

Specification for

Paper-, cotton-, silk- or rayon-covered copper conductors —

Part 1: Round wire

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The Government department and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

British Non-ferrous Metals Federation High Conductivity Copper Group	Small Electric Motor Manufacturers' Association
Copper Development Association	Society of Motor Manufacturers and Traders
Covered Conductors Association	Telecommunication Engineering and Manufacturing Association
Radio and Electronic Component Manufacturers' Federation	

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Foreword

In accordance with the practice of publishing British Standards that conform as closely as possible with internationally agreed recommendations, this standard conforms with the dimensions given in IEC Publication 182, “Basic dimensions of winding wires”; the requirements of IEC Publication 000¹⁾ and the methods of test in IEC Publication 000¹⁾.

With the decline in the use of imperial units, BS 1791, “*Cotton-covered copper conductors*” Part 1 “*Round wire*”; BS 2776, “*Paper-covered copper conductors*” Part 1 “*Round wire*”; BS 3684, “*Silk-covered copper conductors*” Part 1 “*Round wire*”; and BS 3901, “*Rayon-covered copper conductors*” Part 1 “*Round wire*” will eventually be withdrawn.

The values of resistance in Table 4, Table 5 and Table 6 have been calculated using the following values of resistivity in $\Omega \text{ mm}^2 \text{ m}^{-1}$: nominal, 1/58.5, minimum, 1/59 and maximum, 1/58; these values are given in Appendix B and have been accepted for use in IEC Recommendations.

SI units are used in preference to “metric technical units”. The relationship between the units of force in the two systems is: 1 N = 0.102 kgf.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

¹⁾ In course of preparation

1 Scope

1.1 General

This Part of this British Standard specifies requirements and dimensions for round copper wire covered with one of the following textile materials.

Cotton, silk, rayon, paper.

Braided coverings are not included.

1.2 Sizes

The requirements of the standard are applicable to wires having the following conductor diameters.

Cotton covered	0.150 mm to 5.000 mm
Silk or rayon covered	0.040 mm to 1.600 mm
Paper covered	0.250 mm to 5.000 mm

1.3 Thickness of covering

The following grades of covering are specified.

Cotton covering	Four grades:	Single, fine and ordinary, and double, fine and ordinary.
Silk or rayon covering	Two grades:	Single and double.
Paper covering	Two grades:	Grade 1 (fine) and Grade 2 (ordinary).

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of this British Standard, the following definitions apply:

2.1 wire

the insulated material as received

2.2 conductor

the bare metal after removal of the textile covering material

2.3 increase in diameter due to the covering

the difference between the diameter over the textile covering and the diameter of the conductor

2.4 tolerance

the permissible divergence of an actual magnitude from that prescribed

2.5 rayon

any man-made fibre consisting of regenerated cellulose

3 General requirements and test conditions

3.1 Unless otherwise specified, all tests shall be carried out within a temperature range of 15 °C to 35 °C and a relative humidity range of 45 % to 75 %. Before measurements are made, the specimens shall be preconditioned under these atmospheric conditions for a time sufficient to allow them to reach stability.

3.2 The wire to be tested shall be removed from the packaging in such a way that it will not be subjected to tension or unnecessary bends; before each test sufficient wire shall be discarded to ensure that any damaged wire is not included in the test specimen.

3.3 When no specific range of sizes is given for a test, the test is applicable to all sizes.

4 Conductor

4.1 Material

The conductor shall be manufactured from high-conductivity copper complying with the requirements of BS 1036 and of BS 1035-40, 1172-74, 1861, 1954.

4.2 Tolerance on conductor diameter

4.2.1 Wires of conductor diameter 0.071 mm and larger. When measured by the method described in Appendix A, the conductor diameters shall be within the appropriate limits given in Table 4 to Table 6. These have been obtained by applying the tolerances given in Table 1.

4.2.2 Out of roundness of conductor (for wires of conductor diameter 0.071 mm and larger). The out of roundness, as defined in Appendix A, shall not exceed the value given in column 2 of Table 1.

4.2.3 Wires of conductor diameter smaller than 0.071 mm. The conductor diameters shall be deemed to be correct if the resistances are within the appropriate limits given in Table 5.

4.3 Resistance (for wires of conductor diameter up to and including 1.0 mm)

The resistance of the conductor at 20 °C shall be within the limits given in Table 4 to Table 6, when measured in accordance with Appendix B. The maximum and minimum resistance values given in the tables include tolerances on both the resistivity of the material and the diameter of the wire, and no further tolerance is applicable.

NOTE The nominal resistances of conductors above 1.00 mm in diameter are included in Table 4 to Table 6 for information only.

Table 1 — Tolerances on conductor diameter

1	2	1	2
Nominal conductor diameter	Tolerance $\pm$	Nominal conductor diameter	Tolerance $\pm$
mm	mm	mm	mm
0.071	0.003	0.710	0.007
0.080	0.003	0.750	0.008
0.090	0.003	0.800	0.008
0.100	0.003	0.850	0.009
0.112	0.003	0.900	0.009
0.125	0.003	0.950	0.010
0.132	0.003	1.000	0.010
0.140	0.003	1.060	0.011
0.150	0.003	1.120	0.011
0.160	0.003	1.180	0.012
0.170	0.003	1.250	0.013
0.180	0.003	1.320	0.013
0.190	0.003	1.400	0.014
0.200	0.003	1.500	0.015
0.212	0.003	1.600	0.016
0.224	0.003	1.700	0.017
0.236	0.004	1.800	0.018
0.250	0.004	1.900	0.019
0.265	0.004	2.000	0.020
0.280	0.004	2.120	0.021
0.300	0.004	2.240	0.022
0.315	0.004	2.360	0.024
0.335	0.004	2.500	0.025
0.355	0.004	2.650	0.027
0.375	0.005	2.800	0.028
0.400	0.005	3.000	0.030
0.425	0.005	3.150	0.032
0.450	0.005	3.350	0.034
0.475	0.005	3.550	0.036
0.500	0.005	3.750	0.038
0.530	0.006	4.000	0.040
0.560	0.006	4.250	0.043
0.600	0.006	4.500	0.045
0.630	0.006	4.750	0.048
0.670	0.007	5.000	0.050

5 Covering materials

5.1 General

The conductor shall be completely and uniformly covered with one or two layers of cotton, silk or rayon, as may be required, or with two layers of paper.

5.2 Quality

5.2.1 Cotton, silk and rayon. The yarn shall be substantially free from knots, ravelling and other imperfections.

5.2.2 Paper. Paper shall comply with the requirements of BS 698 and shall be free from metallic and other inclusions; it shall have no deleterious effect on insulating oil complying with the requirements of BS 148.