SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4329 | REV. A

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Superseding AMS 4329

Aluminum Alloy, Plate (7085-T7651)
7.5Zn - 1.6Cu - 1.5Mg - 0.12Zr
Solution Heat Treated, Stress-Relieved, and Overaged
(Composition similar to UNS A97085)

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 plate.

1.2 Application

This product has been used in aerospace applications requiring a high level of mechanical properties and fracture toughness, moderate resistance to stress-corrosion cracking and resistance to exfoliation corrosion, 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.

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 Material
AS1990	Aluminum Alloy Tempers

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

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4329A

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 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 High Strength Aluminum Alloy Products

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.

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.

TABLE 1 - COMPOSITION

Element	min	max
Silicon	--	0.06
Iron	--	0.08
Copper	1.3	2.0
Manganese	--	0.04
Magnesium	1.2	1.8
Chromium	--	0.04
Zinc	7.0	8.0
Titanium	--	0.06
Zirconium	0.08	0.15
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition

Heat treatment shall be in accordance with AMS 2772 to the -T7651 temper (see AS1990) and as follows: Solution heat-treated and artificial age practices are proprietary. Material shall be stretched not less than 1½% nor more than 3% prior to artificial aging.

3.3 Properties

Product shall conform to the following requirements, determined in accordance with AMS 2355.

3.3.1 Tensile Properties shall be as shown in Table 2A and 2B.

TABLE 2A - MINIMUM TENSILE PROPERTIES, INCH/POUND UNITS

Nominal Thickness Inch	Grain Direction	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
4.001 - 5.000	L	75.0	72.0	9
	LT	76.0	69.0	7
	ST	74.0	65.0	3
5.001 - 6.000	L	75.0	72.0	8
	LT	76.0	69.0	7
	ST	73.0	65.0	3
6.001 - 7.000	L	74.0	71.0	8
	LT	75.0	67.0	5
	ST	72.0	64.0	3

TABLE 2B - MINIMUM TENSILE PROPERTIES, SI UNITS

Nominal Thickness Millimeters	Grain Direction	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
101.62 - 127.00	L	515	495	9
	LT	525	475	7
	ST	510	450	3
127.02 - 152.40	L	515	495	8
	LT	525	475	7
	ST	505	450	3
152.42 - 177.80	L	510	490	8
	LT	515	460	5
	ST	495	440	3

3.3.2 Electrical Conductivity

Shall be not lower than 39.0% IACS (International Annealed Copper Standard) (22.6 MS/m), determined on the plate surface.

3.3.3 Exfoliation Corrosion Resistance

Specimens cut from plate shall not exhibit exfoliation corrosion at a T/2 plane greater than that illustrated by Photograph B, Figure 2, of ASTM G 34.

3.3.4 Stress Corrosion Cracking

When specified, specimens from plate shall be tested in accordance with ASTM G 47 and shall show no evidence of stress corrosion cracking stressed in the short transverse direction (perpendicular to grain flow) to 26 ksi (180 MPa).

3.3.5 Fracture Toughness

When specified, specimens from plate shall be tested in accordance with AMS 2355 and fracture toughness values shall meet or exceed the values shown in Table 3A and 3B.

TABLE 3A - MINIMUM FRACTURE TOUGHNESS - INCH/POUND UNITS

Thickness inch	L-T direction ksi√inch	T-L direction ksi√inch	S-L direction ksi√inch
4.001-5.000	29	24	24
5.001-6.000	27	22	23
6.001-7.000	26	21	22

TABLE 3B - MINIMUM FRACTURE TOUGHNESS - SI UNITS

Thickness mm	L-T direction MPa√m	T-L direction MPa√m	S-L direction MPa√m
101.62 - 127.00	32	26	26
127.02 - 152.40	30	24	25
152.42 - 177.80	29	23	24

3.3.6 When specified, specimens from plate shall be tested in accordance with AMS 2355 and compressive yield strength shall be as shown in Table 4A and 4B

TABLE 4A - MINIMUM COMPRESSIVE YIELD - INCH/POUND UNITS

Thickness inch	Grain Direction	Compressive Yield Strength - ksi
4.001-5.000	L	71
5.001-6.000	L	71
6.001-7.000	L	70

TABLE 4B - MINIMUM COMPRESSIVE YIELD - SI UNITS

Thickness mm	Grain Direction	Compressive Yield Strength - MPa
101.62 - 127.00	L	490
127.02 - 152.40	L	490
152.42 - 177.80	L	485

3.4 Quality

Products, as received by purchaser, shall be uniform in quality and condition, sound and free from foreign materials and from conditions detrimental to usage of the plate. Any detrimental conditions found during the customer's manufacturing process are subject to rejection.

3.4.1 Each plate shall be subjected to ultrasonic inspection in accordance with ASTM B 594 and shall meet ultrasonic Class A requirements, as described in ASTM B 594.

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 the products 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 products conform to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (3.1), tensile properties (3.3.1), electrical conductivity (3.3.2), tolerances (3.5), ultrasonic inspection (3.4.1), stress corrosion cracking (when specified) (3.3.4), fracture toughness (when specified) (3.3.5), and compressive yield strength (when specified) (3.3.6) are acceptance tests and, except for composition, shall be performed on each inspection lot.