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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 4720E

Issued MAR 1940
Revised MAY 2001
Reaffirmed APR 2006

Superseding AMS 4720D

Wire, Phosphor Bronze
94Cu - 5.0Sn - 0.19P
Cold Drawn, Spring Temper (H08)

(Composition similar to UNS C51000)

1. SCOPE:

1.1 Form:

This specification covers one type of bronze in the form of round wire 0.500 inch (12.70 mm) and under in nominal diameter.

1.2 Application:

This wire has been used typically for springs, but usage is not limited to such applications.

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.

2.1 SAE Publications:

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

AMS 2224 Tolerances, Copper and Copper Alloy Wire
MAM 2224 Tolerances, Metric, Copper and Copper Alloy Wire

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2.2 ASTM Publications:

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

ASTM B 250	General Requirements for Wrought Copper-Alloy Wire
ASTM B 250M	General Requirements for Wrought Copper-Alloy Wire (Metric)
ASTM E 8	Tension Testing of Metallic Materials
ASTM E 8M	Tension Testing of Metallic Materials (Metric)
ASTM E 54	Chemical Analysis of Special Brasses and Bronzes
ASTM E 290	Semi-Guided Bend Test for Ductility of Metallic Materials

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall conform to the percentages by weight, shown in Table 1, determined by wet chemical methods in accordance with ASTM E 54, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element (3.1.1)	min	max
Tin	4.2	5.8
Phosphorus	0.03	0.35
Zinc	--	0.30
Iron	--	0.10
Lead	--	0.05
Copper	99.5	--
Sum of Named Elements (3.1.3)	(See 3.1.2)	--

3.1.1 These composition limits do not preclude the presence of other elements. Limits may be established and analysis required for unnamed elements by agreement between the manufacturer or supplier and purchaser.

3.1.2 Copper may be reported as “remainder”, or as the difference between the sum of results for all elements and 100%, or as the result of direct analysis.

3.1.3 When all named elements in Table 1 are analyzed, the sum shall be 99.5% minimum, but such determination is not required for routine acceptance of each lot.

3.2 Condition:

Cold-drawn, spring (H08) temper (See 8.2).

3.3 Properties:

Wire shall conform to the following requirements:

3.3.1 Tensile Properties: Shall be as specified in Table 2, determined in accordance with ASTM E 8 or ASTM E 8M:

TABLE 2A - Minimum Tensile Properties, Inch/Pound Units

Nominal Diameter Inch	Tensile Strength ksi	Elongation in 2 Inches %
Up to 0.025, incl	145.0	--
Over 0.025 to 0.063, incl	135.0	--
Over 0.063 to 0.125, incl	130.0	--
Over 0.25 to 0.250, incl	125.0	--
Over 0.250 to 0.375, incl	120.0	5
Over 0.375 to 0.500, incl	105.0	9

TABLE 2B - Minimum Tensile Properties, SI Units

Nominal Diameter Millimeters	Tensile Strength MPa	Elongation in 50.8 mm %
Up to 0.64, incl	1000	--
Over 0.64 to 1.60, incl	931	--
Over 1.60 to 3.18, incl	896	--
Over 3.18 to 6.35, incl	862	--
Over 6.35 to 9.52, incl	827	5
Over 9.52 to 12.70, incl	724	9

3.3.2 Bending: Wire 0.250 inch (6.35 mm) and under in nominal diameter shall withstand, without cracking, bending in accordance with ASTM E 290 through an angle of 120 degrees around a diameter equal to twice the nominal diameter of the wire.

3.4 Quality:

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

3.5 Tolerances:

Shall conform to AMS 2224 or MAM 2224 as applicable to nonrefractory alloys.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of wire 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 wire conforms to the 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 ASTM B 250 or ASTM B 250M.

4.4 Reports:

The vendor of wire shall furnish with each shipment a report showing the results of tests on each lot to determine conformance to the technical requirements. This report shall include the purchase order number, lot number, AMS 4720E, nominal size, and quantity.

4.5 Resampling and Retesting:

If any specimen used in the above tests fails to meet the specified requirements, disposition of the wire may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the wire represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Wire shall be supplied on spools or in coils except when straight lengths are ordered.

5.2 Identification:

5.2.1 Spools and Coils: Shall be marked with a durable tag or label showing not less than the manufacturer's identification, purchase order number, lot number, AMS 4720E, nominal size, and quantity; boxes or drums shall be marked with the same information.

5.2.2 Straight Lengths: Shall have attached to each bundle or enclosed in each box a durable tag or label marked with the information of 5.2.1; when boxed, the box shall be marked with the same information.