

AEROSPACE MATERIAL SPECIFICATION

SAE AMS4720F

Issued 1940-03
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Superseding AMS4720E

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

(Composition similar to UNS C51000)

RATIONALE

AMS4720F results from a 5 Year Review and update of this specification.

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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

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

AMS2224 Tolerances, Copper and Copper Alloy Wire

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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 B 250/250M General Requirements for Wrought Copper-Alloy Wire

ASTM E 8/8M Tension Testing of Metallic Materials

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 8/8M:

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 0.125 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 AMS2224 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 250/250M.

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, AMS4720F, 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, AMS4720F, 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.

5.3 Packaging

5.3.1 Spools and Coils

Coils shall be individually wrapped with waterproof paper or packed in waterproof drums. Spools, when ordered, shall be boxed.

5.3.2 Straight Lengths

Shall be bundled or boxed.

5.3.3 Packages of wire shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the wire to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.

6. ACKNOWLEDGMENT

A vendor shall include this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS

Wire not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.