SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4412

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Aluminum Alloy, Sheet
3.2Cu - 0.52Mg - 0.30Ag - 0.12Zr (2198-T8)
Solution Heat Treated, Cold Worked, and Artificially Aged

(Composition similar to UNS A92198)

RATIONALE

AMS 4412 is a new specification to cover aluminum Alloy 2198-T8 in the form of sheet

1.1 Form

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

1.2 Application

This product has been used for aircraft applications where if offers a combination of high strength and low 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 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 Materials
AS 1990	Aluminum Alloy Tempers

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 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B 666/B 666M	Identification Marking of Aluminum and Magnesium 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 and Table 2, determined in accordance with AMS 2355.

TABLE 1 - COMPOSITION

Element	min	max
Silicon	--	0.08
Iron	--	0.10
Copper	2.9	3.5
Manganese	--	0.50
Magnesium	0.25	0.80
Zinc	--	0.35
Titanium	--	0.10
Silver	0.10	0.50
Lithium	0.8	1.1
Zirconium	0.04	0.18
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition

Product shall be supplied in the following condition:

3.2.1 Solution heat treated, cold worked and artificially aged to T8 temper (See AS1990).

3.3 Heat Treatment

Shall be performed in accordance with AMS 2772 and as follows:

3.3.1 Solution Heat Treatment Temperature

930 to 950 °F (500 to 510 °C)

Aging Heat Treatment: Aging shall be performed at a specific temperature and time as required to meet requirements of 3.4. (See 8.2).

3.4 Properties

The product 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.

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 %
0.125 to 0.249, incl	Longitudinal	71.0	64.0	8
	Long-Trans.	69.0	62.0	9

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 %
3.2 to 6.3, incl	Longitudinal	490	441	8
	Long-Trans.	476	427	9

3.5 Quality

The product, 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 product.

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 the product 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 product conforms to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (3.1), tensile properties (3.4.1), and tolerances (3.6) are acceptance tests, and except for composition, shall be performed on each inspection lot.

4.3 Sampling and Testing

Shall be in accordance with AMS 2355.

4.4 Reports

The vendor of the product shall furnish with each shipment a report stating that the product conforms to the composition requirements and tolerances and showing the numerical results of tests to determine conformance to the other acceptance test requirements. This report shall include the purchase order number, inspection lot number(s), AMS 4412, size, and quantity. The report shall also identify the producer, the product form, and the mill produced size.

4.5 Resampling and Retesting

Shall be in accordance with AMS 2355.