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AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
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Standard Specification for Bonded Copper Conductors for Use in Hookup Wires for Electronic Equipment[1]

This standard is issued under the fixed designation B 470; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers stranded uninsulated bare, tin, or tin-lead alloy coated copper conductors in which wires in the strand are metallically bonded together by the application of heat or additional tin, or tin-lead alloy for use in hookup wire for electronic equipment.

1.2 The SI values for density and resistivity are to be regarded as standard. For all other properties, the inch-pound values are to be regarded as the standard and the SI units may be approximate.

1.3 The hazard caveat pertains only to Section 6 of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 The following documents of the issue in effect at the time of reference form a part of this specification to the extent referenced herein:

2.2 *ASTM Standards:*

B 3 Specification for Soft or Annealed Copper Wire[2]

B 286 Specification for Copper Conductors for Use in Hookup Wire for Electronic Equipment[2]

3. Ordering Information

3.1 Orders for material under this specification shall include the following information:

3.1.1 Quantity of each size, material, construction, and type (see 4.1),

3.1.2 Package size (see 8.1),

3.1.3 Special package marking if required (Section 8), and

3.1.4 Place of inspection (Section 7).

3.1.5 In addition, Supplementary Requirements shall apply only when specified by the purchaser in the inquiry, contract, or purchase order for direct procurement by agencies of the U.S. Government (S1, S2, and S3).

4. Conductor Constructions

4.1 Conductor constructions shall conform to the applicable constructions of Specification B 286, except that in addition the following bondings may be specified:

4.1.1 *Type I*—Bare copper, stranded, light bonding,

4.1.2 *Type II*—Tin or tin-lead alloy coated copper, stranded, light bonding, or

4.1.3 *Type III*—Tin or tin-lead alloy coated copper, stranded, heavy bonding.

5. General Requirements

5.1 The conductors shall consist of tinned copper conforming to the product description, quality and specification requirements of Specification B 286 and bare copper conforming to the product description, quality and specification requirements of Specification B 3.

5.2 *Flex Life*—The average of six flex tests specified in 6.1 shall meet the minimum requirements of Table 1 for the applicable type and construction.

5.3 *Fraying, Types I and II*—After performing the test in 6.2, no separations of strands shall be visible to the unaided eye (normal spectacles excepted), from the cut end to the point of bend nearest to that cut end.

5.4 *Mandrel Test, Type III Only* (see Explanatory Note 1)—After performing the test specified in 6.3 no separation of strands shall be visible to the unaided eye (normal spectacles excepted).

6. Test Methods

6.1 *Flex Life*—The testing equipment shall be designed and set up for operation so that steel mandrels shall be horizontal and so positioned that any vertical movement of the specimen is minimized. The conductor as clamped for test shall pass through the vertical center line between the mandrels.

6.1.1 The conductor shall be bent repeatedly in alternating directions in an arc of 60° on both sides of the vertical center line of the mandrels, at a rate of 24 to 36 cpm, between mandrels of size and spacing specified in Table 2. The mandrels must be so supported that the specified spacing during test is maintained. Mandrel deflection must be avoided. The conductor shall be clamped at a point not less than 1 in. (25.4 mm) above the horizontal center line of the mandrels. A load, as specified in Table 2, shall be applied to the free end of the conductor (Explanatory Note 2) not less than 3 in. (76.2 mm) below the horizontal center line of the mandrels. One

[1] This specification is under the jurisdiction of ASTM Committee B-1 on Electrical Conductors and is the direct responsibility of Subcommittee B01.04 on Conductors of Copper and Copper Alloys.

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[2] *Annual Book of ASTM Standards*, Vol 02.03.