



Designation: B 227 – 03

Standard Specification for Hard-Drawn Copper-Clad Steel Wire¹

This standard is issued under the fixed designation B 227; 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 bare hard-drawn round copper-clad steel wire for electrical purposes (Note 1).

NOTE 1—Wire ordered to this specification is not intended for redrawing. If wire is desired for this purpose, consult the manufacturer.

1.2 Four grades of wire are specified, designated as follows (Note 2): Grade 40 HS, Grade 40 EHS, Grade 30 HS, and Grade 30 EHS.

NOTE 2—The grades covered by this specification correspond to the following commercial designations:

Grade 40 HS, High Strength, 40 % Conductivity.

Grade 40 EHS, Extra High Strength, 40 % Conductivity

Grade 30 HS, High Strength, 30 % Conductivity.

Grade 30 EHS, Extra High Strength, 30 % Conductivity.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are in SI units.

2. Referenced Documents

2.1 The following documents of the issue in effect on date of material purchase form a part of this specification to the extent referenced herein.

2.2 ASTM Standards:

B 193 Test Method for Resistivity of Electrical Conductor Materials²

B 258 Specification for Standard Nominal Diameters and Cross-Sectional Areas of AWG Sizes of Solid Round Wires Used as Electrical Conductors²

2.3 National Institute of Standards and Technology:

NBS Handbook 100—Copper Wire Tables³

3. Ordering Information

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

3.1.1 Quantity of each size and grade,

3.1.2 Wire size: diameter in inches (see 5.1 and Table 1),

3.1.3 Grade (see 1.2 and Table 1),

3.1.4 Method of measuring elongation (see 7.3 and 7.4),

3.1.5 Package size (see 14.1),

3.1.6 Special package marking, if required (Section 13), and

3.1.7 Place of inspection (Section 15).

4. Material

4.1 The wire shall be composed of a steel core with a substantially uniform and continuous copper cladding thoroughly bonded to it throughout.

4.2 The finished copper-clad steel wire shall conform to the requirements prescribed in this specification.

5. Dimensions and Permissible Variations

5.1 The size shall be expressed as the diameter of the wire in decimal fractions of an inch using four places of decimals, that is, in tenths of mils (Note 3).

NOTE 3—The values of wire diameters in Table 1 are given to the nearest 0.0001 in. and correspond to the standard sizes given in Specification B 258. In specifying diameters of wire or in inspecting wire, express the diameter to the fourth decimal place. The diameters preceded by asterisks are not in the American Wire Gage series and are also given to four places of decimals. They correspond to certain numbers of the Birmingham Wire Gage of the British Standard Wire Gage and are used for communication lines. The use of gage numbers in specifying wire sizes is not recognized in these specifications because of the possibility of confusion. An excellent discussion of wire gages and related subjects is contained in *NBS Handbook 100* of the National Institute of Standards and Technology.³

5.2 Within the range of diameters included in Table 1, the wire shall not vary from the specified diameter by more than the following amounts rounded off to the nearest 0.1 mil (0.0001 in.):

Specified Diameter, in. (mm)	Permissible Variations in Specified Diameter
0.2043 (5.189) to 0.1000 (2.540), incl	±1.5 %
0.0999 (2.537) to 0.0800 (2.032), incl	±0.0015 in. (1.5 mils) (0.038 mm)
0.799 (2.029) to 0.0600 (1.524), incl	+0.0010 in. (1.0 mils) (0.025 mm)
	−0.0015 in. (1.5 mils) (0.038 mm)
0.0599 (1.521) and under	±0.0010 in. (1.0 mils) (0.025 mm)

¹ This specification is under the jurisdiction of the ASTM Committee B01 on Electrical Conductors and is the direct responsibility of Subcommittee B01.06 on Composite Conductors.

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

³ Available from National Institute of Standards and Technology, (NIST), Gaithersburg, MD 20899.