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Superseding AMS4725D

Copper-Beryllium Alloy Wire
98Cu - 1.9Be
Solution Heat Treated

(Composition similar to UNS C17200)

RATIONALE

AMS4725E has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Form

This specification covers one type of copper-beryllium alloy in the form of wire.

1.2 Application

Primarily for parts requiring high strength with good electrical conductivity or lack of magnetic susceptibility.

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.

AMS 2224 Tolerances, Copper and Copper Alloy Wire

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/B 250M General Requirements for Wrought Copper-Alloy Wire
ASTM E 8 Tension Testing of Metallic Materials
ASTM E 106 Chemical Analysis of Copper-Beryllium Alloys
ASTM E 478 Chemical Analysis of Copper Alloys

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3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the following percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 106 and/or ASTM E 478, by spectrochemical methods, or by other analytical methods approved by purchaser.

TABLE 1 - COMPOSITION

Element	min	max
Beryllium	1.80	2.00
Additive Elements		
Nickel + Cobalt	0.20	--
Nickel + Cobalt + Iron	--	0.6
Aluminum	--	0.20
Silicon	--	0.20
Other Elements, each	--	0.10
Other Elements, total	--	0.50
Copper	remainder	

3.2 Condition

Cold drawn or rolled and solution treated, in a condition suitable for precipitation heat treatment.

3.3 Properties

Wire shall conform to the following requirements:

3.3.1 Tensile Properties as Solution Heat Treated

Shall be as shown in Table 2, determined in accordance with ASTM E8:

TABLE 2 - TENSILE PROPERTIES

Property	Value
Tensile Strength	58 to 78 ksi (400 to 540 MPa)
Elongation in 2 inches (50 mm) or 4D, min	35%

3.3.2 Microstructure

Shall reveal a minimum of beta phase constituent. Any beta phase present shall be fine and well dispersed and shall not be in the form of stringers. Wire may be precipitation heat treated as in 3.3.4 before examination.

3.3.3 Bend Test

Wire shall withstand, without cracking, wrapping at room temperature five full, closely-spaced turns around a diameter equal to the nominal diameter or thickness of the wire.

3.3.4 Tensile Properties After Precipitation Heat Treatment

Wire shall have the properties shown in Table 3 after being precipitation heat treated by heating to 600 to 625 °F (315 to 330 °C), holding at heat for 3 hours $\pm$ 0.25, and cooling in air:

TABLE 3 - TENSILE PROPERTIES

Property	Value
Tensile Strength	165 to 190 ksi (1140 to 1310 MPa)
Elongation in 2 inches (50 mm) or 4D, min	3.0%

3.4 Quality

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

3.5 Tolerances

Unless otherwise specified, tolerances shall conform to AMS 2224 as applicable to refractory 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 specified requirements.

4.2 Classification of Tests

All technical requirements of this specification are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling

Shall be in accordance with AMS B250.

4.4 Reports

4.4.1 The vendor of wire shall furnish with each shipment three copies of a report showing the results of tests for composition of each lot and the results of tests on each lot to determine conformance to the other technical requirements of this specification. This report shall include the purchase order number, lot number, AMS 4725E, size, and quantity from each lot.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, AMS 4725E, contractor or other direct supplier of wire, part number, and quantity. When wire for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of wire to determine conformance to the requirements of this specification and shall include in the report either a statement that the wire conforms or copies of laboratory reports showing the results of tests to determine conformance.

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 and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY

5.1 Identification

Individual coils or reels shall be closely wrapped in waterproof paper and shall have attached a durable tag or label marked with the purchase order number, AMS 4725E, lot number, and nominal size, or shall be boxed and the box marked with the same information.

5.2 Packaging