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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4385J

Issued AUG 1957
Revised JAN 1992
Noncurrent JUL 2000

Superseding AMS 4385H

Magnesium Alloy, Sheet and Plate
3.2Th - 0.70Zr
Cold Rolled and Partially Annealed

UNS M13310

NONCURRENT NOTICE

This specification has been declared “NONCURRENT” by the Aerospace Materials Division, SAE, as of July 2000. It is recommended, therefore, that this specification not be specified for new designs.

“NONCURRENT” refers to those materials which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs. Each of these “NONCURRENT” specifications is available from SAE upon request.

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1. SCOPE:

1.1 Form:

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

1.2 Application:

These products have been used typically for parts requiring good weldability and good strength-to-weight-ratio up to 550 °F (288 °C), but usage is not limited to such applications.

1.3 Precautions:

Product covered by this specification is radioactive. All applicable rules and regulations pertaining to handling of radioactive material and all licensing provisions for use of such material should be observed.

1.4 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

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 2202	Tolerances, Aluminum Alloy and Magnesium Alloy Sheet and Plate
MAM 2202	Tolerances, Metric, Aluminum Alloy and Magnesium Alloy Sheet and Plate
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

2.2 ASTM Publications::

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

ASTM B 660 Packaging/Packing of Aluminum and Magnesium Products
ASTM E 9 Compression Testing of Metallic Materials at Room Temperature
ASTM E 21 Elevated Temperature Tension Tests of Metallic Materials

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
Thorium	2.45	4.0
Zirconium	0.45	1.0
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.

3.2 Condition:

The product shall be supplied in the following condition:

3.2.1 Product 0.500 inch (12.70 mm) and Under in Nominal Thickness: Cold rolled, partially annealed, and pickled.

3.2.2 Product Over 0.500 inch (12.70 mm) in Nominal Thickness: Cold rolled and partially annealed.

3.3 Properties:

The product shall conform to the following requirements:

3.3.1 Tensile Properties:

3.3.1.1 At Room Temperature: Shall be as specified in Table 2 and 3.3.1.1.1, determined in accordance with AMS 2355 or MAM 2355.

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 %
0.016 to 0.125, incl	34.0	26.0	4
Over 0.125 to 0.250, incl	34.0	24.0	4
Over 0.250 to 1.000, incl	34.0	25.0	4
Over 1.000 to 3.000, incl	33.0	25.0	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 %
0.41 to 3.18, incl	234	179	4
Over 3.18 to 6.35, incl	234	165	4
Over 6.35 to 25.40, incl	234	172	4
Over 25.40 to 76.20, incl	228	172	4

3.3.1.1.1 Room temperature tensile property requirements for product under 0.016 inch (0.41 mm) or over 3.000 inches (76.20 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.1.2 At 600°F (316°C): Shall be as follows for product 0.016 to 0.250 inch (0.41 to 6.35 mm) in nominal thickness, determined in accordance with ASTM E 21 on specimens heated to 600°F ± 5 (316°C ± 3), held at heat for 10 to 20 minutes before testing, and tested at 600°F ± 5 (316°C ± 3) at a rate not greater than 0.05 inch/inch/minute (0.05 mm/mm/minute) through the 0.2% offset and at a rate of 0.11 - 0.14 inch/inch/minute (0.11 - 0.14 mm/mm/minute) above the 0.2% offset:

Tensile Strength, minimum	10.0 ksi (69 MPa)
Elongation in 2 Inches (50.8 mm) or 4D, minimum	20%

3.3.1.2.1 Tensile property requirements at 600 °F (316 °C) for product under 0.016 inch (0.41 mm) or over 0.250 inch (6.35 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.3.2 Longitudinal Compressive Properties: Shall be as specified in Table 3 and 3.3.2.1, determined in accordance with ASTM E 9 in the longitudinal direction.

TABLE 3A - Minimum Compressive Properties, Inch/Pound Units

Nominal Thickness Inches	Yield Strength at 0.2% Offset ksi
0.063 to 0.125, incl	20.0
Over 0.125 to 0.250, incl	22.0
Over 0.250 to 1.000, incl	20.0
Over 1.000 to 3.000, incl	17.0

TABLE 3B - Minimum Compressive Properties, SI Units

Nominal Thickness Millimeters	Yield Strength at 0.2% Offset MPa
1.60 to 3.18, incl	138
Over 3.18 to 6.35, incl	152
Over 6.35 to 25.40, incl	138
Over 25.40 to 76.20, incl	117

3.3.2.1 Longitudinal compressive property requirements for product under 0.063 inches (1.60 mm) or over 3.000 inches (76.20 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.

3.4 Quality:

The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from segregation and from foreign materials detrimental to usage of the product.

3.4.1 Acceptance limits for imperfections shall be as agreed upon by purchaser and vendor.

3.5 Tolerances:

Shall conform to all applicable requirements of AMS 2202 or MAM 2202.

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 performing 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 requirements of this specification.