

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard



AMS 4701E

Issued
Revised

JUL 1947
FEB 1994

Superseding AMS 4701D

Copper Wire, Oxygen-Free 99.95(Cu+Ag) Annealed

UNS C10200

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 for copper brazing, high-conductivity bonding, and emergency lockwiring, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2224 Tolerances, Copper and Copper Alloy Wire

MAM 2224 Tolerances, Metric, Copper and Copper Alloy Wire

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright 1998 Society of Automotive Engineers, Inc.
All rights reserved.

Printed in U.S.A.

QUESTIONS REGARDING THIS DOCUMENT:
TO PLACE A DOCUMENT ORDER:
SAE WEB ADDRESS:

(724) 772-7154
(724) 776-4970
<http://www.sae.org>

FAX: (724) 776-0243
FAX: (724) 776-0790

2.2 ASTM Specifications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 250	General Requirements for Wrought Copper-Alloy Wire
ASTM B 250M	General Requirements for Wrought Copper-Alloy Wire (Metric)
ASTM B 577	Hydrogen Embrittlement of Copper
ASTM E 8	Tension Testing of Metallic Materials
ASTM E 8M	Tension Testing of Metallic Materials (Metric)
ASTM E 53	Chemical Analysis of Copper

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-C-3993 Copper and Copper-Base Alloy Mill Products, Packaging of

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall be oxygen-free copper containing not less than 99.95% by weight copper, including silver, and not more than 0.0010% oxygen, determined by wet chemical methods in accordance with ASTM E 53, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

3.2 Condition:

Cold drawn or cold rolled, and annealed (061) (see 8.2).

3.3 Properties:

Wire shall conform to the following requirements:

3.3.1 Tensile Elongation: Shall be as specified in Tables 1 and Table 2, determined in accordance with ASTM E 8 or ASTM E 8M.

3.3.1.1 Rounds, Hexagons, Octagons: See Table 1.

TABLE 1 - Minimum Elongation

Nominal Diameter or Least Distance Between Parallel Sides Inch	Nominal Diameter or Least Distance Between Parallel Sides Millimeters	Elongation in 10 Inches (254 mm) %
Up to 0.0113, excl	Up to 0.287, excl	15
0.0113 to 0.0226, excl	0.287 to 0.574, excl	20
0.0226 to 0.1144, excl	0.574 to 2.906, excl	25
0.1144 to 0.2893, incl	2.906 to 7.348, incl	30
Over 0.2893	Over 7.348	35

3.3.1.2 Squares, Rectangles: See Table 2.

TABLE 2 - Minimum Elongation

Thickness or Nominal Distance Between Parallel Sides Inch	Thickness or Nominal Distance Between Parallel Sides Millimeters	Elongation in 10 Inches (254 mm) %
Up to 0.011, excl	Up to 0.28, excl	20
0.011 to 0.021, excl	0.28 to 0.53, excl	25
0.021 to 0.051, excl	0.53 to 1.30, excl	30
0.051 to 0.290, excl	1.30 to 7.37, excl	32
0.290 and over	7.37 and over	35

3.3.2 Embrittlement: Wire, after exposure to hydrogen, shall withstand, without cracking, eight bends determined in accordance with ASTM B 577, Method D.

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 AMS 2224 or MAM 2224 as applicable to copper and 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 performing 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 requirements of this specification.

4.2 Classification of Tests:

Tests for 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 4701E, 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 legibly marked, by a durable tag or label, with not less than the manufacturer's identification, purchase order number, AMS 4701E, 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 legibly marked with the same information.