AEROSPACE MATERIAL SPECIFICATION

AMS4085™	REV. G

Issued 1976-07
Reaffirmed 1995-05
Revised 2024-06

Superseding AMS4085F

Aluminum Alloy Sheet, 5.7Zn - 2.2Mg - 1.6Cu - 0.22Cr (7475-T761), Solution Heat Treated and Overaged

(Composition similar to UNS A97475)

RATIONALE

AMS4085G results from a Five-Year Review and update of this specification with changes to update wording to prohibit unauthorized exceptions (see 3.3.5, 3.6, and 8.4), relocate Definitions (see 2.4), and update Applicable Documents (see Section 2) and Ordering Information (see 8.5).

1. SCOPE

1.1 Form

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

1.2 Application

This product has been used typically for structural applications requiring sheet 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.

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

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**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS4085G

AMS2772 Heat Treatment of Aluminum Alloy Raw Materials

AS7766 Terms Used in Aerospace Metals Specifications

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 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 Alloy and Temper Designation Systems 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 defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the following percentages by weight, determined in accordance with AMS2355:

Table 1 - Composition

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	

3.2 Condition

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

3.3 Properties

Sheet 0.040 inch (1.02 mm) and over in nominal thickness shall conform to the following requirements, determined in accordance with AMS2355, except fracture toughness (see 3.3.4) shall be performed as indicated in the appropriate paragraph. Tests are to be performed on the mill-produced size.

3.3.1 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 %
0.040 to 0.249, incl	Longitudinal	71.0	61.0	9
	Long-Transverse	71.0	60.0	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 or 4D %
1.02 to 6.32, incl	Longitudinal	490	421	9
	Long-Transverse	490	414	9

3.3.2 Corrosion Resistance

Resistance to exfoliation corrosion shall be acceptable if the sheet conforms to the requirements of 3.3.2.1.

3.3.2.1 If the electrical conductivity is 39.0% IACS (International Annealed Copper Standard) (22.7 MS/m) or higher and the long-transverse yield strength does not exceed the specified minimum by 9000 psi (62 MPa) or more, the sheet is acceptable.

3.3.2.2 If the conductivity is 39.0% IACS (22.7 MS/m) or higher and the long-transverse yield strength exceeds the specified minimum by 9000 psi (62 MPa) or more, the sheet is unacceptable.

3.3.2.3 If the conductivity is less than 39.0% IACS (22.7 MS/m), the sheet is unacceptable.

3.3.2.4 Sheet found to be unacceptable may be given additional overaging heat treatment or be entirely reheat treated, and if, after completion of either treatment, it meets the criteria of 3.3.1 and 3.3.2, it is acceptable.

3.3.3 Exfoliation Corrosion Resistance

Sheet under 0.100 inch (2.54 mm) in nominal thickness examined on the surface and sheet 0.100 inch (2.54 mm) and over in nominal thickness (T) examined at T/10 plane, when tested in accordance with ASTM G34, shall show exfoliation corrosion not greater than that pictured in Photo B, Figure 2 of ASTM G34.

3.3.4 Fracture Toughness

Plane stress fracture toughness (K_C) shall be as shown in Table 3, determined in accordance with ASTM B646 and ASTM E561.

Table 3 - Fracture toughness criteria

Nominal Thickness Inches	Nominal Thickness Millimeters	$K_{c\ minimum}$ T-L Direction ksi $inch^{1/2}$	$K_{c\ minimum}$ T-L Direction MPa $m^{1/2}$
0.040 to 0.125, incl	1.02 to 3.18, incl	87	96
Over 0.125 to 0.249, incl	Over 3.18 to 6.32, incl	80	88

3.3.5 Mechanical property requirements for product outside the range covered by Tables 2 and 3 shall be agreed upon between the purchaser and producer and reported as 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.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Composition (see 3.1), tensile properties (see 3.3.1), corrosion resistance (see 3.3.2), fracture toughness (see 3.3.4), and dimensional tolerances (see 3.5) are acceptance tests and, except for composition, shall be performed on each inspection lot.

4.2.2 Periodic Tests

Exfoliation-corrosion resistance determined in accordance with 3.3.3 is a periodic test and shall be performed at a frequency selected by the producer unless frequency of testing is specified by the purchaser.

4.3 Sampling and Testing

Shall be in accordance with AMS2355 and the following:

4.3.1 Sampling for fracture toughness testing (see 3.3.4) shall be as acceptable to the purchaser (see 8.5).

4.3.2 Specimens for conductivity testing shall be the tensile samples.