SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

AMS 7912B

Issued MAY 1996
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Superseding AMS 7912A

Aluminum-Beryllium Alloy, Extrusions
38Al - 62Be
Annealed

RATIONALE

AMS 7912B 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 bars, rods, tubing, and shapes consolidated from powder by extrusion.

1.2 Application

These extrusions 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 Steel and Corrosion and Heat-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 MPIF Publications

Available from Metal Powder Industries Federation, 105 College Road East, Princeton, NJ 08540-6692, Tel: 609-452-7700, www.mpif.org.

MPIF Standard 01 Method for Sampling Finished Lots of Metal Powders

2.4 ASME Publications

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

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 other analytical methods acceptable to purchaser.

TABLE 1 - COMPOSITION

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

3.1.1 Aluminum reported as balance

3.1.2 Determination is not required for routine analysis.

3.2 Condition

As extruded and annealed.

3.3 Heat Treatment

Product shall be annealed 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

Shall be as shown in Table 2, determined in accordance with ASTM E 8.

TABLE 2 - MINIMUM TENSILE PROPERTIES

Property	Value Longitudinal	Value Transverse
Tensile Strength	58.0 ksi (400 MPa)	50.0 ksi (345 MPa)
Yield Strength, 0.2% Offset	40.0 ksi (276 MPa)	40.0 ksi (276 MPa)
Elongation in 1 inch (25.4 mm)	7%	2%

3.4.1.1 Transverse properties apply only to product from which specimens not less than 2.50 inches (63.5 mm) in length can be obtained.

3.4.2 Density

Shall be within the range 2.071 to 2.122 g/cm^3 (0.0748 to 0.0767 lb/in^3), determined using a water displacement method in accordance with ASTM B 311.

3.5 Quality

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

3.6 Tolerances

Shall conform to the following in accordance with ASME Y14.5M:

3.6.1 Diameter, Width, or Thickness

Shall be as shown in Table 3:

TABLE 3A - DIMENSIONAL TOLERANCES, INCH/POUND UNITS

Diameter, Width, or Thickness Inches	Tolerance Inch Plus Only
0.150 to 3, incl	0.125
Over 3	0.250

TABLE 3B - DIMENSIONAL TOLERANCES, SI UNITS

Diameter, Width, or Thickness Millimeters	Tolerance Millimeters Plus Only
3.81 to 76.2, incl	3.18
Over 76.2	6.35

3.6.2 Length

Shall be as shown in Table 4.

TABLE 4A - DIMENSIONAL TOLERANCES, INCH/POUND UNITS

Length, Inches	Tolerance Inch Plus Only
Up to 20, incl	0.125
Over 20	0.250

TABLE 4B - DIMENSIONAL TOLERANCES, SI UNITS

Length, Millimeters	Tolerance Millimeters Plus Only
Up to 508, incl	3.18
Over 508	6.35

3.6.3 Straightness

Straightness of extruded bar shall be ±0.125 inch per foot (±10.42 mm/m).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The supplier of the product shall supply all samples for supplier'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 powder blend or lot as applicable.

4.3 Sampling and Testing

Shall be in accordance with the following; a lot shall be all extrusions fabricated from the same powder blend and each combination of extrusion session, reduction ratio, and annealing heat treatment.

4.3.1 Composition

One or more samples from each powder blend. Chemical analysis shall be performed on a powder blend of representative powder sample(s) obtained in accordance with MPIF 01 or other procedure acceptable to purchaser.

4.3.2 Tensile Properties

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

4.3.3 Density

One specimen from each lot.

4.3.4 Tolerances

Each extrusion (See 8.2), unless a sampling plan has been agreed upon by purchaser and supplier.