



AEROSPACE MATERIAL SPECIFICATION

AMS7908™

REV. F

Issued 1991-10
Revised 2025-07

Superseding AMS7908E

Beryllium Near-Net Preforms,
Standard Grade,
Hot Isostatic Pressed

RATIONALE

AMS7908F results from a Five-Year Review and update of this specification with changes to prohibit unauthorized exceptions (see 3.6, 4.4.1, 5.1.1, and 8.4), relocate Definitions (see 2.4), update Applicable Documents (see Section 2, 2.4, and 3.4.1), Surface Finish (see 3.2.1), Average Grain Size (see 3.3.2), and Radiographic Inspection (see 3.4.2), and allow the use of the immediate prior specification revision (see 8.3).

1. SCOPE

1.1 Form

This specification covers beryllium in the form of bar, rod, tubing, and shapes fabricated from beryllium powder consolidated by hot isostatic pressing (HIP) (see 8.5).

1.2 Application

This product has been used typically for parts requiring high strength-to-weight ratio 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

Inhaling dust or fumes containing beryllium may cause chronic beryllium disease, a serious chronic lung disease, in some individuals. Over time, lung disease can be fatal. Read the product specific Safety Data Sheet (SDS) for additional environmental, health, and safety information before working with beryllium or beryllium-containing materials.

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.

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Documents

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2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2806 Identification, Bars, Wire, Mechanical Tubing, and Extrusions, Carbon and Alloy Steels and Corrosion and Heat-Resistant Steels and Alloys

AS7766 Terms Used in Aerospace Metals Specifications

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 B311 Density of Powder Metallurgy (PM) Materials Containing Less Than Two Percent Porosity

ASTM E8/E8M Tension Testing of Metallic Materials

ASTM E112 Determining Average Grain Size

ASTM E1417/E1417M Liquid Penetrant Testing

ASTM E1742/E1742M Radiographic Examination

2.3 ASME Publications

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), www.asme.org.

ASME B46.1 Surface Texture

ASME Y14.5M Dimensioning and Tolerancing

2.4 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1. Beryllium oxide shall be determined by gas fusion; aluminum, iron, magnesium, silicon, and other elements by spectrochemical methods; and carbon by combustion. Beryllium shall be determined by difference. In case of disputes between analyses by different spectrochemical methods, emission spectroscopy shall govern.

Table 1 - Composition

Element	Min	Max
Beryllium Oxide	--	1.5
Carbon	--	0.15
Iron	--	0.13
Aluminum	--	0.10
Magnesium	--	0.08
Silicon	--	0.06
Other Elements, each (see 3.1.1)	--	0.04
Beryllium	98.5	--



Documents

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3.1.1 Determination is not required for routine acceptance of each lot.

3.2 Condition

Hot isostatically pressed (HIP) with secondary options of heat treatment and/or stress relief after hot isostatic pressing.

3.2.1 Surface Finish

If surface finish is not specified, the material shall be furnished with an as-sawed, as-HIP'ed, and/or machined surface. Machined surfaces shall have surface finish no greater than 125 microinches (3.2 µm), determined in accordance with ASME 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 E8/E8M with the rate of strain set at 0.005 in/in/min (0.005 mm/mm/min) and maintained within a tolerance of ±0.002 in/in/min (±0.002 mm/mm/min) through the 0.2% offset yield strain and may be increased thereafter to 0.05 in/in/min (0.05 mm/mm/min).

Table 2 - Minimum tensile properties

Property	Value
Tensile Strength	60 ksi (414 MPa)
Yield Strength at 0.2% Offset	43.0 ksi (296 MPa)
Elongation in 4D	3%

3.3.2 Average Grain Size

The average grain size shall be determined in accordance with ASTM E112. The mean intercept length shall be no larger than 20 µm.

3.4 Quality

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

3.4.1 Density

Shall be at least 99.0% of theoretical density, determined by the water displacement method in accordance with ASTM B311. The accuracy of density determination shall be to the second decimal or better.

3.4.1.1 The theoretical density shall be calculated using Equation 1.

$$\text{Theoretical Density (gm/cm}^3\text{)} = \frac{100}{\frac{100 - \% \text{BeO}}{1.8477 \text{ gm/cm}^3} + \frac{\% \text{BeO}}{3.009 \text{ gm/cm}^3}} \quad (\text{Eq. 1})$$

3.4.1.2 Thermally Induced Porosity (TIP) Resistance

3.4.1.2.1 Sample product shall be subjected to a TIP test consisting of a heat treatment in inert atmosphere or under vacuum at 1450 °F (788 °C) for 1 hour.