

Specifications for particular types of winding wires

Part 0. General requirements

Section 1. Enamelled round copper wire

The European Standard EN 60317-0-1 : 1994 has the status of a
British Standard

ICS 29.060.10

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Cables and Insulation Standards Policy Committee (CIL/-) to Technical Committee CIL/55, upon which the following bodies were represented:

- Covered Conductors Association
- Electrical and Electronic Insulation Association (BEAMA Ltd.)
- Electronic Components Industry Federation
- Transmission and Distribution Association (BEAMA Ltd.)

This British Standard, having been prepared under the direction of the Cables and Insulation Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 February 1993

© BSI 1993

The following BSI references relate to the work on this standard:
Committee reference CIL/55
Special announcement in *BSI News* January 1993

ISBN 0 580 21951 8

Amendments issued since publication

Amd. No.	Date	Text affected
7903	September 1993	Indicated by a double line in the margin
8984	July 1996	Indicated by a double line in the margin

Summary of pages

The following table identifies the current issue of each page. Issue 1 indicates that a page has been introduced for the first time by amendment. Subsequent issue numbers indicate an updated page. Vertical sidelining on replacement pages indicates the most recent changes (amendment, addition, deletion).

Page	Issue	Page	Issue
Front cover	2	7	original
Inside front cover	2	8	original
a	1	9	original
b	blank	10	original
i	2	11	original
ii	2	12	original
iii	2	13	original
iv	2	14	original
EN title page	1	15	original
ivb	1	16	original
1	original	17	original
2	2	18	original
2a	1	19	original
2b	blank	20	original
3	original	21	1
4	original	22	1
5	original	Inside back cover	2
6	original	Back cover	2

Change of identifier

Wherever BS 6811 : Section 3.3.0 : 1993 appears in this standard, it should be read as BS EN 60317-0-1 : 1996.

Contents

	Page
Committees responsible	Inside front cover
National foreword	iii
Specification	
1 Scope	1
2 Normative references	1
3 Definitions and general notes on methods of test	2
4 Dimensions	3
5 Electrical resistance	6
6 Elongation	7
7 Springiness	8
8 Flexibility and adherence	9
9 Heat shock	9
10 Cut-through	10
11 Resistance to abrasion	10
12 Resistance to solvents	11
13 Breakdown voltage	11
14 Continuity of insulation	13
15 Temperature index	13
16 Resistance to refrigerants	13
17 Solderability	13
18 Heat or solvent bonding	13
19 Dielectric dissipation factor	14
20 Resistance to transformer oil	14
21 Loss of mass	14
22 High temperature failure	14
30 Packaging	14
Annexes	
A Dimensions for intermediate nominal conductor diameters (R40)	15
B Method for the calculation of minimum overall diameter	18
C Method for the calculation of linear resistance	19
D Resistance	21
ZA Other international publications quoted in this standard with the references of the relevant European publications	22

Tables

1	Dimensions of enamelled wires (R20)	4
2	Dimensions of enamelled wires with a bonding layer (R20)	5
3	Electrical resistances	7
4	Elongation	7
5	Springiness	8
6	Mandrel diameters	9
7	Mandrel diamaters	10
8	Breakdown voltage	11
9	Breakdown voltage	12
10	Breakdown voltage	12
11	Continuity of insulation	13
A.1	Dimensions of enamelled wires (R40)	15
A.2	Dimensions of enamelled wires with a bonding layer (R40)	17
C.1	Ratios	19
D.1	Electrical resistances	21

National foreword

This British Standard was prepared by Technical Committee GEL/55 (formerly CIL/55). It is identical with IEC 317-0-1 : 1990 *Specifications for particular types of winding wires Part 0: General requirements Section 1 Enamelled round copper wire* including Amendment No. 1 : 1990 and Amendment No. 2 : 1993, published by the International Electrotechnical Commission (IEC).

In 1994 the European Committee for Electrotechnical Standardization (CENELEC) accepted IEC 317-0-1 : 1990 as European Standard EN 60317-0-1 : 1994. As a consequence of implementing the European Standard, this British Standard is renumbered as BS EN 60317-0-1 and any reference to BS 6811 : Section 3.0 should be read as a reference to BS EN 60317-0-1.

WARNING. In referring to the methods of test in BS 6811 : Part 2 this Section calls for the use of substances and/or procedures that may be injurious to health if adequate precautions are not taken. It refers to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

The clause numbers used in this Section are not consecutive. The clause numbers are identical with the test numbers used in IEC 851, which is identical with BS 6811 : Part 2 (see **3.2**).

Reference is made in the IEC foreword to IEC 317-0-1 replacing IEC 182-1 and IEC 182-2; attention is drawn to the following British Standards which are related to IEC 182-1 : BS 5550 : Section 6.4 and BS 6811 : Section 1.1 and to BS EN 60182-2 respectively.

The introduction to IEC 317-0-1 reads as follows.

'This International Standard is one of a series which deals with insulated wires used for windings in electrical equipment. The series has three groups describing:

- 1) methods of test (IEC 851);
- 2) specifications (IEC 317);
- 3) packaging (IEC 264).'

NOTE. This Section of BS 6811 should be read in conjunction with BS 6811 : Part 0 *General introduction and list of Parts*.

Cross-references

International standard	Corresponding British Standard
	BS 6811 <i>Winding wires</i> Part 3 <i>Specifications for particular types of enamelled round copper winding wires</i>
IEC 317-1 : 1990	Section 3.5 : 1993 <i>Polyvinyl acetal enamelled round copper wire, class 105</i> (Identical)
IEC 317-2 : 1990	Section 3.4 : 1993 <i>Solderable polyurethane enamelled round copper wire, class 130, with a bonding layer</i> (Identical)
IEC 317-7 : 1990	Section 3.8 : 1993 <i>Polyimide enamelled round copper wire, class 220</i> (Identical)
IEC 851	Part 2 <i>Methods of test</i> (All sections are identical)
ISO 3 : 1973	BS 2045 : 1965 <i>Preferred numbers</i> (Technically equivalent)

The Technical Committee has reviewed the provision of IEC 172 : 1987, IEC 317-3 : 1990, IEC 317-4 : 1990¹⁾, IEC 317-8 : 1990¹⁾, IEC 317-12 : 1990¹⁾, IEC 317-13 : 1990¹⁾, IEC 317-19 : 1990, IEC 317-20 : 1990¹⁾, IEC 317-21 : 1990, IEC 317-22 : 1990¹⁾, IEC 317-23 : 1990¹⁾, IEC 317-26 : 1990¹⁾, IEC 317-34 : 1990, to which normative reference is made in the text, and has decided that they are acceptable for use in conjunction with this Standard.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

¹⁾ To be implemented as a Section of BS 6811

Descriptors: Winding, electric wire, insulated wire, enamelled wire, copper, round shape, specification, dimension

English version

Specifications for particular types of winding wires
Part 0: General requirements
Section 1: Enamelled round copper wire
(includes amendment A2 : 1994)

(IEC 317-0-1 : 1990 + corrigendum 1991 + A1 : 1992 + A2 : 1993)

Spécifications pour types particuliers de fils de bobinage

Partie 0: Prescriptions générales

Section 1: Fil de section circulaire en cuivre émaillé (inclut l'amendement A2 : 1994)

(CEI 317-0-1 : 1990 + A1 : 1992 + A2 : 1993)

Technische Lieferbedingungen für bestimmte Typen von Wickeldrähten

Teil 0: Allgemeine Anforderungen

Hauptabschnitt 1: Lackisolierte Runddrähte aus Kupfer (enthält Änderung A2 : 1994)

(IEC 317-0-1 : 1990 + A1 : 1992 + A2 : 1993)

This European Standard was approved by CENELEC on 1994-07-05. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

Foreword

At the request of CENELEC 78th Technical Board, HD 555.0.1 S2 : 1993 (IEC 317-0-1 : 1990 + corrigendum March 1991 + A1 : 1992) was submitted to the CENELEC voting procedure for conversion into a European Standard.

The text of the International Standard was approved by CENELEC as EN 60317-0-1 on 5 July 1994.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1995-07-15
- latest date of withdrawal of conflicting national standards (dow) —

Annexes designated 'normative' are part of the body of the standard. Annexes designated 'informative' are given only for information. In this standard, annexes A, B, C and D are informative and annex ZA is normative.

Foreword to amendment A2

The CENELEC questionnaire procedure, performed for finding out whether or not amendment 2 : 1993 to the International Standard IEC 317-0-1 : 1990 could be accepted without textual changes, has shown that no common modifications were necessary for the acceptance as a European Standard.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as amendment A2 to EN 60317-0-1 on 5 July 1994.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1995-07-15
- latest date of withdrawal of conflicting national standards (dow) 1995-07-15

SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES

Part 0: General requirements Section 1: Enamelled round copper wire

1 Scope

This International Standard specifies the general requirements of enamelled round copper winding wires with or without a bonding layer.

The range of nominal conductor diameters is given in the relevant specification sheet.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid international standards.

IEC 172: 1987, *Test procedure for the determination of the temperature index of enamelled winding wires.*

IEC 317-1: 1990, *Specifications for particular types of winding wires - Part 1: Polyvinyl acetal enamelled round copper wire, class 105.*

IEC 317-2: 1990, *Specifications for particular types of winding wires - Part 2: Solderable polyurethane enamelled round copper wire, class 130, with a bonding layer.*

IEC 317-3: 1990, *Specifications for particular types of winding wires - Part 3: Polyester enamelled round copper wire, class 155.*

IEC 317-4: 1990, *Specifications for particular types of winding wires - Part 4: Solderable polyurethane enamelled round copper wire, class 130.*

IEC 317-7: 1990, *Specifications for particular types of winding wires - Part 7: Polyimide enamelled round copper wire, class 220.*

IEC 317-8: 1990, *Specifications for particular types of winding wires - Part 8: Polyesterimide enamelled round copper wire, class 180.*

IEC 317-12: 1990, *Specifications for particular types of winding wires - Part 12: Polyvinyl acetal enamelled round copper wire, class 120.*