



# AEROSPACE MATERIAL SPECIFICATION

**AMS4100™****REV. G**Issued 1979-07  
Revised 2024-01

Superseding AMS4100F

Aluminum Alloy, Alclad, Sheet  
5.7Zn - 2.2Mg - 1.6Cu - 0.22Cr (Alclad 7475-T761)  
Solution and Precipitation Heat Treated  
(Composition similar to UNS A87475)

## RATIONALE

AMS4100G results from a Five-Year Review and update of this specification with changes to prohibit unauthorized exceptions (see 3.3.6, 3.6, 4.4.1, 5.1.1, and 8.4), relocate Definitions (see 2.4), update Applicable Documents (see Section 2 and 3.2) and Corrosion Resistance Indicator Test criteria (see 3.3.3.2 and 3.3.3.3), and restrict the use of the immediate prior specification revision (see 8.3).

## 1. SCOPE

### 1.1 Form

This specification covers an aluminum alloy in the form of alclad sheet 0.040 to 0.249 inch (1.02 to 6.32 mm), inclusive, in nominal thickness (see 8.5).

### 1.2 Application

This sheet has been used typically for structural applications requiring material with high strength and resistance to exfoliation-corrosion, moderate fatigue strength, and high fracture toughness, 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 +1 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

AMS2355 Quality Assurance, Sampling and Testing, Aluminum Alloys and Magnesium Alloy, Wrought Products (Except Forging Stock), and Rolled, Forged, or Flash Welded Rings

AMS2772 Heat Treatment of Aluminum Alloy Raw Materials

AS7766 Terms Used in Aerospace Metals Specifications

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## 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](http://www.astm.org).

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| ASTM B646       | Fracture Toughness Testing of Aluminum Alloys                                            |
| ASTM B660       | Packaging/Packing of Aluminum and Magnesium Products                                     |
| ASTM B666/B666M | Identification Marking of Aluminum and Magnesium Products                                |
| ASTM E561       | KR Curve Determination                                                                   |
| ASTM G34        | Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO Test) |

## 2.3 ANSI Accredited Publications

Copies of these documents are available online at <https://webstore.ansi.org/>.

|                   |                                                            |
|-------------------|------------------------------------------------------------|
| ANSI H35.1/H35.1M | Standard Alloy and Temper Designation System for Aluminum  |
| ANSI H35.2        | Dimensional Tolerances for Aluminum Mill Products          |
| ANSI H35.2M       | Dimensional Tolerances for Aluminum Mill Products (Metric) |

## 2.4 Definitions

Terms used in AMS are defined in AS7766.

## 3. TECHNICAL REQUIREMENTS

### 3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS2355.

**Table 1A - Composition, core (7475)**

| Element               | Min       | Max  |
|-----------------------|-----------|------|
| Silicon               | --        | 0.10 |
| Iron                  | --        | 0.12 |
| Copper                | 1.2       | 1.9  |
| Manganese             | --        | 0.06 |
| Magnesium             | 1.9       | 2.6  |
| Chromium              | 0.18      | 0.25 |
| Zinc                  | 5.2       | 6.2  |
| Titanium              | --        | 0.06 |
| Other Elements, each  | --        | 0.05 |
| Other Elements, total | --        | 0.15 |
| Aluminum              | remainder |      |

**Table 1B - Composition, cladding (7072)**

| Element               | Min       | Max  |
|-----------------------|-----------|------|
| Silicon + Iron        | --        | 0.7  |
| Copper                | --        | 0.10 |
| Manganese             | --        | 0.10 |
| Magnesium             | --        | 0.10 |
| Zinc                  | 0.8       | 1.3  |
| Other Elements, each  | --        | 0.05 |
| Other Elements, total | --        | 0.15 |
| Aluminum              | remainder |      |

### 3.2 Condition

Solution and precipitation heat treated in accordance with AMS2772 to the T761 temper (refer to ANSI H35.1/H35.1M).

### 3.3 Properties

Sheet shall conform to the following requirements, determined in accordance with AMS2355 on the mill produced product:

#### 3.3.1 Long Transverse Tensile Properties

Shall be as shown in Table 2.

**Table 2A - Minimum tensile properties, inch/pound units**

| Nominal Thickness<br>Inches | Tensile<br>Strength<br>ksi | Yield Strength<br>at 0.2% Offset<br>ksi | Elongation in<br>2 Inches or<br>4D |
|-----------------------------|----------------------------|-----------------------------------------|------------------------------------|
| 0.040 to 0.062, incl        | 66.0                       | 55.0                                    | 9                                  |
| Over 0.062 to 0.187, incl   | 68.0                       | 57.0                                    | 9                                  |
| Over 0.187 to 0.249, incl   | 70.0                       | 60.0                                    | 9                                  |

**Table 2B - Minimum tensile properties, SI units**

| Nominal Thickness<br>Millimeters | Tensile<br>Strength<br>MPa | Yield Strength<br>at 0.2% Offset<br>MPa | Elongation in<br>50.8 mm |
|----------------------------------|----------------------------|-----------------------------------------|--------------------------|
| 1.02 to 1.57, incl               | 455                        | 379                                     | 9                        |
| Over 1.57 to 4.75, incl          | 469                        | 393                                     | 9                        |
| Over 4.75 to 6.32, incl          | 483                        | 414                                     | 9                        |

#### 3.3.2 Fracture Toughness

Plane-stress fracture toughness,  $K_{IC}$ , shall be tested in accordance with ASTM E561 and ASTM B646 using recommended 16-inch (406-mm) wide specimens of full sheet thickness. Plane-stress fracture toughness,  $K_{IC}$ , meeting the requirements of ASTM B646, shall meet or exceed the values specified in Table 3.

**Table 3 - Minimum fracture toughness properties**

| Nominal Thickness<br>Inches | Nominal Thickness<br>Millimeters | Specimen<br>Orientation | $K_{IC}$<br>ksi $\sqrt{in}$ | $K_{IC}$<br>MPa $\sqrt{m}$ |
|-----------------------------|----------------------------------|-------------------------|-----------------------------|----------------------------|
| 0.040 to 0.125, incl        | 1.02 to 3.18, incl               | T-L                     | 87.0                        | 95.6                       |
| 0.040 to 0.125, incl        | 1.02 to 3.18, incl               | L-T                     | 100.0                       | 110.0                      |
| Over 0.125 to 0.249, incl   | Over 3.18 to 6.32, incl          | T-L                     | 80.0                        | 87.9                       |

#### 3.3.3 Corrosion Resistance Indicator Test

The cladding shall be removed from the test surface.

- 3.3.3.1 If the electrical conductivity is 39.0% IACS (International Annealed Copper Standard) (22.6 MS/m) or higher and the yield strength does not exceed the specified minimum (see 3.3.1) by 9.0 ksi (62 MPa) or more, the sheet is acceptable.
- 3.3.3.2 If the yield strength exceeds the specified minimum (see 3.3.1) by 9.0 ksi (62 MPa) or more, sheet is not acceptable.
- 3.3.3.3 If the electrical conductivity is lower than 39.0% IACS (22.0 MS/m), sheet is not acceptable.
- 3.3.3.4 Sheet that is not acceptable according to the requirements of 3.3.3.2 or 3.3.3.3 may be given additional precipitation heat treatment and retested. After such treatment, if all specified properties are met, the sheet is acceptable.

### 3.3.4 Exfoliation Corrosion Resistance

The cladding shall be removed from the test surface. For sheet 0.100 inch (2.54 mm) or thicker, 10% of the thickness shall be removed by machining one surface. The cladding present on the surface opposite the test surface shall also be removed or masked off.

- 3.3.4.1 Sheet shall not exhibit exfoliation corrosion at test plane greater than EB as illustrated by Figure 2, of ASTM G34.

### 3.3.5 Cladding Thickness Per Side

Shall be as shown in Table 4.

**Table 4 - Average cladding thickness**

| Nominal Sheet Thickness<br>Inches | Nominal Sheet Thickness<br>Millimeters | Average Cladding Thickness<br>% of Sheet Thickness<br>Nominal | Average Cladding Thickness<br>% of Sheet Thickness<br>Minimum Average |
|-----------------------------------|----------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|
| Up to 0.062, incl                 | Up to 1.57, incl                       | 4.0                                                           | 3.2                                                                   |
| Over 0.062 to 0.187, incl         | Over 1.57 to 4.75, incl                | 2.5                                                           | 2.0                                                                   |
| Over 0.187 to 0.249, incl         | Over 4.75 to 6.32, incl                | 1.5                                                           | 1.2                                                                   |

- 3.3.6 Mechanical property and cladding thickness requirements for product outside the range covered by Tables 2, 3, and 4 shall be agreed upon between the purchaser and producer and reported in 4.4.1 (see 8.5).

### 3.4 Quality

Sheet, as received by the 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.

### 3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.1.

## 4. QUALITY ASSURANCE PROVISIONS

### 4.1 Responsibility for Inspection

The producer of sheet shall supply all samples for the producer's tests and shall be responsible for the performance of all required tests. The purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the sheet conforms to specified requirements.