

Electric cables — PVC insulated, non-armoured cables for voltages up to and including 450/750 V, for electric power, lighting and internal wiring

ICS 29.060.20

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee GEL/20, Electric cables, to Subcommittee GEL/20/1, Wiring cables, below 1 kV, upon which the following bodies were represented:

Association of Consulting Engineers
Association of Manufacturers Allied to the Electrical and Electronic Industry (BEAMA Ltd.)
British Approvals Service for Cables
British Cables Association
British Plastics Federation
British Retail Consortium
Chartered Institution of Building Services Engineers
Department of Trade and Industry (Consumer Safety Unit, CA Division)
Electrical Installation Equipment Manufacturers Association
Electricity Association
Energy Industries Council
Engineering Industries Association
ERA Technology Ltd.
Institution of Incorporated Engineers
Lift and Escalator Industry Association
London Underground Ltd.
Transmission and Distribution Association (BEAMA Ltd.)

This British Standard, having been prepared under the direction of the Electrotechnical Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 December 2000

© BSI 26 April 2005

First published August 1969
Second edition January 1976
Third edition May 1984
Fourth edition October 1990
Fifth edition November 1991
Sixth edition December 2000

The following BSI references relate to the work on this British Standard:
Committee reference GEL/20/1
Draft for comment 00/242730 DC

ISBN 0 580 33241 1

Amendments issued since publication

Amd. No.	Date	Comments
14195	25 February 2004	See foreword
15646	26 April 2005	Certification text in foreword changed

Contents

	Page
Committees responsible	Inside front cover
Foreword	iii
1 Scope	1
2 Normative references	1
3 Definitions	2
4 Voltage designation	2
5 General	3
6 Constructional details	5
7 Electrical tests	7
8 Non-electrical tests	8
Annex A (informative) Guide to the use of PVC insulated cables	23
Annex B (informative) Guidance on procedure for routine tests on PVC insulated cables of rated voltages U0/U up to 450/750 V	25
Annex C (normative) Electrical tests	28
Annex D (normative) Measurement of thicknesses	36
Annex E (normative) Procedure for checking the efficacy of the spark testing method and equipment	38
Annex F Spare	39
Annex G (normative) Compatibility test	39
Bibliography	40
Figure C.1 — Test apparatus for measurement of transfer impedance due to resistive and magnetic coupling	31
Figure C.2 — Correction factor F'	34
Figure C.3 — Correction factor F''	35
Figure D.1 — Measurement of sheath thickness	37
Figure E.1 — Preparation of core for spark test equipment check: removal of insulation	38
Figure E.2 — Preparation of core for spark test equipment check: covering with tape	39
Table 1 — List of tests applicable to cables specified in Table 4 to Table 13	9
Table 2 — Schedule of tests	10
Table 3 — Compatibility requirements	10
Table 4 — PVC insulated, non-sheathed general purpose cable, 450/750 V, single core	12
Table 5 — PVC insulated, non-sheathed cable for internal wiring, 300/500 V, single core and twisted twin ^a	13
Table 6 — <i>Spare</i>	14
Table 7 — PVC insulated, PVC sheathed cable, 300/500 V, single core, flat twin and 3-core	14
Table 8 — PVC insulated, PVC sheathed cable with circuit protective conductor, 300/500 V, single core, flat twin and 3-core	15
Table 9 — PVC insulated, PVC sheathed cable with or without circuit protective conductor, 300/500 V, single core and flat twin (alternative conductor versions)	16
Table 10 — PVC insulated, non-sheathed cable, 450/750 V, single core for installation at low temperatures	17
Table 11 — PVC insulated, non-sheathed, heat resisting cable for internal wiring, 450/750 V, single core	19
Table 12 — PVC insulated, non-sheathed, heat resisting cable for internal wiring, 300/500 V, single core and twisted twin	20

	Page
Table 13 — Oil resisting PVC sheathed, screened cables, 300/500 V, having between 2 and 60 cores	21
Table A.1 — Guide to the use of PVC insulated cables	24
Table B.1 — Spark test voltage	25
Table B.2 — Insulation test voltage	26
Table B.3 — Temperature correction factors	27
Table C.1 — Summary of electrical tests	28

Foreword

This British Standard has been prepared by Subcommittee GEL/20/1. It supersedes BS 6004:1995 which is withdrawn.

The start and finish of text introduced or altered by amendment no. 1 is indicated in the text by tags **A1** **A1**. Tags indicating changes to text carry the number of the amendment. For example, text altered by amendment No. 1 is indicated by **A1** **A1**.

This revision of BS 6004 specifies requirements for PVC insulated non-armoured cables for electric power, lighting and internal wiring. It incorporates cables from HD 21.3, HD 21.7 and HD 21.9 and screened cables from HD 21.13.

The following harmonized cables have been introduced:

- H05V-R types;
- H07V2-R and H07V2-K types (conductor sizes above 2.5 mm²);
- H05V2-R types;
- H05VVC4V5-K types.

The following harmonized types have been transferred from BS 6500:

- H05V-K types;
- H05V2-K types.

It has been assumed in the preparation of this standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people for whose use it has been produced.

Amendment No. 1:2004 implements the changes to the identification of cores by colours, in accordance with HD 308 S2. The principal identification colours are now:

- Single phase — Green-and-yellow (Earth); blue (Neutral); brown (Live).
- Three phase — Green-and-yellow (Earth); blue (Neutral); brown, black, grey (Live).

Users should ensure that any interconnection between cables with these new colours and those with the pre-existing ones is carried out safely. BS 7671, as amended in parallel with this standard, gives some guidance in this respect, but does not cover all installation conditions or cable uses.

The provisions introduced by amendment No. 1:2004 are effective from 1st April 2004. The original version of this standard remains current until 31st March 2006.

Annex C, Annex D, Annex E and Annex G are normative. Annex A and Annex B are informative. Annex F is spare.

Warning. This British Standard calls for the use of substances and/or procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

A2 *Product certification/inspection/testing.* Users of this British Standard are advised to consider the desirability of third-party certification/inspection/testing of product conformity with this British Standard. Users seeking assistance in identifying appropriate conformity assessment bodies or schemes may ask BSI to forward their enquiries to the relevant association. **A2**

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 40, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

1 Scope

This British Standard specifies requirements for the construction, dimensions and mechanical and electrical properties of non-armoured polyvinyl chloride (PVC) insulated cables for operation at voltages up to and including 450 V a.c. to earth and 750 V a.c. between conductors, intended for electric power, lighting and internal wiring.

The types of cable included in the standard are:

Table 4a) and Table 4b)	PVC insulated, non-sheathed general purpose cable, single core. (H07V-U, H07V-R and H07V-K)	450/750 V;
Table 5	PVC insulated, non-sheathed cable for internal wiring, single core and twisted twin. (H05V-U, H05V-R and H05V-K)	300/500 V;
Ⓐ Text deleted Ⓐ		
Table 7	PVC insulated, PVC sheathed cable, single core, flat twin and 3-core. (National type)	300/500 V;
Table 8	PVC insulated, PVC sheathed cable with circuit protective conductor, single core, flat twin and 3-core. (National type)	300/500 V;
Table 9	PVC insulated, PVC sheathed cable with or without circuit protective conductor, single core and flat twin (alternative conductor versions). (National type)	300/500 V;
Table 10a) and Table 10b)	PVC insulated, non-sheathed cable, single core for installation at low temperatures. (H07V3-U, H07V3-R and H07V3-K)	450/750 V;
Table 11a) and Table 11b)	PVC insulated, non-sheathed, heat resisting cable, for internal wiring, single core. (H07V2-U, H07V2-R and H07V2-K)	450/750 V;
Table 12	PVC insulated, non-sheathed, heat resisting cable, for internal wiring, single core and twisted twin. (H05V2-U, H05V2-R and H05V2-K)	300/500 V;
Table 13	Oil resisting PVC sheathed, screened cables, having between 2 and 60 cores. (H05VVC4V5-K)	300/500 V.

A guide to the use of the cables specified in this standard is given in Annex A. Guidance to manufacturers on procedures for routine testing is given in Annex B. Test methods are given in Annex C, Annex D, Annex E and Annex G.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 4727-2-08, *Glossary of electrotechnical, power, telecommunication, electronics, lighting and colour terms — Part 2: Terms particular to power engineering — Group 08: Electric cables.*

BS 6360, *Specification for conductors in insulated cables and cords.*

Ⓐ Text deleted **Ⓐ**

BS 7655-3.1, *Specification for insulating and sheathing materials for cables — Part 3: PVC insulating compounds — Section 3.1: Harmonized types.*

BS 7655-4.1, *Specification for insulating and sheathing materials for cables — Part 4: PVC sheathing compounds — Section 4.1: Harmonized types.*

BS 7655-4.2, *Specification for insulating and sheathing materials for cables — Part 4: PVC sheathing compounds — Section 4.2: General application.*

BS EN 50265-2-1:1999, *Common test methods for cables under fire conditions — Test for resistance to vertical flame propagation for a single insulated conductor or cable — Part 2-1: Procedures — 1 kW pre-mixed flame.*

BS EN 50334, *Marking by inscription for the identification of cores of electric cables having more than 5 cores.*

BS EN 60811-1-1:1995, *Insulating and sheathing materials of electric cables — Common test methods — Part 1: General application — Section 1-1: Measurement of thickness and overall dimensions — Tests for determining the mechanical properties.*

BS EN 60811-1-2:1995, *Insulating and sheathing materials of electric cables — Common test methods — Part 1: General application — Section 1.2: Thermal ageing methods.*

IEC 60502-1:1997, *Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV) — Part 1: Cables for rated voltages of 1 kV ($U_m = 1,2$ kV) and 3 kV ($U_m = 3,6$ kV).*

PD 2379, *Register of colours of manufacturers' identification threads for electric cables and cords.*

3 Definitions

For the purposes of this British Standard, the definitions given in BS 4727-2:Group 08 and the following apply.

3.1

rated voltage U_0

nominal power-frequency voltage between conductor(s) and earth, for which the cable is suitable

3.2

rated voltage U

nominal power frequency voltage between phase conductors for which the cable is suitable

3.3

nominal value

value by which a quantity is designated and which is often used in tables

NOTE In this standard, nominal values usually give rise to values to be checked by measurement taking into account specified tolerances.

3.4

approximate value

value which is only indicative

NOTE In this standard, values described as “approximate” do not constitute requirements to be checked by measurement.

3.5

type tests (symbol T)

tests required to be made before supplying a type of cable covered by this standard on a general commercial basis, in order to demonstrate satisfactory performance characteristics to meet the intended application

NOTE These tests are of such a nature that, after they have been made, they need not be repeated unless changes are made in the cable materials, design or type of manufacturing process which might change the performance characteristics.

3.6

sample tests (symbol S)

tests made on samples of completed cable, or components taken from a completed cable adequate to verify that the finished product meets the design specifications

3.7

routine tests (symbol R)

tests made on all production lengths of cable to demonstrate their integrity

4 Voltage designation

Cables shall be designated by the rated voltages U_0 and U , expressed in the form U_0/U .

In an a.c. system, the rated voltage of a cable shall be at least equal to the nominal voltage of the system for which it is intended and this applies both to the value U_0 and to the value U .

In a d.c. system, the nominal voltage between the conductors shall be not higher than 1.5 times the rated voltage U of the cable and the nominal voltage between any conductor and earth shall be not higher than 1.5 times the rated voltage U_0 of the cable.

The rated voltages recognized for the purposes of this standard shall be 300/500 V and 450/750 V.

NOTE The operating voltage of a system may permanently exceed the nominal voltage of such a system by 10 %. A cable can be used at 10 % higher voltage than its rated voltage if the latter is at least equal to the nominal voltage of the system.

5 General

5.1 Construction

The construction of the cables shall be as specified in the appropriate construction table (**A1**) Table 4, Table 5, Table 7, Table 8, Table 9, Table 10, Table 11, Table 12 and Table 13 (**A1**).

Conformity shall be checked by examination.

5.2 Core identification

5.2.1 General

Each core shall be identified by its colour or number as indicated in the appropriate construction table.

5.2.2 Core colours

The colour shall be either throughout the whole of the insulation or on its surface.

The colours of the cores according to the number of cores in the cable and also the sequence of the colours shall be as given in the appropriate construction table.

On the core with the bi-colour combination green/yellow, the distribution of these colours shall be such that for every 15 mm length of core, one of these colours shall cover at least 30 % and not more than 70 % of the surface of the core, while the other colour covers the remainder of the surface.

Conformity shall be checked by measurement.

NOTE 1 In cases of dispute regarding the green/yellow combination and where appropriate to the method of colour marking of the insulation, a suitable test method for checking conformity is given in BS 6469-99.1:1992, Clause 8.

NOTE 2 It is understood that the colours green and yellow when they are combined as specified are recognized as identifying exclusively the core intended for use as an earth connection or similar protection. The colour blue is for the identification of the core intended to be connected to neutral but, if there is no neutral, blue may be used to identify any core except for the earthing or protective conductor.

NOTE 3 Attention is drawn to the fact that, according to the use to which the cables are to be put, they could be subject to the core colour requirements specified in BS 7671, in other British Standards or in other standards, or in regulations or statutory requirements.

NOTE 4 In addition to the combination green/yellow, and the mono-colour blue, the following other mono-colours are recognized as harmonized: black, brown, grey, orange, pink, red, turquoise, violet and white.

5.2.3 Core numbering

Where cables with more than 5 cores are identified by marking by inscription this shall be in accordance with BS EN 50334.

5.2.4 Clarity and durability of colour

The colours shall be clearly identifiable and durable.

Conformity shall be checked by trying to remove the colour of the cores by rubbing the core lightly 10 times with a piece of cotton wool or cloth soaked in water.

5.3 Cable markings

5.3.1 General

Designated harmonized codes for cables are given in the appropriate construction tables and, except where explicitly shown as national types, these cables shall be permitted to bear the CENELEC Common Marking in accordance with 5.3.3.

5.3.2 Indication of origin

All cables shall be provided with an indication of origin consisting of either an identification thread or threads or the continuous marking of the manufacturer's name or trademark.

If coloured threads are used, the colours shall conform to those registered in PD 2379, where applicable. The colours shall be easy to recognize or shall become recognizable by cleaning with petrol or other suitable solvent, if necessary.

The marking of the manufacturer's name or trademark, if used, shall be by one of the following alternative methods:

- a) printed tape within the cable;
- b)  printing, indenting or embossing on the insulation ;
- c) printing, indenting or embossing on the sheath, if any.

Each specified mark shall be legible and shall be regarded as continuous if the distance between the end of the mark and the beginning of the next identical mark does not exceed:

- 1) 550 mm if the marking is on the outer sheath of the cable;
- 2) 275 mm if the marking is:
 - i) on the insulation of an unsheathed cable;
 - ii) on the insulation of a sheathed cable;
 - iii) on a tape within a sheathed cable.

Conformity shall be checked by measurement.

NOTE A "specified mark" is a mandatory mark covered by this standard, or the optional CENELEC Common Marking as specified in 5.3.3

5.3.3 CENELEC "Common Marking"

It shall be permitted for a cable for which a harmonized code designation is given in the appropriate construction table, to carry an indication that it has been manufactured under a licence issued by one of the approvals organizations subscribing to the CENELEC agreement on the use of a commonly agreed marking for cables. If it does carry such an indication this shall be one of the following.

- a) The mark of the approvals organization, followed by the Common Marking <HAR> applied by one of the three methods specified in 5.3.2.
- b) An identification thread extending throughout the length of the cable indicating the approvals organization. The base colour shall be yellow and this shall be serially dyed or printed red and black. The lengths of the coloured sections shall conform to the dimensions laid down by CENELEC for that approvals organization (see PD 2379).

Neither of these indications shall be used for a cable shown in the construction tables as a national type or national size.

The name CENELEC, in full or abbreviated, shall not be marked on, or in, the cable.

5.3.4 Identification mark

 Harmonized cables shall be marked with the CENELEC harmonized code designation, as given in the applicable construction table. For unsheathed cables the marking shall be on the insulation. For sheathed cables the marking shall be on the sheath or on the insulation of one core. 

The marking shall be continuous as specified in 5.3.2.

Conformity shall be checked by measurement.

5.3.5 *Durability of marking*

Any marking by printing shall be durable.

Conformity shall be checked by rubbing the marking lightly 10 times with a piece of cotton wool or cloth soaked in water.

5.4 Cable testing

5.4.1 *Schedule of tests*

Tests to be performed on cables specified in this standard shall be as specified in Table 2, which refers to the relevant clauses of the standard specifying the requirements and test methods as well as the category of each test which applies, i.e. T, S or R (as defined in Clause 3).

NOTE Table 2 also indicates which tests relate to the completed cables, and which relate to components.

5.4.2 *Test conditions*

5.4.2.1 *Ambient temperature*

Tests shall be performed at an ambient temperature of $(20 \pm 15) ^\circ\text{C}$ unless otherwise specified in the details for a particular test.

5.4.2.2 *Frequency and waveform of power frequency test voltages*

Unless otherwise specified for a particular test, the frequency of the alternating test voltages shall be in the range of 49 Hz to 61 Hz. The waveform shall be substantially sinusoidal.

6 Constructional details

6.1 Conductors

The conductors shall be annealed copper conforming to BS 6360. The class of conductor shall be as given in the appropriate construction table. It shall be permissible for the wires to be tinned except for the types specified in Table 7, Table 8 and Table 9.

The d.c. resistance of the conductors shall be as specified in 7.2.

6.2 Insulation

6.2.1 *Type of insulation*

The insulation shall be PVC of type TI 1, TI 2, TI 3 or TI 4 conforming to BS 7655-3.1, as specified in the appropriate construction table.

6.2.2 *Application*

The insulation shall be applied closely by extrusion to the conductor.

It shall be possible to remove the insulation easily without damage to the insulation itself, to the conductor or to the tin coating, if any.

Conformity shall be checked by examination and by a manual test.

6.2.3 *Thickness*

The radial thickness of the insulation, when determined by taking the average of a number of measurements in accordance with D.1, shall be not less than the value given in the appropriate construction table and the smallest of the measured values shall not fall below the value by more than $10\% + 0.1\text{ mm}$.

6.3 Core identification

Each core shall be identified by its colour or number in accordance with 5.2 and the specific requirements given in the appropriate construction table.

6.4 Fillers, inner sheath and extruded inner covering

6.4.1 Fillers

When separate fillers are used they shall be composed of one of the following, or a combination of the two:

- a) an extruded compound based on unvulcanized rubber or plastics;
- b) natural or synthetic textile fibres.

A centre filler shall not be used in multicore cables unless specifically permitted in the appropriate construction table.

6.4.2 Inner sheath

The inner sheath of cables specified in Table 13 shall be PVC of type TM 2 conforming to BS 7655-4.1, applied around the core assembly.

The radial thickness of the inner sheath, when determined by taking the average of a number of measurements in accordance with **D.2**, shall be not less than the value given in Table 13 or, for cables with a non-preferred number of cores, not less than the value t_S , in millimetres, calculated from the following equation, and the smallest of the measured values shall not fall below the value by more than 15 % + 0.1 mm.

$$t_S = 0.02D_F + 0.6$$

where

D_F is the fictitious diameter over the core assembly calculated in accordance with IEC 60502-1:1997, Annex A, excluding IEC 60502-1:1997, **A.2.4**, in millimetres (mm).

For conductors not given in IEC 60502-1:1997, Annex A, the following values of the fictitious conductor diameter, D_C , shall be used according to the cross-sectional area of the conductor:

- cross-sectional area 0.5 mm²: $D_C = 0.8$;
- cross-sectional area 0.75 mm²: $D_C = 1.0$;
- cross-sectional area 1.0 mm²: $D_C = 1.1$.

It shall be permissible for the inner sheath to fill the spaces between the cores, thus forming a filling, but it shall not adhere to the cores.

6.4.3 Spare

6.5 Screen

The screen of the cables specified in Table 13 shall be applied over the inner sheath, in the form of a braid of plain or tinned copper wires.

For a cable with a preferred number of cores, the diameter of the copper wires shall not exceed the maximum value given in Table 13.

For other cables the diameter of the copper wires shall not exceed the following maximum values, as applicable:

- 0.16 mm for: $D_B \leq 10.0$ mm;
- 0.21 mm for: $10 \text{ mm} < D_B \leq 20.0$ mm;
- 0.26 mm for: $20 \text{ mm} < D_B \leq 30.0$ mm;
- 0.31 mm for: $D_B > 30.0$ mm;

where

D_B is the fictitious diameter under the braid, which is calculated by adding together the fictitious diameter over the core assembly, D_F (calculated as specified in **6.4.2**), and twice the inner sheath thickness, t_S (calculated from the equation given in **6.4.2**).

The diameter of the wires shall be measured using a micrometer.

The screening efficiency shall be determined by measuring the transfer impedance in accordance with **7.8**. The value obtained shall not exceed 250 mΩ/m at 30 MHz.

6.6 Sheath

6.6.1 Type of sheath

The sheath shall be PVC of one of the following types, as specified in the appropriate construction table:

- a) $\boxed{A_1}$ TM 2 or TM 5 conforming to BS 7655-4.1 $\boxed{A_1}$;
- b) type 6 conforming to BS 7655-4.2.

6.6.2 Application

The sheath shall be extruded as an homogeneous layer, and shall be capable of being removed without damage to the cores.

NOTE A separator consisting of a tape or film may be placed under the sheath.

6.6.3 Thickness

6.6.3.1 The radial thickness of the sheath, when determined by taking the average of a number of measurements in accordance with **D.2** or **D.3** as applicable, shall be not less than the value given in the appropriate construction table or, for cables with a non-preferred number of cores, the value t_{S2} calculated in accordance with **6.6.3.2**, and the smallest of the measured values shall not fall below the value by more than 15 % + 0.1 mm.

6.6.3.2 For cables specified in Table 13, but with a non-preferred number of cores, the radial thickness, t_{S2} , in millimetres (mm) of the outer sheath shall be as calculated by the following equation:

$$t_{S2} = 0.08D_S + 0.4$$

with a maximum value of 2.4 mm,

where

D_S is the fictitious diameter over the screen, calculated by adding together the fictitious diameter under the braid D_B (calculated as specified in **6.5**) and four times the relevant value for the maximum diameter of the copper wires (as specified in **6.5**).

6.6.4 Colour

The colour of the sheath shall be as specified in the appropriate construction table. The colour shall be throughout the whole of the sheath or on its surface.

Where surface colouring is applied, the surface colour shall be of essentially the same material as the underlying material and shall be applied as part of the extrusion process. The surface colour shall not be separable from the underlying material and shall be durable.

7 Electrical tests

7.1 General

The electrical tests to be performed on cables specified in this standard shall be as specified in Table 1.

These tests shall be performed in accordance with the test schedule given in Table 2.

7.2 Conductor resistance

When the d.c. resistance of each conductor is measured in accordance with BS 6360 on a sample of cable at least 1 m in length it shall conform to BS 6360.

7.3 Voltage test on completed cable

When the cable is tested in accordance with **C.2** no breakdown of the insulation shall occur.

7.4 Voltage test on cores

When the cores are tested in accordance with **C.3** no breakdown of the insulation shall occur.

7.5 Absence of faults in the insulation

When the cable is tested in accordance with **C.6** no breakdown of the insulation shall occur.

7.6 Insulation resistance

When the cable is tested in accordance with C.4, the insulation resistance of each core shall be not less than the minimum value specified in the appropriate construction table.

7.7 Long term resistance of insulation to d.c.

The insulation shall not break down nor shall the exterior of the insulation show damage when the cable is tested in accordance with C.5. Discoloration of the insulation shall be ignored.

7.8 Screening efficiency

For the cables specified in Table 13, the transfer impedance of the screen shall not exceed 250 mΩ/m at 30 MHz, when tested in accordance with C.7.

8 Non-electrical tests

8.1 General

The non-electrical tests to be performed on cables specified in this standard shall be as specified in Table 1.

The tests shall be performed in accordance with the test schedule given in Table 2.

NOTE In some tests, the preparation and presentation of the test sample can have a critical effect on the result of the tests, so it is essential that test samples are always prepared carefully.

Test samples shall be examined for damage before testing. Test samples which have been damaged during preparation shall not be tested.

8.2 Mean overall dimensions

The mean overall diameter of circular cables and the mean overall dimensions of flat cables shall be within the limits specified in the appropriate construction table, with the exception of national types and sizes for which the lower limit given in the construction tables shall be taken as an indicative value and not a requirement for conformity to this standard.

Conformity shall be checked by the method described in BS EN 60811-1-1:1995, 8.3.

One sample of cable shall be taken from each of three places, separated by at least 1 m. For circular cables the mean of the six values obtained shall be taken as the mean overall diameter. For flat cables, the mean of each set of three values, for the major and minor axis, respectively, shall be taken as the relevant overall dimension.

8.3 Ovality of circular cables

The difference between any two values of the overall diameter of circular sheathed cables at the same cross-section shall not exceed 15 % of the upper limit for the mean overall diameter given in the appropriate construction table.

Conformity shall be checked using the method described in BS EN 60811-1-1:1995, 8.3.

One sample of cable shall be taken from each of three places, separated by at least 1 m.

Two measurements shall be taken at the same cross-section of the cable, covering the maximum and minimum values.

8.4 Compatibility

For cables specified in [A1](#) Table 7, Table 8, Table 9 and Table 13 [A1](#), after a sample of completed cable has been aged in accordance with G.2, the insulation and outer sheath shall conform to the requirements given in Table 3. In addition, at the end of the test period in the oven, the blotting paper shall be free of stains.

8.5 Flame propagation of a single cable

Cables shall be tested in accordance with BS EN 50265-2-1. The test shall be carried out on a sample of the completed cable. [A1](#) After the test, the cable shall conform to the performance recommendations given in BS EN 50265-2-1:1999, Annex A [A1](#).



Table 1 — List of tests applicable to cables specified in Table 4 to Table 13

Clause number	Test	Cable specified in table									
		4	5	7	8	9	10	11	12	13	
	<i>Electrical tests</i>										
7.2	Conductor resistance	X	X	X	X	X	X	X	X	X	
7.3	Voltage test on completed cable at 2 000 V	—	X	X	X	X	—	—	X	X	
7.3	Voltage test on completed cable at 2 500 V	X	—	—	—	—	X	X	—	—	
7.4	Voltage test on cores at 1 500 V ^a	—	—	X	X	X	—	—	—	X	
7.4	Voltage test on cores at 2 000 V ^b	—	—	X	X	X	—	—	—	X	
7.5	Absence of faults in the insulation	X	X	X	X	X	X	X	X	X	
7.8	Insulation resistance at 70 °C	X	X	X	X	X	X	—	—	X	
7.8	Insulation resistance at 90 °C	—	—	—	—	—	—	X	X	—	
7.7	Long term resistance to d.c.	X	X	X	X	X	X	X	X	X	
7.8	Screening efficiency	—	—	—	—	—	—	—	—	X	
	<i>Constructional and dimensional tests</i>										
6	Check on construction	X	X	X	X	X	X	X	X	X	
6.2.3	Measurement of insulation thickness	X	X	X	X	X	X	X	X	X	
6.4.2	Measurement of inner sheath thickness	—	—	—	—	—	—	—	—	X	
6.5	Measurement of screening wire diameter	—	—	—	—	—	—	—	—	X	
6.6.3	Measurement of sheath thickness	—	—	X	X	X	—	—	—	X ^c	
8.2	Measurement of overall dimensions	X	X	X	X	X	X	X	X	X	
8.3	Measurement of ovality	—	—	—	—	—	—	—	—	X	
8.4	Compatibility test	—	—	X	X	X	—	—	—	X	
8.5	Flame propagation of a single cable	X	X	X	X	X	X	X	X	X	
^a For insulation thicknesses up to and including 0.6 mm.											
^b For insulation thicknesses exceeding 0.6 mm.											
^c Applicable to both inner and outer sheaths.											