SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

AMS 7913B

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Superseding AMS 7913A

Aluminum-Beryllium Alloy, Sheet and Plate
38Al - 62Be

RATIONALE

AMS 7913B is a Five Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers an aluminum-beryllium alloy in the form of sheet and plate consolidated from powder by extrusion and then rolled.

1.2 Application

These products have been used typically for parts requiring high thermal conductivity, low density, and high modulus of elasticity, but usage is not limited to such applications.

1.3 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 that 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.

1.3.1 WARNING

Beryllium Alloy: Inhaling dust or fumes may cause chronic beryllium disease, a serious chronic lung disease, in some individuals. Cancer hazard. Over time, lung disease and cancer can be fatal. Target organ is primarily the lung.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS 2806 Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Heat and Corrosion Resistant Steels and Alloys

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B 311 Density Determination for Powder Metallurgy (P/M) Materials Containing Less Than Two Percent Porosity
ASTM E 8 Tension Testing of Metallic Materials

2.3 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036, Tel: 212-642-4900, www.ansi.org.

ANSI H35.2 Dimensional Tolerances for Aluminum Mill Products

2.4 ASME Publications

American Society of Mechanical Engineers, 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900, Tel: 973-882-1170, www.asme.org.

ASME B46.1 Surface Texture
ASME Y14.5M Dimensioning and Tolerancing

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1; beryllium shall be determined by wet analysis (titration) or optical emission spectroscopy, oxygen by inert gas fusion, and other elements by spectrochemical methods or by other analytical methods acceptable to purchaser.

TABLE 1 - COMPOSITION

Element	min	max
Aluminum (3.1.1)	36.0	40.0
Beryllium	60.0	64.0
Oxygen	--	1.0
Carbon (3.1.2)	--	0.1
Other Elements, each (3.1.2)	--	0.2

3.1.1 Aluminum content by difference.

3.1.2 Determination is not required for routine analysis.

3.2 Condition

Hot rolled, stress relieved, and ground.

3.2.1 Surface Finish

The product shall be furnished with an as-ground surface. The standard surface finish shall be no greater than 125 microinches Ra (3.2 microns), determined in accordance with ASME B46.1.

3.3 Heat Treatment

Product shall be stress relieved by heating to 1100 °F ± 45 (593 °C ± 25), holding at heat for 24 hours ± 2, and cooling to room temperature.

3.4 Properties

The product shall conform to the following requirements:

3.4.1 Tensile Properties

In-plane transverse and longitudinal tensile properties for product up to and including 0.250 inch (6.35 mm) thick shall be as shown in Table 2, determined in accordance with ASTM E 8.

TABLE 2 - MINIMUM IN-PLANE TENSILE PROPERTIES

Property	Value
Tensile Strength	56.0 ksi (386 MPa)
2% Offset Yield Strength	40.0 ksi (276 MPa)
Elongation	5.0%

3.4.1.1 Properties for plate shall be as agreed upon between purchaser and vendor.

3.4.2 Density

Starting stock for rolling shall be within the range 2.071 to 2.122 grams per cubic centimeter (0.0748 to 0.0767 pound per cubic inch), determined using a water displacement method in accordance with ASTM B 311.

3.5 Quality

The product, as received by purchaser, shall be uniform in quality and condition and shall be free from imperfections detrimental to usage.

3.6 Tolerances

Shall conform to the following dimensional tolerances in accordance with ASME Y14.5M, unless otherwise specified by agreement between purchaser and supplier.

3.6.1 Width and/or Length

Shall be as shown in Table 3.

TABLE 3A - WIDTH AND/OR LENGTH TOLERANCES, INCH/POUND UNITS

Width and/or Length Inches	Tolerances Inch
Up to 20, incl	+0.125, -0
Over 20	+0.250, -0

TABLE 3B - WIDTH AND/OR LENGTH TOLERANCES, SI UNITS

Width and/or Length mm	Tolerances mm
Up to 508, incl	+3.175, -0
Over 508	+6.350, -0

3.6.2 Thickness Tolerances

SHALL BE AS SHOWN IN TABLE 4.

TABLE 4A - Thickness Tolerances, Inch/Pound Units

Thickness, Inch	Tolerances, Inch
0.020 to 0.025, incl	±0.003
Over 0.025 to 0.034, incl	±0.004
Over 0.034 to 0.056, incl	±0.005
Over 0.056	±0.006

TABLE 4B - THICKNESS TOLERANCES, SI UNITS

Thickness, mm	Tolerances, mm
0.508 to 0.635, incl	±0.076
Over 0.635 to 0.864, incl	±0.102
Over 0.864 to 1.422, incl	±0.127
Over 1.422	±0.152

3.6.2.1 Thickness measurements on any plate 1.0 inch (25 mm) and over in width shall not be conducted within 0.250 inch (6.35 mm) from any edge. There shall be no restriction of thickness measurement location for sheet or plate under 1.0 inch (25.4 mm) wide.

3.6.3 Flatness

Shall be as shown in Table 5, determined at room temperature in accordance with methods described in ANSI H35.2 . Measurements will not be made within 0.250 inch (6.35 mm) from any edge on components under 12 × 12 inches (305 × 305 mm).

TABLE 5A - FLATNESS TOLERANCES, INCH/POUND UNITS

	Tolerances Ranges of Distance from Center to Center of Buckles or Edgewaves	Tolerances Ranges of Distance from Center to Center of Buckles or Edgewaves	Tolerances Ranges of Distance from Center to Center of Buckles or Edgewaves	Tolerances Ranges of Distance from Center to Center of Buckles or Edgewaves	Tolerances Ranges of Distance from Center to Center of Buckles or Edgewaves
Specified Thickness	Up to 2 feet, inclusive	Over 2 to 3 feet, inclusive	Over 3 to 4 feet, inclusive	Over 4 to 6 feet, inclusive	Over 6 feet
0.020 to 0.064 inch, inclusive	0.1875 inch	0.1875 inch	0.3125 inch	0.375 inch	0.500 inch
Over 0.064 to 0.250 inch, inclusive	0.1875 inch	0.3125 inch	0.375 inch	0.500 inch	0.5625 inch
Over 0.250 inch	0.250 inch in any 6 feet or less	0.250 inch in any 6 feet or less	0.250 inch in any 6 feet or less	0.250 inch in any 6 feet or less	0.250 inch in any 6 feet or less

TABLE 5B - FLATNESS TOLERANCES, SI UNITS

	Tolerances Ranges of Distance from Center to Center of Buckles or Edgewaves	Tolerances Ranges of Distance from Center to Center of Buckles or Edgewaves	Tolerances Ranges of Distance from Center to Center of Buckles or Edgewaves	Tolerances Ranges of Distance from Center to Center of Buckles or Edgewaves	Tolerances Ranges of Distance from Center to Center of Buckles or Edgewaves
Specified Thickness	Up to 0.61 m, inclusive	Over 0.61 to 0.91 m, inclusive	Over 0.91 to 1.22 m, inclusive	Over 1.22 to 1.83 m, inclusive	Over 1.83 m
0.508 to 1.626 mm, inclusive	4.76 mm	4.76 mm	7.94 mm	9.53 mm	12.70 mm
Over 1.626 to 6.35 mm, inclusive	4.76 mm	7.94 mm	9.53 mm	12.70 mm	14.29 mm
Over 6.35 mm	6.35 mm in any 1.83 m or less	6.35 mm in any 1.83 m or less	6.35 mm in any 1.83 m or less	6.35 mm in any 1.83 m or less	6.35 mm in any 1.83 m or less

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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements.

4.2 Classification of Tests

All technical requirements are acceptance tests and shall be performed on each lot.

4.3 Sampling and Testing

Shall be in accordance with the following: a lot shall be all sheet or plate manufactured from a specific powder blend and rolling session in the same condition. Mechanical properties may be determined from a sample shape (component) or from material produced as an integral part of a shape (component) from the lot.

4.3.1 Composition

One or more samples from each powder blend. Chemical analysis shall be performed on a powder blend basis.

4.3.2 Tensile Properties

One or more sheet tensile specimens from each lot at any location.

4.3.3 Dimensions

Each part, unless a sampling plan has been agreed upon by purchaser and vendor.

4.4 Reports

The vendor of the product shall furnish with each shipment a report showing the results of tests for composition and tensile properties of each lot and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, lot number, powder blend number, AMS 7913B, serial numbers, and quantity.