



400 Commonwealth Drive, Warrendale, PA 15096-0001

# AEROSPACE MATERIAL SPECIFICATION



AMS 4382C

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Superseding AMS 4382B

Submitted for recognition as an American National Standard

MAGNESIUM ALLOY, PLATE, EXTRA FLAT  
3.0Al - 1.0Zn - 0.20Mn (AZ31B-0)  
Annealed

UNS M11311

## 1. SCOPE:

### 1.1 Form:

This specification covers a magnesium alloy in the form of plate.

### 1.2 Application:

This product has been used typically for low-density, low-strength parts requiring rigidity and a high degree of flatness, dimensional stability, and weldability, but usage is not limited to such applications.

## 2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

### 2.1 SAE Publications:

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

AMS 2355 Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings

MAM 2355 Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings, Metric (SI) Units

AMS 2811 Identification, Aluminum and Magnesium Alloy Wrought Products

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**2.2 ASTM Publications:**

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products

**3. TECHNICAL REQUIREMENTS:****3.1 Composition:**

(R)

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
Aluminum	2.5	3.5
Zinc	0.7	1.3
Manganese	0.20	--
Silicon	--	0.05
Copper	--	0.05
Calcium	--	0.04
Iron	--	0.005
Nickel	--	0.005
Other Impurities, each (3.1.1)	--	0.10
Other Impurities, total (3.1.1)	--	0.30
Magnesium	remainder	

**3.1.1 Determination not required for routine acceptance.**

(R)

**3.2 Condition:**

Annealed.

**3.3 Properties:**

Plate shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355.

3.3.1 Tensile Properties: Shall be as shown in Table 2 for plate 0.250 to 6.000 inches (6.35 to 152.40 mm), inclusive, in nominal thickness:

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	30.0 ksi (207 MPa)
Yield Strength at 0.2% Offset	10.0 ksi (69 MPa)
Elongation in 2 Inches (50.8 mm), or 4D	9%

3.3.1.1 Tensile property requirements for plate over 6.000 inches (152.40 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

### 3.4 Quality:

Plate, 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 plate.

### 3.5 Tolerances:

Shall conform to the following requirements as applicable:

3.5.1 Thickness: Thickness variation within a plate shall not exceed  $\pm 0.010$  inch ( $\pm 0.25$  mm). Allowable thickness variation from plate to plate shall be as specified in Table 3.

TABLE 3A - Thickness Tolerances, Inch/Pound Units

Nominal Thickness Inches	Tolerance Inch plus and minus
0.250 to 0.750, incl	0.010
Over 0.750 to 1.250, incl	0.017
Over 1.250 to 2.000, incl	0.025
Over 2.000 to 3.000, incl	0.050
Over 3.000 to 3.250, incl	0.065
Over 3.250 to 3.500, incl	0.080
Over 3.500 to 4.000, incl	0.110
Over 4.000 to 5.000, incl	0.125
Over 5.000 to 6,000, incl	0.135

TABLE 3B - Thickness Tolerances, SI Units

Nominal Thickness Millimeters	Tolerance Millimeters plus and minus
6.35 to 19.05, incl	0.25
Over 19.05 to 31.75, incl	0.43
Over 31.75 to 50.80, incl	0.64
Over 50.80 to 76.20, incl	1.27
Over 76.20 to 82.55, incl	1.65
Over 82.55 to 88.90, incl	2.03
Over 88.90 to 101.60, incl	2.79
Over 101.60 to 127.00, incl	3.18
Over 127.00 to 152.40, incl	3.43

3.5.2 Width and Length: Shall be as specified in Table 4.

TABLE 4A - Width or Length Tolerances, Inch/Pound Units

Nominal Width or Length Inches	Tolerance Inch plus only
Up to 10, incl	3/16
Over 10 to 48, incl	3/8
Over 48 to 72, incl	1/2
Over 72	5/8

TABLE 4B - Width or Length Tolerances, SI Units

Nominal Width or Length Millimeters	Tolerance Millimeters plus only
Up to 254, incl	4.8
Over 254 to 1219, incl	9.5
Over 1219 to 1829, incl	12.7
Over 1829	15.9

3.5.3 Lateral Bow: Shall be as specified in Table 5. Lateral bow (camber) is defined as the curvature of the edges of plate in the plane of the surface of the plate, and is measured as the perpendicular distance from the point of maximum departure of the curved edges from a straight line joining the extremities.

TABLE 5A - Lateral Bow Tolerances, Inch/Pound Units

Nominal Length Inches	Width, Inches 10 and under	Width, Inches Over 10 to 18, incl	Width, Inches Over 18
Up to 30, incl	1/16	1/32	1/32
Over 30 to 60, incl	1/4	1/16	1/16
Over 60 to 90, incl	1/2	1/8	3/32
Over 90 to 120, incl	1	1/4	1/8
Over 120 to 150, incl	1 1/2	13/32	3/16
Over 150 to 180, incl	2	19/32	5/16
Over 180 to 210, incl	3	25/32	7/16
Over 210 to 240, incl *	4*	1*	9/16*

\*Also applicable to any 240-inch increment of longer plate

TABLE 5B - Lateral Bow Tolerances, SI Units

Nominal Length Millimeters	Width, Millimeters 254 and under	Width, Millimeters Over 254 to 457, incl	Width, Millimeters Over 457
Up to 762, incl	1.6	0.8	0.8
Over 762 to 1524, incl	6.4	1.6	1.6
Over 1524 to 2286, incl	12.7	3.2	2.4
Over 2286 to 3048, incl	25.4	6.4	3.2
Over 3048 to 3810, incl	38.1	10.3	4.8
Over 3810 to 4572, incl	50.8	15.1	7.9
Over 4572 to 5334, incl	76.2	19.8	11.1
Over 5334 to 6096, incl *	101.6*	25.4*	14.3*

\*Also applicable to any 6096-mm increment of longer plate

3.5.4 Flatness: Shall be as specified in Table 6. Deviations from flat are measured with the plate resting on a flat surface, concave side upward, using a straight edge and a feeler gauge, dial gauge, or scale.

TABLE 6A - Flatness Tolerances, Inch/Pound Units

Nominal Thickness Inches	Deviation from Flat Inch In Any 1 foot	Deviation from Flat Inch In Any 6 feet
0.250 to 1.000, incl	0.005	0.015
Over 1.000 to 6.000, incl	0.010	0.020

TABLE 6B - Flatness Tolerances, SI Units

Nominal Thickness Millimeters	Deviation from Flat Millimeters In Any 305 mm	Deviation from Flat Millimeters In Any 1829 mm
6.35 to 25.40, incl	0.13	0.38
Over 25.40 to 152.40, incl	0.25	0.51

3.5.5 Squareness: Allowable difference in diagonal lengths shall be as specified in Table 7, determined by comparing the lengths of diagonal measurements taken across opposite corners of the plate.

TABLE 7A - Squareness Tolerances: Maximum Allowable Difference in Length of Diagonals, Inch/Pound Units

Nominal Thickness Inches	Length, Inches 144 and under	Length, Inches Over 144 to 180, incl	Length, Inches Over 180 to 240, incl
0.250 to 0.500, incl	3/8	7/16	9/16
Over 0.500 to 1.000, incl	1/2	9/16	5/8
Over 1.000 to 6.000, incl	5/8	3/4	3/4