AEROSPACE MATERIAL SPECIFICATION

AMS4251™	REV. C

Issued 1989-04
Reaffirmed 2011-11
Revised 2022-09

Superseding AMS4251B

Aluminum Alloy Sheet
2.7Cu - 2.2Li - 0.12Zr (2090-T83)
Solution Heat Treated, Cold Worked, and Precipitation Heat Treated
(Composition similar to UNS A92090)

RATIONALE

AMS4251C results from a Five-Year Review and update of this specification with changes to prohibit unauthorized exceptions (3.3.1.1, 3.6, 4.4.2, 8.6), update application (1.2), applicable documents (Section 2), titles (Tables 2A and 2B), and ordering information (8.7), and allow the use of the immediate prior specification revision (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) in nominal thickness (see 8.7).

1.2 Application

Primarily for applications requiring the strength similar to 70750T6 sheet (refer to AMS4045) and 7.8% lower nominal density.

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
AMS2772	Heat Treatment of Aluminum Alloy Raw Materials
AS7766	Terms Used in Aerospace Metals Specifications

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/AMS4251C/

2.2 ANSI Accredited Publications

Copies of these documents are available online at http://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)

2.3 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 B660 Packaging/Packing of Aluminum and Magnesium Products

ASTM B666 Identification Marking of Aluminum and Magnesium Products

ASTM G34 Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO Test)

ASTM G85 Modified Salt Spray (Fog) Testing

ASTM G112 Conducting Exfoliation Corrosion Tests in Aluminum Alloys

2.4 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

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

Table 1 - Composition

Element	Min	Max
Silicon	--	0.10
Iron	--	0.12
Copper	2.4	3.0
Manganese	--	0.05
Magnesium	--	0.25
Chromium	--	0.05
Zinc	--	0.10
Titanium	--	0.15
Lithium	1.9	2.6
Zirconium	0.08	0.15
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition

Solution heat treated, cold worked, and precipitation heat treated to the -T83 temper, refer to ANSI H35.1/H35.1M.

3.2.1 Heat treatment shall be in accordance with AMS2772; times and temperatures shall be established by the producer (see 8.3).

3.3 Properties

Shall conform to the following requirements, determined in accordance with AMS2355 on the mill produced size:

3.3.1 Tensile Properties

Shall be as specified in Table 2.

Table 2A - Tensile properties, inch/pound units

Nominal Thickness Inches	Specimen Orientation	Tensile Strength ksi, Min	Yield Strength at 0.2% Offset ksi, Min	Elongation in 2 Inches %, Min
0.040 to 0.125, incl	Longitudinal	77.0	70.0	3
	Long-Transverse	73.0	66.0	5
Over 0.125 to 0.249, incl	Longitudinal	75.0	70.0	4
	Long-Transverse	73.0	66.0	5

Table 2B - Tensile properties, SI units

Nominal Thickness Millimeters	Specimen Orientation	Tensile Strength MPa, Min	Yield Strength at 0.2% Offset MPa, Min	Elongation in 50.8 mm %, Min
1.02 to 3.18, incl	Longitudinal	531	483	3
	Long-Transverse	503	455	5
Over 3.18 to 6.32, incl	Longitudinal	517	483	4
	Long-Transverse	503	455	5

3.3.1.1 Mechanical property requirements for product outside of the ranges covered by 3.3.1 shall be agreed upon between purchaser and producer and reported per 4.4.2 (see 8.7).

3.3.2 Exfoliation-Corrosion Resistance

Sheet shall not exhibit exfoliation corrosion greater than that illustrated by Photograph EB, Figure 2, of ASTM G34 when specimens are exposed for 2 weeks according to the procedures in ASTM G85 Annex A2, using the dry-bottom MASTMAASIS test method (see 8.4).

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.

3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.2.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of sheet shall supply all samples for producer'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), long transverse tensile properties (3.3.1), tolerances (3.5), and, when specified, longitudinal tensile properties (3.3.1) are acceptance tests and, except for composition, shall be performed on each lot.

4.2.2 Periodic Tests

Exfoliation-corrosion resistance (3.3.2) is a periodic test and shall be performed at a frequency selected by the producer unless frequency of testing is specified by purchaser.

4.3 Sampling

Shall be in accordance with AMS2355.

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, showing the results of tests on each inspection lot to determine conformance to the other acceptance test requirements, and stating that the sheet conforms to the other technical requirements of this specification. This report shall include the purchase order number, inspection lot number, AMS4251C, size, quantity. The report shall also identify the producer, the product form, and the mill produced size.

4.4.2 When material produced to this specification is beyond the sizes allowed in the scope of tables, or other exceptions are taken to the technical requirements listed in Section 3 (see 5.1.1), the report shall contain a statement “This material is certified as AMS4251C(EXC) because of the following exceptions:” and the specific exceptions shall be listed.

4.5 Resampling and Retesting

Shall be in accordance with AMS2355.

5. PREPARATION FOR DELIVERY

5.1 Identification

Shall be in accordance with ASTM B666/B666M.

5.1.1 When technical exceptions are taken (see 4.4.2), the material shall be marked with AMS4251(EXC).

5.2 Protective Treatment

Product shall be protected from damage during storage and shipment by a method determined by the producer, unless specified by purchaser. Examples of typical protective coating include but are not limited to interleaving with paper or oiling of the surface.

5.3 Packaging

The product shall be prepared for shipment in accordance with ASTM B660 and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the product to ensure carrier acceptance and safe delivery.

6. ACKNOWLEDGMENT

A producer shall mention this specification number and its revision letter in all quotations and when acknowledging purchaser orders.