

AEROSPACE MATERIAL SPECIFICATIONS

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

AMS 4390D

Superseding AMS 4390C

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MAGNESIUM ALLOY SHEET AND PLATE 2.0Th - 0.80Mn (HM21A-T8)

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **APPLICATION:** Primarily for components requiring weldability and good strength-to-weight ratio up to 700 F (371 C).
3. **COMPOSITION:**

	min	max
Thorium	1.5	- 2.5
Manganese	0.45	- 1.1
Other Impurities, each	--	0.10
Other Impurities, total	--	0.30
Magnesium	remainder	

4. **CONDITION:**

- 4.1 **Material 0.500 In. and Under in Thickness:** Solution heat treated, cold worked, precipitation heat treated, and pickled.
- 4.2 **Material Over 0.500 In. Thick:** Solution heat treated, cold worked, and precipitation heat treated.

5. **TECHNICAL REQUIREMENTS:** The product shall conform to the following requirements; tensile properties shall be determined in accordance with the latest issue of AMS 2355.

5.1 **Longitudinal and Long Transverse Tensile Properties:**

Ø	Nominal Thickness Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 6,500,000)		Elongation % in 2 in. or 4D, min
			Extension Under Load		
			psi, min	in. in 2 in.	
	0.016 to 0.250, incl	33,000	18,000	0.0095	6
Over	0.250 to 0.500, incl	32,000	21,000	0.0105	6
Over	0.500 to 3.000, incl	30,000	21,000	0.0105	6

- 5.1.1 When a dispute occurs between purchaser and vendor over the yield strength values, yield strength determined by the offset method shall apply.
- 5.1.2 If sizes other than those shown are ordered, tensile property requirements shall be as agreed upon by purchaser and vendor.

Section 8.3 of the SAE Technical Board rules provides that: "All technical rules, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

- 5.2 Longitudinal and Long Transverse Compressive Properties: Material shall be capable of meeting the following requirements. Testing shall be in accordance with the issue of ASTM E9 specified in the latest issue of AMS 2350.

Nominal Thickness Inches	Yield Strength at 0.2% Offset psi, min
0.063 to 0.250, incl	15,000
Over 0.250 to 0.500, incl	20,000
Over 0.500 to 1.000, incl	17,000
Over 1.000 to 2.000, incl	15,000
Over 2.000 to 3.000, incl	14,000

- 5.2.1 If sizes other than those shown are ordered, compressive properties shall be as agreed upon by purchaser and vendor.

- 5.3 Longitudinal and Long Transverse Tensile Properties at 600 F (315.6 C): Material 0.016 to 0.250 in., excl, in thickness shall be capable of meeting the following requirements. Specimens shall be heated to $600\text{ F} \pm 5$ ($315.6\text{ C} \pm 2.8$), held at heat for 10 min. before testing, and tested at $600\text{ F} \pm 5$ ($315.6\text{ C} \pm 2.8$) at a rate not greater than 0.05 in. per in. per min. through the 0.2% offset and at a rate of 0.11 - 0.14 in. per in. per min. above the 0.2% offset.

Tensile Strength, psi	11,000 min
Elongation, % in 2 in.	8 min

6. QUALITY: Material shall be uniform in quality and condition, clean, sound, and free from segregation and foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to all applicable requirements of latest issue of AMS 2202.

8. REPORTS:

- 8.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report stating that the product conforms to the chemical composition and technical requirements of this specification. This report shall include the purchase order number, material specification number, thickness, size, and quantity.
- 8.2 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.
9. IDENTIFICATION: Unless otherwise specified, each sheet and plate shall be marked on one face, in the respective location indicated below. Symbols shall be applied using a suitable marking fluid and shall be sufficiently stable to withstand normal handling.

- 9.1 Flat Sheet and Plate 0.375 In. and Under Thick, 6 - 60 In., Incl, Wide, and 36 - 200 In., Incl, Long: Shall be marked in rows of symbols not less than 3/8 in. in height and recurring at intervals not greater than 3 feet. Rows shall run parallel to the direction of rolling of the piece and shall be spaced approximately 6 in. on centers across the width. Every third row shall show the manufacturer's identification and nominal thickness in inches. The other rows shall show the alloy number and temper, and AMS 4390, and shall be staggered.
- 9.2 Flat Sheet and Plate Over 0.375 In. Thick, or Over 60 In. Wide, or Over 200 In. Long: Shall be marked as in 9.1 above or, at vendor's discretion, shall be marked in one or two rows of symbols not less than 3/8 in. in height and running around the periphery of the piece. If one row is used, it shall show the alloy number and temper, AMS 4390, manufacturer's identification, and nominal thickness in inches. If two rows are used, one row shall show the alloy number and temper, and AMS 4390; the second row shall show the manufacturer's identification and nominal thickness in inches.
- 9.2.1 If peripheral marking is applied to the full piece as produced but partial sheets or plates are supplied, an arrow shall also be applied near one corner indicating the direction of rolling.
- 9.3 Circles: Shall be marked with the alloy number and temper, AMS 4390, manufacturer's identification, and nominal thickness in inches, when the circle diameter is 24 in. or more. Circles less than 24 in. in diameter shall be identified as agreed upon by purchaser and vendor.
10. PROTECTIVE TREATMENT: Unless otherwise specified, material shall be oiled with a light corrosion-inhibiting oil. Material shall be protected during shipment and storage by interleaving with suitable paper sheets.
11. REJECTIONS: Material not conforming to this specification or to authorized modifications will be subject to rejection.

Note. Material covered by this specification is radioactive. All applicable rules and regulations, including those of the Atomic Energy Commission, pertaining to handling of radioactive material and all licensing provisions for use of such material should be observed.