



Standard Specification for Copper Trolley Wire¹

This standard is issued under the fixed designation B47; 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 round and grooved hard-drawn copper and silver-bearing copper trolley wire.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered 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

3. Ordering Information

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

3.1.1 Quantity of each size and section,

3.1.2 Wire size: diameter in inches (see **6.1** and **Table 1**) or area in circular mils (see **10.1** and **Fig. 1**),

3.1.3 Shape of section (Section **1**),

3.1.4 Type of copper, if the addition of silver of 25 troy oz./short ton minimum, is required (see Section **4** and Explanatory **Note 1**),

3.1.5 Package size (see **18.3**),

3.1.6 Lagging, if required (see **18.1**),

3.1.7 Relation between vertical axis of grooved wire and axis of reel (see **18.1**),

3.1.8 Size of arbor hole, if special (see **18.2**),

3.1.9 Special package marking, if required (see **18.4**), and

3.1.10 Place of inspection (Section **16**).

¹ This specification is under the jurisdiction of ASTM Committee **B01** on Electrical Conductors and is the direct responsibility of **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.

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.

4.2 Copper redraw rod of special qualities, forms, or types, as may be agreed upon between the manufacturer and the purchaser, and that will conform to the requirements prescribed in this specification may also be used.

4.3 Either oxygen-free or tough pitch copper may be supplied. Tests for oxygen content of the copper are not a requirement of this specification.

ROUND WIRE

5. Tensile Properties

5.1 Round wire shall conform to the requirements as to tensile properties specified in **Table 1**.

5.2 Tests on a specimen of round wire containing a joint shall show at least 95 % of the tensile strength specified in **Table 1**. Elongation tests shall not be made on specimens containing joints.

5.3 Tension tests shall be made on representative samples. The elongation shall be determined as the permanent increase in length, due to the breaking of the wire in tension, measured between gage marks placed originally 10 in. apart upon the test specimen (Explanatory **Note 2**). The fracture shall be between the gage marks and not closer than 1 in. to either gage mark.

6. Dimensions and Permissible Variations

6.1 The size of round trolley wire shall be expressed as the diameter of the wire in decimal fractions of an inch, to the nearest 0.1 mil (0.0001 in.).

6.2 Wire shall be truly cylindrical in form. The diameter shall not vary more than plus and minus 1 % from that specified.

7. Twist Test

7.1 For the purpose of determining and developing defects which may be prejudicial to the life of trolley wire, owing to its peculiar service as compared to that of wire for other purposes, round wire shall be subjected to the twist test described in **7.2**.