

# AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.  
29 West 39th Street  
New York City

## AMS 4376

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Revised

### MAGNESIUM ALLOY SHEET AND PLATE AZ31x (Hard)

- 1. ACKNOWLEDGMENT:** A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
- 2. APPLICATION:** Primarily for parts requiring rigidity, moderate strength and low density. Special care is necessary to prevent corrosion.

**3. COMPOSITION:**

|                         |           |
|-------------------------|-----------|
| Aluminum                | 2.5 - 3.5 |
| Zinc                    | 0.6 - 1.4 |
| Manganese               | 0.20 min  |
| Silicon                 | 0.30 max  |
| Calcium                 | 0.16 max  |
| Copper                  | 0.05 max  |
| Nickel                  | 0.005 max |
| Iron                    | 0.005 max |
| Other Impurities, total | 0.30 max  |
| Magnesium               | Remainder |

- 4. CONDITION:** Hard rolled.

**5. TECHNICAL REQUIREMENTS:**

- 5.1 Tensile Properties:** Sheet and plate shall conform to the following requirements. Test specimens shall conform to ASTM E8 except from sheet less than 3/4 inch wide, and shall be cut parallel to the direction of rolling. Elongation requirements apply only to sheet 3/4 inch and over in width.

| Nominal Thickness<br>Inches | Tensile<br>Strength<br>psi, min | Yield Strength at 0.2% Offset<br>or at extension indicated |                                       | Elongation<br>% in 2 in.<br>min |
|-----------------------------|---------------------------------|--|---------------------------------------|---------------------------------|
|                             |                                 | psi, min   | Extension Under Load<br>inch in 2 in. |                                 |
| 0.250 and under             | 39,000                          | 29,000   | 0.0130                                | 4                               |
| Over 0.250 - 0.500, incl    | 35,000                          | 25,500   | 0.0118                                | 6                               |
| Over 0.500 - 0.750, incl    | 35,000                          | 24,500   | 0.0116                                | 8                               |
| Over 0.750 - 1.000, incl    | 33,500                          | 22,500   | 0.0110                                | 8                               |
| Over 1.000 - 1.500, incl    | 31,500                          | 21,500   | 0.0106                                | 8                               |
| Over 1.500 - 2.000, incl    | 30,500                          | 19,500   | 0.0100                                | 8                               |

5.2 Compressive Properties: Sheet and plate shall conform to the following compressive properties. Test specimens shall be tested in the longitudinal direction in a suitable jig.

| <u>Nominal<br/>Thickness<br/>Inches</u> | <u>Yield Strength<br/>at 0.2% offset<br/>psi, min</u> |
|---|---|
| 0.020 - 0.064, incl                     | 25,000  |
| Over 0.064 - 0.250, incl                | 24,000  |
| Over 0.250 - 0.375, incl                | 21,000  |
| Over 0.375 - 0.438, incl                | 19,000  |
| Over 0.438 - 0.500, incl                | 18,000  |
| Over 0.500 - 0.750, incl                | 17,000  |
| Over 0.750 - 1.000, incl                | 15,500  |
| Over 1.000 - 1.500, incl                | 14,500  |
| Over 1.500 - 2.000, incl                | 13,500  |

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

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2212 as applicable.

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 meets the 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 with the manufacturer's identification, and, in addition, the alloy name or number and temper, or AMS 4376, and nominal thickness in inches. The characters shall be not less than 3/8 in. in height, shall be applied using a suitable marking fluid, and shall not be obliterated by normal handling or heat treatment.

9.1 Flat Sheet: Shall be marked in rows of recurring characters from one edge to the opposite edge with rows spaced such that no piece larger than 8 in. square could be cut from the sheet without bearing the alloy identification. The manufacturer's identification and thickness shall be marked in rows not more than 20 in. apart.