

Specification for

Insulated flexible cables and cords for coil leads

UDC [621.315.21 + 621.315.342]:621.3.045.6

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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 20, upon which the following bodies were represented:

- Aluminium Federation
- Association of Consulting Engineers
- Association of Manufacturers of Domestic Electrical Appliances
- British Approvals Service for Cables
- British Cable Makers' Confederation
- British Plastics Federation
- British Steel Industry
- Department of the Environment (Property Services Agency)
- Department of Trade and Industry (Consumer Safety Unit, CA Division)
- Electricity Association
- Engineering Equipment and Materials Users' Association
- Institution of Electrical Engineers
- London Regional Transport

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- Association of Manufacturers Allied to the Electrical and Electronic Industry (BEAMA Ltd.)
- British Electrical Systems Association (BEAMA Ltd.)
- British Non-Ferrous Metals Federation
- British Steel plc
- Chartered Institution of Building Services Engineers
- ERA Technology Ltd.
- Electrical Installation Equipment Manufacturers' Association (BEAMA Ltd.)
- Engineering Industries Association
- GAMBICA (BEAMA Ltd.)
- Institution of Incorporated Executive Engineers
- Lighting Industry Federation Ltd.
- London Underground Ltd.
- National Association of Lift Makers
- Portable Electric Tool Manufacturers' Association
- 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 May 1993

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First published December 1969
Second edition May 1993

The following BSI references relate to the work on this standard:
Committee reference CIL 20
Draft for comment 92 25663 DC

ISBN 0 580 22033 8

Amendments issued since publication

Amd. No.	Date	Comments
8268	November 1994	Indicated by a sideline in the margin

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Foreword

This edition of BS 6195 has been prepared under the direction of the Cable and Insulation Standards Policy Committee at the request of the British Cable Makers' Confederation. It supersedes BS 6195:1969 which is withdrawn.

This edition introduces two new cable types, type 9 and type 10, and removes four cable types, type 1a, type 1b, type 7 and type 8. This edition introduces these changes in order to bring this standard up to date.

There is currently no published international or European standard for cables contained in this British Standard.

Product certification. Users of this British Standard are advised to consider the desirability of third party certification of product conformity with this British Standard based on testing and continuing surveillance which may be coupled with assessment of a supplier's quality systems against the appropriate Part of BS 5750.

Enquiries as to the availability of third party certification schemes are forwarded by BSI to the Association of Certification Bodies. If a third party certification scheme does not already exist, users should consider approaching an appropriate body from the list of Association members.

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.

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 and ii, pages 1 to 14, 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 Scope

This British Standard specifies requirements for various types of insulation, voltage categories and dimensions for a standard range of insulated flexible cables and flexible cords, which are intended to be connected directly and permanently to a coil winding or other component of electric apparatus. The types of cable included in the standard are as follows.

		Designated temperature
a) Type 3 cable, voltage categories A, C and D.	Oil resisting and flame retardant rubber insulated coil leads.	90 °C
b) Type 4 cable, voltage categories A, C, D, E and F.	Flame retardant rubber insulated coil leads.	90 °C
c) Type 5 cable, voltage categories A, C, D, E and F.	180 °C silicone rubber insulated coil leads.	180 °C
d) Type 9 cable, voltage category A.	125 °C flame retardant insulated coil leads.	125 °C
e) Type 10 cable, voltage category A.	150 °C flame retardant insulated coil leads.	150 °C

Guidance on the use of this standard is given in Annex A.

2 References

2.1 Normative references

This British Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed on the inside back cover. For dated references, subsequent amendments to or revisions of any of these publications apply to this British Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

2.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

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

4 Voltage categories

The flexible cables shall be divided into the voltage categories in Table 1 which are defined by the appropriate maximum voltage between conductors or between conductor and earth, to which the cable is liable to be subjected during a 1 min test of the equipment to which it is connected.

Table 1 — Voltage categories

Voltage category	Maximum equipment test voltage (a.c., r.m.s.) kV
A	2.5
C	4.0
D	9.5
E	17
F	27

5 Conductor

5.1 The conductor shall be made from tinned, annealed, high conductivity copper wires as specified in 5.2 or 5.3, except that wires taken from the conductor are not required to pass the tinning test.

5.2 The conductor shall be a class 5 conductor conforming to BS 6360.

5.3 If required, concentric strands shall be used for the sizes stated in Table 2. The number of wires shall be as stated in Table 2 and the maximum conductor resistance shall be the same for a class 5 conductor of equal area in BS 6360.

Table 2 — Concentric strands

Nominal cross-sectional area mm ²	Specified number of wires
0.5	7
0.75	19
1.0	19
1.5	19
2.5	37
4.0	37

5.4 If required, a tape or tapes shall be applied over the conductor.

In the case of voltage categories E and F, if a tape is used it shall be a semi-conducting tape consisting of a textile fabric proofed with a suitable semi-conducting compound with a surface resistivity not exceeding 100 000 Ω per square. Conformity shall be checked by the test method described in Annex B.

6 Insulation

6.1 Types of insulation

The insulation shall meet the requirements stated for each cable type as follows.

- a) Type 3 cable. The insulation shall conform to BS 7655-1.4 for type OR 1 compound.
- b) Type 4 cable. The composite insulation shall conform to BS 7655-1.5 for type FR 1 compound for voltage categories A and C, and type FR 2 compound for voltage categories D, E and F.
- c) Type 5 cable. The insulation shall conform to BS 7655-1.1 for type EI 2 compound.
- d) Type 9 cable. The insulation shall conform to BS 7655-1.6 for type CL 1 compound.
- e) Type 10 cable. The insulation shall conform to BS 7655-1.6 for type CL 2 compound.

Conformity shall be checked by carrying out the appropriate tests listed in Table 3.

6.2 Application

The insulation shall be applied closely to the conductor or conductor taping. It shall be possible to remove the insulation without damage to the insulation itself, the conductor or the tin coating.

In the case of type 4 cable, there shall be no voids between the composite layers of insulation which shall be continually adherent.

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

6.3 Thickness

The mean value of the thickness of the insulation shall be not less than the value given for each type, voltage category and cross section of cable in Table 4 to Table 8, as appropriate.

In the case of type 4 cable, the thickness of the outer layer of the composite insulation shall be the following percentage of the total thickness of the insulation:

- a) for voltage categories A, C, D and E: 25 % to 50 %
- b) for voltage category F: 20 % to 35 %

NOTE For all types of cable, it is permissible for the thickness at any place to be less than the value specified provided that the difference does not exceed 0.1 mm + 10 % of the value specified.

Table 3 — Schedule of tests

Test	Requirements given in clause	Test method	Category
<i>Conductor</i>			
Construction	5	BS 6360	RS
<i>Insulation</i>			
Material	6.1	BS 7655	T
Application	6.2	Visual examination	RS
Thickness	6.3	8.1 of BS 6469-1.1:1992	RS
Identification	7	Visual examination	RS
<i>Tests on complete cables</i>			
Cable marking	8	Visual examination and measurement	R
Conductor resistance	13.2	BS 6360	RS
Voltage test	13.3	Annex D	RS
Absence of faults on insulation	12.2	Annex D	R
Overall dimensions	9	8.3 of BS 6469-1.1:1992	RS
Colour durability	7.3	Annex C	T
Bend test	14.2	Annex E	T
Heating test	14.3	Annex E	T
Solvent resistance test	14.4	Annex E	T
Varnish resistance test	14.5	Annex E	T
Fire test	14.6	BS 4066-1	T