



AEROSPACE MATERIAL SPECIFICATION

AMS4207™**REV. D**

Issued 1982-07
Reaffirmed 2017-07
Revised 2024-06

Superseding AMS4207C

Aluminum Alloy Sheet, Alclad,
5.7Zn - 2.2Mg - 1.6Cu - 0.22Cr (7475-T61),
Solution and Precipitation Heat Treated
(Composition similar to A87475)

RATIONALE

AMS4207D results from a Five-Year Review and update of this specification with changes to prohibit unauthorized exceptions (see 3.3, 3.3.5, 3.6, 4.4.1, 5.1.1, and 8.3), clarify Fracture Toughness (see 3.3.2) as "when specified," relocate Definitions (see 2.4), update Form (see 1.1), Applicable Documents (see Section 2 and 3.2), Condition (see 3.2), Ordering Information (see 8.5), and allow the use of the immediate prior specification revision (see 8.4).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of sheet 0.040 to 0.249 inches (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 a combination of high strength, 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.

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2024 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, or used for text and data mining, AI training, or similar technologies, without the prior written permission of SAE.

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
http://www.sae.org

SAE WEB ADDRESS:

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS4207D>

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

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

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 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 T61 temper (refer to ANSI H35.1/H35.1M).

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. Tensile properties and critical-stress-intensity factor requirements for sheet under 0.040 inch (1.02 mm) in nominal thickness shall be as agreed upon by the purchaser and producer and reported per 4.4.1 (see 8.5).

3.3.1 Tensile Properties

Shall be as specified in Table 2, determined in the long-transverse direction.

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

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches %
0.040 to 0.062, incl	69.0	59.0	9
Over 0.062 to 0.187, incl	70.0	60.0	9
Over 0.187 to 0.249, incl	72.0	61.0	9

Table 2B - Minimum tensile properties, SI units

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm %
1.02 to 1.57, incl	476	407	9
Over 1.57 to 4.75, incl	483	414	9
Over 4.75 to 6.32, incl	496	421	9

3.3.2 Fracture Toughness

When specified, plane stress fracture toughness (K_{IC}) shall be not lower than values shown in Table 3, determined in the T-L direction in accordance with ASTM B646 and ASTM E561 or by other method acceptable to the purchaser.

Table 3 - T-L K_{IC} minimum fracture toughness requirements

Nominal Thickness Inches	Nominal Thickness Millimeters	K_{IC} , Minimum ksi $\sqrt{\text{inch}}$	K_{IC} , Minimum MPa $\sqrt{\text{m}}$
0.040 to 0.125, incl	1.02 to 3.18, incl	75	82.4
Over 0.125 to 0.249, incl	Over 3.18 to 6.32, incl	60	66.0

3.3.3 Bending

Sheet 0.008 to 0.249 inch (0.20 to 6.32 mm), inclusive, in nominal thickness 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 4 times the nominal thickness of the sheet with axis of bend parallel to the direction of rolling.

Table 4 - Bending test parameters

Nominal Thickness Inches	Nominal Thickness Millimeters	Bend Factor
0.008 to 0.020, incl	0.20 to 0.51, incl	6
Over 0.020 to 0.063, incl	Over 0.51 to 1.60, incl	7
Over 0.063 to 0.091, incl	Over 1.60 to 2.31, incl	8
Over 0.091 to 0.125, incl	Over 2.31 to 3.18, incl	9
Over 0.125 to 0.249, incl	Over 3.18 to 6.32, incl	10

3.3.4 Cladding Thickness

After rolling, the average cladding thickness per side shall be as shown in Table 5.

Table 5 - Cladding thickness

Nominal Sheet Thickness Inches	Nominal Sheet Thickness Millimeters	% of Sheet Thickness Nominal	% of Sheet Thickness Minimum Average
Up to 0.062, incl	Up to 1.57, incl	4	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

3.3.5 Mechanical property requirements for product outside the range covered by 1.1 shall be agreed upon between the purchaser and producer and reported per 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 the sheet shall supply all samples for the producer's tests and shall be responsible for the performance of all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. The purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the sheet conforms to specified requirements.