

**NOTICE OF ADOPTION****ADOPTION NOTICE 1**  
**21 DECEMBER 1993**  
**AMS 4383D**

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Society of Automotive Engineers Inc.  
400 Commonwealth Drive  
Warrendale, PA 15096-0001

Title of Document: AMS 4383D, Sheet and Plate, Magnesium Alloy 2.0Th - 0.78Mn (HM21A-T81)  
Solution Heat Treated, Cold Worked, and Precipitation Heat Treated

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400 Commonwealth Drive, Warrendale, PA 15096-0001

# AEROSPACE MATERIAL SPECIFICATION

**SAE**

**AMS 4383D**

Issued 30 SEP 1966

Revised 1 JAN 1992

Superseding AMS 4383C

Submitted for recognition as an American National Standard

SHEET AND PLATE, MAGNESIUM ALLOY  
2.0Th - 0.78Mn (HM21A-T81)  
Solution Heat Treated, Cold Worked, and Precipitation Heat Treated  
UNS M13210

## 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 700 °F (371 °C), but usage is not limited to such applications.

### 1.3 Precautions:

Alloy 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 alloy, 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.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

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AMS 4383D

SAE

AMS 4383D

## 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:

(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
Thorium	1.5	2.5
Manganese	0.45	1.1
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.

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## 3.2 Condition:

Solution heat treated, cold worked, precipitation heat treated, and pickled.

AMS 4383D

SAE

AMS 4383D

## 3.3 Properties:

Product 0.125 - 0.312 inch (3.18 - 7.92 mm) in nominal thickness and 48 inches (1219 mm) and under in nominal width shall conform to the following requirements. Property requirements for product 48 inches (1219 mm) and under in nominal width and under 0.125 inch (3.18 mm) or over 0.312 inch (7.92 mm) in nominal thickness and for product over 48 inches (1219 mm) in nominal width in all thicknesses shall be as agreed upon by purchaser and vendor:

## 3.3.1 Tensile Properties:

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

TABLE 2A - Minimum Tensile Properties, Inch/Pound Units

Specimen Orientation	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 2 Inches or 4D %
Longitudinal	34.0	25.0	4
Long-Transverse	34.0	22.0	4

TABLE 2B - Minimum Tensile Properties, SI Units

Specimen Orientation	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 50.8 mm or 4D %
Longitudinal	234	172	4
Long-Transverse	224	152	4

3.3.1.2 At 600 °F (316 °C): Tensile strength shall be not lower than 15.0 ksi (103 MPa), determined in accordance with ASTM E 21 on specimens in both the longitudinal and long-transverse directions heated to 600 °F  $\pm$  5 (316 °C  $\pm$  3), held at heat for 10 to 20 minutes before testing, and tested at 600 °F  $\pm$  5 (316 °C  $\pm$  3) at a rate not greater than 0.05 inch/inch per minute (0.05 mm/mm per minute) through the 0.2% offset and at a rate of 0.11 - 0.14 inch/inch per minute (0.11 - 0.14 mm/mm per minute) above the 0.2% offset.

3.3.2 Compressive Properties: Compressive yield strength at 0.2% offset in both the longitudinal and long-transverse directions shall be not lower than 20.0 ksi (138 MPa), determined in accordance with ASTM E 9.

AMS 4383D

SAE

AMS 4383D

### 3.4 Quality:

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The product, as received by purchaser, shall be uniform in quality and condition, sound, and free 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:

(R)

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.

### 4.2 Classification of Tests:

Tests for all technical requirements are acceptance tests and shall be performed on each lot.

### 4.3 Sampling and Testing:

(R)

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 other technical requirements. The report shall include the purchase order number, lot number, AMS 4383D, size, and quantity.

### 4.5 Resampling and Retesting:

Shall be in accordance with AMS 2355 or MAM 2355.

## 5. PREPARATION FOR DELIVERY:

### 5.1 Identification:

(R)

Shall be in accordance with AMS 2811.

### 5.2 Protective Treatment:

The product shall be oiled, prior to shipment, with a light corrosion-inhibiting oil and shall be further protected, during shipment and storage, by interleaving with suitable paper sheets.