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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 7911A

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Superseding AMS 7911

Aluminum Beryllium, Preforms
Hot Isostatic Pressed
38Al - 62Be

1. SCOPE:

1.1 Form:

This specification covers aluminum and beryllium powders consolidated by hot isostatic pressing (HIP) into the form of bar, rod, tubing, and shapes. (See 8.3.)

1.2 Application:

These preforms 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 which 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: Inhalation of dust or fumes may cause serious chronic lung disease. Potential cancer hazard based principally on animal tests.

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 canceled and no superseding document has been specified, the last published issue of that document shall apply.

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2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

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

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 311 Density of Cemented Carbides
ASTM E 8 Tension Testing of Metallic Materials
ASTM E 8M Tension Testing of Metallic Materials (Metric)

2.3 ANSI Publications:

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ANSI B46.1 Surface Texture
ANSI 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), 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 Metallics, each (3.1.2)	--	0.2

3.1.1 Aluminum content by difference.

3.1.2 Not required for routine analysis.

3.2 Condition:

Hot isostatically pressed (HIP) with subsequent stress relief heat treatment (See 8.4).

3.2.1 Surface Finish: The product shall be furnished with a machined surface. The standard surface finish shall be no greater than 110 Ra (3.2 µm), determined in accordance with ANSI B46.1.

3.3 Properties:

The product shall conform to the following requirements.

3.3.1 Tensile Properties: Shall be as shown in Table 2, determined at room temperature in accordance with ASTM E 8 or ASTM E 8M.

TABLE 2 - Minimum Tensile Properties

Property	Value
Tensile Strength	38.0 ksi (262 MPa)
Yield Strength at 0.2% Offset	28.0 ksi (193 MPa)
Elongation in 1 inch (25.4 mm)	2%

3.3.2 Density: Shall be within the range of 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 except that measurement shall be made on the product, not on a sample. Density shall be determined after complete heat treatment.

3.4 Quality:

Preforms, as received by purchaser, shall be uniform in quality and condition and shall be free from imperfections detrimental to usage of the preforms.

3.4.1 The product shal be free from cracks, determined visually, and, when applicable, by fluorescent penetrant inspection as in 3.4.1.1.

3.4.1.1 Fluorescent penetrant inspection shall be performed, when agreed upon between purchaser and vendor, in accordance with ASTM E 1417, Type 1, Level 2.

3.5 Tolerances:

Shall conform to the dimensional tolerances shown in Table 3 in accordance with ANSI Y14.5M.

TABLE 3A - Dimensional Tolerances, Inch/Pound Units

Dimension	Inches	Tolerance Inch plus only
Diameter, Width, or Thickness	0.15 to 3, incl	0.015
Diameter, Width, or Thickness	Over 3 to 20, incl	0.062
Diameter, Width, or Thickness	Over 20	0.250
Length	Up to 20, incl	0.125
Length	Over 20	0.250

TABLE 3B - Dimensional Tolerances, SI Units

Dimension	Millimeters	Tolerance Millimeters plus only
Diameter, Width, or Thickness	3.8 to 76, incl	0.38
Diameter, Width, or Thickness	Over 76 to 508, incl	1.57
Diameter, Width, or Thickness	Over 508	6.35
Length	Up to 508, incl	3.18
Length	Over 508	6.35

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 consist of all preforms manufactured from a single powder blend and HIP cycle and stress relief load in the same condition. Mechanical properties may be determined from a sample shape (component) or from material produced as an integral part (prolongation) of a shape (component) from the lot.