

AEROSPACE MATERIAL SPECIFICATION



AMS 7912A

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Superseding AMS 7912

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

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 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 Corrosion and Heat Resistant Steels and Alloys

2.2 ASTM Publications:

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

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

ASTM E 8M Tension Testing of Metallic Materials (Metric)

2.3 MPIF Publications:

Available from Metal Powder Industries Federation, 105 College Road East, Princeton, NJ 08540.

MPIF Standard 01 Method for Sampling Finished Lots of Metal Powders

2.4 ANSI Publications:

Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

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 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	--	0.1
Residual Metallic Impurities, each (3.1.2)	--	0.2

3.1.1 Aluminum may be reported as the difference between the other named elements and 100%, or as the result of direct analysis.

3.1.2 Determination 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 or ASTM E 8M.

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/cm³ (0.0748 to 0.0767 lb/in³), 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 ANSI 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
3 and Over	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
76.2 and Over	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.