SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4315

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Aluminum Alloy Sheet and Plate
5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr
7075: (-T76 Sheet, -T7651 Plate)
Solution and Precipitation Heat Treated

(Composition similar to UNS R97075)

1. SCOPE:

1.1 Form:

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

1.2 Application:

This product has been used typically for structural applications requiring material with high strength and resistance to exfoliation-corrosion, but usage is not limited to such applications.

1.2.1 Certain design and processing procedures may cause these products to become susceptible to stress-corrosion cracking; ARP823 recommends practices to minimize such conditions.

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.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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http://www.sae.org/technical/standards/AMS4315

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or 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
ARP823	Minimizing Stress-Corrosion Cracking in Wrought Heat-Treatable Aluminum Alloy Products
AS1990	Aluminum Alloy Tempers

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or 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 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 ANSI, 25 West 43rd Street, New York, NY 10036 or 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	--	0.40
Iron	--	0.50
Copper	1.2	2.0
Manganese	--	0.30
Magnesium	2.1	2.9
Chromium	0.18	0.28
Zinc	5.1	6.1
Titanium	--	0.20
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition:

The product shall be supplied in the following condition; heat treatments shall be performed in accordance with AMS 2772.

3.2.1 Sheet: Solution and precipitation heat treated to the T76 temper (See AS1990).

3.2.2 Plate: Solution heat treated, stress-relieved by stretching to produce a nominal permanent set of 2% but not less than 1-1/2% nor more than 3%, and precipitation heat treated to the T7651 temper (See AS 1990).

3.2.2.1 Plate shall receive no straightening operations after stretching.

3.3 Properties:

Product shall conform to the following requirements, determined in accordance with AMS 2355 on the mill product size.

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

TABLE 2A - Minimum Tensile Properties, Inch/Pound Units (See 8.2)

Temper	Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
T76	0.063 to 0.249, incl	73.0	62.0	8
	Over 0.249 to 0.499, incl	72.0	61.0	8
T7651	Over 0.499 to 1.000, incl	71.0	60.0	6
	Over 1.000 to 2.000, incl	71.0	60.0	5

TABLE - 2B Minimum Tensile Strength Properties, SI Units (See 8.2)

Temper	Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 2 Inches or 4D %
T76	1.60 to 6.32, incl	503	428	8
	Over 6.32 to 12.67, incl	497	421	8
T7651	Over 12.67 to 25.40, incl	490	414	6
	Over 25.40 to 50.80, incl	490	414	5

3.3.2 Electrical Conductivity:

3.3.2.1 If the conductivity is 38 percent IACS or higher, and the tensile properties meet the minimum limits specified herein, the material is acceptable.

3.3.2.2 If the conductivity is at least 36 percent IACS but less than 38 percent IACS, the material may be tested as specified in 3.3.3 and 3.3.4 and accepted if it passes these tests. As alternatives, the product may be given an additional precipitation heat treatment, or reheat treated, and retested.

3.3.2.3 If the conductivity is lower than 36.0% IACS (22.0 MS/m), the product is not acceptable and may be given an additional precipitation heat treatment, or entirely reheat treated, and retested.

3.3.3 Exfoliation Resistance: Plate shall not exhibit exfoliation corrosion at the T/10 plane greater than that illustrated by Photo B, Figure 2 of ASTM G 34.

3.3.4 Stress-Corrosion Test: Specimens, cut from plate 0.750 inch (19.05 mm) and over in nominal thickness, shall show no evidence of stress-corrosion cracking when tested in accordance with ASTM G 47 and stressed in the short-transverse direction to 25.0 ksi (172 MPa).

3.4 Quality:

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 material.

3.4.1 When specified, each plate, 0.500 inch (12.70 mm) to 1.000 inch (25.40 mm) in nominal thickness weighing less than 2000 pounds (907 kg), shall be ultrasonically inspected in accordance with ASTM B 594 and shall meet ultrasonic Class B.

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 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 (3.3.1), electrical conductivity (3.3.2), quality (3.4), and tolerances (3.5) are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests: Exfoliation resistance (3.3.3) and stress-corrosion resistance (3.3.4) are periodic tests and shall be performed at a frequency of at least one sample per month for each size range of sheet and plate produced during that month unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2355 and the following:

4.3.1 Specimens for conductivity testing shall be the tensile specimens.

4.3.2 One or more samples shall be taken from each inspection lot for exfoliation-resistance testing and for stress-corrosion resistance testing, when the conductivity is between 36.0% and 38.0% IACS (See 3.3.2.2).