



<b>AEROSPACE MATERIAL SPECIFICATION</b>	<b>AMS4278™</b>	<b>REV. C</b>
	Issued 1997-12 Reissued 2003-09 Reaffirmed 2013-12 Revised 2024-04  Superseding AMS4278B	
Aluminum Alloy, Alclad Sheet 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (Alclad 7075-O) Annealed, Fine Grained (Composition similar to UNS A87075)		

RATIONALE

AMS4278C is the result of a Five-Year Review and update of this specification with changes to prohibit unauthorized exceptions (see 3.3.1.2.1, 3.6, 4.4.1, 5.1.1, and 8.4), add provisions for the use of AS6279 (see 3.7), update Title to reflect -O temper, Scope (see 1.1) to align nominal thickness range with tables in Section 3, relocate Definitions (see 2.4), update Applicable Documents (see 2 and 3.3.2) and Ordering Information (see 8.6), renumber Cladding Thickness (see 3.3.3) for clarity, and allow the use of the immediate prior specification revision (see 8.5).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of alclad sheet over 0.039 to 0.126 inches (0.99 to 3.20 mm), inclusive, in nominal thickness with a fine-grain core of ASTM No. 6 or finer (see 8.5).

1.2 Application

This sheet has been used typically for severely formed structural parts that will be subsequently heat treated and painted or otherwise protected from corrosion, 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 after heat treatment; 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 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/AMS4278C>

## 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
ARP823	Minimizing Stress-Corrosion Cracking in Wrought High-Strength Aluminum Alloy Products
AS6279	Standard Practice for Production, Distribution, and Procurement of Metal Stock
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](http://www.astm.org).

ASTM B660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B666/B666M	Identification Marking of Aluminum and Magnesium Products
ASTM E112	Determining Average Grain Size

## 2.3 ANSI Publications

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

ANSI H35.1/H35.1M	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 Tables 1 and 2, determined in accordance with AMS2355.

**Table 1 - Composition, core (7075)**

Element	Min	Max
Silicon	--	0.40
Iron	--	0.50
Copper	1.2	2.0
Manganese	--	0.30
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	

**Table 2 - 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

Annealed in accordance with AMS2772.

### 3.3 Properties

Sheet shall conform to the following requirements, determined in accordance with AMS2355:

#### 3.3.1 As Annealed

##### 3.3.1.1 Average Grain Size of Core

Shall be ASTM No. 6 or finer, determined in accordance with ASTM E112 or by a technique agreed upon by the purchaser and producer.

##### 3.3.1.2 Tensile Properties

Shall be as shown in Table 3.

**Table 3A - Tensile properties, inch/pound units**

Nominal Thickness Inch	Tensile Strength ksi, maximum	Yield Strength at 0.2% Offset ksi, maximum	Elongation in 2 Inches or 4D %, minimum
Over 0.039 to 0.062, incl	36.0	20.0	10
Over 0.062 to 0.126, incl	38.0	20.0	10

**Table 3B - Tensile properties, SI units**

Nominal Thickness Millimeters	Tensile Strength MPa, maximum	Yield Strength at 0.2% Offset MPa, maximum	Elongation in 50.8 mm or 4D %, minimum
Over 0.99 to 1.57, incl	248	138	10
Over 1.57 to 3.20, incl	262	138	10

3.3.1.2.1 Mechanical property requirements for product outside the size range covered by Table 3 shall be agreed upon between the purchaser and producer and reported per 4.4.2 (see 8.5).

### 3.3.1.3 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 4 times the nominal thickness of the sheet with axis of bend parallel to the direction of rolling.

**Table 4 - Bending parameters**

Nominal Thickness Inch	Nominal Thickness Millimeters	Bend Factor
Over 0.039 to 0.062, incl	Over 0.99 to 1.57, incl	0
Over 0.062 to 0.126, incl	Over 1.57 to 3.20, incl	1

### 3.3.2 Response to Heat Treatment

Sheet shall have the following properties after being solution and precipitation heat treated to the -T62 temper (refer to ANSI H35.1/35.1M) in accordance with AMS2772.

#### 3.3.2.1 Tensile Properties

Shall be as specified in Table 5.

**Table 5A - Minimum tensile properties, inch/pound units**

Nominal Thickness Inch	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
Over 0.039 to 0.062, incl	72.0	62.0	9
Over 0.062 to 0.126, incl	74.0	64.0	9

**Table 5B - Minimum tensile properties, SI units**

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Over 0.99 to 1.57, incl	496	427	9
Over 1.57 to 3.20, incl	510	441	9

### 3.3.2.2 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 6 times the nominal thickness of the sheet with axis of bend parallel to the direction of rolling.

**Table 6 - Bending parameters**

Nominal Thickness Inch	Nominal Thickness Millimeters	Bend Factor
Over 0.039 to 0.062, incl	Over 0.99 to 1.57, incl	7
Over 0.062 to 0.091, incl	Over 1.57 to 2.31, incl	8
Over 0.091 to 0.126, incl	Over 2.31 to 3.20, incl	9

### 3.3.3 Cladding Thickness

After rolling, the average cladding thickness shall conform to the requirements shown in Table 7.

**Table 7 - Average cladding thickness**

Nominal Thickness Inch	Nominal Thickness Millimeters	Average Cladding Thickness Per Side % of Total Thickness minimum
Over 0.039 to 0.062, incl	Over 0.99 to 1.57, incl	3.2
Over 0.062 to 0.126, incl	Over 1.57 to 3.20, incl	2.0

### 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 4.4.2.

3.7 Production, distribution, and procurement of metal stock shall comply with AS6279. This requirement becomes effective 18 months after publication of AMS4278C.

## 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), average grain size (see 3.3.1.1), tensile properties as annealed (see 3.3.1.2), after solution and precipitation heat treatment (see 3.3.2.1), and tolerances (see 3.5) are acceptance tests and, except for composition, shall be performed on each lot.

#### 4.2.2 Periodic Tests

Bending as annealed (see 3.3.1.3), after solution and precipitation heat treatment (see 3.3.2.2), and cladding thickness (see 3.3.3) are periodic tests 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 except that average grain size shall be determined on one sample from each inspection lot.

### 4.4 Reports

4.4.1 The producer of sheet shall furnish with each shipment a report stating that the sheet conforms to the composition and tolerances, showing the numerical results of tests on each inspection lot to determine conformance to other acceptance test requirements, and stating that the sheet conforms to the other technical requirements. This report shall include the purchase order number, inspection lot number, AMS4278C, size, and quantity. The report shall also identify the producer, the product form, and the size of the mill product.

4.4.2 When material produced to this specification is beyond the sizes allowed in the scope or tables, or other exceptions are taken to the technical requirements listed in Section 3, the report shall contain a statement "This material is certified as AMS4278C(EXC) because of the following exceptions:" and the specific exceptions shall be listed (see 5.1.1).