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400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4031F

Issued JUN 1962
Revised AUG 2000

Superseding AMS 4031E

Aluminum Alloy, Sheet and Plate
6.3Cu - 0.30Mn - 0.18Zr - 0.10V - 0.06Ti (2219-0)
Annealed

UNS A92219

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1. SCOPE:

1.1 Form:

This specification covers an aluminum alloy in the form of sheet and plate.

1.2 Application:

These products have been used typically for parts requiring high strength up to 600 °F (316 °C), but usage is not limited to such application. These products are well suited for cryogenic applications and where welding is required.

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.

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 2770	Heat Treatment of Aluminum and Aluminum Alloys
AMS 2772	Heat Treatment of Aluminum Alloy Raw Materials

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

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight shown in Table 1, determined in accordance with AMS 2355 or MAM 2355.

TABLE 1 - Composition

Element	min	max
Silicon	--	0.20
Iron	--	0.30
Copper	5.8	6.8
Manganese	0.20	0.40
Magnesium	--	0.02
Zinc	--	0.10
Titanium	0.02	0.10
Vanadium	0.05	0.15
Zirconium	0.10	0.25
Other Elements, each	--	0.05
Other Elements, total	--	0.15
Aluminum	remainder	

3.2 Condition:

Annealed 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 produced size.

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3.3.1 As Annealed:

3.3.1.1 Tensile Properties: Shall be as specified in Table 2 for product 0.020 to 2.000 inches (0.51 to 50.80 mm), inclusive, in nominal thickness.

TABLE 2 - Tensile Properties

Property	Value
Tensile Strength, max	32.0 ksi (221 MPa)
Yield Strength at 0.2% Offset, max	16.0 ksi (110 MPa)
Elongation in 2 Inches (50.8 mm) or 4D, min	12%

3.3.1.2 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
0.020 to 0.250, incl	0.51 to 6.35, incl	4
Over 0.250 to 0.750, incl	Over 6.35 to 19.05, incl	6
Over 0.750 to 1.000, incl	Over 19.05 to 25.40, incl	8

3.3.2 After Solution and Precipitation Heat Treatment: The product, as received by purchaser, shall have the following properties after solution and precipitation heat treatment to the -T62 condition in accordance with AMS 2770:

3.3.2.1 Tensile Properties: Shall be as specified in Table 4.

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TABLE 4A - 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 0.039, incl	54.0	36.0	6
Over 0.039 to 0.249, incl	54.0	36.0	7
Over 0.249 to 1.000, incl	54.0	36.0	8
Over 1.000 to 2.000, incl	54.0	36.0	7

TABLE 4B - 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 0.99, incl	372	248	6
Over 0.99 to 6.32, incl	372	248	7
Over 6.32 to 25.40, incl	372	248	8
Over 25.40 to 50.80, incl	372	248	7

3.3.2.2 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 5 times the nominal thickness of the product with axis of bend parallel to the direction of rolling.

TABLE 5 - Bending Parameters

Nominal Thickness Inch	Nominal Thickness Millimeters	Bend Factor
0.020 to 0.062, incl	0.51 to 1.57, incl	8
Over 0.062 to 0.250, incl	Over 1.57 to 6.35, incl	12
Over 0.250 to 0.499, incl	Over 6.35 to 12.67, incl	16

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.

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