SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS4036 REV. K

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Superseding AMS4036J

Aluminum Alloy Sheet and Plate, Alclad One Side 4.4Cu - 1.5Mg - 0.60Mn Alclad One Side 2024 and 1-1/2% Alclad One Side 2024-T3 Sheet; 1-1/2% Alclad One Side 2024-T351 Plate

A82024

RATIONALE

AMS4036K has been reaffirmed to comply with the SAE five-year review policy.

NONCURRENT NOTICE

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of October, 2006. It is recommended, therefore, that this specification not be specified for new designs.

"NONCURRENT" refers to those specifications which have previously been widely used and which may be required for production or processing of existing designs in the future. The Aerospace Materials Division, however, does not recommend these specifications for future use in new designs. "NONCURRENT" specifications are available from SAE upon request.

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
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SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4036K

1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of sheet and plate clad on one side with a different aluminum alloy.

1.2 Application:

These products have been used typically for structural components including chemically-milled parts, but usage is not limited to such applications.

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 form 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.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

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.

ASTM B 660	Packaging/Packing of Aluminum and Magnesium Products
ASTM B 666/B 666M	Identification Marking of Aluminum and Magnesium Products

2.3 ANSI Publications:

Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

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 1 and 2, determined in accordance with AMS 2355 or MAM 2355.

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	--	0.50
Magnesium	--	0.5
Zinc	--	0.10
Titanium	--	0.03
Vanadium	--	0.05
Other Elements, each	--	0.03
Aluminum, by difference	99.30	--

3.2 Condition:

The product shall be supplied in the following condition:

3.2.1 Sheet: Solution heat treated in accordance with AMS 2772 and cold worked.

3.2.2 Plate: Solution heat treated in accordance with AMS 2772 and stretched to produce a nominal permanent set of 2% but not less than 1-1/2% nor more than 3%.

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 AMS 2355 or MAM 2355 on the mill produced size:

3.3.1 Tensile Properties: Shall be as specified in Table 3.

TABLE 3A - 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 %
0.010 to 0.020, incl	61.0	40.0	12
Over 0.020 to 0.062, incl	61.0	40.0	15
Over 0.062 to 0.128, incl	62.0	41.0	15
Over 0.128 to 0.249, incl	63.0	41.0	15
Over 0.249 to 0.499, incl	63.0	41.0	12

TABLE 3B - Minimum Tensile Properties, SI Units

Nominal Thickness mm	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
0.25 to 0.51, incl	421	276	12
Over 0.51 to 1.57, incl	421	276	15
Over 1.57 to 3.25, incl	427	283	15
Over 3.25 to 6.32, incl	434	283	15
Over 6.32 to 12.67, incl	434	283	12

3.3.2 Bending: Product 0.010 to 0.249 inch (0.25 to 6.32 mm), inclusive, in nominal thickness shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a diameter equal to the bend factor specified in Table 4 times the nominal thickness of the product with axis of bend parallel to the direction of rolling. The bare (unclad) surface shall be on the outside of the bend.

TABLE 4 - Bending Parameters

Nominal Thickness Inch	Nominal Thickness mm	Bend Factor
0.010 to 0.040, incl	0.25 to 1.02, incl	4
Over 0.040 to 0.124, incl	Over 1.02 to 3.15, incl	5
Over 0.124 to 0.249, incl	Over 3.15 to 6.32, incl	8

3.3.3 Cladding Thickness: After rolling, the average cladding thickness shall be as specified in Table 5.

TABLE 5 - Average Cladding Thickness

Nominal Thickness Inch	Nominal Thickness mm	Average Cladding Thickness Per Side % of Thickness min
0.010 to 0.062, incl	0.25 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 0.499, incl	Over 4.75 to 12.67, incl	1.2

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 ANSI 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.