed on each lot.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2355 or MAM 2355 and the following:

4.3.1 The size, type, and number of replicate specimens tested for exfoliation corrosion resistance shall be as agreed upon by purchaser and vendor.

4.4 Reports:

The vendor of plate shall furnish with each shipment a report stating that the plate conforms to the chemical composition, tolerances and ultrasonic inspection, 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(s), AMS 4303A, size, and quantity. The report shall also identify the producer, the product form, and the size of the mill product.