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

AMS 4385D

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# MAGNESIUM ALLOY SHEET AND PLATE
## 3.2Th - 0.70Zr (HK31A-H24)



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 550 F (288 C).

3. COMPOSITION:

| | min | max |
|---|---|---|
| Thorium | 2.5 | 4.0 |
| Zirconium | 0.45 | 1.0 |
| Other Impurities, each | -- | 0.15 |
| Other Impurities, total | -- | 0.30 |
| Magnesium | remainder | |

4. CONDITION:

4.1 Material 0.500 In. and Under in Thickness: Cold rolled, partially annealed (-H24), and pickled.

4.2 Material Over 0.500 In. Thick: Cold rolled and partially annealed (-H24).

5. TECHNICAL REQUIREMENTS: When ASTM methods are specified for determining conformance to the following requirements, tests shall be conducted in accordance with the issue of the ASTM method listed in the latest issue of AMS 2350.

5.1 Tensile Properties: Test specimens shall conform to ASTM E8 and shall be taken parallel to the direction of rolling. Sheet type specimens shall be used for material less than 0.500 in. thick and 0.750 in. and over in width. Round specimens shall be used for material 0.500 in. and over in thickness and 0.750 in. and over in width. Material under 0.750 in. wide and under 0.500 in. thick may be tested in either full section or by use of round specimens; for such sizes, elongation requirements apply only when round specimens are used.

| 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 |
|---|---|---|---|---|
| | | psi, min | Extension Under Load in. in 2 in. | |
| 0.016 to 0.125, incl | 34,000 | 26,000 | 0.0120 | 4 |
| Over 0.125 to 0.250, incl | 34,000 | 24,000 | 0.0114 | 4 |
| Over 0.250 to 1.000, incl | 34,000 | 25,000 | 0.0117 | 4 |
| Over 1.000 to 3.000, incl | 33,000 | 25,000 | 0.0117 | 4 |

5.1.1 When a dispute occurs between purchaser and vendor over the yield strength value, 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.

5.2 Compressive Properties: Material shall be capable of meeting the following requirements. Specimens shall be tested in the longitudinal direction in accordance with ASTM E9.

| Nominal Thickness Inches | Yield Strength at 0.2% Offset psi, min |
|---|---|
| 0.063 to 0.125, incl | 20,000 |
| Over 0.125 to 0.250, incl | 22,000 |
| Over 0.250 to 1.000, incl | 20,000 |
| Over 1.000 to 3.000, incl | 17,000 |

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

5.3 Tensile Properties at 600 F (315.6 C): Material 0.016 to 0.250 in., excl, thick shall be capable of meeting the following requirements. Test specimens shall conform to ASTM E8 and shall be taken parallel to the direction of rolling. Sheet type specimens shall be used. Material under 0.750 in. wide is tested in full section, in which case elongation is not determined. Unless otherwise specified, tensile test specimens shall be heated to 600 F ± 5 (315.6 C ± 2.8), held at 600 F ± 5 (315.6 C ± 2.8) for 10 min. before testing, and tested at 600 F ± 5 (315.6 C ± 2.8) at a rate not greater than 0.05 in. per in. per min. up to the yield strength and at a rate of 0.11 - 0.14 in. per in. per min. above the yield strength.

| | |
|---|---|
| Tensile Strength, psi | 10,000 min |
| Elongation, %.in 2 in. | 20 min |

6. QUALITY: Material shall be uniform in quality and condition, clean, sound, smooth, 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 the 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, or AMS 4385, 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 perimeter of the piece. If one row is used, it shall show the alloy number and temper, or AMS 4385, manufacturer's identification, and nominal thickness in inches. If two rows are used, one row shall show the alloy number and temper, or AMS 4385; the second row shall show the manufacturer's identification and nominal thickness in inches.

9.2.1 If perimetral 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 Ø Circles: Shall be marked with the alloy number and temper, or AMS 4385, 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. SIMILAR SPECIFICATIONS: (a) This specification exceeds the minimum requirements of MIL-M-26075B, Temper H24, dated 13 June 1961.

(b) MIL-M-26075 is listed for information only and shall not be construed as an acceptable alternate unless all requirements of this AMS are met.

Note. Ø 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.