AEROSPACE MATERIAL SPECIFICATION

AMS4700	REV. D

Issued 1969-11
Revised 2009-02
Reaffirmed 2014-12

Superseding AMS4700C

Copper Wire, Bare
High Purity
(Composition similar to UNS C10100)

RATIONALE

AMS4700D has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Form

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

1.2 Application

This wire has been used typically as electronic component leads which must be resistance welded to produce high quality weld joints, 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 form 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 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

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AMS4700D

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 193 Resistivity of Electrical Conductor Materials

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

ASTM E 3 Preparation of Metallographic Specimens

ASTM E 53 Chemical Analysis of Copper

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 53, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - COMPOSITION

Element	min	max
Copper (3.1.1)	99.99	--
Sulfur	--	0.0018 (18 ppm)
Lead	--	0.0010 (10 ppm)
Bismuth (3.1.2)	--	0.0010 (10 ppm)
Selenium (3.1.2)	--	0.0010 (10 ppm)
Tellurium (3.1.2)	--	0.0010 (10 ppm)
Phosphorus	--	0.0003 (3 ppm)
Zinc	--	0.0001 (1 ppm)
Cadmium	--	0.0001 (1 ppm)
Mercury	--	0.0001 (1 ppm)
Arsenic (3.1.2)	--	0.0005 (5 ppm)
Antimony (3.1.2)	--	0.0004 (4 ppm)
Tin (3.1.2)	--	--
Manganese (3.1.2)	--	--

3.1.1 Copper shall be determined by taking the difference between 100% and the sum of the other elements listed.

3.1.2 The sum of the bismuth, selenium, tellurium, arsenic, antimony, tin, and manganese shall not exceed 0.0040% (40 ppm).

3.2 Condition

Cold-drawn or cold-rolled, annealed, and cleaned.

3.3 Properties

Wire shall conform to the following requirements:

3.3.1 Resistivity

The weight resistivity, determined in accordance with ASTM B 193, shall not exceed 0.15328 ohm-gram per square meter at 68 °F ± 4 (20 °C ± 2), which corresponds to a conductivity of not less than 100% IACS (International Annealed Copper Standard) (58 MS/m).

3.3.2 Embrittlement

Wire shall withstand a minimum of 10 bends without cracking or breaking, when tested as in 3.3.2.1 and then subjected to additional bending until failure occurs.

3.3.2.1 Specimens shall be cleaned by any suitable method and then heated at 1562 °F ± 45 (850 °C ± 25) for not less than 30 minutes in an atmosphere containing not less than 10% hydrogen. Specimen shall then be clamped between jaws having edge radii equal to 2.5 times the nominal diameter of the wire. Specimen, held under a tension of approximately 3000 psi (21 MPa), shall be bent 90 degrees over the edge of one jaw and returned to its initial position; this constitutes one bend. Specimen shall then be bent 90 degrees in the reverse direction and returned to its initial position; this constitutes another bend. Each bend shall be made in the opposite direction from that of the preceding bend.

3.3.2.1.1 Specimens shall be examined at the bend after 10 bends and at the broken area after failure under 10X magnification. The bend shall have no surface cracks or blisters. The break shall show a necked-down section, characteristic of a ductile material, with no evidence of grain faces or boundaries.

3.3.3 Microstructure

Specimens, prepared as specified in ASTM E 3, from wire heated as in 3.3.2.1, when suitably etched to reveal the structure and examined at 100X magnification, shall show no evidence of copper oxide or other inclusions.

3.4 Quality

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

3.5 Tolerances

Shall conform to AMS2224.

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/B 250M.

4.4 Reports

The vendor of wire shall furnish with each shipment a report showing the results of tests to determine conformance to all technical requirements. This report shall include the purchase order number, lot number, AMS4700D, 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 legibly marked, by a durable tag or label, with not less than the manufacturer's identification, purchase order number, AMS4700D, 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 legibly 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 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.

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.