SAE The Engineering Resource For Advancing Mobility

400 COMMONWEALTH DRIVE WARRENDALE PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4630F

Issued 1-22-40
Revised 1-1-83

ALUMINUM BRONZE BARS, RODS, TUBING, AND FORGINGS
90Cu - 8.5Al
Soft

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of 1-1-83. It is recommended that this specification not be specified for new designs. Copper Development Association has advised that Alloy No. 617 is no longer in production.

This cover sheet should be attached to the "F" revision of the subject specification.

::

This specification is under the jurisdiction of AMS Committee "C", NOMETCOM.

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 4630F
Superseding AMS 4630E
Issued 1-22-40
Revised 7-15-78

ALUMINUM BRONZE BARS, RODS, TUBING, AND FORGINGS
90Cu - 8.5Al
Soft

1. SCOPE:

1.1 Form: This specification covers one type of aluminum bronze in the form of bars, rods, tubing, forgings, and forging stock.

1.2 Application: Primarily for parts, such as bushings, requiring strength and corrosion resistance at moderate temperatures.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2221 - Tolerances, Copper and Copper Alloy Rods and Bars
AMS 2223 - Tolerances, Copper and Copper Alloy Seamless Tubing
AMS 2350 - Standards and Test Methods
AMS 2808 - Identification, Forgings

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM B154 - Mercurous Nitrate Test for Copper and Copper Alloys
ASTM B249 - General Requirements for Wrought Copper and Copper-Alloy Rod, Bar, and Shapes
ASTM B251 - General Requirements for Wrought Seamless Copper and Copper-Alloy Tube
ASTM E8 - Tension Testing of Metallic Materials
ASTM E10 - Brinell Hardness of Metallic Materials
ASTM E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
ASTM E478 - Chemical Analysis of Copper-Base Alloys

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Specifications:

MIL-C-3993 - Copper and Copper-Base Alloy Mill Products, Packaging of

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E478, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other approved analytical methods:

	min	max
Copper	87.0	--
Aluminum	7.0	10.0
Iron	--	1.5
Other Additions including Nickel, Tin, and Manganese	--	2.0
Total Named Elements	99.5	--

3.2 Condition: The product shall be supplied in the following condition:

3.2.1 Bars, Rods, and Tubing: Hot rolled or drawn, or extruded, cold finished if necessary, and stress relieved, soft temper.

3.2.2 Forgings: Stress relieved.

3.2.3 Forging Stock: As ordered by the forging manufacturer.

3.3 Properties: The product shall conform to the following requirements:

3.3.1 Tensile Properties: Shall be as specified in Table I and Table II, determined in accordance with ASTM E8.

3.3.1.1 Bars and Rods:

3.3.1.1.1 Rounds:

TABLE I

Nominal Diameter Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset psi, min	Elongation in 4D %, min
Up to 0.50, incl	80,000	40,000	15
Over 0.50 to 1.00, incl	75,000	37,000	15
Over 1.00	72,000	33,000	15

TABLE I (SI)

Nominal Diameter Millimetres	Tensile Strength MPa, min	Yield Strength at 0.2% Offset MPa, min	Elongation in 4D %, min
Up to 12.7, incl	552	276	15
Over 12.7 to 25.4, incl	517	255	15
Over 25.4	496	228	15

3.3.1.1.2 Hexagons, Squares, and Rectangles:

TABLE II

Nominal Distance Between Parallel Sides Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset psi, min	Elongation in 4D %, min
Up to 1.00 incl	75,000	35,000	15
Over 1.00	72,000	33,000	15

TABLE II (SI)

Nominal Distance Between Parallel Sides Millimetres	Tensile Strength MPa, min	Yield Strength at 0.2% Offset MPa, min	Elongation in 4D %, min
Up to 25.4 incl	517	241	15
Over 25.4	496	228	15

3.3.2 Hardness:

3.3.2.1 Bars and Rods:

3.3.2.1.1 Ø Surface hardness, except on rounds where a flat as necessary for accuracy may be made, should be not lower than 130 HB/10/1000 or equivalent, determined in accordance with ASTM E10.

3.3.2.1.2 Ø Subsurface hardness should be not lower than 80 HRB or equivalent, determined in accordance with ASTM E18 at mid-radius of rounds and quarter-thickness of hexagons, squares, and rectangles.

3.3.2.1.3 The product shall not be rejected on the basis of hardness if the tensile property requirements are met.

3.3.2.2 Tubing and Forgings:

3.3.2.2.1 Ø Surface hardness, except on curved surfaces where a flat as necessary for accuracy may be made, shall be not lower than 130 HB/10/1000 or equivalent, determined in accordance with ASTM E10.

3.3.2.2.2 Ø Subsurface hardness shall be not lower than 80 HRB or equivalent, determined in accordance with ASTM E18 at midwall of tubing or quarter-thickness of forgings.

3.3.3 Embrittlement: Specimens as in 4.3.4 shall withstand, without cracking, immersion in mercurous nitrate solution in accordance with ASTM B154, Procedure A.

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

3.5 Tolerances: Unless otherwise specified, tolerances shall conform to the following as applicable to refractory alloys.

3.5.1 Rods and Bars: AMS 2221.

3.5.2 Tubing: AMS 2223.