



Designation: B1 – 01(Reapproved 2007)

Standard Specification for Hard-Drawn Copper Wire¹

This standard is issued under the fixed designation B1; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers hard-drawn round copper wire for electrical purposes.

1.2 The values stated in inch-pound or SI units are to be regarded separately as standard. Each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the specification. For conductor sizes designated by AWG or kcmil sizes, the requirements in SI units are numerically converted from the corresponding requirements in inch-pound units. For conductor sizes designated by AWG or kcmil, the requirements in SI units have been numerically converted from corresponding values stated or derived in inch-pound units. For conductor sizes designated by SI units only, the requirements are stated or derived in SI units.

1.2.1 For density, resistivity and temperature, the values stated in SI units are to be regarded as standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

B49 Specification for Copper Rod Drawing Stock for Electrical Purposes

B193 Test Method for Resistivity of Electrical Conductor Materials

B258 Specification for Nominal Diameters and Cross-Sectional Areas of AWG Sizes of Solid Round Wires Used as Electrical Conductors

2.2 *National Institute of Standards and Technology: NBS Handbook 100—Copper Wire Tables*³

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

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

3. Ordering Information

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

3.1.1 Quantity of each size,

3.1.2 Wire size: diameter in inches (5.4 and Table 1),

3.1.3 Type of copper, if special (Section 4),

3.1.4 Whether certification of resistivity of rod stock is acceptable instead of resistivity tests on the finished wire (6.2),

3.1.5 Package size (8.1),

3.1.6 Special package marking, if required, and

3.1.7 Place of inspection (7.1).

4. Materials and Manufacture

4.1 The material shall be copper of such quality and purity that the finished product shall have the properties and characteristics prescribed in this specification.

NOTE 1—Specification B49 defines the materials suitable for use.

5. General Requirements (see Section 8)

5.1 *Tensile Strength and Elongation*—The wire shall conform to the requirements as to tensile strength and elongation prescribed in Table 1 (see Explanatory Note 1 and Note 2). For wire whose nominal diameter is more than 0.001 in. (1 mil) (0.025 mm) greater than a size listed in Table 1 and less than that of the next larger size, the requirements of the next larger size shall apply.

5.2 *Joints*—No joints shall be made in the completed wire (see Explanatory Note 3). Joints in the wire and rods made prior to final drawing shall be in accordance with the best commercial practice. Tests on a specimen containing a joint shall show at least 95% of the tensile strength given in Table 1. Elongation tests shall not be made on a specimen containing a joint.

5.3 *Resistivity*—The electrical resistivity at 20°C shall not exceed the following values:

Nominal Diameter, in.	Resistivity at 20°C, Ω -lb/mile ²
0.460 to 0.325, incl	900.77
Under 0.325 to 0.0403, incl	910.15
Nominal Diameter, in.	Resistivity at 20°C, Ω -g/m ²
11.68 to 8.25, incl	0.15775
Under 8.25 to 1.02, incl	0.15940



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