AEROSPACE MATERIAL SPECIFICATION

AMS4041™	REV. U

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Superseding AMS4041T

Aluminum Alloy, Sheet and Plate, Alclad, 4.4Cu - 1.5Mg - 0.60Mn (2024, -T3 Sheet/-T351 Plate with 1-1/2% Alclad), Solution Heat Treated, Cold Worked, and Naturally Aged (Composition similar to UNS A82024)

RATIONALE

AMS4041U results from a Five-Year Review and update of this specification with changes to update wording to prohibit unauthorized exceptions (see 3.3.1.1 and 8.4), relocate Definitions (see 2.4), and update Applicable Documents (see Section 2).

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of sheet and plate alclad two sides, over 0.187 to 1.000 inch (over 4.750 to 25.40 mm) in nominal thickness, supplied in the -T3/-T351 temper (see 8.5).

1.1.1 AMS4041 covers alclad material for sheet greater than 0.187 inch and plate. The cladding thickness is minimized to provide a commensurate increase in tensile properties for this alclad reduction. Use of this product is not recommended without proper evaluation of corrosion resistance.

1.2 Supersession Notice

Requirements for thin gauge sheet (0.008 to 0.187 inch) in accordance with AMS4041 are superseded by AMS4462. AMS-QQ-A-250/5 and AMS4462 have the same requirements for alclad thickness and tensile properties for material less than 0.187 inch in thickness.

1.3 Application

These products have been used typically for high-strength parts requiring higher yield strength than is afforded by non-cold worked, naturally aged tempers of this alloy, maximum corrosion resistance, and fabrication that does not involve welding, 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.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
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SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS4041U/

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
AMS4462	Aluminum Alloy, Sheet and Plate, Alclad, 4.4Cu - 1.5Mg - 0.60Mn (Alclad 2024, -T3 Sheet, -T351 Plate), Solution Heat Treated, Cold Worked and Naturally Aged
AMS-QQ-A-250/5	Aluminum Alloy Alclad 2024, Plate and Sheet
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 B660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B666/B666M	Identification Marking of Aluminum and Magnesium Alloy Products

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 as shown in Tables 1, determined in accordance with AMS2355.

Table 1A - Composition, core (2024)

Element	Min	Max
Silicon	--	0.50
Iron	--	0.50
Copper	3.8	4.9
Manganese	0.30	0.9
Magnesium	1.2	1.8
Chromium	--	0.10
Zinc	--	0.25
Titanium	--	0.15
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

Table 1B - Composition, cladding (1230)

Element	Min	Max
Iron + Silicon	--	0.70
Copper	--	0.10
Manganese	--	0.05
Magnesium	--	0.05
Zinc	--	0.10
Titanium	--	0.03
Vanadium	--	0.05
Other Elements, each	--	0.03
Aluminum	99.30	--

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Sheet

Solution heat treated, cold worked, and naturally aged to the T3 temper in accordance with AMS2772 (refer to ANSI H35.1/H35.1M).

3.2.2 Plate

Solution heat treated, stretched to produce a nominal permanent set of 2%, but not less than 1-1/2% nor more than 3%, and naturally aged to the T351 temper in accordance with AMS2772 (refer to ANSI H35.1/H35.1M).

3.2.2.1 Plate shall receive no further straightening operations after stretching.

3.3 Properties

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

3.3.1 Tensile Properties

Shall be as shown in Table 2.

3.3.1.1 Tensile property requirements for sheet and plate outside the thickness range of 1.1 shall be as agreed upon by the purchaser and producer and reported per 4.4.1 (see 8.5).

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

Temper	Nominal Thickness Inch	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
-T3	Over 0.187 to 0.249, incl	63.0	41.0	15
-T351	0.250 to 0.499, incl	63.0	41.0	12
	Over 0.499 to 1.000, incl	63.0	42.0	8

Table 2B - Minimum tensile properties, SI units

Temper	Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
-T3	Over 4.750 to 6.324, incl	434	283	15
-T351	6.350 to 12.675, incl	434	283	12
	Over 12.675 to 25.400, incl	434	290	8

3.3.2 Bending

Product 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 3 times the nominal thickness of the product with axis of bend parallel to the direction of rolling.

Table 3 - Bending parameters

Nominal Thickness Inch	Nominal Thickness Millimeters	Bend Factor
Over 0.187 to 0.249, incl	Over 4.750 to 6.324, incl	8
Over 0.249 to 0.499, incl	Over 6.324 to 12.675, incl	10

3.3.3 Cladding Thickness

The aluminum alloy plates that are bonded to the two sides of the aluminum alloy (2024) ingot or slab, to form a composite that is to be rolled, shall each have a thickness as specified in Table 4.

Table 4 - Cladding thickness

Nominal Thickness Inch	Nominal Thickness Millimeters	Average Cladding Thickness Per Side % of Total Thickness Minimum	Average Cladding Thickness Per Side % of Total Thickness Maximum
Over 0.187 to 0.499, incl	Over 4.750 to 12.675, incl	1.2	--
Over 0.499	Over 12.675	1.2	3.0

3.4 Quality

The product, 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 product.

3.5 Tolerances

Shall conform to all applicable requirements of ANSI H35.2/H35.2M.