



Designation: B 105 – 00

# Standard Specification for Hard-Drawn Copper Alloy Wires for Electric Conductors<sup>1</sup>

This standard is issued under the fixed designation B 105; 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 approval. A superscript epsilon ( $\epsilon$ ) 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 alloy wires for electric conductors.

1.2 The copper alloy wires shall be made in any one of ten distinct alloys designated 8.5 to 85 in accordance with their increasing conductivities or designated by assigned UNS numbers as follows:

	Copper Alloy UNS No.		Copper Alloy UNS No.
Alloy 8.5	C65100	Alloy 40	
Alloy 13	C51000	Alloy 55	C16500
Alloy 15		Alloy 74	C19600
Alloy 20		Alloy 80	C16200
Alloy 30	C50700	Alloy 85	C16200

NOTE 1—The UNS system for copper and copper alloys (see Practice E 527) is a simple expansion of the former standard designation system accomplished by the addition of a prefix “C” and a suffix “00”. The suffix can be used to accommodate composition variations of the base alloy.

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

## 2. Referenced Documents

2.1 The following documents of the issue in effect on the 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 Materials<sup>2</sup>

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

<sup>1</sup> This specification is under the jurisdiction of the 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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<sup>2</sup> Annual Book of ASTM Standards, Vol 02.03.

Used as Electrical Conductors<sup>2</sup>

E 527 Practice for Numbering Metals and Alloys (UNS)<sup>3</sup>

### 2.3 Other Document:

NBS Handbook 100—Copper Wire Tables<sup>4</sup>

## 3. Ordering Information

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

3.1.1 Quantity of each size and grade,

3.1.2 Wire size: diameter in inches or millimetres (see 9.1 and Table 1),

3.1.3 Alloy (see 1.2 and Table 1),

3.1.4 Special composition limits, if required (see 5.2),

3.1.5 Package size (see 14.1),

3.1.6 Special package marking, if required, and

3.1.7 Place of inspection (see 13.1).

## 4. Material and Manufacture

4.1 The material used shall be copper alloys of such nature and composition as to secure by proper treatment the properties prescribed in this specification for the finished wire.

## 5. Chemical Composition

5.1 The copper alloy wires shall conform to the requirements of Table 2 as to chemical composition. The values prescribed in Table 2 cover limits of composition of the different alloys which may be supplied (see Note 2).

NOTE 2—It is the intention of this specification to permit under each of the alloys listed in 1.2 any alloy coming within the total range of analysis specified in Section 5, provided the product conforms to the other requirements of this specification. For purposes of information only, the types of alloy now commonly used for each of the several alloys are listed below. Certain alloys that have a “commercial standing” may have been assigned a UNS designation (see 1.2). The chemical composition of any of the materials shall be within the total range specified in Section 5, but in

<sup>3</sup> Annual Book of ASTM Standards, Vol 01.01.

<sup>4</sup> Available from the National Technical Information Service, 5285 Port Royal Rd, Springfield, VA 22161.



TABLE 1 Tensile Requirements<sup>A</sup>

NOTE 1—Conversion factors are presented for ready adaptation to computer readout and electronic data transmission. The factors are written as a number greater than one and less than ten with six or less decimal places. This number is followed by the letter E (for exponent), a plus or minus symbol, and two digits which indicate the power of 10 by which the number must be multiplied to obtain the correct value. For example: 2.54 E + 01 = 2.54 × 10<sup>1</sup> = 25.4.

Table with columns: Diameter (in, mm), Area at 20°C (in.², mm², cmill), Elongation (min, % in 10 in, (250 mm)), Tensile Strength (min, ksi, Mpa), Alloy 8.5, Alloy 13, Alloy 15 and 20, Alloy 30, Alloy 40, Alloy 55, Alloy 74, Alloy 80, Alloy 85.

<sup>A</sup> Conversion factors: 1 in. = 2.54 E + 01 mm, 1 cmill = 5.067 E - 01 mm, 1 in.² = 6.452 E + 02 mm², 1 ksi = 6.895 E + 00 MPa.