



BSI Standards Publication

Electric cables – Thermosetting insulated, armoured, fire-resistant cables of rated voltage 600/1 000 V, having low emission of smoke and corrosive gases when affected by fire – Specification

Publishing and copyright information

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

© BSI 2009

ISBN 978 0 580 66960 6

ICS 29.060.20

The following BSI references relate to the work on this standard:

Committee reference GEL/20/17

Draft for comment 09/30199575 DC

Publication history

First published September 1996

Second edition October 2000

Third (present) edition September 2009

Amendments issued since publication

Date	Text affected
------	---------------

Contents

Foreword *iii*

1	Scope	1
2	Normative references	2
3	Terms and definitions	3
4	Voltage designation and fire resistance categories	4
5	Conductors	5
6	Insulation	5
7	Identification of cores	6
8	Laying-up	7
9	Bedding	7
10	Armour	8
11	Sheath	9
12	Cable marking	10
13	End sealing	11
14	Schedule of tests	12
15	Test conditions	12
16	Routine tests	12
17	Sample tests	12
18	Type tests	14

Annexes

Annex A (informative)	Recommendations for the selection and operation of cables	23
Annex B (informative)	Recommendations for the installation of cables	25
Annex C (informative)	Information to be provided with the enquiry or order	28
Annex D (normative)	Measurement of thickness	28
Annex E (normative)	Abrasion test	29
Annex F (normative)	Insulation resistance constant test on sheath	30
Annex G (normative)	Armour tests	31
Annex H (normative)	Resistance of armour	34
Annex I	<i>Spare</i>	36
Annex J (normative)	Test for shrinkage of sheath on cable	36
Annex K (normative)	Voltage test on completed cables	37
Annex L (normative)	Fire resistance tests for category F2 – Additional provisions for cables with a diameter exceeding 20 mm	37
Annex M (normative)	Compatibility test	39
Annex N (informative)	Gross cross-sectional area of armour	39
Annex O	<i>Spare</i>	41
Annex P (informative)	Notes on type tests	41
Annex Q (informative)	Guides to use	44
Bibliography		47

List of figures

Figure E.1 – Abrasion test	29
Figure L.1 – Method of mounting a sample for test for resistance to fire with mechanical shock	38

List of tables

Table 1 – Tape thickness, wire diameter and mass of zinc coating	9
Table 2 – Schedule of tests	15
Table 3 – Compatibility requirements	16
Table 4 – Two-core 600/1 000 V cables with steel wire armour	16
Table 5 – Three-core 600/1 000 V cables with steel wire armour	17
Table 6 – Four-core 600/1 000 V cables with steel wire armour	18
Table 7 – Five-core 600/1 000 V cables with steel wire armour	19

Table 8 – 600/1 000 V auxiliary cables with steel wire armour	20
Table 9 – Two-core 600/1 000 V cables with interlocked steel tape armour	21
Table 10 – Three-core 600/1 000 V cables with interlocked steel tape armour	21
Table 11 – Four-core 600/1 000 V cables with interlocked steel tape armour	22
Table 12 – Five-core 600/1 000 V cables with interlocked steel tape armour	22
Table A.1 – Selection of cables for a.c. systems	23
Table B.1 – Minimum installation radius	25
Table B.2 – Test voltages after installation	27
Table E.1 – Vertical force on cable during abrasion test	30
Table G.1 – Temperature correction multiplication factors	33
Table H.1 – Maximum resistance of steel wire armour for two-, three-, four- and five-core cables	34
Table H.2 – Maximum resistance of steel wire armour for auxiliary cables	35
Table H.3 – Maximum resistance of interlocked steel tape armour for two-, three-, four- and five-core cables	35
Table K.1 – Test voltage on completed cable	37
Table N.1 – Gross cross-sectional area of armour wires for two-, three-, four- and five-core cables having steel wire armour	39
Table N.2 – Gross cross-sectional area of armour wires for auxiliary cables with copper conductors having steel wire armour	40
Table N.3 – Gross cross-sectional area of interlocked steel tape armour for two-, three-, four- and five-core cables	40
Table P.1 – Test schedule for the smoke emission test	43

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 48, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI and came into effect on 30 September 2009. It was prepared by Subcommittee GEL/20/17, *Low voltage cables*, under the authority of Technical Committee GEL/20, *Electric cables*. A list of organizations represented on these committees can be obtained on request to their secretary.

Supersession

This British Standard supersedes BS 7846:2000, which is withdrawn.

Information about this document

This new edition makes changes to the scope to include types of fire resistant cables for use in the construction and industrial sector for life safety, fire fighting, property protection and business continuity applications. It requires that all cables meet, as a minimum requirement, the fire resistance category F2 and introduces the additional options of resistance to fire with direct mechanical impact and water in combination for varying periods of time, which are assessed in accordance with BS 8491, and classified in this standard as categories F30, F60 and F120. Alternative armour wire sizes and new armour constructions, which might be appropriate for certain of these optional categories, are also introduced.

BS 8491:2008 describes a method for assessment of the fire integrity of large diameter power cables for use as components of smoke and heat control systems as given in BS 7346-6 and certain other active fire safety systems. It is applicable to cables of rated voltages not exceeding 600/1 000 V and of overall diameter greater than 20 mm.

NOTE The test method given in BS 8491:2008 is technically identical with the test method given in BS 7346-6:2005, Annex B. It is intended that when BS 7346-6:2005 is amended Annex B will be taken out.

As with the previous edition, performance under fire conditions is assessed on the basis of tests which measure, under defined conditions, the flame propagation, emission of smoke and corrosive gases, and fire resistance.

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.

Hazard warnings

WARNING. This British Standard calls for the use of substances and/or procedures that can 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.

Use of this document

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

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

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 cannot confer immunity from legal obligations.

1 Scope

This British Standard specifies requirements for construction and performance, and describes methods of test, for armoured, fire-resistant cables with thermosetting insulation and of rated voltage 600/1 000 V and low emission of smoke and corrosive gases when affected by fire.

The circuit integrity performance under fire conditions is assessed on the basis of various tests which either separately measure resistance to fire, resistance to fire with water spray, and resistance to fire with mechanical shock (Category F2) or in combination measure resistance to fire with direct mechanical impact and water jet (Categories F30, F60 and F120).

Cables specified in this standard are intended for use in fixed installations in industrial areas, buildings and similar applications, where maintenance of power supply during a fire is required for a defined period of time.

NOTE 1 Attention is drawn to the fact that the ability of a given cable to meet a particular category in this standard refers only to the test conditions stated, and the level of performance achieved in a particular installation can be influenced by actual installation conditions.

Cables covered by this standard have limited evolution of smoke and corrosive gases when assessed under the fire conditions as specified in BS EN 61034-2 and BS EN 50267-2-1.

In this standard, the level of corrosive (and acid) gases is determined by measurement of hydrochloric acid (HCl) in accordance with BS EN 50267-2-1.

The insulation and other components are suitable to permit operation of the cables at a maximum sustained conductor temperature of 90 °C and for a maximum short-circuit conductor temperature of 250 °C.

NOTE 2 Limitation on the temperature of the cables may be imposed in situations where they may be touched.

NOTE 3 Due to the relatively high conductor temperature, there is a risk of drying out the surrounding soil causing an increase in thermal resistivity which in turn would lead to the cable temperature rising to a higher value than anticipated. For cable laid directly in the ground, a suitable de-rating factor should be applied or a lower maximum sustained conductor operating temperature should be assumed to take into account the possible effects of soil drying out.

NOTE 4 In installations which include cable joints and terminations, the performance of these accessories should be taken into account in deciding the maximum operating temperature of the cable.

The cables specified in the standard are either steel wire armoured or interlocked steel tape armoured and sheathed, as follows:

- a) two-, three-, four- and five-core stranded copper conductor;
- b) multicore auxiliary stranded copper conductor.

Annex A gives recommendations for the selection and operation of cables while recommendations for the installation of cables are given in Annex B. Annex C lists the information that should be given with an enquiry or order.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 5099, *Electric cables – Voltage levels for spark testing*

BS 6387:1994, *Specification for performance requirements for cables required to maintain circuit integrity under fire conditions*

BS 7655-1.2, *Specification for insulating and sheathing materials for cables – Part 1: Cross-linked elastomeric insulating compounds – Section 1.2: General 90 °C application*

BS 7655-1.3, *Specification for insulating and sheathing materials for cables – Part 1: Cross-linked elastomeric insulating compounds – Section 1.3: XLPE*

BS 7655-6.1, *Specification for insulating and sheathing materials for cables – Part 6: Thermoplastic sheathing compounds having low emission of corrosive gases, and suitable for use in cables having low emission of smoke when affected by fire – Section 6.1: General application thermoplastic types*

BS 8491:2008, *Method for assessment of fire integrity of large diameter power cables for use as components for smoke and heat control systems and certain other active fire safety systems*

BS 10244-2:2009, *Steel wire and wire products – Non-ferrous metallic coatings on steel wire – Part 2: Zinc or zinc alloy coatings*

BS EN 50266-2-4:2001, *Common test methods for cables under fire conditions – Test for vertical flame spread of vertically-mounted bunched wires or cables – Part 2-4: Procedures – Category C*

BS EN 50267-2-1, *Common test methods for cables under fire conditions – Tests on gases evolved during combustion of materials from cables – Part 2-1: Procedures – Determination of the amount of halogen acid gas*

BS EN 50363-5, *Insulating, sheathing and covering materials for low voltage energy cables – Part 5: Halogen-free, cross-linked insulating compounds*

BS EN 60228, *Conductors of insulated cables*

BS EN 60332-1-2:2004, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

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

BS EN 60811-1-2:1995 +A1:2002, *Common test methods for insulating and sheathing materials of electric and optical cables – Part 1-2: General application – Thermal ageing methods*

BS EN 60811-1-3, *Insulating and sheathing materials of electric and optical cables – Common test methods – Part 1-3: General application – Methods for determining the density – Water absorption tests – Shrinkage test*

BS EN 61034-2, *Measurement of smoke density of cables burning under defined conditions – Part 2: Test procedure and requirements*

BS EN 62230, *Electric cables – Spark-test method*

IEC 60050-461, *International Electrotechnical Vocabulary – Part 461: Electric cables*

3 Terms and definitions

For the purposes of this British Standard the terms and definitions given in IEC 60050-461 and the following apply.

- 3.1 rated voltage U_0**
nominal power-frequency voltage between conductor(s) and armour or 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 maximum voltage U_m**
maximum sustained power-frequency voltage between phase conductors for which the cable is suitable
- 3.4 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 measurements taking into account specified tolerances.
- 3.5 approximate value**
value which is only indicative
NOTE In this standard, values described as approximate do not constitute requirements to be checked by measurement.
- 3.6 fire resistance**
ability of a cable to maintain circuit integrity for a stated period of time and under conditions as defined in a standard test
- 3.7 type tests (symbol T)**
tests made before supplying, on a general commercial basis, a type of cable covered by this standard, in order to demonstrate satisfactory performance characteristics required 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 or design or manufacturing process which might change the performance characteristics.
- 3.8 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
- 3.9 routine tests (symbol R)**
tests made on all production lengths to demonstrate their integrity
- 3.10 tests after installation**
tests intended to demonstrate the integrity of the cable and its accessories as installed

4 Voltage designation and fire resistance categories

4.1 Voltage designation

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

The rated voltage recognized for the purposes of this standard shall be 600/1 000 V.

The maximum designated voltage (U_m) for the purposes of this standard for 600/1 000 V cables shall be 1 200 V.

NOTE Guidance on the selection of cables of appropriate voltage designations for particular systems is given in A.2.

4.2 Fire resistance categories

Cables shall be designated by category according to their special fire resistance characteristics as follows:

- Category F2: Resistance to fire, resistance to fire with water, resistance to fire with mechanical shock, assessed separately, when tested in accordance with 17.4.2;
- Category F30 Resistance to fire with direct mechanical impact and water assessed in combination when tested in accordance with BS 8491:2008 for 30 min.
- Category F60 Resistance to fire with direct mechanical impact and water assessed in combination when tested in accordance with BS 8491:2008 for 60 min.
- Category F120 Resistance to fire with direct mechanical impact and water assessed in combination when tested in accordance with BS 8491:2008 for 120 min.

All cables shall conform to the requirements for category F2.

It shall be permissible for a manufacturer to carry out additional testing and to declare that a cable conforms to the requirements for any of the additional categories F30, F60 or F120. If a cable conforms to the requirements for category F60 it shall be deemed to conform to the requirements for category F30 as the tests are identical except for the test durations. If a cable conforms to the requirements for category F120 it shall be deemed to conform to the requirements for categories F30 and F60 as the tests are identical except for the test durations.

NOTE 1 The test in BS 8491 is applicable to cables of rated voltage not exceeding 600/1 000 V and of overall diameter greater than 20 mm.

NOTE 2 Attention is drawn to the fact that the ability of a given cable to conform to the requirements for a particular category in this standard refers only to the test condition stated, and the level of performance achieved in a particular installation can be influenced by the actual installation conditions.

5 Conductors

The conductors shall be annealed copper and shall conform to BS EN 60228. Where the manufacturer deems it necessary to use tinned copper conductors, they shall conform to the requirements of BS EN 60228 for metal coated conductors.

The conductors shall be circular, circular compacted or shaped stranded (class 2), as specified in Table 4 to Table 12 inclusive.

6 Insulation

6.1 General

The insulation shall be GP 8 conforming to BS 7655-1.3, or GP 6 conforming to BS 7655-1.2, or EI 5 conforming to BS EN 50363-5. For the assessment of halogens on the insulation taken from a completed cable, only 6.4 shall apply.

NOTE 1 Other tests for assessment of halogens, for instance to BS EN 50267-2-2 and BS EN 60684-2, are not required.

The insulation shall be applied by the extrusion process and cross-linked to form a compact and homogeneous layer.

The insulation shall be applied in a single layer, or in a number of coherent layers. Where more than one layer is used, the complete insulation shall be tested as though it were a single layer.

NOTE 2 Insulation applied in more than one layer does not conform to the definition of "Double insulation" given, for instance, in BS 7671.

The manufacturer shall have the option to apply a tape or tapes over the conductor. These tapes shall not be included as part of the insulation thickness.

6.2 Thickness of insulation

The thickness of insulation, when determined by taking the average of a number of measurements in accordance with Annex D, shall be not less than the value given in Table 4 to Table 12, as appropriate, and the smallest of the measured values shall not fall below the value given in Table 4 to Table 12, as appropriate, by more than (10% + 0.1 mm).

6.3 Spark testing of insulation

When tested in accordance with the a.c. or d.c. test methods specified in BS EN 62230, and using the test voltages specified in BS 5099, there shall be no breakdown of the insulation.

6.4 Corrosive and acid gas emission of insulation and tape(s)

When tested in accordance with BS EN 50267-2-1, the level of HCl shall be not greater than 0.5%.

7 Identification of cores

7.1 General

The cores of all cables shall be identified either by colour or by numbers. Numbers shall be marked sequentially starting with the number 1. Colour coding shall be in accordance with the following sequence.

Number of cores	Identification
Two-core	Brown, blue
Three-core	Brown, black, grey
Four-core	Blue, brown, black, grey
Five-core	Green-and-yellow, blue, brown, black, grey

NOTE Depending on their intended use, the cables might be subject to core colour requirements specified in BS 7671 or other standards, or in statutory requirements.

The colour shall be applied either throughout the insulation or on its external 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.

Numbers on each core shall be printed in a colour contrasting with that of the insulation.

The height of each individual number shall be not less than 1.5 mm.

The spacing shall be such that each number is repeated at intervals not greater than 70 mm.

Conformity shall be checked by visual examination and measurement.

7.2 Bi-colour combination

On the core marked with the bi-colour combination green-and-yellow, the distribution of the colours shall be such that for every 15 mm length of core, one of these colours shall cover at least 30% and at most 70% of the surface of the core, while the other colour covers the remainder of the surface.

NOTE In cases of dispute and where appropriate to the method of colour marking of the insulation, a suitable test for checking conformity is given in BS EN 50396:2005, 5.2.

7.3 Clarity and durability

The colour or the number used for core identification shall be clearly identifiable and durable such that it cannot be removed when rubbed 10 times with a piece of cotton wool or cloth soaked in water.

8 Laying-up

8.1 General

The cores of cables having two, three, four or five cores shall be laid-up with a right-hand or right-and-left-hand alternating direction of lay. For multicore auxiliary cables the direction of lay shall alternate for each successive layer. Auxiliary cables having up to and including seven cores shall be laid-up with a right-hand or left-hand or with a right-and-left-hand alternating direction of lay. Cores shall be laid up in the sequence given in 7.1.

Conformity shall be checked by visual examination.

NOTE The manufacturer may apply a tape or tapes over the laid-up cores.

If necessary, the formation of a compact and reasonably circular cable shall be achieved either by the bedding (see 9.1), or by the application of synthetic fillers and binder tape.

It shall be possible to strip the fillers, if any, from the cable without damaging the insulation of the cores.

8.2 Corrosive and acid gas emission of tape(s) and fillers

When tested in accordance with BS EN 50267-2-1, the level of HCl of filler and tape(s) shall be not greater than 0.5%.

9 Bedding

9.1 General

The bedding shall consist of an extruded layer of polymeric material compatible with the operating temperature of the cable. When tested in accordance with BS EN 60811-1-1, it shall have a tensile strength of not less than 4 N/mm² and elongation at break not less than 50%.

It shall be possible to remove the bedding without damaging the insulation of the cores.

The manufacturer shall have the option to apply a tape or tapes over the bedding. These tapes shall not be included as part of the bedding thickness.

9.2 Thickness of bedding

The minimum thickness of extruded bedding, measured in accordance with Annex D, shall not fall below the value given in Table 4 to Table 12, as appropriate, by an amount more than (20% + 0.2 mm).

9.3 Corrosive and acid gas emission of bedding and tape(s)

When tested in accordance with BS EN 50267-2-1, the level of HCl shall be not greater than 0.5%.

10 Armour

10.1 General

The armour shall consist of either a single layer of galvanized steel wires or a single layer of galvanized interlocking steel tape.

The wires shall have the nominal wire dimensions as given in Table 4 to Table 8, as appropriate. The wire armour shall be applied helically with a left-hand lay for cables having up to and including five cores. For multicore auxiliary cables the armour shall be applied helically with a direction of lay opposite to that of the final layer of cores, except that for cables which have been laid-up with alternating right-and-left-hand lay the armour shall be applied with either a right-hand or a left-hand lay.

The interlocked steel tape shall have the nominal thickness as given in Table 9 to Table 12, as appropriate. The interlocked steel tape armour shall be applied helically.

NOTE The manufacturer may apply a tape or tapes over the armour.

No protective compounds, e.g. bitumen, shall be applied over the armour.

10.2 Corrosive and acid gas emission of tape(s)

When tested in accordance with BS EN 50267-2-1, the level of HCl shall be not greater than 0.5%.

10.3 Wire armour

Wire armour shall consist of a single layer of galvanized steel wires.

The armour wire shall conform to the following.

- a) When determined in accordance with **G.1**, the diameter of the round armour wires, shall fall within the minimum and the maximum wire diameters given in Table 1.
- b) When determined in accordance with **G.2**, the mass of zinc coating of galvanized steel armour wire shall be not less than the value given Table 1.
- c) When tested in accordance with **G.3**, the mechanical characteristics of galvanized armour wires shall be such that none of the wires shall break.

10.4 Interlocked steel tape armour

Interlocked steel tape armour shall consist of a single layer of galvanized interlocked steel tape and shall conform to the following.

- a) When determined in accordance with **G.5**, the thickness of the galvanized interlocked steel tape, shall fall within the minimum and maximum thickness given in Table 1.
- b) When determined in accordance with **G.6**, the mass of zinc coating of the galvanized interlocked steel tape shall be not less than the value given in Table 1.
- c) When subjected to a flexibility of armour test in accordance with **G.7**, the galvanized interlocked steel tape armour shall pass the test.

Table 1 Tape thickness, wire diameter and mass of zinc coating

Nominal thickness of tape and diameter of wire	Tape thickness and wire diameter		Minimum mass of zinc coating
	Minimum	Maximum	
mm	mm	mm	g/m ²
<i>Thickness of tape</i>			
0.63	0.55	0.76	150
0.85	0.77	1.0	150
<i>Diameter of wire</i>			
0.90	0.85	0.95	112
1.25	1.18	1.32	150
1.6	1.51	1.69	172
2.0	1.90	2.10	180
2.5	2.37	2.63	195
3.15	2.99	3.31	206

10.5 Joints

Joints in steel wire armour or interlocked steel tape armour shall be brazed or welded and any surface irregularity shall be removed.

A joint in any one steel wire shall be not less than 1 m from the nearest joint in any other steel wire in the complete cable.

10.6 Armour resistance

When measured and corrected to 20 °C in accordance with G.4, the d.c. resistance of the armour of the completed cable shall not exceed the appropriate value given in Table H.1, Table H.2 or Table H.3.

11 Sheath

11.1 General

The sheath shall be an extruded layer of polymeric material conforming to the requirements for LTS 1 specified in BS 7655-6.1.

NOTE Sheaths are normally black and, when properly formulated and compounded, this provides good resistance to deterioration from outdoor exposure to light. Colours other than black may be provided by agreement between the manufacturer and the purchaser but, unless such sheaths also include additives to protect the cable from UV, the cables will not be suitable for all exposure conditions.

11.2 Thickness of sheath

The minimum thickness of the sheath, when measured in accordance with Annex D, shall not fall below the value given in Table 4 to Table 12, as appropriate, by an amount exceeding (20% + 0.2 mm).

11.3 Spark testing of sheath

When tested in accordance with the a.c. or d.c. test methods specified in BS EN 62230, and using the test voltages specified in BS 5099, there shall be no breakdown of the sheath.

11.4 Corrosive and acid gas emission of sheath

When tested in accordance with BS EN 50267-2-1, the level of HCl shall be not greater than 0.5%.

12 Cable marking

12.1 End marking

The ends of each factory length of cable having three or more cores of conductor size 25 mm² and above shall be marked red or green. The end at which the sequence of core colours, as specified in Clause 7, is clockwise shall be marked red and the other end shall be marked green.

12.2 External marking

The external surface of all cables conforming to this British Standard shall be legibly marked with the following elements.

Element	Example of marking
a) Electric cable	ELECTRIC CABLE
b) Voltage designation	600/1 000 V 600/1 000 V AUX
c) British Standard number and cable fire resistance category	BS 7846-F2 ¹⁾ BS 7846-F30 ²⁾ BS 7846-F60 ²⁾ BS 7846-F120 ²⁾
d) Manufacturer's identification	XYZ
e) Number of cores and nominal area of conductor	4 × 50

NOTE 1 4 × 50 indicates a four-core cable with 50 mm² conductors.

¹⁾ Marking BS 7846-F2 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard and the requirements for the fire resistance category stated. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third party certification of conformity.

²⁾ Where a manufacturer is claiming conformity to one of the additional optional fire resistance categories F30, F60 or F120, as an alternative to marking BS 7846-F2, the cable may be marked BS 7846-F30, BS 7846-F60 or BS 7846-F120, as applicable. Such a marking on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard and the requirements for the fire resistance category stated. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third party certification of conformity.

The marking of the items a) to d) shall be by embossing, indenting or printing on the sheath.

For cables with tabulated approximate overall diameters above 15 mm, items a), b) and c) shall appear, in any sequence that is deemed neither to confuse nor conflict, on two or more primary lines along the axis of the cable, approximately equally spaced around the circumference of the cable.

Items d) and e) shall appear on either one of the primary lines, or on a secondary line or lines, in any sequence that is deemed neither to confuse nor conflict.

NOTE 2 Items d) and e) need not both appear on the same line.

For cables with tabulated approximate overall diameters up to 15 mm, the elements of the marking shall be disposed as for cables of greater than 15 mm diameter except that the marking for items a), b) and c) shall appear on one or more primary lines.

The letters and figures shall consist of upright block characters with a minimum height of 3 mm.

The distance between the end of one element of marking and the beginning of the next identical element of marking shall be not greater than 550 mm for items a), b) and c) and not greater than 1 100 mm for items d) and e).

Conformity shall be checked by visual examination and measurement.

12.3 Identification of year of manufacture

The year of manufacture shall be marked on the external surface of the cable. The maximum distance between marks shall be not greater than 1 100 mm.

12.4 The mark of an approval organization

If the mark of an approval organization is used it shall be marked on the external surface of the cable.

Identification on the external surface shall be in the form of the symbol(s) or legend specified by the approval organization, and the maximum distance between marks shall be not greater than 1 100 mm.

12.5 Additional marking

Any additional marking shall be throughout the length of the cable, and shall be on the external surface of the cable.

Such marking, however made, shall be repeated at intervals not exceeding 1 100 mm.

The additional marking shall not be such as to render illegible the marking specified in 12.2, 12.3 and 12.4.

13 End sealing

Before dispatch, the manufacturer shall cap the ends of the cable in order to form a seal to prevent the ingress of water during transportation and storage.