AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
29 West 39th Street
New York City

AMS 4640B

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ALUMINUM BRONZE
81.5Cu - 10.3Al - 5.0Ni - 2.8Fe

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

2. FORM: Rods, bars, forgings, and forging stock.

3. APPLICATION: Primarily for parts requiring abrasion resistance, good ductility, and good retention of hardness at moderate temperatures.

4. COMPOSITION:

Copper	78.0 min
Aluminum	9.7 - 10.9
Nickel	4.5 - 5.5
Iron	2.0 - 3.5
Manganese	1.5 max
Zinc	0.30 max
Tin	0.20 max
Total Named Elements	99.8 min

5. CONDITION:

5.1 Rods and Bars: Hot or cold finished, reheated to not lower than 1100 F and cooled in air.

5.2 Forgings: Quenched from a temperature not lower than 1600 F, reheated to not lower than 1100 F and cooled in air.

5.3 Forging Stock: As ordered by the forging manufacturer.

6. TECHNICAL REQUIREMENTS:

6.1 Tensile Properties:

6.1.1 Rods and Bars:

Nominal Diameter or Distance between parallel sides, Inches	Tensile Strength, psi, min	Yield Strength at 0.2% offset or at Extension Indicated Extension Under Load inch in 2 in. psi, min	Elongation, % in 4D, min
1.0 and under	110,000	65,000	0.0114	9
Over 1.0 to 2.0, incl	110,000	60,000	0.0109	9
Over 2.0 to 3.0, incl	105,000	50,000	0.0097	9
Over 3.0 to 5.0, incl	100,000	48,000	0.0095	9

6.1.1.1 Tensile test specimens from rods and bars over 1.5 in. in diameter or distance between parallel sides shall have their axes located approximately midway between center and surface.

6.2 Hardness: Material shall have hardness as follows, or equivalent hardness by other methods; requirements apply from surface to center of material, to determinations made using 3000 kg load:

6.2.1 Rods and Bars:

Nominal Diameter or Distance between parallel sides, Inches	Hardness, Brinell
2.0 and under	201-248
Over 2.0 to 5.0, incl	187-241

6.2.2 Forgings: Brinell 201-248.

6.3 Fracture Test: When material is broken for fracture test, the fracture shall be fine grained. Material shall be sufficiently ductile to show some bending before rupture.

7. QUALITY: Material shall be uniform in quality and condition, clean, sound, smooth, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts.

8. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2221 as applicable. Diameter, thickness and width tolerances shall be as specified below:

8.1 Rounds, Hexagons and Octagons: Table I, Refractory.

8.2 Squares: Table IV.

8.3 Rectangles, Thickness: Table IV.

8.4 Rectangles, Width: Table VII, Refractory.

9. REPORTS:

9.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report showing the results of tests to determine conformance to the requirements of this specification or stating that the chemical composition of the product, tensile properties of rods and bars, and hardness of forgings conform to the requirements specified. This report shall include the purchase order number, material specification number, size, and quantity. If forgings are supplied, the part number and size of stock used to make the forgings shall also be included.