SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4195C

Issued 1970-11
Revised 2002-01
Reaffirmed 2010-05

Superseding AMS 4195B

Aluminum Alloy Sheet and Plate, Alclad
4.4Cu - 1.5Mg - 0.60Mn (Alclad 2024 and 1-1/2% Alclad 2024-T861 Flat Sheet; 1-1/2% Alclad 2024-T861 Plate)
Solution Heat Treated, Cold Worked, and Precipitation Heat Treated

RATIONALE

This document has been reaffirmed to comply with the SAE 5-year Review policy.

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of flat sheet and plate 0.500 inch (12.70 mm) and under in nominal thickness.

1.2 Application:

These products have been used typically for structural parts requiring a combination of good strength and maximum corrosion resistance. These products, when re-solution heat treated by the user, may not have the tensile properties shown.

1.2.1 Certain design and processing procedures may cause these products to become susceptible to stress-corrosion cracking; 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 canceled 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)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or www.sae.org.

AMS 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings
MAM 2355	Quality Assurance Sampling and Testing, Aluminum Alloys and Magnesium Alloys, Wrought Products, Except Forging Stock, and Rolled, Forged, or Flash Welded Rings, Metric (SI) Units
AMS 2772	Heat Treatment of Aluminum Alloy Raw Materials
ARP823	Minimizing Stress-Corrosion Cracking in Wrought Heat Treatable Aluminum Alloy Products

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM E 29	Using Significant Digits in Test Data to Determine Conformance with Specifications
ASTM B 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B 666/B 666M	Identification of Aluminum and Magnesium Alloy Products

2.3 ANSI Publications:

Available from ANSI, 25 West 43rd Street, New York, NY 10036.

ANSI H35.1	ANS 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)

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Tables 1A and 1B, determined in accordance with AMS 2355 or MAM 2355.

TABLE 1A - Composition - Core (2024)

Element (3.1.1)	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 (3.1.1)	min	max
Silicon + Iron	--	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, by difference	99.30	--

3.1.1 Limits for alloying elements and other elements are expressed in ANSI H35.1.

3.1.2 Test results may be rounded by the “rounding off” method of ASTM E 29.

3.2 Condition:

Solution heat treated, cold reduced approximately 6% in thickness, and precipitation heat treated. Heat treatments shall be performed in accordance with AMS 2772.

3.3 Properties:

The product shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355 on the mill product.

3.3.1 Tensile Properties: Shall be as specified in Table 2.

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 or 4D %
0.020 to 0.062, incl	64.0	58.0	3
Over 0.062 to 0.187, incl	69.0	64.0	4
Over 0.187 to 0.249, incl	70.0	65.0	4
Over 0.249 to 0.500, excl	69.0	63.0	4
0.500	70.0	64.0	4

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 or 4D %
0.51 to 1.57, incl	441	400	3
Over 1.57 to 4.75, incl	476	441	4
Over 4.75 to 6.32, incl	483	448	4
Over 6.32 to 12.70, excl	476	434	4
12.70	483	441	4

3.3.2 Cladding Thickness: After rolling, the average cladding thickness shall conform to the requirements of Table 3.

TABLE 3 - Average Cladding Thickness

Total Thickness of Composite Product Inch	Total Thickness of Composite Product Millimeters	Average Cladding Thickness Per Side % of Total Thickness min	Average Cladding Thickness Per Side % of Total Thickness max
0.020 to 0.062, incl	0.51 to 1.57, incl	4.0	--
Over 0.062 to 0.187, incl	Over 1.57 to 4.75, incl	2.0	--
Over 0.187 to 0.500, excl	Over 4.75 to 12.70, excl	1.2	--
0.500	12.70	1.2	3.0

3.4 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.

3.5 Tolerances:

Shall conform to all applicable requirements of ANSI H35.2 or 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 the specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Composition (3.1), tensile properties (3.3.1), and tolerances (3.5) are classified as acceptance tests and except for composition, shall be performed on each lot.

4.2.2 Periodic Tests: Cladding thickness (3.3.2) is classified as a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing:

Shall be in accordance with AMS 2355 or MAM 2355.

4.4 Reports:

The vendor of the product shall furnish with each shipment a report stating that the product conforms to the chemical composition and tolerances, and showing the numerical results of tests on each inspection lot to determine conformance to the other acceptance test requirements and, when performed, to the periodic test requirements. This report shall include the purchase order number, inspection lot number(s), AMS 4195C, size, and quantity. The report shall also identify the producer, the product form, and the size of the mill product.

4.5 Resampling and Retesting:

Shall be in accordance with AMS 2355 or MAM2355.