SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS4475

Issued 2013-06

Aluminum Alloy, Coiled Sheet, Alclad
4.4Cu - 1.5Mg - 0.60Mn (Alclad 2024; -T4 Coiled Sheet)
Solution Heat Treated
(Composition similar to UNS A82024)

RATIONALE

AMS4475 is a new specification to define the requirements of 2024-T4 alclad coiled sheet to facilitate cancellation of AMS-QQ-A-250/5.

1. SCOPE

1.1 Form

This specification covers an aluminum alloy in the form of alclad coiled sheet supplied in the –T4 temper.

1.2 Application

These products have been used typically for medium strength parts requiring formability and maximum corrosion resistance and whose fabrication 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.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 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

AS1990 Aluminum Alloy Tempers

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**

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 B 660 Packaging/Packing of Aluminum and Magnesium Products

ASTM B 666/B 666MIdentification of Aluminum and Magnesium Alloy Products

2.3 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036, Tel: 212-642-4900, www.ansi.org.

ANSI H 35.2 Dimensional Tolerances for Aluminum Mill Products

ANSI H 35.2M Dimensional Tolerances for Aluminum Mill Products (Metric)

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight as shown in Table 1 and 2, determined in accordance with AMS2355.

TABLE 1 – 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 2 – 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
Other Elements, each	--	0.03
Aluminum	99.30	--

3.2 Condition

The product shall be supplied in the following condition:

3.2.1 Coiled sheet

Solution heat treated and naturally aged to the T4 temper in accordance with AMS2772. (See AS1990)

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 3 (See 8.3).

TABLE 3A – MINIMUM TENSILE PROPERTIES, INCH/POUND UNITS

Temper	Nominal Thickness, Inches	Tensile Strength, ksi	Yield Strength at 0.2% Offset, ksi	Elongation in 2 inches or 4D, %
-T4	0.010 thru 0.020 0.021 thru 0.062 0.063 thru 0.128	58 58 61	36.0 34.0 38.0	12 15 15

TABLE 3B – 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, %
-T4	0.25 thru 0.51 0.53 thru 1.57 1.60 thru 3.25	400 400 421	248 234 262	12 15 15

3.4 Cladding Thickness

3.4.1 Thickness of Cladding Plates

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, mm	Nominal Cladding Thickness Per Side, % Of Thickness	Average Cladding Thickness Per Side, % Of Thickness; Minimum
0.010 thru 0.062	0.25 to 1.57, incl	5	4
0.063 and above	1.60 and above	2.5	2

3.5 Response to Heat Treatment (-T42, -T62, & -T72)

The product, as received by purchaser, shall meet the following properties shown in Table 5 after solution heat treatment and natural aging to the –T42 temper (See AS1990) in accordance with AMS2772. Additionally, material in the –T42 condition shall meet the properties shown in Table 5 after artifical aging to the –T62 and –T72 condition respectively in accordance with AMS 2772.

3.5.1 Tensile Properties:

Shall be as shown in Table 5 (See 8.3).

TABLE 5A – MINIMUM TENSILE PROPERTIES, INCH/POUND UNITS

Temper	Nominal Thickness, Inches	Tensile Strength, ksi	Yield Strength at 0.2% Offset, ksi	Elongation in 2 Inches or 4D, %
-T42	0.010 thru 0.020 0.021 thru 0.062 0.063 thru 0.128	57.0 57.0 60.0	34.0 36.0 36.0	12 15 15
-T62	0.010 thru 0.062 0.063 thru 0.128	60.0 62.0	47.0 49.0	5 5
-T72	0.010 thru 0.062 0.063 thru 0.128	56.0 58.0	43.0 45.0	5 5

TABLE 5B – 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, %
-T42	0.25 thru 0.51 0.53 thru 1.57 1.60 thru 3.25	393 393 414	234 248 248	12 15 15
-T62	0.25 thru 1.57 1.60 thru 3.25	414 427	324 338	5 5
-T72	0.25 thru 1.57 1.60 thru 3.25	386 400	296 310	5 5

3.6 Quality

The product, 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 product.

3.7 Tolerances

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

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The vendor of the product shall supply all samples for vendor'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 product conforms to specified requirements.