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400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE

AMS 4273

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ALUMINUM ALLOY, SHEET
4.1Cu - 1.4Mg - 0.45Mn (2424-T3 Flat Sheet)
Solution Heat Treated and Cold Worked

UNS A9204

1. SCOPE:

1.1 Form:

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

1.2 Application:

This sheet has been used typically for formed structural parts with good tensile strength and good resistance to fatigue crack growth, but usage is not limited to such applications:

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

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

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 2811 Identification, Aluminum and Magnesium Alloy Wrought Products
- ARP823 Minimizing Stress-Corrosion Cracking in Wrought Heat-Treatable Aluminum Alloy Products

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AMS 4273

SAE

AMS 4273

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 646 Fracture Toughness Testing of Aluminum Alloys
 ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products
 ASTM E 399 Plane-Strain Fracture Toughness of Metallic Materials
 ASTM E 561 R-Curve Determination

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-H-6088 Heat Treatment of Aluminum Alloys

2.4 ANSI Publications:

Available from American National Standards Institute, Inc., 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 |
|-------------------------|-----------|------|
| Copper | 3.8 | 4.4 |
| Magnesium | 1.2 | 1.6 |
| Manganese | 0.30 | 0.60 |
| Zinc | -- | 0.20 |
| Iron | -- | 0.12 |
| Silicon | -- | 0.10 |
| Titanium | -- | 0.10 |
| Chromium | -- | 0.10 |
| Other Impurities, each | -- | 0.05 |
| Other Impurities, total | -- | 0.15 |
| Aluminum | remainder | |

AMS 4273

SAE

AMS 4273

3.2 Condition:

Solution heat treated in accordance with MIL-H-6088 as applicable to 2024-T3 sheet and cold worked.

3.3 Properties:

Sheet 0.020 to 0.128 inch (0.51 to 3.25 mm), inclusive, in nominal thickness shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355:

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

TABLE 2 - Minimum Tensile Properties

| Property | Value |
|--|--------------------|
| Tensile Strength | 63.0 ksi (434 MPa) |
| Yield Strength at 0.2% Offset | 42.0 ksi (290 MPa) |
| Elongation in 2 Inches (50.8 mm) or 4D | 15% |

3.3.2 Bending: Sheet shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a diameter equal to the bend factor shown in Table 3 times the nominal thickness of the sheet with axis of bend parallel to the direction of rolling.

TABLE 3 - Bending Parameters

| Nominal Thickness Inch | Nominal Thickness Millimeters | Bend Factor |
|---------------------------|----------------------------------|-------------|
| Over 0.020 to 0.051, incl | Over 0.51 to 1.30, incl | 5 |
| Over 0.051 to 0.128, incl | Over 1.30 to 3.25, incl | 6 |

AMS 4273

SAE

AMS 4273

3.3.3 Critical-Stress-Intensity Factor (K_{Ic}): Shall be not lower than 130 ksi $\sqrt{\text{inch}}$ (143 MPa $\sqrt{\text{m}}$), determined in the T/L direction using a 16-inch (406-mm) wide center-cracked panel in accordance with ASTM B 646 and ASTM E 561.

3.4 Quality:

Sheet, 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 sheet.

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 sheet 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 sheet conforms to specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Composition (3.1), tensile properties (3.3.1), critical-stress-intensity factor (3.3.3), and tolerances (3.5) are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests: Bending (3.3.2) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2355 or MAM 2355 except that sampling and testing for R-curve determination (3.3.3) shall be in accordance with ASTM E 399.