608-13-05 Socket-outlets shall be protected individually, or in groups of not more than three, by a residual current device complying with BS 4293 and having the characteristics specified in Regulation 412-06 and must not be bonded to the PME terminal.

For a PME supply the protective conductor of each socket-outlet circuit shall be connected to an earth electrode and shall comply with Regulations 413-02-18 to 413-02-20.

608-13-06 Grouped socket-outlets shall be on the same phase.

SECTION 609

(Reserved for Marinas)

SECTION 610

(Reserved for future use)

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SECTION 611

HIGHWAY POWER SUPPLIES AND STREET FURNITURE

611-01 Scope

611-01-01 The requirements of this section shall apply to installations comprising highway distribution circuits, street furniture and other street located equipment. They shall not apply to supplier's works as defined by The Electricity Supply Regulations 1988 as amended in accordance with Regulation 110-02.

611-01-02 Any measure prescribed in this section of the Regulations shall also apply to similar equipment located in other areas used by the public but not designated as a highway or part of a building.

Protection for safety

611-02 Protection against electric shock

611-02-01 Where a measure for protection against direct contact in accordance with Regulation 412-01 is used then:

(i) protection by obstacles shall not be used, and

(ii) where protection is provided by placing out of reach, it shall only apply to low voltage overhead lines constructed to the standard required by The Electricity Supply Regulations 1988 as amended, and

(iii) except when the maintenance of equipment is to be restricted to skilled persons specially trained, where items of street furniture or street located equipment are within 1.5 m of a low voltage overhead line, protection against direct contact with the overhead line shall be provided by means other than placing out of reach.

611-02-02 A door in street furniture or street located equipment used for access to electrical equipment shall not be used, to meet Regulation 412-03-01, as a barrier or an enclosure. To satisfy the purposes of protection against direct contact the requirements of Regulation 412-03-04 shall be applied. An intermediate barrier shall be provided to prevent contact with live parts, such barrier affording a degree of protection of at least IP2X or IPXXB and removable only by the use of a tool.

611-02-03 Protection against indirect contact in accordance with Regulation 413-01 shall not be provided by:

(i) a non-conducting location

(ii) earth-free equipotential bonding

(iii) electrical separation.

611-02-04 A maximum disconnection time of 5 s shall apply to all circuits feeding fixed equipment used in highway power supplies for compliance with the requirements of Regulation 413-02-04.

611-02-05 Where protection against indirect contact is provided by using earthed equipotential bonding and automatic disconnection in accordance with Regulation 413-01-01(i) metallic structures not connected to or part of the street furniture or street located equipment shall not be connected to the main earthing terminal as extraneous-conductive-parts under Regulation 413-02-02.

611-03 Devices for isolation and switching

611-03-01 Where it is intended that isolation and switching will be carried out only by instructed persons and subject to Regulation 461-01-02 for TN systems the requirement of Regulation 460-01-02 is considered to be fulfilled if the means of isolation is provided by a suitably rated fuse-carrier.

611-03-02 Where the supplier's cut-out is used as the means of isolation of a highway power supply the approval of the supplier shall be obtained.

611-04 Identification of cables

611-04-01 On completion of an installation including highway distribution circuits and highway power supplies, detailed records in accordance with Regulation 514-09 shall be provided with the Completion and Inspection Certificate required by Regulation 741-01-01.

611-04-02 Except where the method of cable installation does not permit marking the installation of underground cable shall comply with Regulation 522-06-03.

611-04-03 Ducting, marker tape or cable tiles used with highway power supply cable shall be suitably colour coded or marked for the purpose of identification and shall be distinct from other services.

611-04-04 The requirement of Regulation 514-12 need not be applied where the highway power supply installation is subject to a programmed inspection and testing procedure.

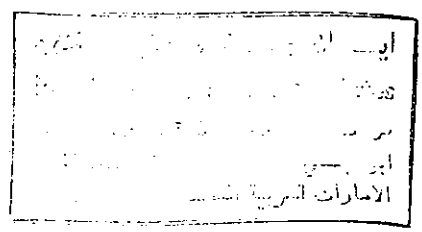
611-05 External influences

611-05-01 Deleted by Amendment No. 1.

611-06 Temporary supplies

611-06-01 Temporary supplies taken from street furniture shall not reduce the safety of the permanent installation and shall generally be in accordance with Section 604.

611-06-02 On every temporary supply unit there shall be a durable label externally mounted stating the maximum sustained current to be supplied from that unit.



PART 7

INSPECTION AND TESTING

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PART 7

INSPECTION AND TESTING

CONTENTS

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CHAPTER 71

INITIAL VERIFICATION

711 GENERAL

711-01-01 Every installation shall, during erection and/or on completion before being put into service be inspected and tested to verify, so far as is reasonably practicable, that the requirements of the Regulations have been met.

Precautions shall be taken to avoid danger to persons and to avoid damage to property and installed equipment during inspection and testing.

711-01-02 The result of the assessment of general characteristics required by Sections 311, 312 and 313, together with the information required by Regulation 514-09-01 shall be made available to the person or persons carrying out the inspection and testing.

712 INSPECTION

712-01-01 Inspection shall precede testing and shall normally be done with that part of the installation under inspection disconnected from the supply.

712-01-02 The inspection shall be made to verify that the installed electrical equipment is:

(i) in compliance with Section 511 (this may be ascertained by mark or by certification furnished by the installer or by the manufacturer), and

(ii) correctly selected and erected in accordance with the Regulations, and

(iii) not visibly damaged or defective so as to impair safety.

712-01-03 The inspection shall include at least the checking of the following items, where relevant to the installation and, where necessary, during erection:

(i) connection of conductors

(ii) identification of conductors

(iii) routing of cables in safe zones or protection against mechanical damage, in compliance with Section 522

(iv) selection of conductors for current-carrying capacity and voltage drop, in accordance with the design

(v) connection of single-pole devices for protection or switching in phase conductors only

(vi) correct connection of accessories and equipment

(vii) presence of fire barriers and protection against thermal effects

(viii) methods of protection against electric shock

(a) protection against both direct and indirect contact, i.e.:

- SELV
- limitation of discharge energy

(b) protection against direct contact (including measurement of distances where appropriate), i.e.:

- protection by insulation of live parts
- protection by a barrier or an enclosure
- protection by obstacles
- protection by placing out of reach
- protection by PELV

(c) protection against indirect contact:

- earthed equipotential bonding and automatic disconnection of supply

presence of earthing conductors

presence of protective conductors

presence of main equipotential bonding conductors

presence of supplementary equipotential bonding conductors

presence of earthing arrangements for combined protective and functional purposes

- use of Class II equipment or equivalent insulation
- non-conducting location (including measurement of distances, where appropriate)

absence of protective conductors

- earth-free local equipotential bonding

presence of earth-free equipotential bonding conductors

- electrical separation

(ix) prevention of mutual detrimental influence

(x) presence of appropriate devices for isolation and switching correctly located

(xi) presence of undervoltage protective devices

(xii) choice and setting of protective and monitoring devices (for protection against indirect contact and/or protection against overcurrent)

(xiii) labelling of protective devices, switches and terminals

(xiv) selection of equipment and protective measures appropriate to external influences

(xv) adequacy of access to switchgear and equipment

(xvi) presence of danger notices and other warning signs

(xvii) presence of diagrams, instructions and similar information

(xviii) erection methods.

713 TESTING

713-01 General

713-01-01 The tests of Regulations 713-02 to 713-09 where relevant shall be carried out in that sequence.

If any test indicates a failure to comply, that test and any preceding test, the results of which may have been influenced by the fault indicated, shall be repeated after the fault has been rectified.

Some methods of test are described in Guidance Note Number 3, Inspection & Testing, published by the Institution of Electrical Engineers. Other methods are not precluded provided they give valid results.

713-02 Continuity of protective conductors including main and supplementary equipotential bonding

713-02-01 A continuity test shall be made. It is recommended that the test be carried out with a supply having a no-load voltage between 4 V and 24 V, d.c. or a.c., and a short-circuit current of not less than 200 mA.

713-03 Continuity of ring final circuit conductors

713-03-01 A test shall be made to verify the continuity of each conductor including the protective conductor, of every ring final circuit.

713-04 Insulation resistance

713-04-01 The insulation resistance between live conductors and between each live conductor and Earth shall be measured before the installation is connected to the supply. The PEN conductor in TN-C systems shall be considered as part of the earth. Where appropriate during this measurement, phase and neutral conductors may be connected together.

713-04-02 The insulation resistance measured with the test voltages indicated in Table 71A shall be considered satisfactory if the main switchboard, and each distribution circuit tested separately with all its final circuits connected but with current-using equipment disconnected, has an insulation resistance not less than the appropriate value given in Table 71A.

713-04-03 Measurements shall be carried out with direct current. The testing apparatus shall be capable of supplying the test voltage indicated in Table 71A when loaded with 1 mA.

TABLE 71A

Minimum values of insulation resistance

Circuit nominal voltage (V)	Test voltage d.c. (V)	Minimum insulation resistance (MΩ)
SELV and PELV	250	0.25
Up to and including 500 V with the exception of the above systems	500	0.5
Above 500 V	1000	1.0

713-04-04 When the circuit includes electronic devices, only a measurement to protective earth shall be made with the phase and neutral connected together. Precautions may be necessary to avoid damage to electronic devices.

713-05 Site applied insulation

713-05-01 Where insulation applied on site in accordance with Regulation 412-02 is intended to provide protection against direct contact, it shall be verified that the insulation is capable of withstanding, without breakdown or flashover, an applied voltage test equivalent to that specified in the British Standard for similar type-tested equipment.

713-05-02 Where protection against indirect contact is provided by supplementary insulation applied to equipment during erection in accordance with Regulation 413-03, it shall be verified by test:

(i) that the insulating enclosure affords a degree of protection not less than IP2X or IPXXB, and

(ii) that the insulating enclosure is capable of withstanding, without breakdown or flashover, an applied voltage test equivalent to that specified in the British Standard for similar type tested equipment.

713-06 Protection by separation of circuits

713-06-01 The separation of circuits shall be verified in accordance with Regulation 713-06-02 for protection by SELV, Regulation 713-06-03 for protection by PELV and Regulation 713-06-04 for protection by electrical separation.

713-06-02 The separation of live parts from those of other circuits and from earth, according to Regulation 411-02, shall be verified by a measurement of the insulation resistance. The resistance values shall be in accordance with Table 71A.

713-06-03 The separation of live parts from those of other circuits according to Regulation 471-14 shall be verified by a measurement of the insulation resistance. The resistance values obtained shall be in accordance with Table 71A.

713-06-04 The separation of live parts from those of other circuits and from earth, according to Regulation 413-06 shall be verified by a measurement of the insulation resistance. The resistance values obtained shall be in accordance with Table 71A.

713-06-05 Functional Extra-Low Voltage circuits shall meet all the test requirements for low voltage circuits.

713-07 Protection against direct contact by a barrier or an enclosure provided during erection

713-07-01 Where protection against direct contact is intended to be afforded by a barrier or an enclosure provided during erection in accordance with Regulation 412-03, it shall be verified by test that each enclosure or barrier affords a degree of protection not less than IP2X or IPXXB or IP4X as appropriate, where that regulation so requires.

713-08 Insulation of non-conducting floors and walls

713-08-01 Where protection against indirect contact is to be provided by a non-conducting location intended to comply with Regulations 413-04 and 471-10, the resistance of the floors and walls of the location to the main protective conductor of the installation shall be measured at not less than three points on each relevant surface, one of which shall be not less than 1 m and not more than 1.2 m from any extraneous-conductive-part in the location. The other two measurements shall be made at greater distances.

713-08-02 Any insulation or insulating arrangement of extraneous-conductive-parts intended to satisfy Regulation 413-04-07(iii):

(i) when tested at 500 V d.c. shall not be less than 0.5 megohm, and

(ii) shall be able to withstand a test voltage of at least 2 kV a.c. r.m.s., and

(iii) shall not pass a leakage current exceeding 1 mA in normal conditions of use.

713-09 Polarity

713-09-01 A test of polarity shall be made and it shall be verified that:

(i) every fuse and single-pole control and protective device is connected in the phase conductor only, and

(ii) centre-contact bayonet and Edison screw lampholders to BS EN 60238 in circuits having an earthed neutral conductor have the outer or screwed contacts connected to the neutral conductor, and

(iii) wiring has been correctly connected to socket-outlets and similar accessories.

713-10 Earth fault loop impedance

713-10-01 Where protective measures are used which require a knowledge of earth fault loop impedance, the relevant impedances shall be measured, or determined by an alternative method.

Where the alternative method described in Regulation 413-02-12 (see Table 41C) is used, the impedance of the protective conductor of the circuit concerned shall also be measured.

713-11 Earth electrode resistance

713-11-01 Where protective measures are used which require a knowledge of the earth electrode resistance, this shall be measured.

713-12 Functional testing

713-12-01 Where protection against indirect contact or supplementary protection against direct contact is to be provided by a residual current device, its effectiveness shall be verified by a test simulating an appropriate fault condition and independent of any test facility incorporated in the device.

713-12-02 Assemblies, such as switchgear and controlgear assemblies, drives, controls and interlocks, shall be subjected to a functional test to show that they are properly mounted, adjusted and installed in accordance with the relevant requirements of these Regulations.

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CHAPTER 72

ALTERATIONS AND ADDITIONS TO AN INSTALLATION

721 GENERAL

721-01-01 The relevant requirements of Chapter 71 shall apply to alterations and additions.

721-01-02 It shall be verified that every alteration or addition complies with the Regulations and does not impair the safety of an existing installation.

CHAPTER 73

PERIODIC INSPECTION AND TESTING

731 GENERAL

731-01-01 Periodic inspection and testing of every installation, where required, shall be carried out in accordance with the requirements of this Chapter.

731-01-02 Inspection comprising careful scrutiny of the installation shall be carried out without dismantling or with partial dismantling as required, supplemented by testing to verify compliance with Sections 731 and 732 and as far as possible to provide for:

(i) the safety of persons and livestock against the effects of electric shock and burns, in accordance with Regulation 120-01, and

(ii) protection against damage to property by fire and heat arising from an installation defect, and

(iii) the identification that the installation is not damaged or deteriorated so as to impair safety, and

(iv) the identification of installation defects or non-compliance with the requirements of the Regulations which may give rise to danger.

732 INSPECTION AND TESTING

732-01-01 The frequency of periodic inspection and testing of an installation shall be determined by the type of installation, its use and operation, the frequency of maintenance and the external influences to which it is subjected.

732-01-02 The inspection and testing shall not cause danger to persons or livestock and shall not cause damage to property and equipment even if the circuit is defective.

732-01-03 The results of periodic inspection and testing shall be recorded on a report, signed by the person carrying out the inspection or a person authorised to act on their behalf and forwarded to the originator of the request for the inspection in accordance with Section 744 of the Regulations.

CHAPTER 74

CERTIFICATION AND REPORTING

741 GENERAL

741-01-01 Following the initial verification required by Chapter 71 or Chapter 72, a Completion Certificate in the form set out in Appendix 6, together with a schedule of test results, shall be given to the person ordering the work.

The schedule of test results shall record the results of the appropriate tests detailed in Regulations 713-02 to 713-12.

Those responsible for the design, construction and initial verification of a large or complex installation shall, as appropriate, give to the person ordering the work an equivalent form of Completion Certificate which takes account of their respective responsibilities for the safety of that installation, together with a schedule of test results.

741-01-02 Following the periodic inspection and testing described in Chapter 73, a Periodic Inspection Report in the form set out in Appendix 6, together with a schedule of test results, shall be given to the person ordering the work.

The schedule of test results shall record the results of the appropriate tests detailed in Regulations 713-02 to 713-12.

742 INITIAL VERIFICATION

742-02-01 The inspection shall comply with the requirements of Chapter 71 and any defects or omissions revealed by the inspection shall be made good before a Completion Certificate is issued.

742-02-02 The Completion Certificate shall be signed by a competent person or persons stating that the installation has been designed, constructed and inspected and tested in accordance with the Regulations.

743 ALTERATIONS AND ADDITIONS

743-01-01 The requirements of Section 742 for the issue of a Completion Certificate shall apply to all the work of the alterations or additions. Any defects or omissions revealed in that work shall be made good before a Completion Certificate is issued.

The contractor or other person responsible for the new work, or a person authorised to act on their behalf, shall report in writing, to the person ordering the work any defects found in related parts of the existing installation.

744 PERIODIC INSPECTION AND TESTING

744-01-01 In accordance with Chapter 73 the results and extent of a periodic inspection and test of an installation, or any part thereof, shall be recorded on a Periodic Inspection Report and given, by the person carrying out the inspection or a person authorised to act on their behalf, to the person ordering the inspection.

744-01-02 Dangerous conditions arising from non-compliance with these Regulations together with any limitations of the inspection and testing in accordance with Section 732, shall be recorded.

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Appendices

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APPENDIX 1

BRITISH STANDARDS TO WHICH REFERENCE IS MADE IN THE REGULATIONS

Note: Certain British Standards have been withdrawn since the issue of the 16th Edition in 1991. From the date of withdrawal, certificates and marks already awarded may continue to apply to production until a date specified in the superseding standard. During the period between these dates, the withdrawn standard may be specified in contracts. It should be noted however that this appendix may not list such standards, as only current British Standards are listed with some references to superseded standards.

BS Number	Title	Referenced in Regulations
BS 31 : 1940(1988)	Specification. Steel conduit and fittings for electrical wiring.	521-04-01(i)
BS 67 : 1987	Specification for ceiling roses.	553-04-01(i)
BS 88 :	Low-voltage fuses Part 1 : 1988 General requirements. Also numbered BS EN 60269-1 : 1994 Part 2 : Specification for fuses for use by authorized persons (mainly for industrial applications). Part 6 : 1988 (1992) Specification of supplementary requirements for fuses of compact dimensions for use in 240/415 V a.c. industrial and commercial electrical installations.	433-02-02 433-02-04 Table 41B1 Table 41C Table 41D Table 471A Table 604B1 Table 605B1 Appx. 4
BS 196 : 1961	Specification for protected-type non-reversible plugs, socket-outlets, cable-couplers and appliance-couplers with earthing contacts for single-phase a.c. circuits up to 250 volts.	Table 55A 553-01-05 553-02-01
BS 476 :	Fire tests on building materials and structure. Part 4 : 1970(1984) Non-combustibility test for materials. Part 5 : 1979 Method of test for ignitability. Part 23 : 1987 Methods for determination of the contribution of components to the fire resistance of a structure.	521-05-01 526-03-02(iv) 521-05-01 526-03-02(v) 527-01-03 553-03-01 554-06-01 527-02-02
BS 546 : 1950(1988)	Specification. Two-pole and earthing pin plugs, socket-outlets and socket-outlet adaptors.	Table 55A 553-01-05
BS 559 : 1991	Specification for electric signs and high-voltage luminous-discharge-tube installations.	110-01-01(ix) 554-02-01
BS 646 : 1958(1991)	Specification. Cartridge fuse links (rated up to 5 amperes) for a.c. and d.c. service.	Table 55A 553-01-05(i)
BS 731 :	Flexible steel conduit for cable protection and flexible steel tubing to enclose flexible drives. Part 1 : 1952(1993) Flexible steel conduit and adaptors for the protection of electric cables.	521-04-01(ii)
BS 951 : 1986	Specification for clamps for earthing and bonding purposes.	514-13-01

BS Number	Title	Referenced in Regulations
BS 1361 : 1971(1986)	Specification for cartridge fuses for a.c. circuits in domestic and similar premises.	Table 41B1 Table 41C Table 41D Table 604B1 433-02-02 433-02-04 Appx. 4
BS 1362 : 1973(1992)	Specification for general purpose fuse links for domestic and similar purposes (primarily for use in plugs).	Table 41B1 Table 41C Table 41D Table 55A Table 604B1 553-01-05(i)
BS 1363 :	13A plugs, socket-outlets, adaptors and connection units. Part 1 : 1995 Specification for rewirable and non-rewirable 13A fused plugs. Part 2 : 1995 Specification for 13A switched and unswitched socket-outlets. Part 3 : 1995 Specification for 13A adaptors. Part 4 : 1995 Specification for 13A fused connection units: switched and unswitched.	433-02-04 Table 55A 553-01-04 553-01-05 553-04-01
BS 1710 : 1984(1991)	Specification for identification of pipelines and services.	514-02-01
BS 2754 : 1976	Memorandum. Construction of electrical equipment for protection against electric shock.	Part 2
BS 2848 : 1973	Specification for flexible insulating sleeving for electrical purposes.	543-03-02
BS 3036 : 1958(1992)	Specification. Semi-enclosed electric fuses (rating up to 100 amperes and 240 volts to earth).	Table 41B1 Table 41D Table 604B1 433-02-03 433-02-04 Appx. 3 Appx. 4
BS 3456 :	Specification for safety of household and similar electrical appliances. Part 201 : 1990 General requirements.	603-01-01
BS 3535 :	Isolating transformers and safety isolating transformers. Part 1 : 1990 General requirements. Part 2 : 1990 Specification for transformers for reduced system voltage.	411-02-02(i) 413-06-02(i) (a) 413-06-03(iv) 471-12-01 471-15-03(i) 553-01-05(ii) 601-09-01 602-07-02(iv)
BS 3676 :	Switches for household and similar fixed electrical installations. Part 1 : 1989 Specification for general requirements.	412-03-04(iii) 553-04-01 601-08-01(i) 602-07-02(iv)

BS Number	Title	Referenced in Regulations
BS 3858 : 1992	Specification for binding and identification sleeves for use on electric cables and wires.	514-06-01
BS 3871 :	Specification for miniature and moulded case circuit-breakers. Part 1 : 1965(1984) Miniature air-break circuit-breakers for a.c. circuits. (See also BS EN 60898).	433-02-04 Table 41B2 Table 41C Table 471A Table 604B2 Appx. 3 and 4
BS 3939 :	Graphical symbols for electrical power, telecommunications and electronic diagrams.	514-09-01
BS 4293 : 1983(1993)	Specification for residual current-operated circuit-breakers.	412-06-02(ii)
BS 4343 : 19 92	Specification for industrial plugs, socket-outlets and couplers for a.c. and d.c. supplies. Also numbered BS EN 60309-2 : 1992.	Table 55A 553-01-05 553-02-01 602-07-01 602-08-01 604-12-02 604-13-01 607-02-04 607-02-05 608-07-01 608-08-08(i) 608-08-08(iii) 608-13-02(ii)
BS 4363 : 1991	Specification for distribution assemblies for electricity supplies for construction and building sites.	604-09-01
BS 4444 : 1989	Guide to electrical earth monitoring and protective conductor proving.	543-03-05 607-02-05
BS 4491 :	Appliance couplers for household and similar general purposes.	553-02-01
BS 4568 : 1970	Specification for steel conduit and fittings with metric threads of ISO form for electrical installations.	521-04-01(iii)
BS 4573 : 1970(1979)	Specification for 2-pin reversible plugs and shaver socket-outlets.	553-01-05(ii)
BS 4607 :	Non-metallic conduits and fittings for electrical installations.	521-04-01(iv)
BS 4678 :	Cable trunking.	521-05-01
BS 4727 :	Glossary of electrotechnical, power, telecommunications, electronics, lighting and colour terms.	Part 2

BS Number	Title	Referenced in Regulations
BS 5042 : 1987	Specification for bayonet lampholders.	412-03-04 471-05-02 Table 55B 553-03-03 553-04-01(iii) 601-11-01
BS 5266 :	Emergency lighting.	110-01-01(x) 528-01-04
BS 5345 :	Code of practice for selection, installation and maintenance of electrical apparatus for use in potentially explosive atmospheres (other than mining applications or explosive processing and manufacture).	110-01-01(xi)
BS 5467 : 1989	Specification for cables with thermosetting insulation for electricity supply for rated voltages of up to and including 600/1000 V and up to and including 1900/3300 V.	514-06-01(iv) Appx. 4
BS 5490 : 1977(1985)	Specification for classification of degrees of protection provided by enclosures. (IP codes)	411-02-09(i) 412-03-01 412-03-02 412-03-04(iii) 412-05-03 413-03-04 471-14-02(i) 602-05-01 603-03-01(ii) 608-13-02(ii) 611-02-02 713-05-02(i)
BS 5518 : 1977	Specification for electronic variable control switches (dimmer switches) for tungsten filament lighting.	553-04-01
BS 5593 : 1978(1991)	Specification for impregnated paper-insulated cables with aluminium sheath/neutral conductor and three shaped solid aluminium phase conductors (CONSAC), 600/1000 V, for electricity supply.	546-02-04(ii)
BS 5655 :	Lifts and service lifts.	110-02-01(x) 528-02-06
BS 5733: 1979	Specification for general requirements for electrical accessories.	553-04-01(vi)
BS 5839 :	Fire detection and alarm systems for buildings.	110-01-01(xii) 528-01-04
BS 6004 : 1991	Specification for pvc-insulated cables (non-armoured) for electric power and lighting.	543-03-02 Appx. 4
BS 6007 : 1993	Specification for rubber-insulated cables for electric power and lighting.	608-08-08(ii) Appx. 4

BS Number	Title	Referenced in Regulations
BS 6053 : 1981(1991)	Specification for outside diameters of conduits for electrical installations and threads for conduits and fittings.	521-04-01(i) 521-04-01(ii) 521-04-01(iii)
BS 6099 :	Conduits for electrical installations. Part 1 : 1981 (1993) Specification of general requirements. Section 2.2 : 1982 (1988) Specification for rigid plain conduits of insulating material.	521-04-01(i) 521-04-01(ii) 521-04-01(iii) 521-04-01(iv)
BS 6141 : 1991	Specification for insulated cables and flexible cords for use in high temperature zones.	603-07-01
BS 6207 : 1991	Specification for mineral-insulated copper-sheathed cables with copper conductors.	546-02-07 Appx. 4
BS 6231 : 1990	Specification for pvc-insulated cables for switchgear and controlgear wiring.	Appx. 4
BS 6346 : 1989	Specification for pvc-insulated cables for electricity supply.	514-06-01(ii) Appx. 4
BS 6351 :	Electric surface heating. Part 1 : 1983 (1993) Specification for electric surface heating devices. Part 2 : 1983 (1993) Guide to the design of electric surface heating systems. Part 3 : 1983 (1993) Code of practice for the installation, testing and maintenance of electric surface heating systems.	110-01-01(xiv) 554-07-01
BS 6387 : 1994	Specification for performance requirements for cables required to maintain circuit integrity under fire conditions.	528-01-06
BS 6458 :	Fire hazard testing for electrotechnical products. Section 2.1 : 1984 Glow-wire test.	526-03-02(iii)
BS 6480 : 1988	Specification for impregnated paper-insulated lead or lead alloy sheathed electric cables of rated voltages up to and including 33000 V.	514-06-01(iii)
BS 6500 : 1994	Specification for insulated flexible cords and cables.	608-08-08(ii) Appx. 4
BS 6651 : 1992	Code of practice for protection of structures against lightning.	110-02-01(ix) 541-01-03
BS 6701 :	Code of practice for installation of apparatus intended for connection to certain telecommunications systems. Part 1 : 1990 General recommendations.	110-01-01(xiii) Table 51A 528-01-03 528-01-04
BS 6724 : 1990	Specification for armoured cables for electricity supply having thermosetting insulation with low emission of smoke and corrosive gases when affected by fire.	Appx. 4
BS 6765 :	Leisure accommodation vehicles: caravans. Part 3 : 1989 Specification for 12 V direct current extra-low voltage electrical installations.	608-01-01

BS Number	Title	Referenced in Regulations
BS 6883 : 1991	Specification for elastomer insulated cables for fixed wiring in ships and on mobile and fixed offshore units.	Appx. 4
BS 6972 : 1988	Specification for general requirements for luminaire supporting couplers for domestic, light industrial and commercial use.	553-04-01(ii)
BS 6991 : 1990	Specification for 6/10 amp two pole weather-resistant couplers for household, commercial and light industrial equipment.	553-02-01
BS 7001 : 1988	Specification for interchangeability and safety of a standardized luminaire supporting coupler.	553-04-01(ii)
BS 7071 : 1992	Specification for portable residual current devices.	412-06-02
BS 7211 : 1994	Specification for thermosetting insulated cables (non-armoured) for electric power and lighting with low emission of smoke and corrosive gases when affected by fire.	543-03-02 Appx. 4
BS 7288 : 1990	Specification for socket-outlets incorporating residual current devices. (S.R.C.Ds).	412-06-02
BS 7430 : 1991	Code of practice for earthing.	542-03-01
BS 7454 : 1991	Method for calculation of thermally permissible short-circuit currents taking into account non-adiabatic heating effects.	434-03-03 543-01-03
BS 7629 : 1993	Specification for thermosetting insulated cables with limited circuit integrity when affected by fire.	Appx. 4
BS EN 60073 : 1993	Specification for coding of indicating devices and actuators by colours and supplementary means. Replaces BS 4099. (See note).	514-01-01
BS EN 60238 : 1992	Specification for Edison screw lampholders Replaces BS 6776: 1990. (See note).	412-03-04 Table 55B 553-04-01(iii) 713-10-01(ii)
BS EN 60269-1 : 1994	Low-voltage fuses Part 1 : General requirements. Also numbered BS 88 : Part 1 : 1988.	
BS EN 60309 :	Plugs, socket-outlets and couplers for industrial purposes.	
BS EN 60309-1 : 1992	General requirements.	

BS Number	Title	Referenced in Regulations
BS EN 60309-2 : 1992	Dimensional interchangeability requirements for pin and contact-tube accessories of harmonised configurations. (Also numbered as BS 4343 : 1992).	Table 55A 553-01-05 553-02-01 602-07-01 602-08-01 604-12-02 604-13-01 607-02-04 607-02-05 608-07-01 608-08-08(i) 608-08-08(iii) 608-13-02(ii)
BS EN 60335-2-53 : 1991	Electric sauna heating appliances. (To be read in conjunction with BS 3456 Part 201).	603-01-01
BS EN 60439 :	Specification for low-voltage switchgear and controlgear assemblies.	
BS EN 60439-1 : 1994	Specification for type-tested and partially type-tested assemblies. Replaces BS 5486 : Part 1 : 1990. (See note).	413-03-01(i)b 543-02-04(ii)
BS EN 60439-2 : 1993	Particular requirements for busbar trunking systems (busways). Replaces BS 5486 : Part 2 : 1988. (See note).	521-01-02
BS EN 60439-4 : 1991	Particular requirements for assemblies for construction sites (ACS).	604-09-01
BS EN 60570 : 1994	Electrical supply track systems for luminaires. Replaces BS 4533: Section 102.57: 1990. (See note).	521-06-01
BS EN 60898 : 1991	Specification for circuit-breakers for overcurrent protection for household and similar installations. (See also BS 3871).	413-02-11 433-02-04 Table 41B2 Table 41C Table 471A Table 604B2 Appx. 3
BS EN 60947 :	Specification for low-voltage switchgear and controlgear.	
BS EN 60947-1 : 1992	General rules.	
BS EN 60947-2 : 1992	Circuit-breakers. Replaces BS 4752: Part 1:1977. (See note).	413-02-11 413-02-14 Appx. 4
BS EN 60947-3 : 1992	Switches, disconnectors, switch-disconnectors and fuse-combination units.	537-02-02
BS EN 60947-4	Contactors and motor-starters.	
BS EN 60947-4-1 : 1992	Electromechanical contactors and motor-starters.	435-01-01

BS Number	Title	Referenced in Regulations
BS EN 60950 : 1992	Specification for safety of information technology equipment including-electrical business equipment. Replaces BS 7002 : 1989. (See note)	607-01-01 607-02-02
BS EN 61008 : 1994	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's). Part 1 : General rules.	412-06-02
BS EN 61009 : 1994	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's). Part 1 : General rules.	412-06-02
BS EN 61011 : 1993	Electric fence energizers. Safety requirements for mains-operated electric fence energizers. Replaces BS 2632. (See note).	471-03-01 605-14-01
BS EN 61011-1 : 1993	Electric fence energizers. Safety requirements for battery-operated electric fence energizers suitable for connection to the supply mains. Replaces BS 6369. (See note).	471-03-01 605-14-01

APPENDIX 2

STATUTORY REGULATIONS AND ASSOCIATED MEMORANDA

1. In Great Britain the following classes of electrical installations are required to comply with the Statutory Regulations indicated below. The regulations listed represent the principal legal requirements. Information concerning these regulations may be obtained from the appropriate authority also indicated below.

Provisions relating to electrical installations are also to be found in other legislation relating to particular activities.

(i)	Electricity suppliers installations generally, subject to certain exemptions	The Electricity Supply Regulations 1988 as amended (SI 1988 No 1057 : ISBN 011 087057 3) (SI 1990 No 390 : ISBN 011 003390 6) (SI 1992 No 2961 : ISBN 011 025770 7) (SI 1994 No 533 : ISBN 011 043533 8)	President of the Board of Trade and Secretary of State for Trade and Industry, and Secretary of State for Scotland
(ii)	Building generally (for Scotland only), subject to certain exemptions	Building Standards (Scotland) Regulations 1990	Secretary of State for Scotland
(iii)	Work activity Places of work Non-domestic installations	The Electricity at Work Regulations 1989 (SI 1989 No 635 : ISBN 011 05635 X)	Health and Safety Commission
(iv)	Cinematograph installations	Cinematograph Regulations 1955, made under the Cinematograph Act, 1909, and/or Cinematograph Act, 1952	The Secretary of State for the Home Department, and Secretary of State for Scotland
(v)	Agricultural and horticultural installations	Agricultural (Stationary Machinery) Regulations 1959 as amended (SI 1959 No 1216, SI 1976 No 1247) (SI 1981 No 1414, SI 1989 No 2311)	Health and Safety Commission
(vi)	Theatres and other places licensed for public entertainment, music, dancing, etc.	Conditions of licence under: (a) in England and Wales, The Local Government (Miscellaneous provisions) Act 1982 (b) in Scotland, The Civic Government (Scotland) Act 1982	(a) The Secretary of State for the Home Department (b) Secretary of State for Scotland
(vii)	High voltage luminous tube signs	As (a) and (b) above	As (a) and (b) above

2. Failure to comply in a consumer's installation in Great Britain with the requirements of Chapter 13 of BS 7671, Requirements for Electrical Installations (the IEE Wiring Regulations 16th Edition) places the supplier in the position of not being compelled to commence or, in certain circumstances, to continue to give, a supply of energy to that installation.

Under Regulation 29 of The Electricity Supply Regulations 1988 as amended, any difference which may arise between a consumer and the supplier having reference to the consumer's installation shall be determined by a person nominated by the Secretary of State on the application of the consumer or consumer's authorised agent or the supplier.

3. Where it is intended to use protective multiple earthing the supplier and the consumer must comply with The Electricity Supply Regulations 1988 as amended.

4. For further guidance on the application of The Electricity at Work Regulations, reference may be made to the following publication:

(i) Memorandum of Guidance on The Electricity at Work Regulations 1989. (HS(R)25) ISBN 011 883963 2.

5. For installations in potentially explosive atmospheres reference should be made to:

(i) The Electricity at Work Regulations 1989 and HSE guidance booklet HS(G)22 "Electrical apparatus for use in potentially explosive atmospheres" ISBN 011 883746 X

(ii) The Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972

(iii) The Petroleum (Consolidation) Act 1928

(iv) relevant British Standards.

Under The Petroleum (Consolidation) Act 1928 local authorities are empowered to grant licences in respect of premises where petroleum spirit is stored and as the authorities may attach such conditions as they think fit, the requirements may vary from one local authority to another. Guidance may be obtained from the Health and Safety Executive (Guidance Note HS(G)41. Petrol filling Stations : Instructions and Operation).

6. For installations in theatres and other places of public entertainment, and on caravan sites, the requirements of the licensing authority should be ascertained. Model Standards were issued by the Department of Environment in 1977 under the Caravan Sites and Control of Development Act 1960 as guidance for local authorities.

7. The Electrical Equipment (Safety) Regulations, administered by the Department of Trade and Industry, Consumer Safety Unit, contain requirements for safety of equipment designed or suitable for general use. Information on the application of the Regulations is given in guidance issued by the DTI.

8. The Plugs and Sockets etc. (Safety) Regulations 1994 (SI 1994/1768 ISBN 0 11 044768 9) of The Consumer Safety Act 1978, administered by the Department of Trade and Industry, containing requirements for the safety of plugs, sockets, adaptors and fuse links etc. designed for use at a voltage of not less than 50 volts.

9. Where a pictographic safety sign is used for a caution of risk of electric shock, The Safety Signs Regulations (SI 1980 No 1471), administered by the Health and Safety Executive, are applicable.

10. The Electrical Appliance (Colour Code) Regulations 1969 (SI 310) makes requirements for the colour coding of flexible cables and flexible cords to electrical appliances.

11. The Management of Health and Safety at Work Regulations 1992 implements European Directives 89/391/EEC and 91/383/EEC and requires employers and self employed persons to assess risks to workers and others who may be affected by their undertaking. (An Approved Code of Practice made under Section 16(1) of the HSW Act 1974).

12. Provision and Use of Work Equipment Regulations 1992 (SI 2932) implements European Directive 89/655/EEC and requires employers to ensure that all work equipment is suitable for the purpose for which it is used, it is properly maintained and appropriate training is given (see HSE Guidance Booklet L22).

13. The Electromagnetic Compatibility Regulations 1992 (SI 1992 No 2372) provide requirements for electrical and electronic products for electromagnetic compatibility.

14. Other Regulations relevant to electrical installation include:

The Personal Protective Equipment at Work Regulations 1992
(European Directive 89/656/EEC, HSE Booklet L25)

The Workplace (Health Safety and Welfare) Regulations 1992
(European Directive 89/654/EEC, HSE Booklet L24)

The Manual Handling Operations Regulations 1992
(European Directive 90/269/EEC, HSE Booklet L23).

APPENDIX 3

TIME/CURRENT CHARACTERISTICS OF OVERCURRENT PROTECTIVE DEVICES

This appendix gives the time/current characteristics of the following overcurrent protective devices:

figure 1	Fuses to BS 1361
figures 2A & 2B	Semi-enclosed fuses to BS 3036
figures 3A & 3B	Fuses to BS 88 Part 2 and Part 6

Miniature circuit-breakers (m.c.bs)

figure 4	Type 1 to BS 3871
figure 5	Type 2 to BS 3871
figure 6	Type 3 to BS 3871
figure 7	Type B to BS EN 60898
figure 8	Type C to BS EN 60898
figure 9	Type D to BS EN 60898

In all of these cases time/current characteristics are based on the slowest operating times for compliance with the Standard and have been used as the basis for determining the limiting values of earth fault loop impedance prescribed in Section 413 of Chapter 41.

Maximum Earth Fault Loop Impedance

Regulations 413-02-09 and 413-02-13 specify maximum disconnection times for circuits. Regulations 413-02-10, 413-02-11 and 413-02-14 provide maximum earth fault loop impedances (Z_S) that will result in protective devices operating within the required disconnection times (of Regulations 413-02-09 and 413-02-13).

The maximum earth loop impedance for a protective device is given by:

$$Z_s = \frac{U_{oc}}{I_a}$$

where:

U_{oc} is the open circuit voltage at the distribution transformer.

I_a is the current causing operation of the protective device within the specified time.

For the purposes of Regulations 413-02-10 and 413-02-13 (Table 41B1, 41B2, 41D, 604B1, 604B2, 605B1 and 605B2) the open circuit voltage has been presumed to be 240 V for nominal supply voltage U_0 of 230 V.

The tabulated values are applicable for supplies from regional electricity companies. For other supplies the designer will need to determine open circuit voltages and calculate Z_S accordingly.

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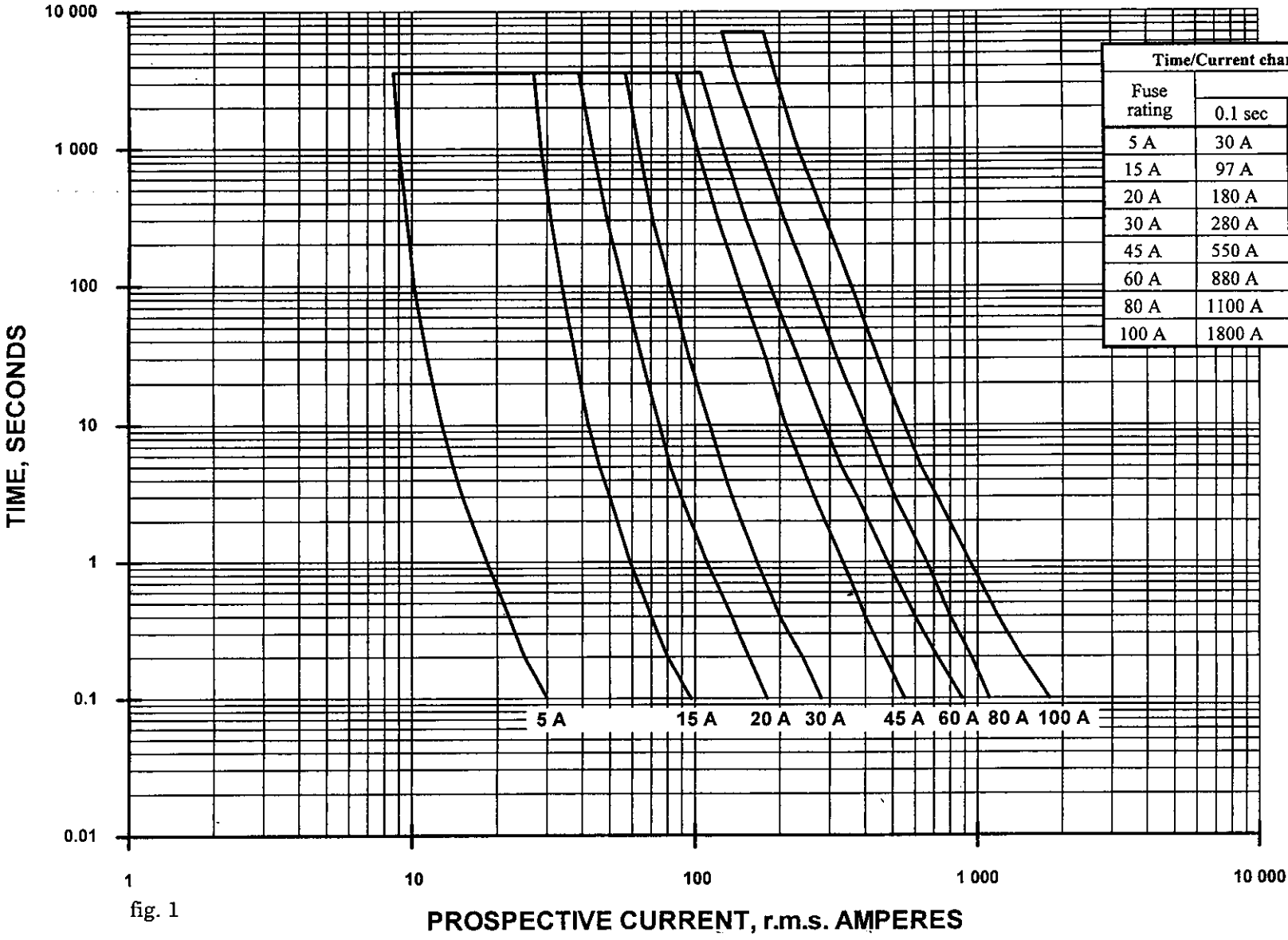
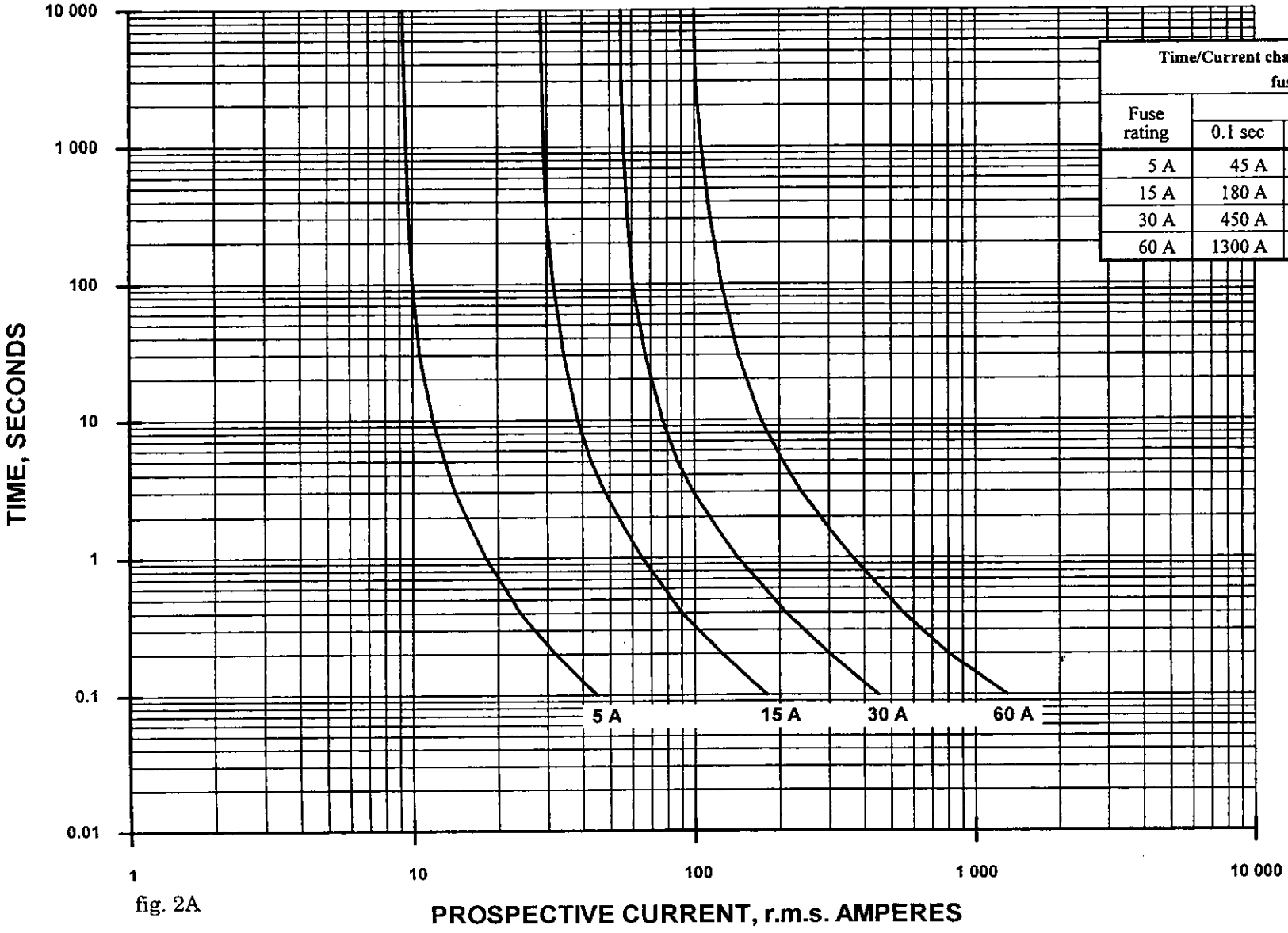
P. O. Box : 2853 ص.ب : ٢٨٥٣
ABU DHABI ابوظبـــي
U. A. E. الامارات العربية المتحدة



Time/Current characteristics for fuses to BS 1361

Fuse rating	Current for time			
	0.1 sec	0.2 sec	0.4 sec	5 secs
5 A	30 A	25 A	22 A	14 A
15 A	97 A	80 A	70 A	46 A
20 A	180 A	155 A	135 A	82 A
30 A	280 A	240 A	200 A	125 A
45 A	550 A	470 A	400 A	240 A
60 A	880 A	720 A	600 A	330 A
80 A	1100 A	950 A	800 A	460 A
100 A	1800 A	1400 A	1200 A	630 A

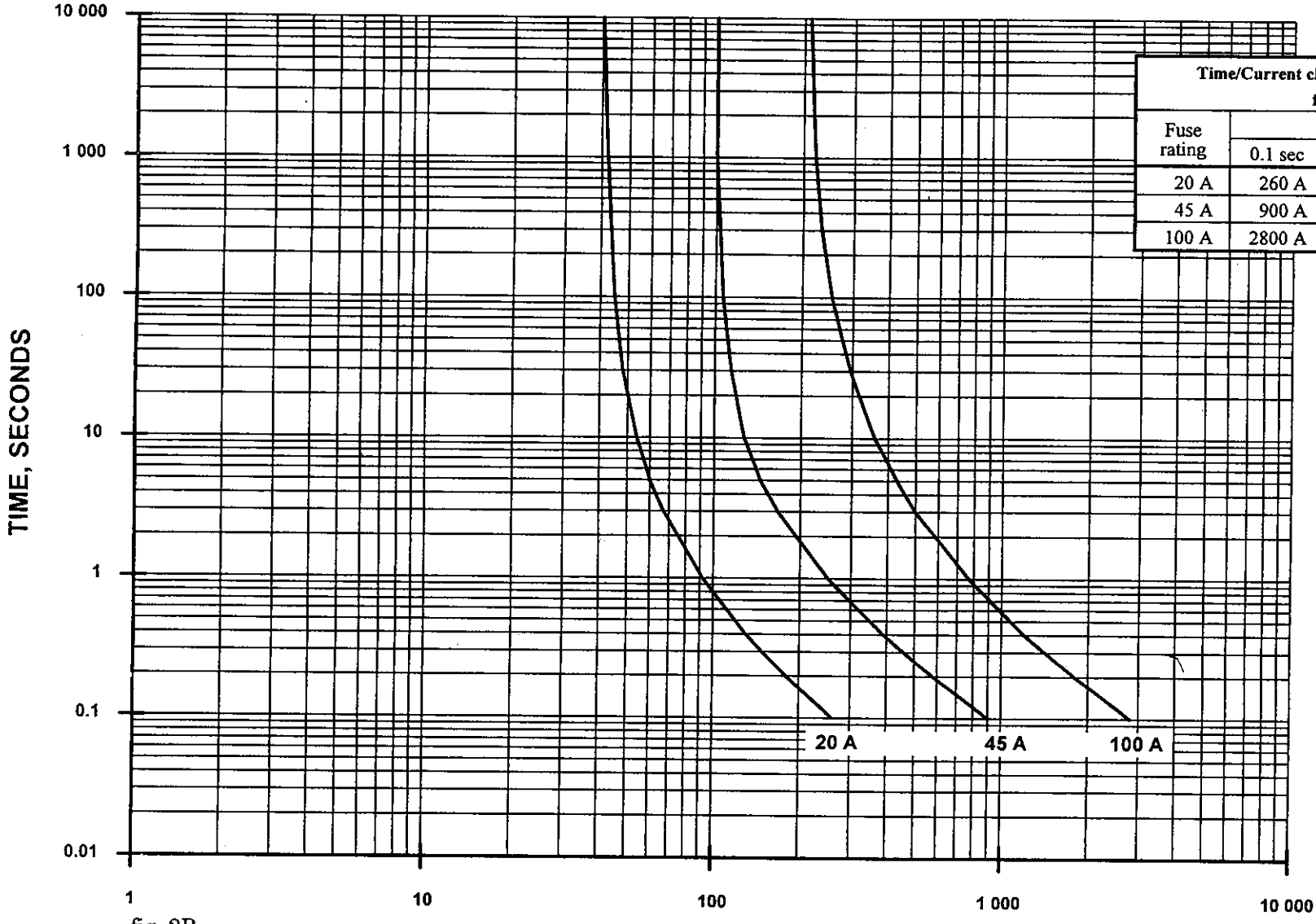
fig. 1



Time/Current characteristics for semi-enclosed fuses to BS 3036

Fuse rating	Current for time			
	0.1 sec	0.2 sec	0.4 sec	5 secs
5 A	45 A	32 A	24 A	13 A
15 A	180 A	125 A	90 A	43 A
30 A	450 A	300 A	210 A	87 A
60 A	1300 A	800 A	550 A	205 A

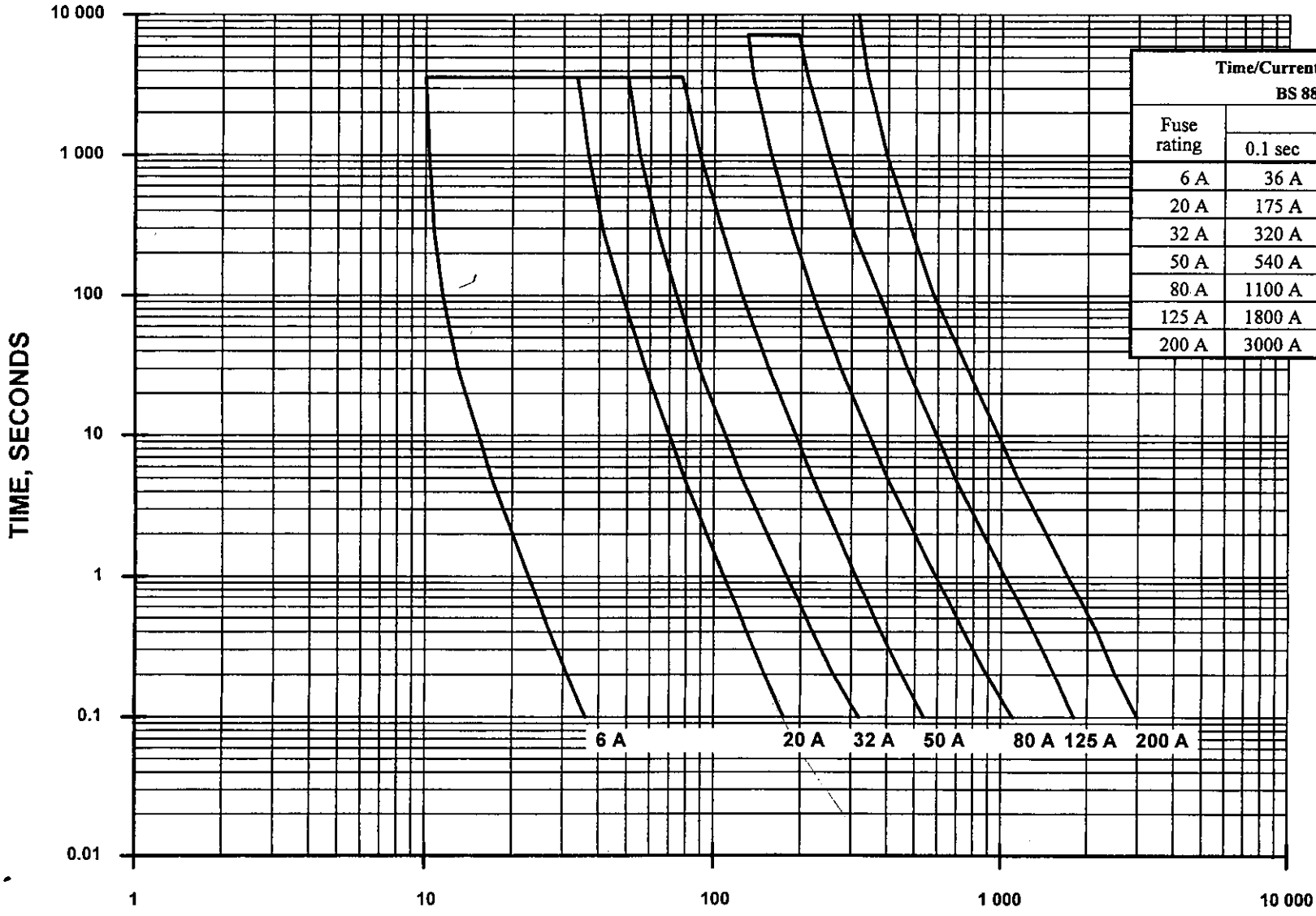
fig. 2A



Time/Current characteristics for semi-enclosed fuses to BS 3036

Fuse rating	Current for time			
	0.1 sec	0.2 sec	0.4 sec	5 secs
20 A	260 A	180 A	130 A	60 A
45 A	900 A	580 A	390 A	145 A
100 A	2800 A	1800 A	1200 A	430 A

fig. 2B



Time/Current characteristics for fuses to BS 88: Part 2 and Part 6

Fuse rating	Current for time			
	0.1 sec	0.2 sec	0.4 sec	5 secs
6 A	36 A	31 A	27 A	17 A
20 A	175 A	150 A	130 A	79 A
32 A	320 A	260 A	220 A	125 A
50 A	540 A	450 A	380 A	220 A
80 A	1100 A	890 A	740 A	400 A
125 A	1800 A	1500 A	1300 A	690 A
200 A	3000 A	2500 A	2200 A	1200 A

fig. 3A

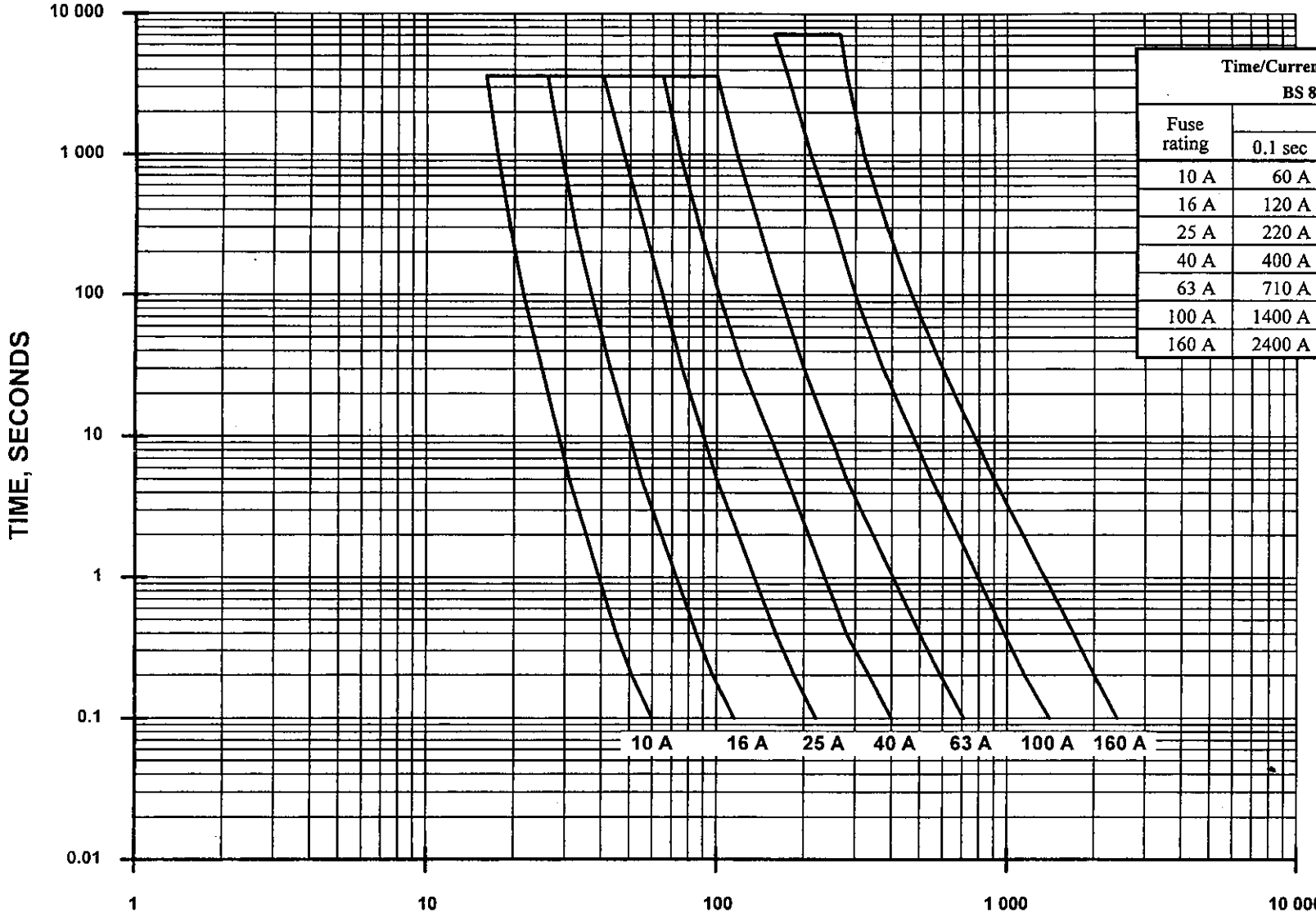
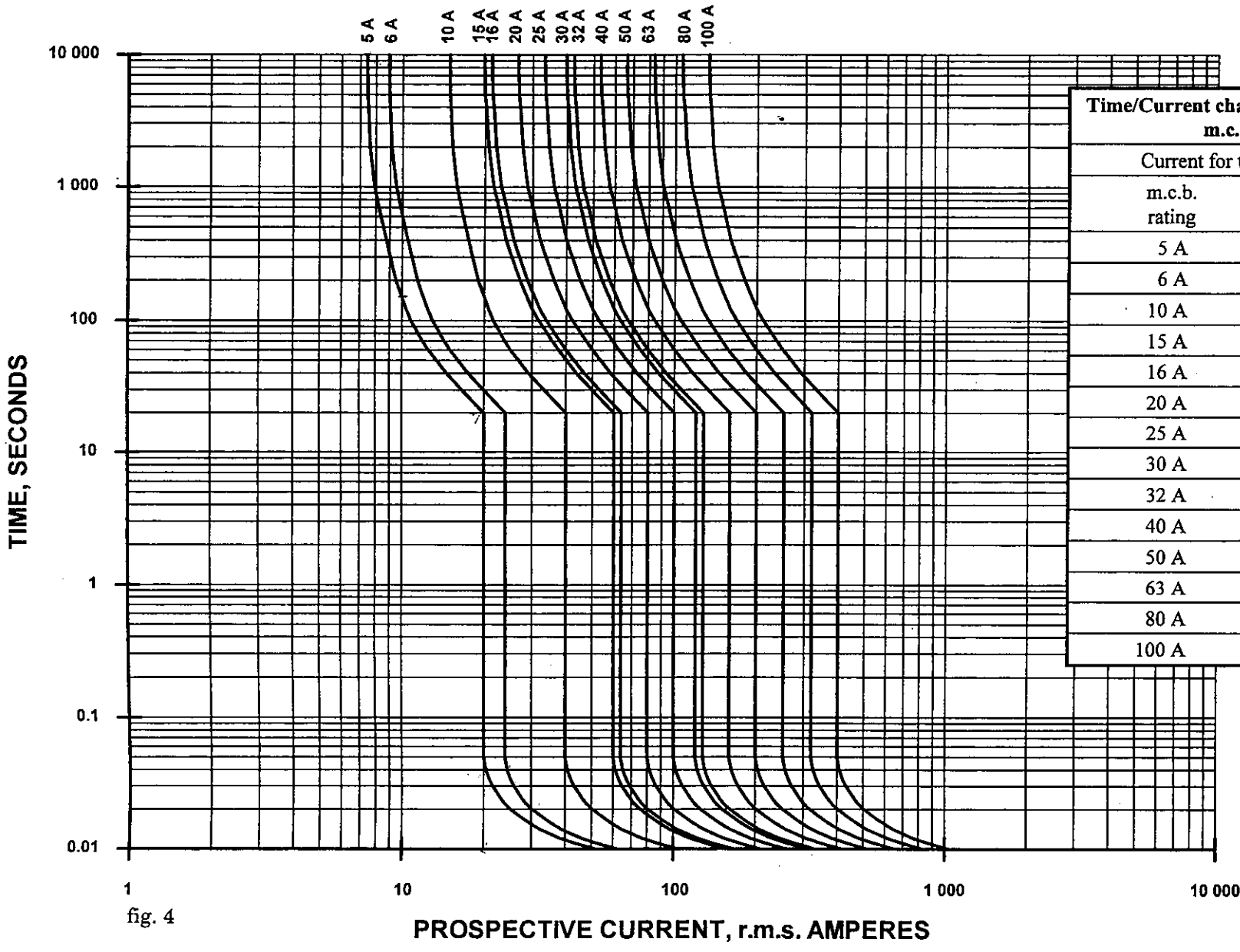


fig. 3B

Time/Current characteristics for fuses to BS 88: Part 2 and Part 6

Fuse rating	Current for time			
	0.1 sec	0.2 sec	0.4 sec	5 secs
10 A	60 A	51 A	45 A	31 A
16 A	120 A	95 A	85 A	55 A
25 A	220 A	180 A	160 A	100 A
40 A	400 A	340 A	280 A	170 A
63 A	710 A	590 A	500 A	280 A
100 A	1400 A	1150 A	980 A	550 A
160 A	2400 A	2000 A	1700 A	900 A

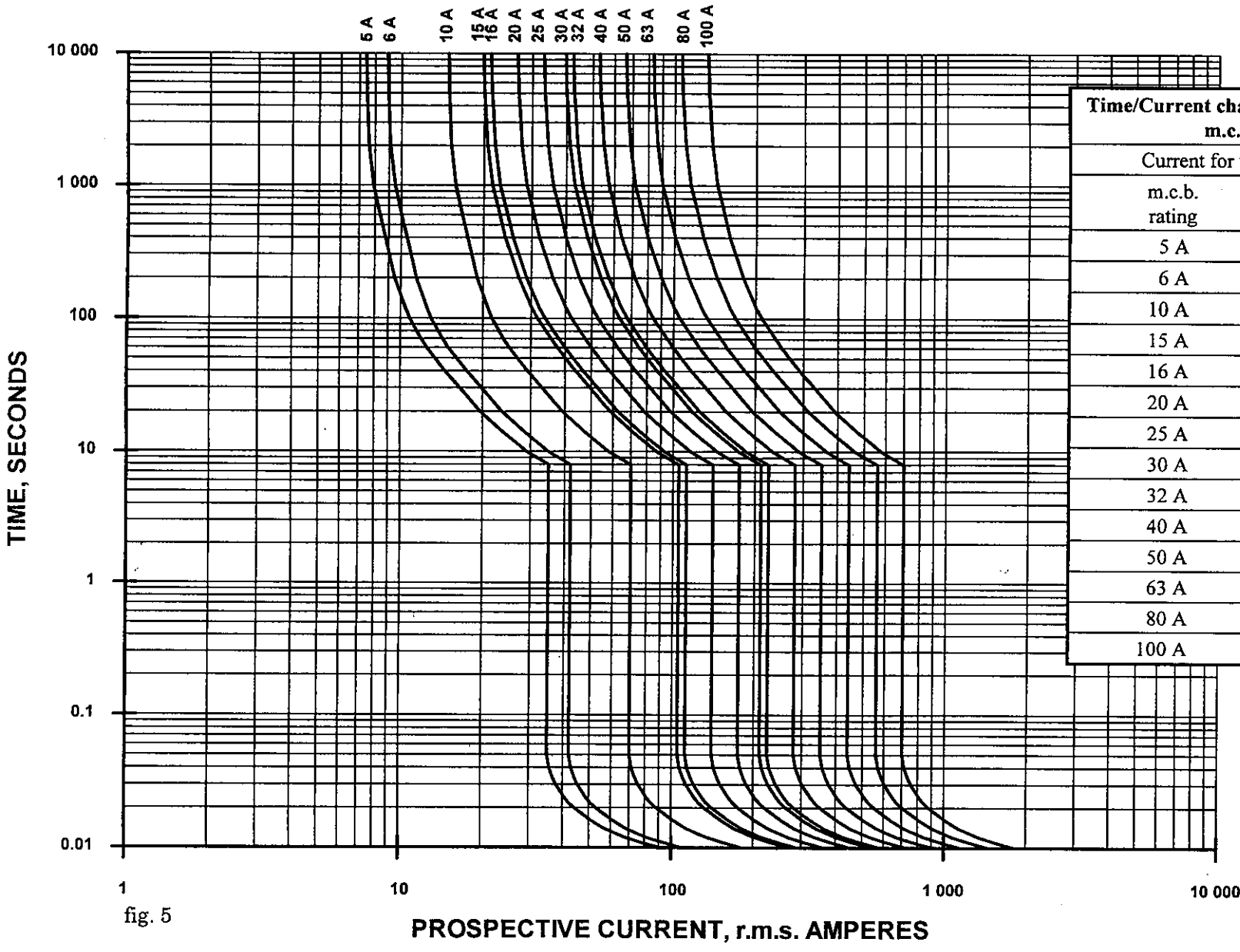


Time/Current characteristics for the Type 1 m.c.b. to BS 3871

Current for time, 0.1 sec to 5 secs

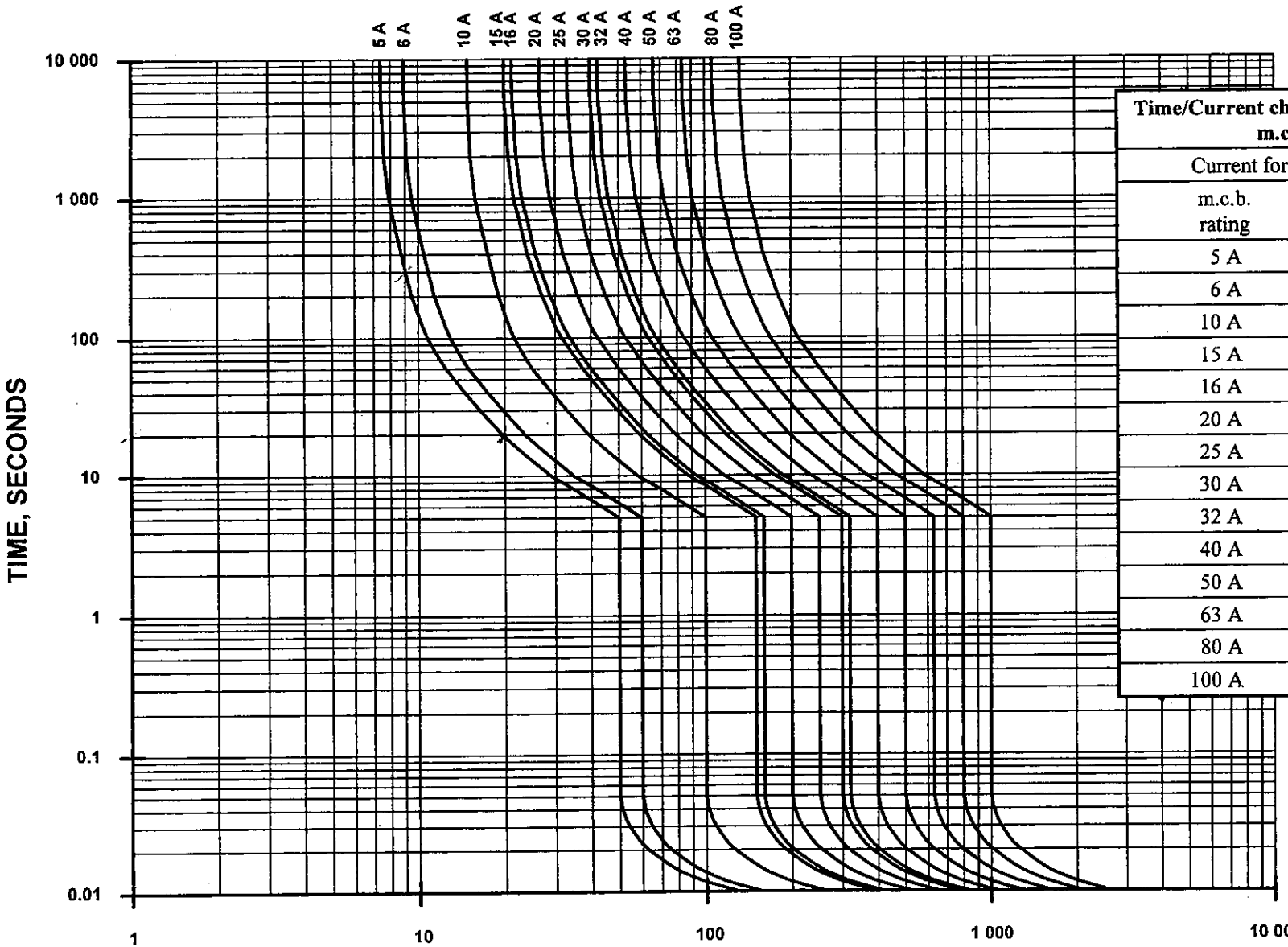
m.c.b. rating	Current
5 A	20 A
6 A	24 A
10 A	40 A
15 A	60 A
16 A	64 A
20 A	80 A
25 A	100 A
30 A	120 A
32 A	128 A
40 A	160 A
50 A	200 A
63 A	252 A
80 A	320 A
100 A	400 A

fig. 4



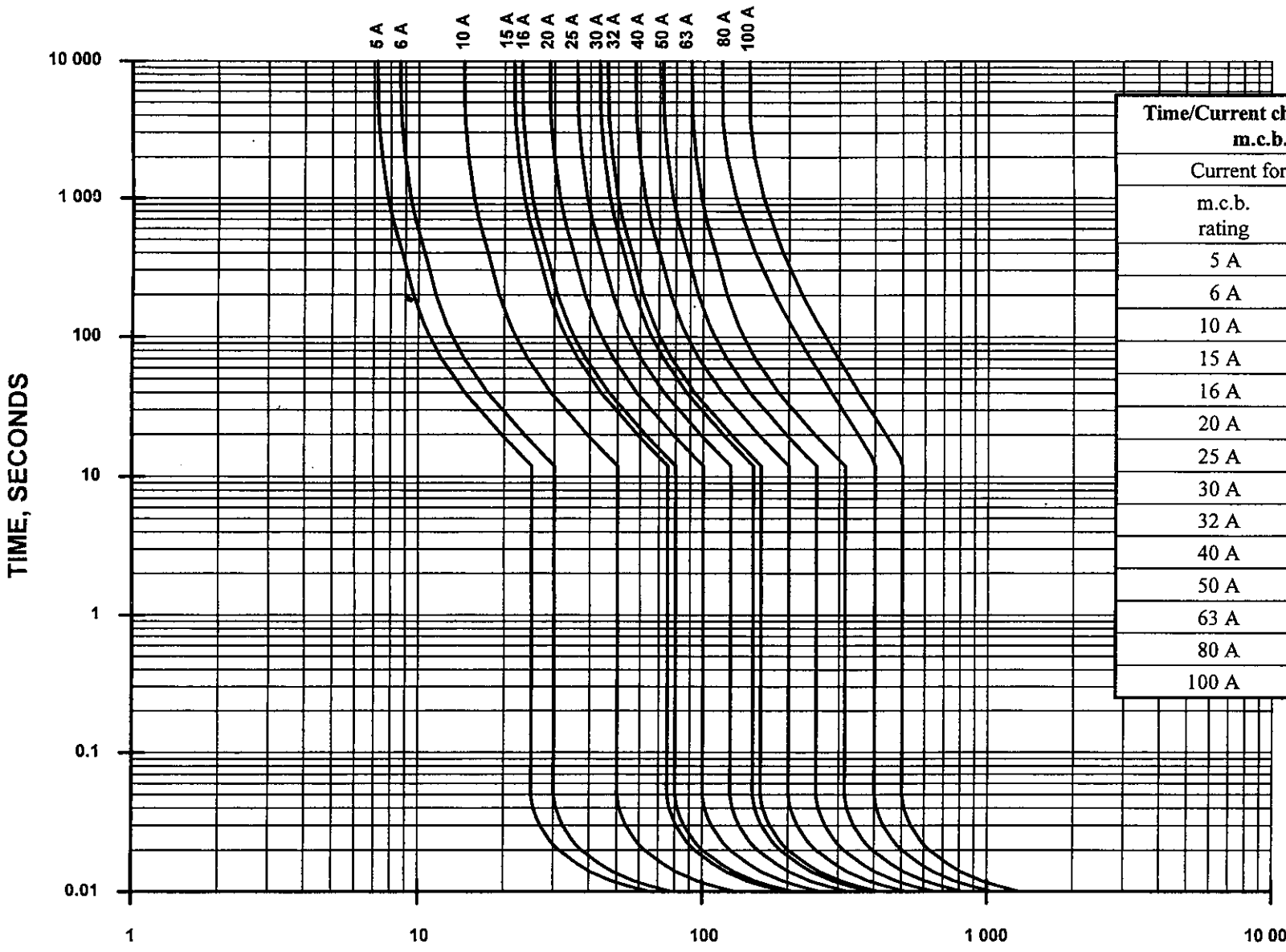
Time/Current characteristics for the Type 2 m.c.b. to BS 3871	
Current for time, 0.1 sec to 5 secs	
m.c.b. rating	Current
5 A	35 A
6 A	42 A
10 A	70 A
15 A	105 A
16 A	112 A
20 A	140 A
25 A	175 A
30 A	210 A
32 A	224 A
40 A	280 A
50 A	350 A
63 A	441 A
80 A	560 A
100 A	700 A

fig. 5



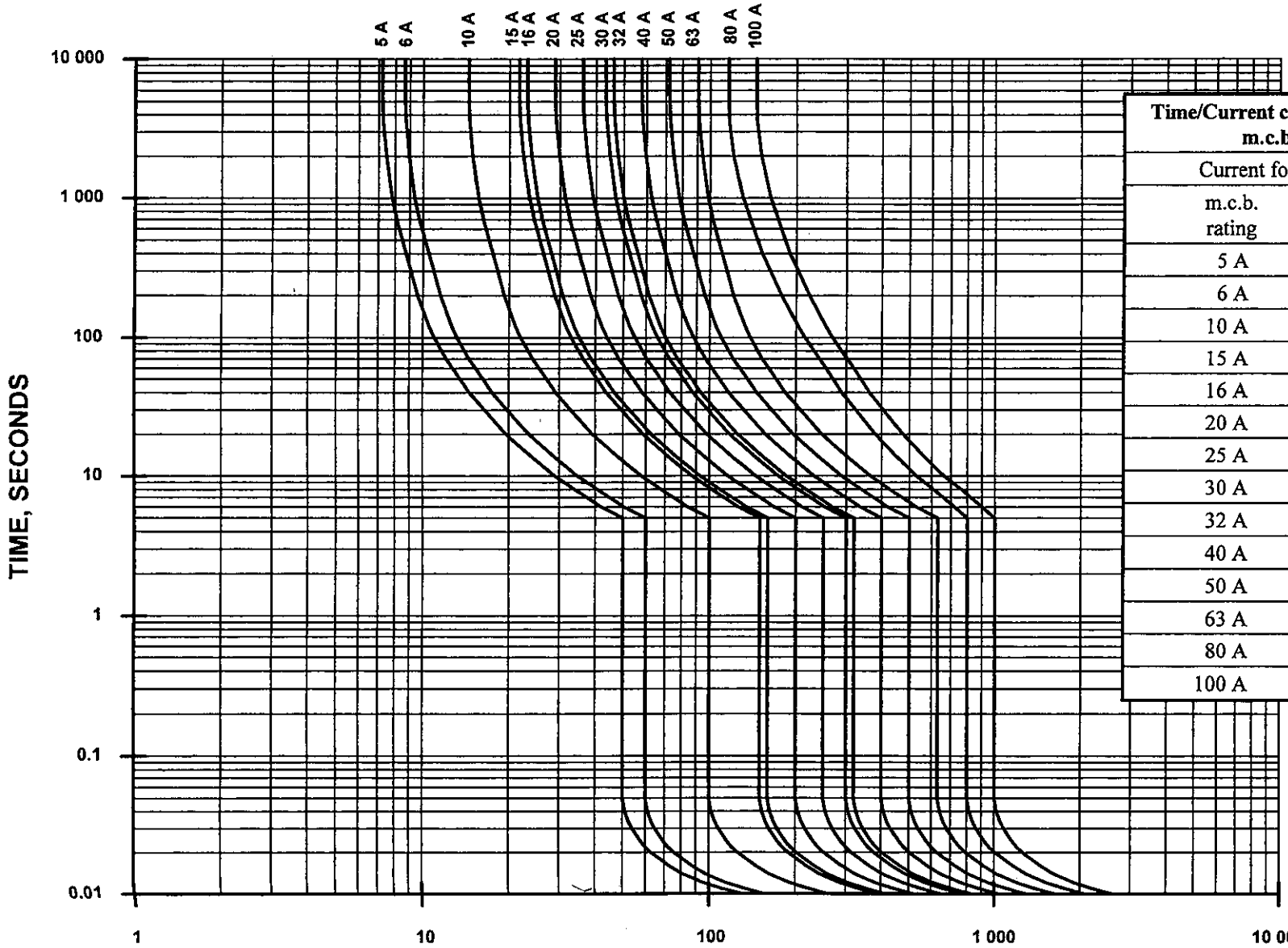
Time/Current characteristics for the Type 3 m.c.b. to BS 3871	
Current for time, 0.1 sec to 5 secs	
m.c.b. rating	Current
5 A	50 A
6 A	60 A
10 A	100 A
15 A	150 A
16 A	160 A
20 A	200 A
25 A	250 A
30 A	300 A
32 A	320 A
40 A	400 A
50 A	500 A
63 A	630 A
80 A	800 A
100 A	1000 A

fig. 6



Time/Current characteristics for the Type B m.c.b. to BS EN 60898	
Current for time, 0.1 sec to 5 secs	
m.c.b. rating	Current
5 A	25 A
6 A	30 A
10 A	50 A
15 A	75 A
16 A	80 A
20 A	100 A
25 A	125 A
30 A	150 A
32 A	160 A
40 A	200 A
50 A	250 A
63 A	315 A
80 A	400 A
100 A	500 A

fig. 7



Time/Current characteristics for the Type C m.c.b. to BS EN 60898	
Current for time, 0.1 sec to 5 secs	
m.c.b. rating	Current
5 A	50 A
6 A	60 A
10 A	100 A
15 A	150 A
16 A	160 A
20 A	200 A
25 A	250 A
30 A	300 A
32 A	320 A
40 A	400 A
50 A	500 A
63 A	630 A
80 A	800 A
100 A	1000 A

fig. 8

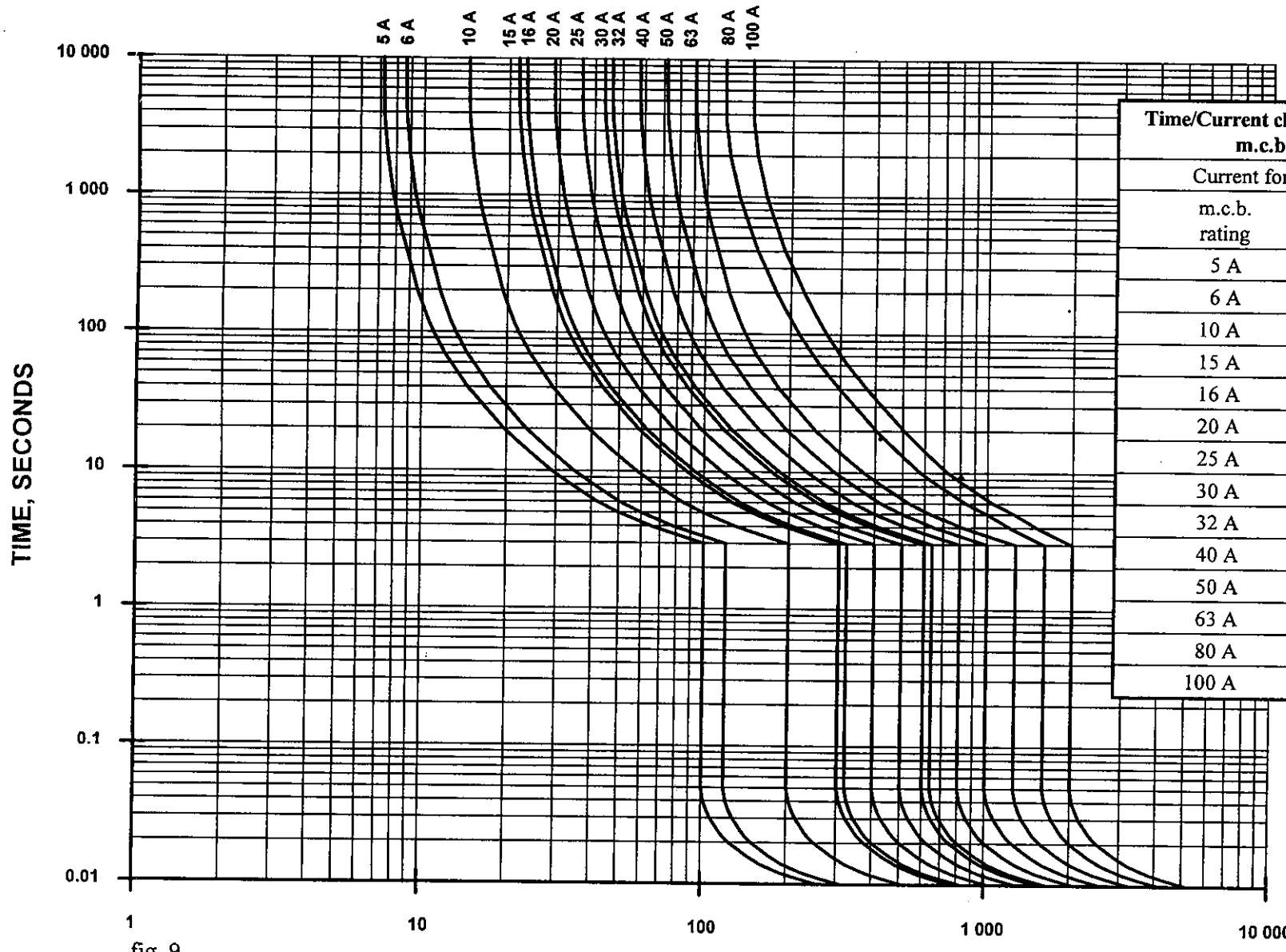


fig. 9

Time/Current characteristics for the Type D m.c.b. to BS EN 60898	
Current for time, 0.1 sec to 5 secs	
m.c.b. rating	Current
5 A	100 A
6 A	120 A
10 A	200 A
15 A	300 A
16 A	320 A
20 A	400 A
25 A	500 A
30 A	600 A
32 A	640 A
40 A	800 A
50 A	1000 A
63 A	1260 A
80 A	1600 A
100 A	2000 A

APPENDIX 4

CURRENT-CARRYING CAPACITY AND VOLTAGE DROP FOR CABLES AND FLEXIBLE CORDS

CONTENTS

COPPER CONDUCTORS

PVC-INSULATED CABLES

CABLES HAVING THERMOSETTING INSULATION

85°C RUBBER-INSULATED CABLES

FLEXIBLE CABLES AND CORDS

MINERAL INSULATED CABLES

ALUMINIUM CONDUCTORS

PVC- INSULATED CABLES

4K1 Single-core non-armoured, with or without sheath
4K2 Multicore non-armoured
4K3 Single-core armoured (non-magnetic armour)
4K4 Multicore armoured

CABLES HAVING THERMOSETTING INSULATION

4L1 Single-core, non-armoured
4L2 Multicore, non-armoured
4L3 Single-core armoured (non-magnetic armour)
4L4 Multicore armoured

APPENDIX 4

CURRENT-CARRYING CAPACITY AND VOLTAGE DROP FOR CABLES AND FLEXIBLE CORDS

PREFACE TO THE TABLES

1. Basis of tabulated current-carrying capacity

The current-carrying capacity set out in this appendix takes account of IEC Publication 364-5-523 (1983), so far as the latter is applicable. For types of cable not treated in the IEC publication (e.g. armoured cables) the current-carrying capacities given in this appendix are based on data provided by ERA Technology Ltd, and the British Cable Makers' Confederation. See also the ERA Report 69-30 "Current rating standards for distribution cables"*.

The tabulated current-carrying capacity relates to continuous loading and is also known as the 'full thermal current rating' of the cable, corresponding to the conductor operating temperature indicated in the headings to the tables concerned. It is intended to provide for a satisfactory life of conductor and insulation subject to the thermal effects of carrying current for sustained periods in normal service. A cable may be seriously damaged, leading to early failure, or its service life may be significantly reduced, if it is operated for any prolonged period at a temperature higher than the indicated value.

In addition, there are other considerations affecting the choice of the cross-sectional area of a conductor, such as the requirements for protection against electric shock (see Chapter 41), protection against thermal effects (see Chapter 42), overcurrent protection (see Chapter 43 and item 5 below), voltage drop (see item 7 below) and the limiting temperatures for terminals of equipment to which the conductors are connected.

The tabulated current-carrying capacity relates to a single circuit in the installation methods shown in Table 4A, in an ambient air temperature of 30°C. The current-carrying capacities given in the tables for a.c. operation apply only to frequencies in the range 49 to 61 Hz. For other conditions appropriate correction factors are to be applied as described below.

The current ratings given for single-core armoured cable are for the condition of armour bonded at both ends and to earth.

Further information on cables installed in thermal insulation may be obtained from ERA Report 85-0111. "The temperature rise of cables passing through short lengths of thermal insulation"*.

*ERA Technology Ltd, Cleeve Road, LEATHERHEAD, Surrey, United Kingdom KT22 7SA.

2. Correction factors for current-carrying capacity

The current-carrying capacity of a cable for continuous service is affected by ambient temperature, by grouping, by partial or total enclosure in thermal insulating material and, for a.c., by frequency. This appendix provides correction factors in these respects as follows:

2.1 *Ambient temperature*

Tables 4C1 and 4C2 give the correction factor to be applied to the tabulated current-carrying capacity depending upon the actual ambient temperature of the location in which the cable is to be installed.

In practice the ambient air temperatures may be determined by thermometers placed in free air as close as practicable to the position at which the cables are installed or are to be installed, subject to the proviso that the measurements are not to be influenced by the heat arising from the cables; thus if the measurements are made while the cables are loaded, the thermometers should be placed about 0.5 m or ten times the overall diameter of the cable, whichever is the lesser, from the cables, in the horizontal plane, or 150 mm below the lowest of the cables.

Tables 4C1 and 4C2 do not take account of temperature increase, if any, due to solar or other infra-red radiation. Where cables are subject to such radiation, the current-carrying capacity may need to be specially calculated.

2.2 *Grouping*

Tables 4B1, 4B2 and 4B3 give the correction factor to be applied to the tabulated current-carrying capacity where cables or circuits are grouped.

2.3 *Other frequencies*

In extreme cases, notably for large multicore cables, the reduction in current-carrying capacity of cables carrying, for example, balanced 400 Hz a.c. compared with the current-carrying capacity at 50 Hz, may be as much as 50%. For small cables and flexible cords, such as may be used to supply individual tools, the difference in the 50 Hz and the 400 Hz current-carrying capacities may be negligible.

3. Effective current-carrying capacity

The current-carrying capacity of a cable corresponds to the maximum current that can be carried in specified conditions without the conductors exceeding the permissible limit of steady state temperature for the type of insulation concerned.

The values of current tabulated represent the effective current-carrying capacity only where no correction factor is applicable. Otherwise the current-carrying capacity corresponds to the tabulated value multiplied by the appropriate factor or factors for ambient temperature, grouping and thermal insulation, as applicable.

Irrespective of the type of overcurrent protective device associated with the conductors concerned, the ambient temperature correction factors to be used when calculating current-carrying capacity (as opposed to those used when selecting cable sizes) are those given in Table 4C1.

4. Relationship of current-carrying capacity to other circuit parameters

The relevant symbols used in the Regulations are as follows:

I_z the current-carrying capacity of a cable for continuous service, under the particular installation conditions concerned.

I_t the value of current tabulated in this appendix for the type of cable and installation method concerned, for a single circuit in an ambient temperature of 30°C.

I_b the design current of the circuit, i.e. the current intended to be carried by the circuit in normal service.

I_n the nominal current or current setting of the device protecting the circuit against overcurrent.

I_2 the operating current (i.e. the fusing current or tripping current for the conventional operating time) of the device protecting the circuit against overload.

C a correction factor to be applied where the installation conditions differ from those for which values of current-carrying capacity are tabulated in this appendix. The various correction factors are identified as follows:

C_a for ambient temperature

C_g for grouping

C_i for thermal insulation

C_t for operating temperature of conductor.

In all circumstances I_z must be not less than I_b and I_n also must be not less than I_b.

Where the overcurrent device is intended to afford protection against overload, I_2 must not exceed 1.45 I_z and I_n must not exceed I_z (see item 5 below).

Where the overcurrent device is intended to afford short circuit protection only, I_n can be greater than I_z and I_2 can be greater than 1.45 I_z. The protective device is then to be selected for compliance with Regulation 434-03-03.

5. Overload protection

Where overload protection is required, the type of protection provided does not affect the current-carrying capacity of a cable for continuous service (I_z) but it may affect the choice of conductor size. The operating conditions of a cable are influenced not only by the limiting conductor temperature for continuous service, but also by the conductor temperature which might be attained during the conventional operating time of the overload protection device, in the event of an overload.

This means that the operating current of the protective device must not exceed 1.45 I_z. Where the protective device is a fuse to BS 88 or BS 1361 or a miniature circuit-breaker to BS 3871 or BS EN 60898, this requirement is satisfied by selecting a value of I_z not less than I_n.

In practice, because of the standard steps in nominal rating of fuses and circuit-breakers, it is often necessary to select a value of I_n exceeding I_b. In that case, because it is also necessary for I_z in turn to be not less than the

selected value of I_n, the choice of conductor cross-sectional area may be dictated by the overload conditions and the current-carrying capacity (I_z) of the conductors will not always be fully used.

The size needed for a conductor protected against overload by a BS 3036 semi-enclosed fuse can be obtained by the use of a correction factor, 1.45/2=0.725, which results in the same degree of protection as that afforded by other overload protective devices. This factor is to be applied to the nominal rating of the fuse as a divisor, thus indicating the minimum value of I_t required of the conductor to be protected. In this case also, the choice of conductor size is dictated by the overload conditions and the current-carrying capacity (I_z) of the conductors cannot be fully used.

6. Determination of the size of cable to be used

Having established the design current (I_b) of the circuit under consideration, the appropriate procedure described in items 6.1 to 6.4 below will enable the designer to determine the size of the cable it will be necessary to use.

As a preliminary step it is useful to identify the length of the cable run and the permissible voltage drop for the equipment being supplied, as this may be an over-riding consideration (see Regulation 525-01 and item 7 of this appendix). The permissible voltage drop in mV, divided by I_b and by the length of run, will give the value of voltage drop in mV/A/m which can be tolerated. A voltage drop not exceeding that value is identified in the appropriate table and the corresponding cross-sectional area of conductor needed on this account can be read off directly before any other calculations are made.

The conductor size necessary from consideration of the conditions of normal load and overload is then determined. All correction factors affecting I_z (i.e. the factors for ambient temperature, grouping and thermal insulation) can, if desired, be applied to the values of I_t as multipliers. This involves a process of trial and error until a cross-sectional area is reached which ensures that I_z is not less than I_b and not less than I_n of any protective device it is intended to select. In any event, if a correction factor for protection by a semi-enclosed fuse is necessary, this has to be applied to I_n as a divisor. It is therefore more convenient to apply all the correction factors to I_n as divisors.

This method is used in items 6.1 to 6.3 and produces a value of current and that value (or the next larger value) can readily be located in the appropriate table of current-carrying capacity and the corresponding cross-sectional area of conductor can be identified directly. It should be noted that the value of I_t appearing against the chosen cross-sectional area is not I_z. It is not necessary to know I_z where the size of conductor is chosen by this method, but if it is desired to identify I_z the value is determined by the method indicated in item 3 above.

However, this method cannot be used for cables installed in enclosed trenches (installation methods 18, 19 and 20 of Table 4A) because the correction factors given in Table 4B3 are related to conductor cross-sectional areas. For such cables it is therefore necessary to use the process of trial and error described in the third paragraph above, selecting on a trial basis a particular size of cable from, for instance, voltage drop considerations.

6.1 *Where overload protection is afforded by a fuse to BS 88 or BS 1361, or a miniature circuit-breaker to BS 3871 or BS EN 60898.*

6.1.1 *For single circuits*

- DIVIDE the nominal current of the protective device (I_n) by any applicable correction factor for ambient temperature (C_a) given in Table 4C1.

- then further DIVIDE by any applicable correction factor for thermal insulation (C_i).

The size of cable to be used is to be such that its tabulated current-carrying capacity (I_t) is not less than the value of nominal current of the protective device adjusted as above:

$$I_t \geq \frac{I_n}{C_a C_i} \qquad (1)$$

6.1.2 *For groups*

- DIVIDE the nominal current of the protective device (I_n) by the correction factor for grouping (C_g) given in Tables 4B1, 4B2 or 4B3:

$$I_t \geq \frac{I_n}{C_g} \qquad (2)$$

Alternatively, it may be selected in accordance with the following formulae, provided that the circuits of the group are not liable to simultaneous overload:

$$I_t \geq \frac{I_b}{C_g}, \text{ and} \tag{3}$$

$$I_t \geq \sqrt{I_n^2 + 0.48\, I_b^2 \left(\frac{1-C_g^2}{C_g^2}\right)} \tag{4}$$

The size of cable to be used is to be such that its tabulated single-circuit current-carrying capacity (I_t) is not less than the value of I_t calculated in accordance with formula (2) above or, where formulae (3) and (4) are used not less than the larger of the resulting two values of I_t.

Where correction factors C_a and/or C_i are applicable, they are to be applied as divisors to the value of I_t determined by the above formulae.

6.2 *Where the protective device is a semi-enclosed fuse to BS 3036:*

6.2.1 *For single circuits*

- DIVIDE the nominal current of the fuse (I_n) by any applicable correction factor for ambient temperature (C_a) given in Table 4C2
- then further DIVIDE by any applicable correction factor for thermal insulation, (C_i)
- then further DIVIDE by 0.725.

The size of cable to be used is to be such that its tabulated current-carrying capacity (I_t) is not less the value of nominal current of the fuse adjusted as above:

$$I_t \geq \frac{I_n}{0.725\, C_a C_i} \tag{5}$$

6.2.2 *For groups*

- DIVIDE the nominal current of the fuse I_n by 0.725 and by the applicable correction factor for grouping (C_g) given in Table 4B1, 4B2 or 4B3:

$$I_t \geq \frac{I_n}{0.725\, C_g} \tag{6}$$

Alternatively, it may be selected by the following formulae, provided that the circuits of the group are not liable to simultaneous overload:

$$I_t \geq \frac{I_b}{C_g}, \text{ and} \tag{7}$$

$$I_t \geq \sqrt{1.9\, I_n^2 + 0.48\, I_b^2 \left(\frac{1-C_g^2}{C_g^2}\right)} \tag{8}$$

The size of cable to be used is to be such that its tabulated single-circuit current-carrying capacity (I_t) is not less than the value of I_t calculated in accordance with formula (6) above or, where formulae (7) and (8) are used, not less than the larger of the resulting two values of I_t.

Where correction factors C_a and/or C_i are applicable, they are to be applied as divisors to the value of I_t determined by the above formulae.

6.3 *Where overload protection is not required:*

Where Regulation 473-01-04 applies, and the cable under consideration is not required to be protected against overload, the design current of the circuit (I_b) is to be divided by any applicable correction factors, and the size of the cable to be used is to be such that its tabulated current-carrying capacity (I_t) for the installation method concerned is not less than the value of I_b adjusted as above:

$$I_t \geq \frac{I_b}{C_a C_g C_i} \tag{9}$$

6.4 *Variation of installation conditions along a cable route*

The procedures in items 6.1 to 6.3 above are based on the assumption that all the conditions necessitating the use of correction factors apply to the same part of the route of the conductors of the circuit. Where various factors apply to different parts of the route, each part may be treated separately, or alternatively only the factor or combination of factors appropriate to the most onerous conditions encountered along the route may be applied to the whole of the route. It is permissible to obtain more precise factors by calculation of the various conductor temperature rises that will occur along such a route, provided that the appropriate limiting temperature of the conductor is nowhere exceeded (see Regulation 523-01).

7. Tables of voltage drop

In the tables, values of voltage drop are given for a current of one ampere for a metre run, i.e. for a distance of 1 m along the route taken by the cables, and represent the result of the voltage drops in all the circuit conductors. The values of voltage drop assume that the conductors are at their maximum permitted normal operating temperatures.

The values in the tables, for a.c. operation, apply only to frequencies in the range 49 to 61 Hz and for single-core armoured cables the tabulated values apply where the armour is bonded to earth at both ends. The values of voltage drop for cables operating at higher frequencies may be substantially greater.

For a given run, to calculate the voltage drop (in mV) the tabulated value of voltage drop per ampere per metre for the cable concerned has to be multiplied by the length of the run in metres and by the current the cable is intended to carry, namely the design current of the circuit (I_b) in amperes. For three-phase circuits the tabulated mV/A/m values relate to the line voltage and balanced conditions have been assumed.

For cables having conductors of 16 mm^2 or less cross-sectional area their inductances can be ignored and $(mV/A/m)_r$ values only are tabulated. For cables having conductors greater than 16 mm^2, cross-sectional area the impedance values are given as $(mV/A/m)_z$, together with the resistive component $(mV/A/m)_r$ and the reactive component $(mV/A/m)_x$.

The *direct* use of the tabulated $(mV/A/m)_r$ or $(mV/A/m)_z$ values, as appropriate, may lead to pessimistically high calculated values of voltage drop or, in other words, to unnecessarily low values of permitted circuit lengths.

For example, where the design current of a circuit is significantly less than the effective current-carrying capacity of the cable chosen, the actual voltage drop would be less than the calculated value because the conductor temperature (and hence its resistance) will be less than that on which the tabulated mV/A/m had been based.

As regards power factor in a.c. circuits the use of the tabulated mV/A/m values, (for the larger cable sizes, the tabulated $(mV/A/m)_z$ values) to calculate the voltage drop is strictly correct only when the phase angle of the cable equals that of the load. When the phase angle of the cable does not equal that of the load, the direct use of the tabulated mV/A/m or $(mV/A/m)_z$ values leads to a calculated value of voltage drop higher than the actual value. In some cases it may be advantageous to take account of the load power factor when calculating voltage drop.

Where a more accurate assessment of voltage drop is desirable the following methods may be used.

7.1 *Correction for operating temperature*

For cables having conductors of cross-sectional area 16 mm^2 or less the design value of mV/A/m is obtained by multiplying the tabulated value by a factor C_t, given by

$$C_t = \frac{230 + t_p - \left(C_a^{\,2} C_g^{\,2} - \frac{I_b^{\,2}}{I_t^{\,2}} \right)\left(t_p - 30 \right)}{230 + t_p} \qquad (10)$$

where t_p is the maximum permitted normal operating temperature, (°C)

This equation applies only where the overcurrent protective device is other than a BS 3036 fuse and where the actual ambient temperature is equal to or greater than 30°C

NOTE: For convenience, the above formula is based on the resistance-temperature coefficient of 0.004 per °C at 20°C for both copper and aluminium conductors.

For cables having conductors of cross-sectional area greater than 16 mm^2, only the resistive component of the voltage drop is affected by the temperature and the factor C_t is therefore applied only to the tabulated value of $(mV/A/m)_r$ and the design value of $(mV/A/m)_z$ is given by the vector sum of C_t $(mV/A/m)_r$ and $(mV/A/m)_x$.

For very large conductor sizes where the resistive component of voltage drop is much less than the corresponding reactive part (i.e. when x/r ≥3) this correction factor need not be considered.

7.2 *Correction for load power factor*

For cables having conductors of cross-sectional area of 16 mm^2 or less the design value of mV/A/m is obtained approximately by multiplying the tabulated value by the power factor of the load, cos Ø.

For cables having conductors of cross-sectional area greater than 16 mm^2 the design value of mV/A/m is given approximately by:

$$\cos Ø \text{ (tabulated } (mV/A/m)_r) + \sin Ø \text{ (tabulated } (mV/A/m)_x)$$

For single-core cables in flat formation the tabulated values apply to the outer cables and may under-estimate for the voltage drop between an outer cable and the centre cable for cross-sectional areas above 240 mm^2, and power factors greater than 0.8.

7.3 *Combined correction for both operating temperature and load power factor*

From items 7.1 and 7.2 above, where it is considered appropriate to correct the tabulated mV/A/m values for both operating temperature and load power factor, the design values of mV/A/m are given by:

for cables having conductors of 16 mm^2 or less cross-sectional area

$$C_t \cos Ø \text{ (tabulated mV/A/m)}$$

for cables having conductors of cross-sectional area greater than 16 mm^2

$$C_t \cos Ø \text{ (tabulated } mV/A/m)_r) + \sin Ø \text{ (tabulated } mV/A/m)_x).$$

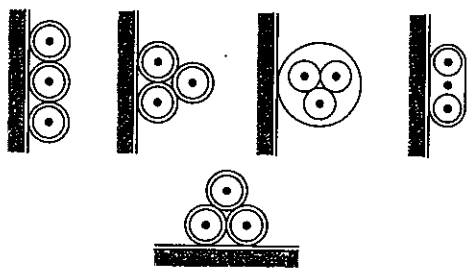
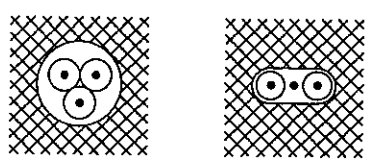
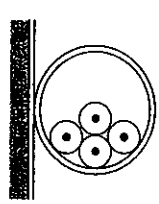
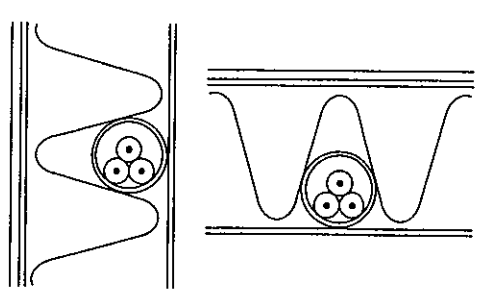
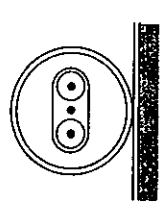
8. Methods of installation of cables

Table 4A lists the methods of installation for which this appendix provides guidance for the selection of the appropriate cable size. The methods of installation distinguished by bold type are reference methods for which the current-carrying capacities given in Tables 4D1 to 4L4 have been determined. For the other methods, an indication is given of the appropriate reference method having values of current-carrying capacity which can safely be applied.

As stated in Regulation 521-07-01 the use of other methods is not precluded, where specified by a suitably qualified electrical engineer; in that case the evaluation of current-carrying capacity may need to be based on experimental work.

TABLE 4A

Schedule of Installation Methods of Cables (including Reference Method)

Installation method		Examples	Appropriate Reference Method for determining current-carrying capacity
Number	Description		
1	2	3	4
Open and clipped direct:			
1	**Sheathed cables clipped direct to or lying on a non-metallic surface**		**Method 1**
Cables embedded direct in building materials:			
2	Sheathed cables embedded directly in masonry, brickwork, concrete, plaster or the like (other than thermally insulating materials)		Method 1
In conduit:			
3	**Single-core non-sheathed cables in metallic or non-metallic conduit on a wall or ceiling**		**Method 3**
4	**Single-core non-sheathed cables in metallic or non-metallic conduit in a thermally insulating wall or above a thermally insulating ceiling, the conduit being in contact with a thermally conductive surface on one side †**		**Method 4**
5	Multicore cables having non-metallic sheath, in metallic or non-metallic conduit on a wall or ceiling		Method 3

† The wall is assumed to consist of an outer weatherproof skin, thermal insulation and an inner skin of plasterboard or wood-like material having a coefficient of heat transfer not less than 10 W/m²K. The conduit is fixed so as to be close to, but not necessarily touching, the inner skin. Heat from the cables is assumed to escape through the inner skin only.

TABLE 4A (continued)

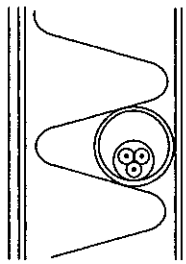
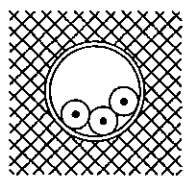
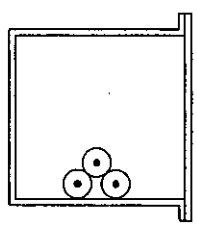
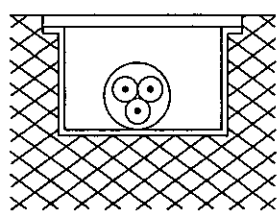
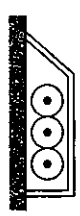
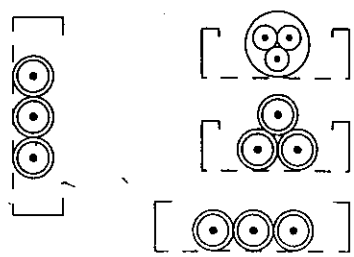
Installation method		Examples	Appropriate Reference Method for determining current-carrying capacity
Number	Description		
1	2	3	4
6	Sheathed cables in conduit in a thermally insulating wall etc. (otherwise as Reference Method 4)		Method 4
7	Cables in conduit embedded in masonry, brickwork, concrete, plaster or the like (other than thermally insulating materials)		Method 3
In trunking:			
8	Cables in trunking on a wall or suspended in the air		Method 3
9	Cables in flush floor trunking		Method 3
10	Single-core cables in skirting trunking		Method 3
On trays:			
11	**Sheathed cables on a perforated cable tray, bunched and unenclosed. A perforated cable tray is considered as a tray in which the holes occupy at least 30% of the surface area**		**Method 11**

TABLE 4A (continued)

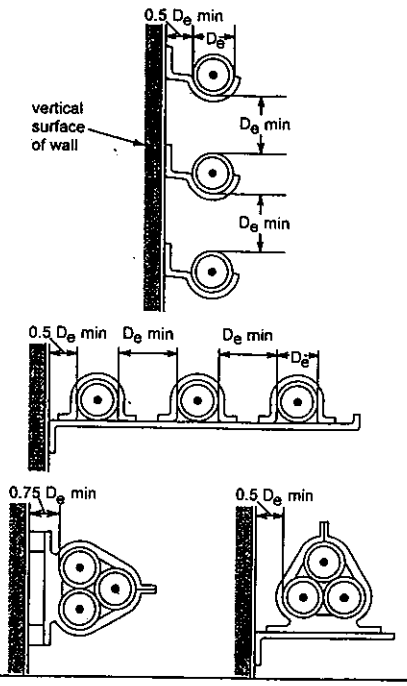
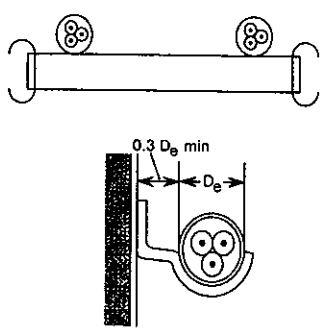
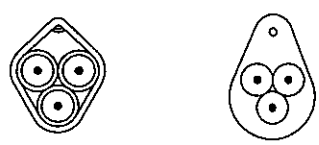
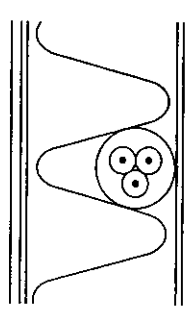
Installation method		Examples	Appropriate Reference Method for determining current-carrying capacity
Number	Description		
1	2	3	4
In free air, on cleats, brackets or a ladder:			
12	**Sheathed single-core cables in free air (any supporting metalwork under the cables occupying less than 10% of the plan area):** **Two or three cables vertically one above the other, minimum distance between cable surfaces equal to the overall cable diameter (D_e); distance from the wall not less than $0.5D_e$** **Two or three cables horizontally, with spacings as above** **Three cables in trefoil, distance between wall and surface of nearest cable $0.5D_e$ or nearest cables $0.75D_e$**		**Method 12**
13	**Sheathed multicore cables on ladder or brackets, separation greater than $2D_e$** **Sheathed multicore cables in free air distance between wall and cable surface not less than $0.3D_e$** **Any supporting metalwork under the cables occupying less than 10% of the plan area**		**Method 13**
14	Cables suspended from or incorporating a catenary wire		Method 12 or 13, as appropriate
Cables in building voids:			
15	Sheathed cables installed directly in a thermally insulating wall or above a thermally insulating ceiling, the cable being in contact with a thermally conductive surface on one side (otherwise as Reference Method 4)		Method 4

TABLE 4A (continued)

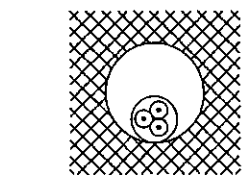
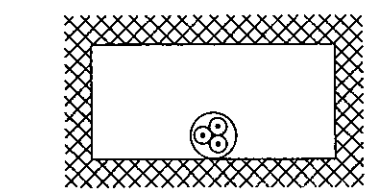
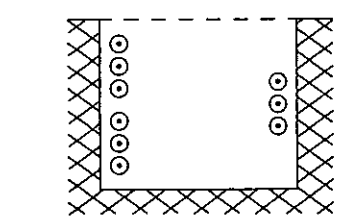
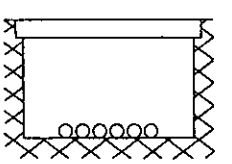
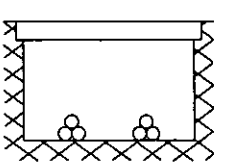
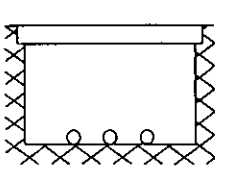
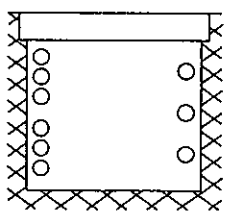
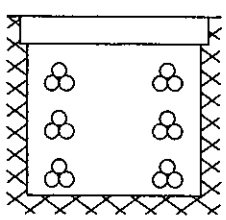
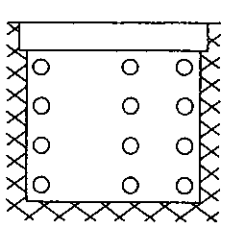
Installation method		Examples	Appropriate Reference Method for determining current-carrying capacity
Number	Description		
1	2	3	4
16	Sheathed cables in ducts or voids formed by the building structure, other than thermally insulating materials	 	Method 4 Where the cable has a diameter D_e and the duct has a diameter not greater than $5D_e$ or a perimeter not greater than $20D_e$ Method 3 Where the duct has either a diameter greater than $5D_e$ or a perimeter greater than $20D_e$ NOTE 1 - Where the perimeter is greater than $60D_e$, installation Methods 18 to 20, as appropriate, should be used. NOTE 2 - D_e is the overall cable diameter. For groups of cables D_e is the sum of the cable diameters.
Cables in trenches:			
17	Cables supported on the wall of an open or ventilated trench, with spacings as indicated for Reference Method 12 or 13 as appropriate		Method 12 or 13, as appropriate
18	**Cables in enclosed trench 450 mm wide by 300 mm deep (minimum dimensions) including 100 mm cover**	Two single-core cables with surfaces separated by a minimum of one cable diameter.  Three single-core cables in trefoil and touching throughout.  Multicore cables or groups of single-core cables with surfaces separated by a minimum of 50 mm 	**Method 18** **Use rating factors in Table 4B3**

TABLE 4A (continued)

Installation method		Examples	Appropriate Reference Method for determining current-carrying capacity
Number	Description		
1	2	3	4
19	**Cables in enclosed trench 450 mm wide by 600 mm deep (minimum dimensions) including 100 mm cover**	Single-core cables arranged in flat groups of two or three on the vertical trench wall with surfaces separated by one diameter with a minimum distance of 50 mm between groups. Multicore cables installed with surfaces separated by a minimum* of 75 mm. All cables spaced at least 25 mm from the trench wall. 	**Method 19 Use rating factors in Table 4B3**
20	**Cables in enclosed trench 600 mm wide by 760 mm deep (minimum dimensions) including 100 mm cover**	Single-core cables arranged in groups of two or three in flat formation with the surfaces separated by one diameter or in trefoil formation with cables touching.  Groups separated by a minimum* of 50 mm either horizontally or vertically. Multicore cables installed with surfaces separated by a minimum* of 75 mm either horizontally or vertically. All cables spaced at least 25 mm from the trench wall. 	**Method 20 Use rating factors in Table 4B3**

* Larger spacing to be used where practicable.

TABLE 4B1

Correction factors for groups of more than one circuit of single-core cables, or more than one multicore cable (to be applied to the corresponding current-carrying capacity for a single circuit in Tables 4D1 to 4D4, 4E1 to 4E4, 4F1 and 4F2, 4J1, 4K1 to 4K4, 4L1 to 4L4)**

Reference method of installation (see Table 4A)		Correction factor (C_g) Number of circuits or multicore cables													
		2	3	4	5	6	7	8	9	10	12	14	16	18	20
Enclosed (Method 3 or 4) or bunched and clipped direct to a non-metallic surface (Method 1)		0.80	0.70	0.65	0.60	0.57	0.54	0.52	0.50	0.48	0.45	0.43	0.41	0.39	0.38
Single layer clipped to a non-metallic surface (Method 1)	Touching	0.85	0.79	0.75	0.73	0.72	0.72	0.71	0.70	-	-	-	-	-	-
	Spaced*	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Single layer *multicore* on a perforated metal cable tray, vertical or horizontal (Method 11)	Touching	0.86	0.81	0.77	0.75	0.74	0.73	0.73	0.72	0.71	0.70	-	-	-	-
	Spaced*#	0.91	0.89	0.88	0.87	0.87	-	-	-	-	-	-	-	-	-
Single layer *single-core* on a perforated metal cable tray, touching (Method 11)	Horizontal	0.90	0.85	-	-	-	-	-	-	-	-	-	-	-	-
	Vertical	0.85	-	-	-	-	-	-	-	-	-	-	-	-	-
Single layer multicore touching on ladder supports (Method 13)		0.86	0.82	0.80	0.79	0.78	0.78	0.78	0.77	-	-	-	-	-	-

* Spaced by a clearance between adjacent surfaces of at least one cable diameter (D_e). Where the horizontal clearances between adjacent cables exceeds $2D_e$ no correction factor need be applied.

** When cables having differing conductor operating temperatures are grouped together, the current rating shall be based upon the lowest operating temperature of any cable in the group.

\- Correction factor not tabulated.

\# Not applicable to mineral insulated cables see Table 4B2.

TABLE 4B2

Correction factors for mineral insulated cables installed on perforated tray, (to be applied to the corresponding current-carrying capacity for single circuits for reference method 11 in Table 4J1A)

Tray orientation	Arrangement of cables	Number of trays	Number of multicore cables or circuits					
			1	2	3	4	6	9
Horizontal	Multiconductor cables touching	1	1.0	0.90	0.80	0.80	0.75	0.75
Horizontal	Multiconductor cables spaced ‡	1	1.0	1.0	1.0	0.95	0.90	-
Vertical	Multiconductor cables touching	1	1.0	0.90	0.80	0.75	0.75	0.70
Vertical	Multiconductor cables spaced ‡	1	1.0	0.90	0.90	0.90	0.85	-
Horizontal	Single conductor cables trefoil separated ‡‡	1	1.0	1.0	0.95			
Vertical	Single conductor cables trefoil separated ‡‡	1	1.0	0.90	0.90			

‡ Spaced by a clearance between adjacent surfaces of at least one cable diameter (D_e).

‡‡ Separated by a clearance between adjacent surfaces of at least two cable diameters ($2D_e$).

\- Correction factor not tabulated.

NOTES to Tables 4B1 and 4B2

1. The factors in the table are applicable to groups of cables all of one size. The value of current derived from application of the appropriate factors is the maximum current to be carried by any of the cables in the group.
2. If, due to known operating conditions, a cable is expected to carry not more than 30% of its *grouped* rating, it may be ignored for the purpose of obtaining the rating factor for the rest of the group.
   For example, a group of N loaded cables would normally require a group reduction factor of C_g applied to the tabulated I_t. However, if M cables in the group carry loads which are not greater than 0.3 $C_g I_t$ amperes the other cables can be sized by using the group rating factor corresponding to (N-M) cables.
3. When cables having differing conductor operating temperatures are grouped together, the current rating shall be based on the lowest operating temperature of any cable in the group.
4. Where the horizontal clearances between adjacent cables exceeds $2D_e$, no correction factor need be applied.

TABLE 4B3

Correction factors for cables installed in enclosed trenches (Installation Methods 18, 19 and 20 of Table 4A)*

The correction factors tabulated below relate to the disposition of cables illustrated in items 18 to 20 of Table 4A and are applicable to the current-carrying capacities for Reference Methods 12 or 13 of Table 4A as given in the relevant tables of this appendix.

Conductor cross-sectional area	Correction factor									
	Installation Method 18				Installation Method 19			Installation Method 20		
	2 single-core cables, or 1 three- or four-core cable	3 single-core cables, or 2 two-core cables	4 single-core cables, or 2 three- or four-core cables	6 single-core cables, 4 two-core cables, or 3 three- or four-core cables	6 single-core cables, 4 two-core cables, or 3 three- or four-core cables	8 single-core cables, or 4 three- or four-core cables	12 single-core cables, 8 two-core cables, or 6 three- or four-core cables	12 single-core cables, 8 two-core cables, or 6 three- or four-core cables	18 single-core cables, 12 two-core cables, or 9 three- or four-core cables	24 single-core cables, 16 two-core cables, or 12 three- or four-core cables
1	2	3	4	5	6	7	8	9	10	11
(mm^2)										
4	0.93	0.90	0.87	0.82	0.86	0.83	0.76	0.81	0.74	0.69
6	0.92	0.89	0.86	0.81	0.86	0.82	0.75	0.80	0.73	0.68
10	0.91	0.88	0.85	0.80	0.85	0.80	0.74	0.78	0.72	0.66
16	0.91	0.87	0.84	0.78	0.83	0.78	0.71	0.76	0.70	0.64
25	0.90	0.86	0.82	0.76	0.81	0.76	0.69	0.74	0.67	0.62
35	0.89	0.85	0.81	0.75	0.80	0.74	0.68	0.72	0.66	0.60
50	0.88	0.84	0.79	0.74	0.78	0.73	0.66	0.71	0.64	0.59
70	0.87	0.82	0.78	0.72	0.77	0.72	0.64	0.70	0.62	0.57
95	0.86	0.81	0.76	0.70	0.75	0.70	0.63	0.68	0.60	0.55
120	0.85	0.80	0.75	0.69	0.73	0.68	0.61	0.66	0.58	0.53
150	0.84	0.78	0.74	0.67	0.72	0.67	0.59	0.64	0.57	0.51
185	0.83	0.77	0.73	0.65	0.70	0.65	0.58	0.63	0.55	0.49
240	0.82	0.76	0.71	0.63	0.69	0.63	0.56	0.61	0.53	0.48
300	0.81	0.74	0.69	0.62	0.68	0.62	0.54	0.59	0.52	0.46
400	0.80	0.73	0.67	0.59	0.66	0.60	0.52	0.57	0.50	0.44
500	0.78	0.72	0.66	0.58	0.64	0.58	0.51	0.56	0.48	0.43
630	0.77	0.71	0.65	0.56	0.63	0.57	0.49	0.54	0.47	0.41

* When cables having different conductor operating temperatures are grouped together the current rating shall be based on the lowest operating temperature of any cable in the group.

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TABLE 4C1

Correction factors for ambient temperature where protection is against short-circuit

NOTE: This table applies where the associated overcurrent protective device is intended to provide short-circuit protection only. Except where the device is a semi-enclosed fuse to BS 3036 the table also applies where the device is intended to provide overload protection.

Type of insulation	Operating temperature	Ambient temperature (°C)														
		25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Rubber (flexible cables only)	60°C	1.04	1.0	0.91	0.82	0.71	0.58	0.41	-	-	-	-	-	-	-	-
General purpose pvc	70°C	1.03	1.0	0.94	0.87	0.79	0.71	0.61	0.50	0.35	-	-	-	-	-	-
Paper	80°C	1.02	1.0	0.95	0.89	0.84	0.77	0.71	0.63	0.55	0.45	0.32	-	-	-	-
Rubber	85°C	1.02	1.0	0.95	0.90	0.85	0.80	0.74	0.67	0.60	0.52	0.43	0.30	-	-	-
Heat resisting pvc*	90°C	1.03	1.0	0.97	0.94	0.91	0.87	0.84	0.80	0.76	0.71	0.61	0.50	0.35	-	-
Thermosetting	90°C	1.02	1.0	0.96	0.91	0.87	0.82	0.76	0.71	0.65	0.58	0.50	0.41	0.29	-	-
Mineral	70°C sheath	1.03	1.0	0.93	0.85	0.77	0.67	0.57	0.45	0.31	-	-	-	-	-	-
	105°C sheath	1.02	1.0	0.96	0.92	0.88	0.84	0.80	0.75	0.70	0.65	0.60	0.54	0.47	0.40	0.32

NOTES:

1. Correction factors for flexible cords and for 85°C or 150°C rubber-insulated flexible cables are given in the relevant table of current-carrying capacity.
2. This table also applies when determining the current-carrying capacity of a cable.
3. * These factors are applicable only to ratings in columns 2 to 5 of Table 4D1.

TABLE 4C2

Correction factors for ambient temperature where the overload protective device is a semi-enclosed fuse to BS 3036.

Type of insulation	Operating temperature	Ambient temperature (°C)														
		25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Rubber (flexible cables only)	60°C	1.04	1.0	0.96	0.91	0.87	0.79	0.56	-	-	-	-	-	-	-	-
General purpose pvc	70°C	1.03	1.0	0.97	0.94	0.91	0.87	0.84	0.69	0.48	-	-	-	-	-	-
Paper	80°C	1.02	1.0	0.97	0.95	0.92	0.90	0.87	0.84	0.76	0.62	0.43	-	-	-	-
Rubber	85°C	1.02	1.0	0.97	0.95	0.93	0.91	0.88	0.86	0.83	0.71	0.58	0.41	-	-	-
Heat resisting pvc*	90°C	1.03	1.0	0.97	0.94	0.91	0.87	0.84	0.80	0.76	0.72	0.68	0.63	0.49	-	-
Thermosetting	90°C	1.02	1.0	0.98	0.95	0.93	0.91	0.89	0.87	0.85	0.79	0.69	0.56	0.39	-	-
Mineral: bare and exposed to touch or pvc covered	70°C sheath	1.03	1.0	0.96	0.93	0.89	0.86	0.79	0.62	0.42	-	-	-	-	-	-
Bare and not exposed to touch	105°C sheath	1.02	1.0	0.98	0.96	0.93	0.91	0.89	0.86	0.84	0.82	0.79	0.77	0.64	0.55	0.43

NOTES:

1. Correction factors for flexible cords and for 85°C or 150°C rubber-insulated flexible cables are given in the relevant table of current-carrying capacity.
2. * These factors are applicable only to ratings in columns 2 to 5 of Table 4D1.

TABLE 4D1A

Single-core pvc-insulated cables, non-armoured, with or without sheath
(COPPER CONDUCTORS)

BS 6004
BS 6231
BS 6346

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 70°C

COPPER CONDUCTORS

Conductor cross-sectional area	Reference Method 4 (enclosed in conduit in thermally insulating wall etc.)		Reference Method 3 (enclosed in conduit on a wall or in trunking etc.)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray horizontal or vertical)		Reference Method 12 (free air)		
									Horizontal flat spaced	Vertical flat spaced	Trefoil
	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c.or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. or 3 cables three-phase a.c.	2 cables, single-phase a.c. or d.c. or 3 cables three-phase a.c.	3 cables trefoil, three phase a.c.
1	2	3	4	5	6	7	8	9	10	11	12
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1	11	10.5	13.5	12	15.5	14	-	-	-	-	-
1.5	14.5	13.5	17.5	15.5	20	18	-	-	-	-	-
2.5	19.5	18	24	21	27	25	-	-	-	-	-
4	26	24	32	28	37	33	-	-	-	-	-
6	34	31	41	36	47	43	-	-	-	-	-
10	46	42	57	50	65	59	-	-	-	-	-
16	61	56	76	68	87	79	-	-	-	-	-
25	80	73	101	89	114	104	126	112	146	130	110
35	99	89	125	110	141	129	156	141	181	162	137
50	119	108	151	134	182	167	191	172	219	197	167
70	151	136	192	171	234	214	246	223	281	254	216
95	182	164	232	207	284	261	300	273	341	311	264
120	210	188	269	239	330	303	349	318	396	362	308
150	240	216	300	262	381	349	404	369	456	419	356
185	273	245	341	296	436	400	463	424	521	480	409
240	320	286	400	346	515	472	549	504	615	569	485
300	367	328	458	394	594	545	635	584	709	659	561
400	-	-	546	467	694	634	732	679	852	795	656
500	-	-	626	533	792	723	835	778	982	920	749
630	-	-	720	611	904	826	953	892	1138	1070	855
800	-	-	-	-	1030	943	1086	1020	1265	1188	971
1000	-	-	-	-	1154	1058	1216	1149	1420	1337	1079

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. The current-carrying capacities in columns 2 to 5 are also applicable to flexible cables to BS 6004 table 1(c) and to 90°C heat resisting pvc cables to BS 6231 tables 8 and 9 where the cables are used in fixed installations.

TABLE 4D1B

TABLE 4D1B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 70°C

Conductor cross-sectional area	2 cables d.c.	2 cables, single-phase a.c.									3 or 4 cables, three-phase a.c.											
		Reference Methods 3 & 4 (enclosed in conduit etc. in or on a wall)			Reference Methods 1 & 11 (clipped direct or on trays, touching)			Reference Method 12 (spaced*)			Reference Methods 3 & 4 (enclosed in conduit etc. in or on a wall)			Reference Methods 1, 11 & 12 (in trefoil)			Reference Methods 1 & 11 (flat and touching)			Reference Method 12 (flat spaced*)		
1	2	3			4			5			6			7			8			9		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
1	44	44			44			44			38			38			38			38		
1.5	29	29			29			29			25			25			25			25		
2.5	18	18			18			18			15			15			15			15		
4	11	11			11			11			9.5			9.5			9.5			9.5		
6	7.3	7.3			7.3			7.3			6.4			6.4			6.4			6.4		
10	4.4	4.4			4.4			4.4			3.8			3.8			3.8			3.8		
16	2.8	2.8			2.8			2.8			2.4			2.4			2.4			2.4		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
25	1.75	1.80	0.33	1.80	1.75	0.20	1.75	1.75	0.29	1.80	1.50	0.29	1.55	1.50	0.175	1.50	1.50	0.25	1.55	1.50	0.32	1.55
35	1.25	1.30	0.31	1.30	1.25	0.195	1.25	1.25	0.28	1.30	1.10	0.27	1.10	1.10	0.170	1.10	1.10	0.24	1.10	1.10	0.32	1.15
50	0.93	0.95	0.30	1.00	0.93	0.190	0.95	0.93	0.28	0.97	0.81	0.26	0.85	0.80	0.165	0.82	0.80	0.24	0.84	0.80	0.32	0.86
70	0.63	0.65	0.29	0.72	0.63	0.185	0.66	0.63	0.27	0.69	0.56	0.25	0.61	0.55	0.160	0.57	0.55	0.24	0.60	0.55	0.31	0.63
95	0.46	0.49	0.28	0.56	0.47	0.180	0.50	0.47	0.27	0.54	0.42	0.24	0.48	0.41	0.155	0.43	0.41	0.23	0.47	0.40	0.31	0.51
120	0.36	0.39	0.27	0.47	0.37	0.175	0.41	0.37	0.26	0.45	0.33	0.23	0.41	0.32	0.150	0.36	0.32	0.23	0.40	0.32	0.30	0.44
150	0.29	0.31	0.27	0.41	0.30	0.175	0.34	0.29	0.26	0.39	0.27	0.23	0.36	0.26	0.150	0.30	0.26	0.23	0.34	0.26	0.30	0.40
185	0.23	0.25	0.27	0.37	0.24	0.170	0.29	0.24	0.26	0.35	0.22	0.23	0.32	0.21	0.145	0.26	0.21	0.22	0.31	0.21	0.30	0.36
240	0.180	0.195	0.26	0.33	0.185	0.165	0.25	0.185	0.25	0.31	0.17	0.23	0.29	0.160	0.145	0.22	0.160	0.22	0.27	0.160	0.29	0.34
300	0.145	0.160	0.26	0.31	0.150	0.165	0.22	0.150	0.25	0.29	0.14	0.23	0.27	0.130	0.140	0.190	0.130	0.22	0.25	0.130	0.29	0.32
400	0.105	0.130	0.26	0.29	0.120	0.160	0.20	0.115	0.25	0.27	0.12	0.22	0.25	0.105	0.140	0.175	0.105	0.21	0.24	0.100	0.29	0.31
500	0.086	0.110	0.26	0.28	0.098	0.155	0.185	0.093	0.24	0.26	0.10	0.22	0.25	0.086	0.135	0.160	0.086	0.21	0.23	0.081	0.29	0.30
630	0.068	0.094	0.25	0.27	0.081	0.155	0.175	0.076	0.24	0.25	0.08	0.22	0.24	0.072	0.135	0.150	0.072	0.21	0.22	0.066	0.28	0.29
800	0.053		-		0.068	0.150	0.165	0.061	0.24	0.25		-		0.060	0.130	0.145	0.060	0.21	0.22	0.053	0.28	0.29
1000	0.042		-		0.059	0.150	0.160	0.050	0.24	0.24		-		0.052	0.130	0.140	0.052	0.20	0.21	0.044	0.28	0.28

NOTE: * Spacings larger than those specified in Method 12 (see table 4A) will result in larger voltage drop.

Multicore pvc-insulated cables, non-armoured (COPPER CONDUCTORS)

BS 6004
BS 6346
BS 7629

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 70°C

Conductor cross-sectional area	Reference Method 4 (enclosed in an insulated wall, etc.)		Reference Method 3 (enclosed in conduit on a wall or ceiling, or in trunking)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray) or Reference Method 13 (free air)	
	1 two-core cable*, single-phase a.c. or d.c.	1 three-core cable* or 1 four-core cable, three-phase a.c.	1 two-core cable*, single-phase a.c. or d.c.	1 three-core cable* or 1 four-core cable, three-phase a.c.	1 two-core cable*, single-phase a.c. or d.c.	1 three-core cable* or 1 four-core cable, three-phase a.c.	1 two-core cable*, single-phase a.c. or d.c.	1 three-core cable* or 1 four-core cable, three-phase a.c.
1	2	3	4	5	6	7	8	9
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1	11	10	13	11.5	15	13.5	17	14.5
1.5	14	13	16.5	15	19.5	17.5	22	18.5
2.5	18.5	17.5	23	20	27	24	30	25
4	25	23	30	27	36	32	40	34
6	32	29	38	34	46	41	51	43
10	43	39	52	46	63	57	70	60
16	57	52	69	62	85	76	94	80
25	75	68	90	80	112	96	119	101
35	92	83	111	99	138	119	148	126
50	110	99	133	118	168	144	180	153
70	139	125	168	149	213	184	232	196
95	167	150	201	179	258	223	282	238
120	192	172	232	206	299	259	328	276
150	219	196	258	225	344	299	379	319
185	248	223	294	255	392	341	434	364
240	291	261	344	297	461	403	514	430
300	334	298	394	339	530	464	593	497
400	-	-	470	402	634	557	715	597

COPPER CONDUCTORS

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. Circular conductors are assumed for sizes up to and including 16 mm². Values for larger sizes relate to shaped conductors and may safely be applied to circular conductors.
3. Cables to BS 7629 are rated for a conductor operating temperature of 70°C and are therefore included in this table, although the material used for the cable insulation is not pvc.
4. * With or without a protective conductor.

TABLE 4D2B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 70°C

Conductor cross-sectional area	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three- or four-core cable, three-phase a.c.		
1	2	3			4		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
1	44	44			38		
1.5	29	29			25		
2.5	18	18			15		
4	11	11			9.5		
6	7.3	7.3			6.4		
10	4.4	4.4			3.8		
16	2.8	2.8			2.4		
		r	x	z	r	x	z
25	1.75	1.75	0.170	1.75	1.50	0.145	1.50
35	1.25	1.25	0.165	1.25	1.10	0.145	1.10
50	0.93	0.93	0.165	0.94	0.80	0.140	0.81
70	0.63	0.63	0.160	0.65	0.55	0.140	0.57
95	0.46	0.47	0.155	0.50	0.41	0.135	0.43
120	0.36	0.38	0.155	0.41	0.33	0.135	0.35
150	0.29	0.30	0.155	0.34	0.26	0.130	0.29
185	0.23	0.25	0.150	0.29	0.21	0.130	0.25
240	0.180	0.190	0.150	0.24	0.165	0.130	0.21
300	0.145	0.155	0.145	0.21	0.135	0.130	0.185
400	0.105	0.115	0.145	0.185	0.100	0.125	0.160

COPPER CONDUCTORS

TABLE 4D3A

Single-core armoured pvc-insulated cables
(non-magnetic armour)
(COPPER CONDUCTORS)

BS 6346

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 70°C

	Reference Method 1 (clipped direct)		Reference Method 11 (on perforated cable tray)		Reference Method 12 (free air)						
					2 cables, single-phase a.c.		2 cables, d.c.		3 or 4 cables, three-phase a.c.		
Conductor cross-sectional area	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching	Horizontal flat spaced	Vertical flat spaced	Horizontal spaced	Vertical spaced	Horizontal flat spaced	Vertical flat spaced	3 cables trefoil
1	2	3	4	5	6	7	8	9	10	11	12
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
50	193	179	205	189	229	217	229	216	230	212	181
70	245	225	259	238	287	272	294	279	286	263	231
95	296	269	313	285	349	332	357	340	338	313	280
120	342	309	360	327	401	383	415	396	385	357	324
185	447	399	469	422	511	489	548	525	490	456	425
240	525	465	550	492	593	568	648	622	566	528	501
300	594	515	624	547	668	640	748	719	616	578	567
400	687	575	723	618	737	707	885	851	674	632	657
500	763	622	805	673	810	777	1035	997	721	676	731
630	843	669	891	728	893	856	1218	1174	771	723	809
800	919	710	976	777	943	905	1441	1390	824	772	886
1000	975	737	1041	808	1008	967	1685	1627	872	816	945

NOTE:
Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.

TABLE 4D3B

VOLTAGE DROP (per ampere per metre):

Conductor operating temperature: 70°C

Conductor cross-sectional area	2 cables d.c.	2 cables, single-phase a.c.						3 or 4 cables, three-phase a.c.								
		Reference Methods 1 & 11 (touching)			Reference Method 12 (spaced*)			Reference Methods 1, 11 and 12 (in trefoil touching)			Reference Methods 1 & 11 (flat and touching)			Reference Method 12 (flat spaced*)		
1	2	3			4			5			6			7		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
50	0.93	0.93	0.22	0.95	0.92	0.30	0.97	0.80	0.190	0.82	0.79	0.26	0.84	0.79	0.34	0.86
70	0.63	0.64	0.21	0.68	0.66	0.29	0.72	0.56	0.180	0.58	0.57	0.25	0.62	0.59	0.32	0.68
95	0.46	0.48	0.20	0.52	0.51	0.28	0.58	0.42	0.175	0.45	0.44	0.25	0.50	0.47	0.31	0.57
120	0.36	0.39	0.195	0.43	0.42	0.28	0.50	0.33	0.170	0.37	0.36	0.24	0.43	0.40	0.30	0.50
150	0.29	0.31	0.190	0.37	0.34	0.27	0.44	0.27	0.165	0.32	0.30	0.24	0.38	0.34	0.30	0.45
185	0.23	0.26	0.190	0.32	0.29	0.27	0.39	0.22	0.160	0.27	0.25	0.23	0.34	0.29	0.29	0.41
240	0.180	0.20	0.180	0.27	0.23	0.26	0.35	0.175	0.160	0.23	0.20	0.23	0.30	0.24	0.28	0.37
300	0.145	0.160	0.180	0.24	0.190	0.26	0.32	0.140	0.155	0.21	0.165	0.22	0.28	0.20	0.28	0.34
400	0.105	0.140	0.175	0.22	0.180	0.24	0.30	0.120	0.130	0.195	0.160	0.21	0.26	0.21	0.25	0.32
500	0.086	0.120	0.170	0.21	0.165	0.23	0.29	0.105	0.145	0.180	0.145	0.20	0.25	0.190	0.24	0.30
630	0.068	0.105	0.165	0.195	0.150	0.22	0.27	0.091	0.145	0.170	0.135	0.195	0.23	0.175	0.22	0.28
800	0.053	0.095	0.160	0.185	0.145	0.21	0.25	0.082	0.140	0.160	0.125	0.180	0.22	0.170	0.195	0.26
1000	0.042	0.091	0.155	0.180	0.140	0.190	0.24	0.079	0.135	0.155	0.125	0.165	0.21	0.165	0.170	0.24

NOTE: * Spacings larger than those specified in Method 12 (see table 4A) will result in larger voltage drop.

COPPER CONDUCTORS

TABLE 4D4A

Multicore armoured pvc-insulated cables
(COPPER CONDUCTORS)
BS 6346

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 70°C

Conductor cross-sectional area	Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated horizontal or vertical cable tray) or Reference Method 13 (free air)	
	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.
1	2	3	4	5
(mm^2)	(A)	(A)	(A)	(A)
1.5	21	18	22	19
2.5	28	25	31	26
4	38	33	41	35
6	49	42	53	45
10	67	58	72	62
16	89	77	97	83
25	118	102	128	110
35	145	125	157	135
50	175	151	190	163
70	222	192	241	207
95	269	231	291	251
120	310	267	336	290
150	356	306	386	332
185	405	348	439	378
240	476	409	516	445
300	547	469	592	510
400	621	540	683	590

NOTE:
Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.

TABLE 4D4B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 70°C

Conductor cross-sectional area	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three- or four-core cable, three-phase a.c.		
1	2	3			4		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
1.5	29	29			25		
2.5	18	18			15		
4	11	11			9.5		
6	7.3	7.3			6.4		
10	4.4	4.4			3.8		
16	2.8	2.8			2.4		
		r	x	z	r	x	z
25	1.75	1.75	0.170	1.75	1.50	0.145	1.50
35	1.25	1.25	0.165	1.25	1.10	0.145	1.10
50	0.93	0.93	0.165	0.94	0.80	0.140	0.81
70	0.63	0.63	0.160	0.65	0.55	0.140	0.57
95	0.46	0.47	0.155	0.50	0.41	0.135	0.43
120	0.36	0.38	0.155	0.41	0.33	0.135	0.35
150	0.29	0.30	0.155	0.34	0.26	0.130	0.29
185	0.23	0.25	0.150	0.29	0.21	0.130	0.25
240	0.180	0.190	0.150	0.24	0.165	0.130	0.21
300	0.145	0.155	0.145	0.21	0.135	0.130	0.185
400	0.105	0.115	0.145	0.185	0.100	0.125	0.160

TABLE 4F1A

Single-core cables having thermosetting insulation, non-armoured, with or without sheath
(COPPER CONDUCTORS)
BS 5467
BS 7211

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor cross-sectional area	Reference Method 4 (enclosed in conduit in thermally insulating wall etc.)		Reference Method 3 (enclosed in conduit on a wall or in trunking etc.)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray horizontal or vertical		Reference Method 12 (free air)		
									Horizontal flat spaced	Vertical flat spaced	Trefoil
	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. or 3 cables three-phase	2 cables, single-phase a.c. or d.c. or 3 cables three-phase	3 cables trefoil, three phase a.c.
1	2	3	4	5	6	7	8	9	10	11	12
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1	14	13	17	15	19	17.5	-	-	-	-	-
1.5	18	17	22	19	25	23	-	-	-	-	-
2.5	24	23	30	26	34	31	-	-	-	-	-
4	33	30	40	35	46	41	-	-	-	-	-
6	43	39	51	45	59	54	-	-	-	-	-
10	58	53	71	63	81	74	-	-	-	-	-
16	76	70	95	85	109	99	-	-	-	-	-
25	100	91	126	111	143	130	158	140	183	163	138
35	124	111	156	138	176	161	195	176	226	203	171
50	149	135	189	168	228	209	293	215	274	246	209
70	189	170	240	214	293	268	308	279	351	318	270
95	228	205	290	259	355	326	375	341	426	389	330
120	263	235	336	299	413	379	436	398	495	453	385
150	300	270	375	328	476	436	505	461	570	524	445
185	341	306	426	370	545	500	579	530	651	600	511
240	400	358	500	433	644	590	686	630	769	711	606
300	459	410	573	493	743	681	794	730	886	824	701
400	-	-	683	584	868	793	915	849	1065	994	820
500	-	-	783	666	990	904	1044	973	1228	1150	936
630	-	-	900	764	1130	1033	1191	1115	1423	1338	1069
800	-	-	-	-	1288	1179	1358	1275	1581	1485	1214
1000	-	-	-	-	1443	1323	1520	1436	1775	1671	1349

COPPER CONDUCTORS

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. The current-carrying capacities in columns 2 to 5 are also applicable to flexible cables to BS 7211 table 3(b) where the cables are used in fixed installations.
3. For cable in rigid pvc conduit the values stated in table 4D1 are applicable (see Regulation 521-05).
4. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).
5. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C pvc insulated cables (BS 6004, BS 6346) shall be used (see also Regulation 523-01-01).

TABLE 4E1B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 90°C

Conductor cross-sectional area	2 cables, d.c.	2 cables, single-phase a.c.									3 or 4 cables, three-phase a.c.											
		Reference Methods 3 & 4 (enclosed in conduit etc. in or on a wall)			Reference Methods 1 & 11 (clipped direct or on trays, touching)			Reference Method 12 (spaced*)			Reference Methods 3 & 4 (enclosed in conduit etc. in or on a wall)			Reference Methods 1, 11 & 12 (in trefoil)			Reference Methods 1 & 11 (flat and touching)			Reference Method 12 (flat spaced*)		
1	2	3			4			5			6			7			8			9		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
1	46	46			46			46			40			40			40			40		
1.5	31	31			31			31			27			27			27			27		
2.5	19	19			19			19			16			16			16			16		
4	12	12			12			12			10			10			10			10		
6	7.9	7.9			7.9			7.9			6.8			6.8			6.8			6.8		
10	4.7	4.7			4.7			4.7			4.0			4.0			4.0			4.0		
16	2.9	2.9			2.9			2.9			2.5			2.5			2.5			2.5		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
25	1.85	1.85	0.31	1.90	1.85	0.190	1.85	1.85	0.28	1.85	1.60	0.27	1.65	1.60	0.165	1.60	1.60	0.190	1.60	1.60	0.27	1.65
35	1.35	1.35	0.29	1.35	1.35	0.180	1.35	1.35	0.27	1.35	1.15	0.25	1.15	1.15	0.155	1.15	1.15	0.180	1.15	1.15	0.26	1.20
50	0.99	1.00	0.29	1.05	0.99	0.180	1.00	0.99	0.27	1.00	0.87	0.25	0.90	0.86	0.155	0.87	0.86	0.180	0.87	0.86	0.26	0.89
70	0.68	0.70	0.28	0.75	0.68	0.175	0.71	0.68	0.26	0.73	0.60	0.24	0.65	0.59	0.150	0.61	0.59	0.175	0.62	0.59	0.25	0.65
95	0.49	0.51	0.27	0.58	0.49	0.170	0.52	0.49	0.26	0.56	0.44	0.23	0.50	0.43	0.145	0.45	0.43	0.170	0.46	0.43	0.25	0.49
120	0.39	0.41	0.26	0.48	0.39	0.165	0.43	0.39	0.25	0.47	0.35	0.23	0.42	0.34	0.140	0.37	0.34	0.165	0.38	0.34	0.24	0.42
150	0.32	0.33	0.26	0.43	0.32	0.165	0.36	0.32	0.25	0.41	0.29	0.23	0.37	0.28	0.140	0.31	0.28	0.165	0.32	0.28	0.24	0.37
185	0.25	0.27	0.26	0.37	0.26	0.165	0.30	0.25	0.25	0.36	0.23	0.23	0.32	0.22	0.140	0.26	0.22	0.165	0.28	0.22	0.24	0.33
240	0.190	0.21	0.26	0.33	0.20	0.160	0.25	0.195	0.25	0.31	0.185	0.22	0.29	0.170	0.140	0.22	0.170	0.165	0.24	0.170	0.24	0.29
300	0.155	0.175	0.25	0.31	0.160	0.160	0.22	0.155	0.25	0.29	0.150	0.22	0.27	0.140	0.140	0.195	0.135	0.160	0.21	0.135	0.24	0.27
400	0.120	0.140	0.25	0.29	0.130	0.155	0.20	0.125	0.24	0.27	0.125	0.22	0.25	0.110	0.135	0.175	0.110	0.160	0.195	0.110	0.24	0.26
500	0.093	0.120	0.25	0.28	0.105	0.155	0.185	0.098	0.24	0.26	0.100	0.22	0.24	0.090	0.135	0.160	0.088	0.160	0.180	0.085	0.24	0.25
630	0.072	0.100	0.25	0.27	0.086	0.155	0.175	0.078	0.24	0.25	0.088	0.21	0.23	0.074	0.135	0.150	0.071	0.160	0.170	0.068	0.23	0.24
800	0.056		-		0.072	0.150	0.170	0.064	0.24	0.25		-		0.062	0.130	0.145	0.059	0.155	0.165	0.055	0.23	0.24
1000	0.045		-		0.063	0.150	0.165	0.054	0.24	0.24		-		0.055	0.130	0.140	0.050	0.155	0.165	0.047	0.23	0.24

NOTE: * Spacings larger than those specified in Method 12 (see table 4A) will result in larger voltage drop.

COPPER CONDUCTORS

TABLE 4E2A

Multicore cable having thermosetting insulation, non armoured
(COPPER CONDUCTORS)

CURRENT-CARRYING CAPACITY (amperes): BS 5467 / BS 7211

Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor cross-sectional area	Reference Method 4 (enclosed in an insulated wall, etc.)		Reference Method 3 (enclosed in conduit on a wall or ceiling, or in trunking)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray) or Reference Method 13 (free air)	
	1 two-core cable*, single-phase a.c. or d.c.	1 three- or four-core cable*, three-phase a.c.	1 two-core cable*, single-phase a.c. or d.c.	1 three- or four-core cable*, three-phase a.c.	1 two-core cable*, single-phase a.c. or d.c.	1 three- or four-core cable*, three-phase a.c.	1 two-core cable*, single-phase a.c. or d.c.	1 three- or four-core cable*, three-phase a.c.
1	2	3	4	5	6	7	8	9
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1	14.5	13	17	15	19	17	21	18
1.5	18.5	16.5	22	19.5	24	22	26	23
2.5	25	22	30	26	33	30	36	32
4	33	30	40	35	45	40	49	42
6	42	38	51	44	58	52	63	54
10	57	51	69	60	80	71	86	75
16	76	68	91	80	107	96	115	100
25	99	89	119	105	138	119	149	127
35	121	109	146	128	171	147	185	158
50	145	130	175	154	209	179	225	192
70	183	164	221	194	269	229	289	246
95	220	197	265	233	328	278	352	298
120	253	227	305	268	382	322	410	346
150	290	259	334	300	441	371	473	399
185	329	295	384	340	506	424	542	456
240	386	346	459	398	599	500	641	538
300	442	396	532	455	693	576	741	621
400	-	-	625	536	803	667	865	741

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).
3. * With or without a protective conductor.
4. For cables in rigid pvc conduit the values stated in table 4D2 are applicable (see Regulation 521-05).
5. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C pvc insulated cables (BS 6004, BS 6346) shall be used (see also Regulation 523-01-01).
6. Circular conductors are assumed for sizes up to and including 16 mm². Values for larger sizes relate to shaped conductors and may safely be applied to circular conductors.

TABLE 4E2B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 90°C

Conductor cross-sectional area	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three- or four-core cable, three-phase a.c.		
1	2	3			4		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
1	46	46			40		
1.5	31	31			27		
2.5	19	19			16		
4	12	12			10		
6	7.9	7.9			6.8		
10	4.7	4.7			4.0		
16	2.9	2.9			2.5		
		r	x	z	r	x	z
25	1.85	1.85	0.160	1.90	1.60	0.140	1.65
35	1.35	1.35	0.155	1.35	1.15	0.135	1.15
50	0.98	0.99	0.155	1.00	0.86	0.135	0.87
70	0.67	0.67	0.150	0.69	0.59	0.130	0.60
95	0.49	0.50	0.150	0.52	0.43	0.130	0.45
120	0.39	0.40	0.145	0.42	0.34	0.130	0.37
150	0.31	0.32	0.145	0.35	0.28	0.125	0.30
185	0.25	0.26	0.145	0.29	0.22	0.125	0.26
240	0.195	0.200	0.140	0.24	0.175	0.125	0.21
300	0.155	0.160	0.140	0.21	0.140	0.120	0.185
400	0.120	0.130	0.140	0.190	0.115	0.120	0.165

COPPER CONDUCTORS

TABLE 4E3A

Single-core cables having thermosetting insulation (non-magnetic armour)
(COPPER CONDUCTORS)

CURRENT-CARRYING CAPACITY (amperes): BS 5467 / BS 6724

Ambient temperature: 30°C
Conductor operating temperature: 90°C

	Reference Method 1 (clipped direct)		Reference Method 11 (on perforated cable tray)		Reference Method 12 (free air)						
					2 cables, single-phase a.c.		2 cables, d.c.		3 or 4 cables, three-phase a.c.		
Conductor cross-sectional area	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching	Horizontal flat spaced	Vertical flat spaced	Horizontal spaced	Vertical spaced	Horizontal flat spaced	Vertical flat spaced	3 cables trefoil
1	2	3	4	5	6	7	8	9	10	11	12
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
50	237	220	253	232	282	266	284	270	288	266	222
70	303	277	322	293	357	337	356	349	358	331	285
95	367	333	389	352	436	412	446	426	425	393	346
120	425	383	449	405	504	477	519	497	485	449	402
150	488	437	516	462	566	539	600	575	549	510	463
185	557	496	587	524	643	614	688	660	618	574	529
240	656	579	689	612	749	714	815	782	715	666	625
300	755	662	792	700	842	805	943	906	810	755	720
400	853	717	899	767	929	889	1137	1094	848	797	815
500	962	791	1016	851	1032	989	1314	1266	923	871	918
630	1082	861	1146	935	1139	1092	1528	1474	992	940	1027
800	1170	904	1246	987	1204	1155	1809	1744	1042	978	1119
1000	1261	961	1345	1055	1289	1238	2100	2026	1110	1041	1214

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).
3. Where cables in this table are connected to equipment or accessories desinged to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C pvc insulated cables (BS 6004, BS 6346) shall be used (see also Regulation 523-01-01).

TABLE 4E3B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 90°C

Conductor cross-sectional area	2 cables, d.c.	2 cables, single-phase a.c.						3 or 4 cables, three-phase a.c.								
		Reference Methods 1 & 11 (touching)			Reference Method 12 (spaced*)			Reference Methods 1, 11 & 12 (in trefoil touching)			Reference Methods 1 & 11 flat and touching)			Reference Method 12 (flat spaced*)		
1	2	3			4			5			6			7		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
50	0.98	0.99	0.21	1.00	0.98	0.29	1.00	0.86	0.180	0.87	0.84	0.25	0.88	0.84	0.33	0.90
70	0.67	0.68	0.200	0.71	0.69	0.29	0.75	0.59	0.170	0.62	0.60	0.25	0.65	0.62	0.32	0.70
95	0.49	0.51	0.195	0.55	0.53	0.28	0.60	0.44	0.170	0.47	0.46	0.24	0.52	0.49	0.31	0.58
120	0.39	0.41	0.190	0.45	0.43	0.27	0.51	0.35	0.165	0.39	0.38	0.24	0.44	0.41	0.30	0.51
150	0.31	0.33	0.185	0.38	0.36	0.27	0.45	0.29	0.160	0.33	0.31	0.23	0.39	0.34	0.29	0.45
185	0.25	0.27	0.185	0.33	0.30	0.26	0.40	0.23	0.160	0.28	0.26	0.23	0.34	0.29	0.29	0.41
240	0.195	0.21	0.180	0.28	0.24	0.26	0.35	0.180	0.155	0.24	0.21	0.22	0.30	0.24	0.28	0.37
300	0.155	0.170	0.175	0.25	0.195	0.25	0.32	0.145	0.150	0.21	0.170	0.22	0.28	0.20	0.27	0.34
400	0.115	0.145	0.170	0.22	0.180	0.24	0.30	0.125	0.150	0.195	0.160	0.21	0.27	0.20	0.27	0.33
500	0.093	0.125	0.170	0.21	0.165	0.24	0.29	0.105	0.145	0.180	0.145	0.20	0.25	0.190	0.24	0.31
630	0.073	0.105	0.165	0.195	0.150	0.23	0.27	0.092	0.145	0.170	0.135	0.195	0.24	0.175	0.23	0.29
800	0.056	0.090	0.160	0.190	0.145	0.23	0.27	0.086	0.140	0.165	0.130	0.180	0.23	0.175	0.195	0.26
1000	0.045	0.092	0.155	0.180	0.140	0.21	0.25	0.080	0.135	0.155	0.125	0.170	0.21	0.165	0.180	0.24

NOTE: * Spacings larger than those specified in Method 12 (see table 4A) will result in a larger voltage drop.

COPPER CONDUCTORS

TABLE 4E4A

Multicore armoured cables having thermosetting insulation
(COPPER CONDUCTORS)

BS 5467
BS 6724

CURRENT-CARRYING CAPACITY (amperes): Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor cross-sectional area	Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated horizontal or vertical cable tray) or Reference Method 13 (free air)	
	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.
1	2	3	4	5
(mm²)	(A)	(A)	(A)	(A)
1.5	27	23	29	25
2.5	36	31	39	33
4	49	42	52	44
6	62	53	66	56
10	85	73	90	78
16	110	94	115	99
25	146	124	152	131
35	180	154	188	162
50	219	187	228	197
70	279	238	291	251
95	338	289	354	304
120	392	335	410	353
150	451	386	472	406
185	515	441	539	463
240	607	520	636	546
300	698	599	732	628
400	787	673	847	728

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).
3. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C pvc insulated cables (BS 6004, BS 6346) shall be used (see also Regulation 523-01-01).

TABLE 4E4B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 90°C

Conductor cross-sectional area	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three- or four-core cable, three-phase a.c.		
1	2	3			4		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
1.5	31	31			27		
2.5	19	19			16		
4	12	12			10		
6	7.9	7.9			6.8		
10	4.7	4.7			4.0		
16	2.9	2.9			2.5		
		r	x	z	r	x	z
25	1.85	1.85	0.160	1.90	1.60	0.140	1.65
35	1.35	1.35	0.155	1.35	1.15	0.135	1.15
50	0.98	0.99	0.155	1.00	0.86	0.135	0.87
70	0.67	0.67	0.150	0.69	0.59	0.130	0.60
95	0.49	0.50	0.150	0.52	0.43	0.130	0.45
120	0.39	0.40	0.145	0.42	0.34	0.130	0.37
150	0.31	0.32	0.145	0.35	0.28	0.125	0.30
185	0.25	0.26	0.145	0.29	0.22	0.125	0.26
240	0.195	0.20	0.140	0.24	0.175	0.125	0.21
300	0.155	0.16	0.140	0.21	0.140	0.120	0.185
400	0.120	0.13	0.140	0.190	0.115	0.120	0.165

COPPER CONDUCTORS

Single-core non-armoured cables having 85°C rubber insulation (COPPER CONDUCTORS)

BS 6007
BS 6883

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 85°C

Conductor cross-sectional area	Reference Method 3 (enclosed in conduit etc. in or on a wall)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray) Horizontal or Vertical		Reference Method 12 (free air)	
	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. or 3 or 4 cables, three-phase a.c. flat spaced horizontal or vertical	3 cables trefoil, three-phase a.c.
1	2	3	4	5	6	7	8	9
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
1	17	15	19	17.5	-	-	-	-
1.5	22	19.5	25	23	-	-	-	-
2.5	30	27	34	31	-	-	-	-
4	40	36	45	42	-	-	-	-
6	52	46	59	54	-	-	-	-
10	72	63	81	75	-	-	-	-
16	96	85	108	100	-	-	-	-
25	127	112	143	133	153	140	154	134
35	157	138	177	164	189	174	192	167
50	190	167	215	199	229	211	235	204
70	242	213	274	254	293	269	303	262
95	293	258	332	308	356	327	370	320
120	339	298	384	357	412	379	431	373
150	372	334	442	411	475	437	499	432
185	428	379	519	469	542	499	573	495
240	510	443	607	553	639	589	679	587
300	593	506	695	636	735	679	786	680
400	719	602	827	755	860	798	929	799
500	835	689	946	865	989	918	1081	919
630	975	791	1088	996	1143	1062	1263	1060

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).
3. For cables in rigid pvc conduit the values stated in table 4D1 are applicable (see Regulation 521-05).
4. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C pvc insulated cables (BS 6004, BS 6346) shall be used (see also Regulation 523-01-01).

TABLE 4F1B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 85°C

Conductor cross-sectional area	2 cables, d.c.	2 cables, single-phase a.c.									3 or 4 cables, three-phase a.c.									
		Reference Method 3 (enclosed in conduit etc. in or on a wall)			Reference Methods 1 & 11 (clipped direct or on trays, touching)			Reference Method 12 (spaced*)			Reference Method 3 (enclosed in conduit etc. in or on a wall)			Reference Methods 1, 11 & 12 (in trefoil touching)			Reference Methods 1 & 11 (flat and touching)			Reference Method 12 (flat spaced*)		
1	2	3			4			5			6			7			8			9		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
1	46	46			46			-			40			40			40			-		
1.5	31	31			31			-			26			26			26			-		
																				-		
2.5	18	18			18			-			16			16			16			-		
4	12	12			12			-			10			10			10			-		
6	7.7	7.7			7.7			-			6.7			6.7			6.7			-		
10	4.6	4.6			4.6			-			4.0			4.0			4.0			-		
16	2.9	2.9			2.9			-			2.5			2.5			2.5			-		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
25	1.80	1.85	0.32	1.90	1.85	0.20	1.85	1.85	0.29	1.85	1.60	0.28	1.65	1.60	0.175	1.60	1.60	0.25	1.60	1.60	0.32	1.65
35	1.30	1.35	0.31	1.40	1.30	0.195	1.35	1.30	0.28	1.35	1.15	0.27	1.20	1.15	0.170	1.15	1.15	0.24	1.15	1.15	0.32	1.20
50	0.95	1.00	0.30	1.05	0.97	0.190	0.99	0.97	0.28	1.00	0.87	0.26	0.91	0.84	0.165	0.86	0.84	0.24	0.88	0.84	0.32	0.90
70	0.65	0.68	0.29	0.74	0.66	0.185	0.69	0.66	0.27	0.72	0.60	0.25	0.65	0.57	0.160	0.60	0.57	0.24	0.62	0.57	0.31	0.65
95	0.48	0.51	0.28	0.58	0.49	0.180	0.52	0.49	0.27	0.56	0.44	0.25	0.51	0.43	0.155	0.45	0.43	0.23	0.48	0.42	0.31	0.52
120	0.38	0.40	0.27	0.49	0.39	0.175	0.43	0.39	0.26	0.47	0.35	0.24	0.43	0.34	0.155	0.37	0.34	0.23	0.41	0.34	0.30	0.45
150	0.30	0.33	0.27	0.42	0.31	0.175	0.36	0.31	0.26	0.40	0.29	0.24	0.37	0.27	0.150	0.31	0.27	0.23	0.35	0.27	0.30	0.40
185	0.25	0.27	0.27	0.38	0.25	0.170	0.30	0.25	0.26	0.36	0.23	0.23	0.33	0.22	0.150	0.26	0.22	0.22	0.31	0.22	0.30	0.37
240	0.190	0.21	0.26	0.33	0.195	0.165	0.26	0.195	0.25	0.32	0.180	0.23	0.29	0.170	0.145	0.22	0.170	0.22	0.28	0.170	0.30	0.34
300	0.150	0.170	0.26	0.31	0.155	0.165	0.23	0.155	0.25	0.29	0.150	0.23	0.27	0.135	0.140	0.195	0.135	0.22	0.26	0.135	0.29	0.32
400	0.115	0.140	0.26	0.30	0.125	0.160	0.20	0.120	0.25	0.28	0.130	0.22	0.26	0.110	0.140	0.175	0.110	0.21	0.24	0.105	0.29	0.31
500	0.091	0.115	0.26	0.28	0.100	0.155	0.185	0.097	0.24	0.26	0.105	0.22	0.24	0.089	0.135	0.165	0.089	0.21	0.23	0.085	0.29	0.30
630	0.072	0.100	0.25	0.27	0.082	0.155	0.175	0.077	0.24	0.25	0.085	0.22	0.24	0.073	0.135	0.155	0.073	0.21	0.22	0.067	0.28	0.29

NOTE: * Spacings larger than those specified in Method 12 (see table 4A) will result in larger voltage drop.

TABLE 4F2A

Multicore, sheathed and non-armoured cables having 85°C rubber insulation (COPPER CONDUCTORS)

BS 6883

Ambient temperature: 30°C

CURRENT-CARRYING CAPACITY (amperes):

Conductor operating temperature: 85°C

Conductor cross-sectional area	Reference Method 3 (enclosed)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray) or Reference Method 13 (free air)	
	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.
1	2	3	4	5	6	7
(mm^2)	(A)	(A)	(A)	(A)	(A)	(A)
1	16.5	14.5	18	16	19.5	17.5
1.5	21	18.5	23	20	25	22
2.5	29	25	32	28	34	30
4	38	33	43	37	46	40
6	48	43	55	48	59	52
10	66	58	76	66	81	71
16	87	77	103	88	109	94
25	114	100	136	117	144	123
35	139	122	168	144	177	151
50	167	147	201	174	213	186
70	211	185	256	222	272	237
95	254	222	310	269	329	287
120	292	256	359	312	381	333
150	320	287	413	359	438	383
185	368	326	470	409	499	437
240	439	381	553	482	587	515
300	509	436	636	555	675	593

COPPER CONDUCTORS

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).
3. For cables in rigid pvc conduit the values stated in table 4D2 are applicable (see Regulation 521-05).
4. Where cables in this table are connected to equipment or accessories designed to operate at a temperature rating not exceeding 70°C, the current ratings given in the equivalent table for 70°C pvc insulated cables (BS 6004, BS 6346) shall be used (see also Regulation 523-01-01).

TABLE 4F2B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 85°C

Conductor cross-sectional area	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three- or four-core cable, three-phase a.c.		
1	2	3			4		
(mm^2)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
1	46	46			40		
1.5	31	31			26		
2.5	19	19			16		
4	12	12			10		
6	7.7	7.7			6.7		
10	4.6	4.6			4.0		
16	2.9	2.9			2.5		
		r	x	z	r	x	z
25	1.80	1.85	0.175	1.85	1.60	0.150	1.60
35	1.30	1.30	0.170	1.35	1.15	0.150	1.15
50	0.95	0.97	0.170	0.99	0.84	0.145	0.86
70	0.65	0.66	0.165	0.68	0.58	0.140	0.59
95	0.48	0.49	0.160	0.52	0.43	0.140	0.45
120	0.38	0.39	0.160	0.42	0.34	0.135	0.36
150	0.30	0.31	0.155	0.35	0.27	0.135	0.30
185	0.25	0.25	0.155	0.30	0.22	0.130	0.26
240	0.190	0.195	0.150	0.25	0.170	0.130	0.22
300	0.150	0.155	0.150	0.22	0.135	0.130	0.185

TABLE 4H1A

60°C rubber-insulated flexible cables

BS 6007

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 60°C

Conductor cross-sectional area	Single-phase a.c. or d.c.	Three-phase a.c.	Single-phase a.c. or d.c.
	1 two-core cable, with or without protective conductor	1 three-core, four-core or five-core cable	2 single-core cables
1	2	3	4
(mm^2)	(A)	(A)	(A)
4	30	26	-
6	39	34	-
10	51	47	-
16	73	63	-
25	97	83	-
35	-	102	140
50	-	124	175
70	-	158	216
95	-	192	258
120	-	222	302
150	-	255	347
185	-	291	394
240	-	343	471
300	-	394	541
400	-	-	644
500	-	-	738
630	-	-	861

NOTES:

1. The current ratings tabulated are for cables in free air but may also be used for cables resting on a surface. If the cable is to be wound on a drum on load the ratings should be reduced in accordance with NOTE 3 below and for cables which may be covered, NOTE 4 below.

2. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**

3. *Flexible cables wound on reeling drums*

   The current ratings of cables used on reeling drums are to be reduced by the following factors:

   a) Radial type drum
      ventilated: 85%
      unventilated: 75%

   b) Ventilated cylindrical type drum
      1 layer of cable: 85%
      2 layers of cable: 65%
      3 layers of cable: 45%
      4 layers of cable: 35%

   A radial type drum is one where spiral layers of cable are accommodated between closely spaced flanges; if fitted with solid flanges the ratings given above should be reduced and the drum is described as non-ventilated and if the flanges have suitable apertures as ventilated.

   A ventilated cylindrical cable drum is one where layers of cable are accommodated between widely spaced flanges and the drum and end flanges have suitable ventilating apertures.

4. Where cable may be covered over or coiled up whilst on load, or the air movement over the cable restricted, the current rating should be reduced.

   It is not possible to specify the amount of reduction but the table of rating factors for reeling drums can be used as a guide.

TABLE 4H1B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 60°C

Conductor cross-sectional area	Two-core cable, d.c.	Two-core cable, single-phase a.c.			1 three-core, four-core or five-core cable, three-phase a.c.			2 single-core cables, touching			
								d.c.	Single-phase a.c.*		
1	2	3			4			5	6		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)	(mV/A/m)		
4	12	12			10			-	-		
6	7.8	7.8			6.7			-	-		
10	4.6	4.6			4.0			-	-		
16	2.9	2.9			2.5			-	-		
		r	x	z	r	x	z		r	x	z
25	1.80	1.80	0.175	1.85	1.55	0.150	1.55	-	-	-	-
35	-	-	-	-	1.10	0.150	1.15	1.31	1.31	0.21	1.32
50	-	-	-	-	0.83	0.145	0.84	0.91	0.91	0.21	0.93
70	-	-	-	-	0.57	0.140	0.58	0.64	0.64	0.20	0.67
95	-	-	-	-	0.42	0.135	0.44	0.49	0.49	0.195	0.53
120	-	-	-	-	0.33	0.135	0.36	0.38	0.38	0.190	0.43
150	-	-	-	-	0.27	0.130	0.30	0.31	0.31	0.190	0.36
185	-	-	-	-	0.22	0.130	0.26	0.25	0.25	0.190	0.32
240	-	-	-	-	0.170	0.130	0.21	0.190	0.195	0.185	0.27
300	-	-	-	-	0.135	0.125	0.185	0.150	0.155	0.180	0.24
400	-	-	-	-	-	-	-	0.115	0.120	0.175	0.21
500	-	-	-	-	-	-	-	0.090	0.099	0.170	0.20
630	-	-	-	-	-	-	-	0.068	0.079	0.170	0.185

NOTE: * A larger voltage drop will result if the cables are spaced.

COPPER CONDUCTORS

TABLE 4H2A

85°C or 150°C rubber-insulated flexible cables

BS 6007

CURRENT-CARRYING CAPACITY (amperes): Ambient temperature: 30°C
Conductor operating temperature: 85°C

Conductor cross-sectional area	d.c. or single-phase a.c. (1 two-core cable, with or without protective conductor)	Three-phase a.c. (1 three-core, four-core or five-core cable)	Single-phase a.c. or d.c., 2 single-core cables, touching
1	2	3	4
(mm^2)	(A)	(A)	(A)
4	41	36	-
6	53	47	-
10	73	64	-
16	99	86	-
25	131	114	-
35	-	140	192
50	-	170	240
70	-	216	297
95	-	262	354
120	-	303	414
150	-	348	476
185	-	397	540
240	-	467	645
300	-	537	741
400	-	-	885
500	-	-	1017
630	-	-	1190

CORRECTION FACTOR FOR AMBIENT TEMPERATURE

85°C rubber-insulated cables:

Ambient temperature	35°C	40°C	45°C	50°C	55°C	60°C	65°C	70°C	75°C	80°C
Correction factor	0.95	0.90	0.85	0.80	0.74	0.67	0.60	0.52	0.43	0.30

150°C rubber-insulated cables:

Ambient temperature	35 to 85°C	90°C	95°C	100°C	105°C	110°C	115°C	120°C	125°C	130°C	135°C	140°C	145°C
Correction factor	1.0	0.96	0.92	0.88	0.83	0.78	0.73	0.68	0.62	0.55	0.48	0.39	0.28

NOTES:

1. The current ratings tabulated are for cables in free air but may also be used for cables resting on a surface. If the cable is to be wound on a drum on load the ratings should be reduced in accordance with NOTE 3 below and for cables which may be covered, NOTE 4 below.
2. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
3. *Flexible cables wound on reeling drums*
   The current ratings of cables used on reeling drums are to be reduced by the following factors:
   a) Radial type drum
      ventilated: 85%
      unventilated: 75%
   b) Ventilated cylindrical type drum
      1 layer of cable: 85%
      2 layers of cable: 65%
      3 layers of cable: 45%
      4 layers of cable: 35%
   A radial type drum is one where spiral layers of cable are accommodated between closely spaced flanges; if fitted with solid flanges the ratings given above should be reduced and the drum is described as non-ventilated and if the flanges have suitable apertures as ventilated.
   A ventilated cylindrical cable drum is one where layers of cable are accommodated between widely spaced flanges and the drum and end flanges have suitable ventilating apertures.
4. Where cable may be covered over or coiled up whilst on load, or the air movement over the cable restricted, the current rating should be reduced.
   It is not possible to specify the amount of reduction but the table of rating factors for reeling drums can be used as a guide.
5. The temperature limits given in table 54C should be taken into account when it is intended to operate these cables at maximum permissible temperature.
6. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).
7. For 150°C cables, where the correction factors for ambient temperature are used, the conductor operating temperature may be up to 150°C.
8. BS 6007 does not include rubber-insulated cables above 16 mm^2 nominal cross-sectional area

TABLE 4H2B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 85°C

Conductor cross-sectional area	1 two-core or 2 single-core cables d.c.	Two-core cable single-phase a.c.			1 three-core, four-core or five-core cable three-phase a.c.			2 single-core cables touching Single-phase a.c.*		
1	2	3			4			5		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)		
4	13	13			11			-		
6	8.4	8.4			7.3			-		
10	5.0	5.0			4.3			-		
16	3.1	3.1			2.7			-		
		r	x	z	r	x	z	r	x	z
25	2.0	2.00	0.175	2.00	1.70	0.150	1.70	-	-	-
35	1.42	-	-	-	1.20	0.150	1.20	1.42	0.21	1.43
50	0.99	-	-	-	0.90	0.145	0.91	0.99	0.21	1.01
70	0.70	-	-	-	0.61	0.140	0.63	0.70	0.20	0.72
95	0.53	-	-	-	0.46	0.135	0.48	0.53	0.195	0.56
120	0.41	-	-	-	0.36	0.135	0.39	0.41	0.190	0.46
150	0.33	-	-	-	0.29	0.130	0.32	0.33	0.190	0.38
185	0.27	-	-	-	0.24	0.130	0.27	0.27	0.190	0.33
240	0.21	-	-	-	0.185	0.130	0.22	0.21	0.185	0.28
300	0.165	-	-	-	0.145	0.125	0.195	0.170	0.180	0.25
400	0.125	-	-	-	-	-	-	0.130	0.175	0.22
500	0.098	-	-	-	-	-	-	0.105	0.170	0.20
630	0.073	-	-	-	-	-	-	0.084	0.170	0.190

NOTES:

1. The voltage drop figures given above are based on a conductor operating temperature of 85°C and are therefore not accurate when the operating temperature is in excess of 85°C. In the case of the 150°C cables with a conductor temperature of 150°C the above resistive values should be increased by a factor of 1.2. (This factor is only applicable to the range of 150°C rubber-insulated cables included in BS 6007 i.e. up to 16 mm² nominal cross-sectional area).
2. * A larger voltage drop will result if the cables are spaced.

TABLE 4H3A

Flexible cords

BS 6141
BS 6500

CURRENT-CARRYING CAPACITY (amperes): and MASS SUPPORTABLE (kg):

Conductor cross-sectional area	Current-carrying capacity		Maximum mass supportable by twin flexible cord (see Regulation 522-08-06)
	Single-phase a.c.	Three-phase a.c.	
1	2	3	4
(mm^2)	(A)	(A)	(kg)
0.5	3	3	2
0.75	6	6	3
1	10	10	5
1.25	13	-	5
1.5	16	16	5
2.5	25	20	5
4	32	25	5

Where cable is on a reel see the notes to table 4H1A.

CORRECTION FACTOR FOR AMBIENT TEMPERATURE

60°C rubber and pvc cords:

Ambient temperature	35°C	40°C	45°C	50°C	55°C
Correction factor	0.91	0.82	0.71	0.58	0.41

85°C rubber cords having a h.o.f.r. sheath or a heat-resisting pvc sheath and for 85°C and 90°C heat-resisting pvc cords:

Ambient temperature	35 to 50°C	55°C	60°C	65°C	70°C
Correction factor	1.0	0.96	0.83	0.67	0.47

150°C rubber cords:

Ambient temperature	35 to 120°C	125°C	130°C	135°C	140°C	145°C
Correction factor	1.0	0.96	0.85	0.74	0.60	0.42

Glass fibre cords:

Ambient temperature	35 to 150°C	155°C	160°C	165°C	170°C	175°C
Correction factor	1.0	0.92	0.82	0.71	0.57	0.40

TABLE 4H3B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 60°C*

Conductor cross-sectional area	d.c. or single-phase a.c.	Three-phase a.c.
1	2	3
(mm^2)	(mV/A/m)	(mV/A/m)
0.5	93	80
0.75	62	54
1	46	40
1.25	37	-
1.5	32	27
2.5	19	16
4	12	10

NOTE: * The tabulated values above are for 60°C rubber-insulated and pvc-insulated flexible cords and for other types of flexible cords they are to be multiplied by the following factors:

For	85°C rubber or 85°C and 90°C pvc-insulated	1.09
	150°C rubber-insulated	1.31
	185°C glass fibre	1.43

COPPER CONDUCTORS

TABLE 4J1A

Mineral insulated cables bare and exposed to touch (see note 2) or having an overall covering of pvc (COPPER CONDUCTORS AND SHEATH)

BS 6207

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Sheath operating temperature: 70°C

REFERENCE METHOD 1 (CLIPPED DIRECT)								
Conductor cross-sectional area	2 single-core cables, or 1 two-core cable, single-phase a.c. or d.c.	3 single-core cables in trefoil, or 1 three-core cable, three-phase a.c.	3 single-core cables in flat formation, three-phase a.c.	1 four-core cable, three cores loaded three-phase a.c.	1 four-core cable, all cores loaded	1 seven-core cable, all cores loaded	1 twelve-core cable, all cores loaded	1 nineteen-core cable, all cores loaded
1	2	3	4	5	6	7	8	9
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
Light duty 500 V								
1	18.5	15	17	15	13	10	-	-
1.5	23	19	21	19.5	16.5	13	-	-
2.5	31	26	29	26	22	17.5	-	-
4	40	35	38	-	-	-	-	-
Heavy duty 750 V								
1	19.5	16	18	16.5	14.5	11.5	9.5	8.5
1.5	25	21	23	21	18	14.5	12.0	10.0
2.5	34	28	31	28	25	19.5	16.0	-
4	45	37	41	37	32	26	-	-
6	57	48	52	47	41	-	-	-
10	77	65	70	64	55	-	-	-
16	102	86	92	85	72	-	-	-
25	133	112	120	110	94	-	-	-
35	163	137	147	-	-	-	-	-
50	202	169	181	-	-	-	-	-
70	247	207	221	-	-	-	-	-
95	296	249	264	-	-	-	-	-
120	340	286	303	-	-	-	-	-
150	388	327	346	-	-	-	-	-
185	440	371	392	-	-	-	-	-
240	514	434	457	-	-	-	-	-

NOTES:

1. For single-core cables, the sheaths of the circuit are assumed to be connected together at both ends.
2. For bare cables exposed to touch, the tabulated values should be multiplied by 0.9.
3. Regulation 528-01-06 allows the omission of partitions under certain circumstances.

COPPER CONDUCTORS

TABLE 4J1A (continued)

Mineral insulated cables bare and exposed to touch (see note 2) or having an overall covering of pvc (COPPER CONDUCTORS AND SHEATH)

BS 6207

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Sheath operating temperature: 70°C

REFERENCE METHOD 11 (ON A PERFORATED CABLE TRAY, HORIZONTAL OR VERTICAL)

Conductor cross-sectional area	2 single-core cables, touching	1 two-core cable,	1 three-core cable, three-phase a.c.	1 four-core cable, three cores loaded three-phase a.c.	1 four-core cable, all cores loaded	1 seven-core cable, all cores loaded	1 twelve-core cable, all cores loaded	1 nineteen-core cable, all cores loaded	3 single-core cables, three-phase a.c.			
	Single-phase a.c. or d.c.								Vertical spaced	Horizontal spaced	Flat touching	Trefoil
1	10	11	12	13	14	15	16	17	18	19	20	21
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
ght uuty 500 V												
1	18.5	19.5	16.5	16	14	11	-	-	19	22	17	16.5
1.5	24	25	21	21	18	14	-	-	25	28	22	21
2.5	31	33	28	28	24	19	-	-	32	37	29	28
4	42	44	37	-	-	-	-	-	43	48	39	37
Heavy duty 0 V												
1	20	21	17.5	18	16	12	10	9	21	24	19	17.5
1.5	25	26	22	23	20	15.5	13	11	27	30	25	22
2.5	34	36	30	30	27	21	17	-	35	41	32	30
4	45	47	40	40	35	28	-	-	47	53	43	40
6	57	60	51	51	44	-	-	-	59	67	54	51
10	78	82	69	68	59	-	-	-	80	90	73	69
16	104	109	92	89	78	-	-	-	105	119	97	92
25	135	142	120	116	101	-	-	-	135	154	125	120
35	165	174	147	-	-	-	-	-	164	187	153	147
50	204	215	182	-	-	-	-	-	202	230	188	182
70	251	264	223	-	-	-	-	-	246	279	229	223
95	301	317	267	-	-	-	-	-	294	333	275	267
120	346	364	308	-	-	-	-	-	335	382	314	308
150	395	416	352	-	-	-	-	-	380	431	358	352
185	448	472	399	-	-	-	-	-	424	482	405	399
240	524	552	466	-	-	-	-	-	472	537	471	466

NOTES:

1. For single-core cables, the sheaths of the circuit are assumed to be connected together at both ends.
2. For bare cables exposed to touch, the tabulated values should be multiplied by 0.9.
3. Regulation 528-01-06 allows the omission of partitions under certain circumstances.

TABLE 4J1A (continued)

Mineral insulated cables bare and exposed to touch (see note 2) or having an overall covering of pvc (COPPER CONDUCTORS AND SHEATH)

BS 6207

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Sheath operating temperature: 70°C

REFERENCE METHODS 12 and 13 (FREE AIR)										
Conductor cross-sectional area	2 single-core cables, or 1 two-core cable, single-phase a.c. or d.c.	3 single-core cables in trefoil, or 1 three-core cable, three phase a.c.	1 four-core cable, three cores loaded three-phase a.c.	1 four-core cable, all cores loaded	1 seven-core cable, all cores loaded	1 twelve-core cable, all cores loaded	1 nineteen-core cable, all cores loaded	3 single-core cables, three-phase a.c.		
								Vertical spaced	Horizontal spaced	Touching
1	22	23	24	25	26	27	28	29	30	31
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
Light duty 500 V										
1	19.5	16.5	16	14	11	-	-	20	23	18
1.5	25	21	21	18	14	-	-	26	29	23
2.5	33	28	28	24	19	-	-	34	39	31
4	44	37	-	-	-	-	-	45	51	41
Heavy duty 750 V										
1	21	17.5	18	16	12	10	9	22	25	20
1.5	26	22	23	20	15.5	13	11	28	32	26
2.5	36	30	30	27	21	17	-	37	43	34
4	47	40	40	35	28	-	-	49	56	45
6	60	51	51	44	-	-	-	62	71	57
10	82	69	68	59	-	-	-	84	95	77
16	109	92	89	78	-	-	-	110	125	102
25	142	120	116	101	-	-	-	142	162	132
35	174	147	-	-	-	-	-	173	197	161
50	215	182	-	-	-	-	-	213	242	198
70	264	223	-	-	-	-	-	259	294	241
95	317	267	-	-	-	-	-	309	351	289
120	364	308	-	-	-	-	-	353	402	331
150	416	352	-	-	-	-	-	400	454	377
185	472	399	-	-	-	-	-	446	507	426
240	552	466	-	-	-	-	-	497	565	496

NOTES:

1. For single-core cables, the sheaths of the circuit are assumed to be connected together at both ends.
2. For bare cables exposed to touch, the tabulated values should be multiplied by 0.9.
3. Regulation 528-01-06 allows the omission of partitions under certain circumstances.

TABLE 4J1B

Mineral insulated cables bare and exposed to touch or having an overall covering of pvc (COPPER CONDUCTORS AND SHEATH)

BS 6207

VOLTAGE DROP (per ampere per metre) for single-phase a.c. or d.c.: Sheath operating temperature: 70°C

Conductor cross-sectional area	Two single-core cables, touching			One two-core or multicore* cable		
1	2			3		
(mm²)	(mV/A/m)			(mV/A/m)		
1	42			42		
1.5	28			28		
2.5	17			17		
4	10			10		
6	7			7		
10	4.2			4.2		
16	2.6			2.6		
	r	x	z	r	x	z
25	1.65	0.200	1.65	1.65	0.145	1.65
35	1.20	0.195	1.20	-	-	-
50	0.89	0.185	0.91	-	-	-
70	0.62	0.180	0.64	-	-	-
95	0.46	0.175	0.49	-	-	-
120	0.37	0.170	0.41	-	-	-
150	0.30	0.170	0.34	-	-	-
185	0.25	0.165	0.29	-	-	-
240	0.190	0.160	0.25	-	-	-

NOTE: * Multiple single-phase a.c. or d.c. circuits in a multicore cable

TABLE 4J1B (continued)

Mineral insulated cables bare and exposed to touch or having an overall covering of pvc
(COPPER CONDUCTORS AND SHEATH)
BS 6207

VOLTAGE DROP (per ampere per metre) for three-phase operation: Sheath operating temperature: 70°C

Conductor cross-sectional area	Three single-core cables									One three-core or four-core or multicore* cable		
	Trefoil touching			Flat formation								
				Touching			Spaced 1 cable diameter apart					
1	2			3			4			5		
(mm²)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
1	36			36			36			36		
1.5	24			24			24			24		
2.5	14			14			14			14		
4	9.1			9.1			9.1			9.1		
6	6.0			6.0			6.0			6.0		
10	3.6			3.6			3.6			3.6		
16	2.3			2.3			2.3			2.3		
	r	x	z	r	x	z	r	x	z	r	x	z
25	1.45	0.170	1.45	1.45	0.25	1.45	1.45	0.32	1.50	1.45	0.125	1.45
35	1.05	0.165	1.05	1.05	0.24	1.10	1.05	0.31	1.10	-	-	-
50	0.78	0.160	0.80	0.79	0.24	0.83	0.82	0.31	0.87	-	-	-
70	0.54	0.155	0.56	0.55	0.23	0.60	0.58	0.30	0.65	-	-	-
95	0.40	0.150	0.43	0.41	0.22	0.47	0.44	0.29	0.53	-	-	-
120	0.32	0.150	0.36	0.33	0.22	0.40	0.36	0.28	0.46	-	-	-
150	0.26	0.145	0.30	0.29	0.21	0.36	0.32	0.27	0.42	-	-	-
185	0.21	0.140	0.26	0.25	0.21	0.32	0.28	0.26	0.39	-	-	-
240	0.165	0.140	0.22	0.21	0.20	0.29	0.26	0.25	0.36	-	-	-

NOTE: * Multiple three-phase circuits in a multicore cable

COPPER CONDUCTORS

TABLE 4J2A

Mineral insulated cables bare and neither exposed to touch nor in contact with combustible materials (COPPER CONDUCTORS AND SHEATH)

BS 6207

Ambient temperature: 30°C

CURRENT-CARRYING CAPACITY (amperes): Sheath operating temperature: 105°C

REFERENCE METHOD 1 (CLIPPED DIRECT)								
Conductor cross-sectional area	2 single-core cables, or 1 two-core cable, single-phase a.c. or d.c.	3 single-core cables in trefoil, or 1 three-core cable, three-phase a.c.	3 single-core cables in flat formation, three-phase a.c.	1 four-core cable, three cores loaded three-phase a.c.	1 four-core cable, all cores loaded	1 seven-core cable, all cores loaded	1 twelve-core cable, all cores loaded	1 nineteen-core cable, all cores loaded
1	2	3	4	5	6	7	8	9
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
Light duty 500 V								
1	22	19	21	18.5	16.5	13	-	-
1.5	28	24	27	24	21	16.5	-	-
2.5	38	33	36	33	28	22	-	-
4	51	44	47	-	-	-	-	-
Heavy duty 750 V								
1	24	20	24	20	17.5	14	12	10.5
1.5	31	26	30	26	22	17.5	15.5	13
2.5	42	35	41	35	30	24	20	-
4	55	47	53	46	40	32	-	-
6	70	59	67	58	50	-	-	-
10	96	81	91	78	68	-	-	-
16	127	107	119	103	90	-	-	-
25	166	140	154	134	117	-	-	-
35	203	171	187	-	-	-	-	-
50	251	212	230	-	-	-	-	-
70	307	260	280	-	-	-	-	-
95	369	312	334	-	-	-	-	-
120	424	359	383	-	-	-	-	-
150	485	410	435	-	-	-	-	-
185	550	465	492	-	-	-	-	-
240	643	544	572	-	-	-	-	-

NOTES:

1. For single-core cables, the sheaths of the circuit are assumed to be connected together at both ends.
2. No correction factor for grouping need be applied.
3. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).

COPPER CONDUCTORS

TABLE 4J2A (continued)

Mineral insulated cables bare and neither exposed to touch nor in contact with combustible materials
(COPPER CONDUCTORS AND SHEATH)

BS 6207

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Sheath operating temperature: 105°C

REFERENCE METHODS 12 and 13 (FREE AIR)										
								3 single-core cables, three-phase a.c.		
Conductor cross-sectional area	2 single-core cables, or 1 two-core cable, single-phase a.c. or d.c.	3 single-core cables in trefoil, or 1 three-core cable, three-phase a.c.	1 four-core cable, three cores loaded three-phase a.c.	1 four-core cable, all cores loaded	1 seven-core cable, all cores loaded	1 twelve-core cable, all cores loaded	1 nineteen-core cable, all cores loaded	Vertical spaced	Horizontal spaced	Touching
1	10	11	12	13	14	15	16	17	18	19
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
Light duty 500 V										
1	24	21	20	18	14	-	-	26	29	23
1.5	31	26	26	22	18	-	-	33	37	29
2.5	41	35	35	30	24	-	-	43	49	39
4	54	46	-	-	-	-	-	56	64	51
Heavy duty 750 V										
1	26	22	22	19	15	13	11	28	32	25
1.5	33	28	28	24	19	16.5	14	35	40	32
2.5	45	38	37	32	26	22	-	47	54	43
4	60	50	49	43	34	-	-	61	70	56
6	76	64	63	54	-	-	-	78	89	71
10	104	87	85	73	-	-	-	105	120	96
16	137	115	112	97	-	-	-	137	157	127
25	179	150	146	126	-	-	-	178	204	164
35	220	184	-	-	-	-	-	216	248	200
50	272	228	-	-	-	-	-	266	304	247
70	333	279	-	-	-	-	-	323	370	300
95	400	335	-	-	-	-	-	385	441	359
120	460	385	-	-	-	-	-	441	505	411
150	526	441	-	-	-	-	-	498	565	469
185	596	500	-	-	-	-	-	557	629	530
240	697	584	-	-	-	-	-	624	704	617

NOTES:

1. For single-core cables, the sheaths of the circuit are assumed to be connected together at both ends.
2. No correction factor for grouping need be applied.
3. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).

TABLE 4J2B

Mineral insulated cables bare and neither exposed to touch nor in contact with combustible materials
(COPPER CONDUCTORS AND SHEATH)

BS 6207

VOLTAGE DROP (per ampere per metre) for single-phase a.c. or d.c.: Sheath operating temperature: 105°C

Conductor cross-sectional area	Two single-core cables touching			One two-core or multicore* cable		
1	2			3		
(mm^2)	(mV/A/m)			(mV/A/m)		
1	47			47		
1.5	31			31		
2.5	19			19		
4	12			12		
6	7.8			7.8		
10	4.7			4.7		
16	3.0			3.0		
	r	x	z	r	x	z
25	1.85	0.180	1.85	1.85	0.145	1.85
35	1.35	0.175	1.35	-	-	-
50	1.00	0.170	1.00	-	-	-
70	0.69	0.165	0.71	-	-	-
95	0.51	0.160	0.54	-	-	-
120	0.41	0.160	0.44	-	-	-
150	0.33	0.155	0.36	-	-	-
185	0.27	0.150	0.31	-	-	-
240	0.21	0.150	0.26	-	-	-

NOTE: * Multiple single-phase a.c. or d.c. circuits in a multicore cable

TABLE 4J2B (continued)

Mineral insulated cables bare and neither exposed to touch nor in contact with combustible materials
(COPPER CONDUCTORS AND SHEATH)
BS 6207

VOLTAGE DROP (per ampere per metre) for three-phase operation: Sheath operating temperature: 105°C

Conductor cross-sectional area	Three single-core cables									One three-core or four-core or multicore* cable		
	Trefoil touching			Flat formation								
				Touching			Spaced 1 cable diameter apart					
1	2			3			4			5		
(mm^2)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
1	40			40			40			40		
1.5	27			27			27			27		
2.5	16			16			16			16		
4	10			10			10			10		
6	6.8			6.8			6.8			6.8		
10	4.1			4.1			4.1			4.1		
16	2.6			2.6			2.6			2.6		
	r	x	z	r	x	z	r	x	z	r	x	z
25	1.60	0.160	1.65	1.60	0.23	1.65	1.60	0.31	1.65	1.60	0.125	1.60
35	1.15	0.155	1.20	1.15	0.23	1.20	1.20	0.30	1.25	-	-	-
50	0.87	0.150	0.88	0.88	0.22	0.91	0.90	0.29	0.95	-	-	-
70	0.60	0.145	0.62	0.61	0.22	0.65	0.63	0.29	0.70	-	-	-
95	0.45	0.140	0.47	0.46	0.21	0.50	0.48	0.28	0.56	-	-	-
120	0.36	0.135	0.38	0.37	0.21	0.42	0.39	0.28	0.48	-	-	-
150	0.29	0.135	0.32	0.31	0.20	0.37	0.34	0.27	0.43	-	-	-
185	0.23	0.130	0.27	0.26	0.20	0.33	0.29	0.26	0.39	-	-	-
240	0.180	0.130	0.22	0.22	0.195	0.29	0.26	0.25	0.36	-	-	-

NOTE: * Multiple three-phase circuits in a multicore cable

TABLE 4K1A

Single-core pvc-insulated cables, non-armoured, with or without sheath
(ALUMINIUM CONDUCTORS)

CURRENT-CARRYING CAPACITY (amperes): BS 6004 / BS 6346

Ambient temperature: 30°C
Conductor operating temperature: 70°C

Conductor cross-sectional area	Reference Method 4 (enclosed in conduit in thermally insulating wall etc.)		Reference Method 3 (enclosed in conduit on a wall or in trunking etc.)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray horizontal or vertical)		Reference Method 12 (free air)		
									Horizontal flat spaced	Vertical flat spaced	Trefoil
	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. or 3 cables three-phase a.c.	2 cables, single-phase a.c. or d.c. or 3 cables three-phase a.c.	3 cables trefoil, three-phase a.c.
1	2	3	4	5	6	7	8	9	10	11	12
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
50	93	84	118	104	134	123	144	132	163	148	128
70	118	107	150	133	172	159	185	169	210	191	165
95	142	129	181	161	210	194	225	206	256	234	203
120	164	149	210	186	245	226	261	240	298	273	237
150	189	170	234	204	283	261	301	277	344	317	274
185	215	194	266	230	324	299	344	317	394	364	316
240	252	227	312	269	384	354	407	375	466	432	375
300	289	261	358	306	444	410	469	433	538	501	435
380	-	-	413	352	511	472	543	502	625	584	507
480	-	-	477	405	591	546	629	582	726	680	590
600	-	-	545	462	679	626	722	669	837	787	680
740	-	-	-	-	771	709	820	761	956	902	776
960	-	-	-	-	900	823	953	886	1125	1066	907
1200	-	-	-	-	1022	926	1073	999	1293	1229	1026

NOTE:
Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.

TABLE 4K1B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 70°C

Conductor cross-sectional area	2 cables, d.c.	2 cables, single-phase a.c.									3 or 4 cables, three-phase a.c.												
		Reference Methods 3 & 4 (enclosed in conduit etc. in or on a wall)			Reference Methods 1 & 11 (clipped direct or on trays, touching)			Reference Method 12 (spaced*)			Reference Methods 3 & 4 (enclosed in conduit etc. in or on a wall)			Reference Methods 1, 11 & 12 (in trefoil touching)			Reference Methods 1 & 11 (flat touching)			Reference Method 12 (flat spaced*)		
1	2	3			4			5			6			7			8			9		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
50	1.55	1.60	0.30	1.60	1.55	0.190	1.55	1.55	0.28	1.55	1.35	0.26	1.40	1.35	0.165	1.35	1.35	0.24	1.35	1.35	0.32	1.40
70	1.05	1.10	0.30	1.15	1.05	0.185	1.05	1.05	0.27	1.10	0.94	0.26	0.97	0.91	0.160	0.92	0.91	0.24	0.94	0.91	0.31	0.96
95	0.77	0.81	0.29	0.86	0.77	0.185	0.79	0.77	0.27	0.82	0.70	0.25	0.74	0.67	0.160	0.69	0.67	0.23	0.71	0.67	0.31	0.74
120	0.61	0.64	0.29	0.70	0.61	0.180	0.64	0.61	0.27	0.67	0.55	0.25	0.61	0.53	0.155	0.55	0.53	0.23	0.58	0.53	0.31	0.61
150	0.49	0.51	0.28	0.59	0.49	0.175	0.52	0.49	0.26	0.55	0.45	0.24	0.51	0.42	0.155	0.45	0.42	0.23	0.48	0.42	0.30	0.52
185	0.39	0.42	0.28	0.50	0.40	0.175	0.43	0.39	0.26	0.47	0.36	0.24	0.44	0.34	0.150	0.37	0.34	0.23	0.41	0.34	0.30	0.46
240	0.30	0.32	0.27	0.42	0.30	0.170	0.35	0.30	0.26	0.40	0.28	0.24	0.37	0.26	0.150	0.30	0.26	0.22	0.35	0.26	0.30	0.40
300	0.24	0.26	0.27	0.37	0.24	0.170	0.30	0.24	0.26	0.35	0.23	0.23	0.32	0.21	0.145	0.26	0.21	0.22	0.31	0.21	0.30	0.36
380	0.190	0.22	0.27	0.35	0.195	0.165	0.26	0.195	0.25	0.32	0.190	0.23	0.30	0.170	0.145	0.22	0.170	0.22	0.28	0.170	0.29	0.34
480	0.150	0.180	0.26	0.32	0.155	0.165	0.23	0.155	0.25	0.29	0.155	0.23	0.27	0.140	0.140	0.195	0.140	0.22	0.26	0.135	0.29	0.32
600	0.120	0.150	0.26	0.30	0.130	0.160	0.21	0.125	0.25	0.28	0.125	0.22	0.26	0.110	0.140	0.180	0.110	0.22	0.24	0.110	0.29	0.31
740	0.099	-	-	-	0.105	0.160	0.190	0.100	0.25	0.27	-	-	-	0.094	0.135	0.165	0.094	0.21	0.23	0.089	0.29	0.30
960	0.075	-	-	-	0.086	0.155	0.180	0.082	0.24	0.26	-	-	-	0.077	0.135	0.155	0.077	0.21	0.22	0.071	0.29	0.29
1200	0.060	-	-	-	0.074	0.155	0.170	0.068	0.24	0.25	-	-	-	0.066	0.135	0.150	0.066	0.21	0.22	0.059	0.28	0.29

NOTE: * Spacings larger than those specified in Method 12 (see table 4A) will result in a larger voltage drop.

TABLE 4K2A

Multicore pvc-insulated cables, non-armoured
(ALUMINIUM CONDUCTORS)

BS 6004
BS 6346

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 70°C

Conductor cross-sectional area	Reference Method 4 (enclosed in an insulating wall etc.)		Reference Method 3 (enclosed in conduit on a wall or ceiling, or in trunking)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray) or Reference Method 13 (free air)	
	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.
1	2	3	4	5	6	7	8	9
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
16	44	41	54	48	66	59	73	61
25	58	53	71	62	83	73	89	78
35	71	65	86	77	103	90	111	96
50	86	78	104	92	125	110	135	117
70	108	98	131	116	160	140	173	150
95	130	118	157	139	195	170	210	183
120	-	135	-	160	-	197	-	212
150	-	155	-	184	-	227	-	245
185	-	176	-	210	-	259	-	280
240	-	207	-	248	-	305	-	330
300	-	237	-	285	-	351	-	381

NOTE:
Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.

TABLE 4K2B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 70°C

Conductor cross-sectional area	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three- or four-core cable, three-phase a.c.		
1	2	3			4		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
16	4.5	4.5			3.9		
		r	x	z	r	x	z
25	2.9	2.9	0.175	2.9	2.5	0.150	2.5
35	2.1	2.1	0.170	2.1	1.80	0.150	1.80
50	1.55	1.55	0.170	1.55	1.35	0.145	1.35
70	1.05	1.05	0.165	1.05	0.90	0.140	0.92
95	0.77	0.77	0.160	0.79	0.67	0.140	0.68
120	-	-	-	-	0.53	0.135	0.55
150	-	-	-	-	0.42	0.135	0.44
185	-	-	-	-	0.34	0.135	0.37
240	-	-	-	-	0.26	0.130	0.30
300	-	-	-	-	0.21	0.130	0.25

TABLE 4K3A

Single-core armoured pvc-insulated cables (non-magnetic armour)
(ALUMINIUM CONDUCTORS)

CURRENT-CARRYING CAPACITY (amperes): BS 6346

Ambient temperature: 30°C
Conductor operating temperature: 70°C

Conductor cross-sectional area	Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray)		Reference Method 12 (free air)						
					2 cables, single-phase a.c.		2 cables, d.c. spaced		3 or 4 cables, three-phase a.c.		
	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching	Horizontal flat spaced	Vertical flat spaced	Horizontal	Vertical	Horizontal flat spaced	Vertical flat spaced	3 cables trefoil
1	2	3	4	5	6	7	8	9	10	11	12
(mm^2)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
50	143	133	152	141	168	159	167	157	169	155	131
70	183	168	194	178	212	200	214	202	213	196	168
95	221	202	234	214	259	245	261	247	255	236	205
120	255	233	270	246	299	285	303	288	293	272	238
150	294	267	310	282	340	323	349	333	335	312	275
185	334	303	352	319	389	371	400	382	379	354	315
240	393	354	413	374	457	437	472	452	443	415	372
300	452	405	474	427	520	498	545	523	505	475	430
380	518	452	543	479	583	559	638	613	551	518	497
480	586	501	616	534	655	629	742	715	604	568	568
600	658	550	692	589	724	696	859	828	656	618	642
740	728	596	769	642	802	770	986	952	707	666	715
960	819	651	868	706	866	832	1171	1133	770	726	808
1200	893	692	952	756	938	902	1360	1317	822	774	880

NOTE:
Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.

TABLE 4K3B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 70°C

Conductor cross-sectional area	2 cables, d.c.	2 cables, single-phase a.c.						3 or 4 cables, three-phase a.c.								
		Reference Methods 1 & 11 (touching)			Reference Method 12 (spaced*)			Reference Methods 1, 11 and 12 (in trefoil touching)			Reference Methods 1 & 11 (flat and touching)			Reference Method 12 (flat spaced*)		
1	2	3			4			5			6			7		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
50	1.55	1.55	0.23	1.55	1.55	0.31	1.55	1.35	0.195	1.35	1.35	0.27	1.35	1.30	0.34	1.35
70	1.05	1.05	0.22	1.10	1.05	0.30	1.10	0.92	0.190	0.93	0.93	0.26	0.96	0.95	0.33	1.00
95	0.77	0.78	0.21	0.81	0.81	0.29	0.86	0.68	0.185	0.70	0.70	0.25	0.75	0.73	0.32	0.80
120	0.61	0.62	0.21	0.66	0.65	0.29	0.71	0.54	0.180	0.57	0.57	0.25	0.62	0.60	0.32	0.68
150	0.49	0.50	0.20	0.54	0.53	0.28	0.60	0.44	0.175	0.47	0.46	0.24	0.52	0.50	0.31	0.58
185	0.39	0.41	0.195	0.45	0.44	0.28	0.52	0.35	0.170	0.39	0.38	0.24	0.45	0.42	0.30	0.51
240	0.30	0.32	0.190	0.37	0.34	0.27	0.44	0.28	0.165	0.32	0.30	0.23	0.38	0.33	0.29	0.44
300	0.24	0.26	0.185	0.32	0.28	0.26	0.39	0.22	0.160	0.27	0.24	0.23	0.34	0.28	0.29	0.40
380	0.190	0.22	0.185	0.28	0.26	0.25	0.36	0.185	0.155	0.24	0.22	0.22	0.32	0.27	0.26	0.38
480	0.150	0.180	0.180	0.25	0.22	0.25	0.33	0.155	0.155	0.22	0.195	0.22	0.29	0.24	0.25	0.35
600	0.120	0.150	0.175	0.23	0.195	0.24	0.31	0.130	0.150	0.200	0.170	0.21	0.27	0.21	0.24	0.32
740	0.097	0.135	0.170	0.22	0.180	0.23	0.29	0.115	0.145	0.185	0.160	0.20	0.26	0.200	0.22	0.30
960	0.075	0.115	0.160	0.200	0.165	0.21	0.27	0.100	0.140	0.175	0.150	0.185	0.24	0.190	0.195	0.27
1200	0.060	0.110	0.155	0.190	0.160	0.180	0.24	0.094	0.140	0.170	0.145	0.160	0.22	0.185	0.165	0.25

NOTE: * Spacings larger than those specified in Method 12 (see table 4A) will result in larger voltage drop.

TABLE 4K4A

Multicore armoured pvc-insulated cables (ALUMINIUM CONDUCTORS)

BS 6346

Ambient temperature: 30°C
Conductor operating temperature: 70°C

CURRENT-CARRYING CAPACITY (amperes):

Conductor cross-sectional area	Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray) or Reference Method 13 (free air)	
	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.
1	2	3	4	5
(mm²)	(A)	(A)	(A)	(A)
16	68	58	71	61
25	89	76	94	80
35	109	94	115	99
50	131	113	139	119
70	165	143	175	151
95	199	174	211	186
120	-	202	-	216
150	-	232	-	250
185	-	265	-	287
240	-	312	-	342
300	-	360	-	399

NOTE:
Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.

TABLE 4K4B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 70°C

Conductor cross-sectional area	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three- or four-core cable, three-phase a.c.		
1	2	3			4		
(mm^2)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
16	4.5	4.5			3.9		
		r	x	z	r	x	z
25	2.9	2.9	0.175	2.9	2.5	0.150	2.5
35	2.1	2.1	0.170	2.1	1.80	0.150	1.80
50	1.55	1.55	0.170	1.55	1.35	0.145	1.35
70	1.05	1.05	0.165	1.05	0.90	0.140	0.92
95	0.77	0.77	0.160	0.79	0.67	0.140	0.68
120	-	-	-	-	0.53	0.135	0.55
150	-	-	-	-	0.42	0.135	0.44
185	-	-	-	-	0.34	0.135	0.37
240	-	-	-	-	0.26	0.130	0.30
300	-	-	-	-	0.21	0.130	0.25

ALUMINIUM CONDUCTORS

TABLE 4L1A

Single-core cables having thermosetting insulation, non-armoured, with or without sheath (ALUMINIUM CONDUCTORS)

BS 5467

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor cross-sectional area	Reference Method 4 (enclosed in conduit in thermally insulating wall etc.)		Reference Method 3 (enclosed in conduit on a wall or in trunking etc.)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray horizontal or vertical)		Reference Method 12 (free air)		
									Horizontal flat spaced	Vertical flat spaced	Trefoil
	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c.	3 or 4 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. flat and touching	3 or 4 cables, three-phase a.c. flat and touching or trefoil	2 cables, single-phase a.c. or d.c. or 3 cables, three-phase a.c.	2 cables, single-phase a.c. or d.c. or 3 cables, three-phase a.c.	3 cables trefoil, three-phase a.c.
1	2	3	4	5	6	7	8	9	10	11	12
(mm^2)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
50	125	113	157	140	169	149	180	165	210	188	159
70	158	142	200	179	215	189	231	211	271	244	206
95	191	171	242	217	265	234	281	258	332	300	253
120	220	197	281	251	308	273	326	300	387	351	296
150	253	226	-	-	353	314	376	346	448	408	343
185	288	256	-	-	410	366	430	396	515	470	395
240	338	300	-	-	489	438	509	469	611	561	471
300	387	344	-	-	564	507	586	541	708	652	544
380	-	-	-	-	658	594	679	628	798	742	638
480	-	-	-	-	765	692	786	728	927	865	743
600	-	-	-	-	871	791	903	836	1058	990	849
740	-	-	-	-	1001	911	1025	951	1218	1143	979
960	-	-	-	-	1176	1072	1191	1108	1440	1355	1151
1200	-	-	-	-	1333	1217	1341	1249	1643	1550	1307

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).
3. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C pvc insulated cables (BS 6004, BS 6346) shall be used (see also Regulation 523-01-01).

TABLE 4L1B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 90°C

Conductor cross-sectional area	2 cables, d.c.	2 cables, single-phase a.c.									3 or 4 cables, three-phase a.c.												
		Reference Methods 3 & 4 (enclosed in conduit etc. in or on a wall)			Reference Methods 1 & 11 (clipped direct or on trays, touching)			Reference Method 12 (spaced*)			Reference Methods 3 & 4 (enclosed in conduit etc. in or on a wall)			Reference Methods 1, 11 & 12 (in trefoil)			Reference Methods 1 & 11 (flat and touching)			Reference Method 12 (flat spaced*)		
1	2	3			4			5			6			7			8			9		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
50	1.65	1.70	0.30	1.72	1.65	0.190	1.66	1.65	0.28	1.68	1.44	0.26	1.46	1.44	0.165	1.45	1.44	0.24	1.46	1.44	0.32	1.48
70	1.13	1.17	0.30	1.21	1.12	0.185	1.14	1.12	0.27	1.15	1.00	0.26	1.04	0.97	0.160	0.98	0.97	0.24	1.00	0.97	0.31	1.02
95	0.82	0.86	0.29	0.91	0.82	0.185	0.84	0.82	0.27	0.94	0.75	0.25	0.79	0.71	0.160	0.73	0.71	0.23	0.75	0.71	0.31	0.78
120	0.65	0.68	0.29	0.74	0.65	0.180	0.67	0.65	0.27	0.70	0.59	0.25	0.64	0.57	0.155	0.59	0.57	0.23	0.61	0.57	0.31	0.64
150	0.53	0.54	0.28	0.61	0.52	0.175	0.55	0.52	0.26	0.58	0.48	0.24	0.54	0.45	0.155	0.47	0.45	0.23	0.50	0.45	0.30	0.54
185	0.42	0.45	0.28	0.53	0.43	0.175	0.46	0.42	0.26	0.49	0.38	0.24	0.45	0.36	0.150	0.39	0.36	0.23	0.43	0.36	0.30	0.47
240	0.32	0.34	0.27	0.43	0.32	0.170	0.36	0.32	0.26	0.41	0.30	0.24	0.38	0.28	0.150	0.32	0.28	0.22	0.35	0.28	0.30	0.41
300	0.26	0.28	0.27	0.38	0.26	0.170	0.31	0.26	0.26	0.36	0.25	0.23	0.34	0.22	0.145	0.27	0.22	0.22	0.31	0.22	0.30	0.37
380	0.20	-	-	-	0.21	0.165	0.27	0.21	0.25	0.33	0.20	0.23	0.31	0.180	0.145	0.23	0.180	0.22	0.28	0.180	0.29	0.34
480	0.160	-	-	-	0.170	0.165	0.23	0.165	0.25	0.30	0.165	0.23	0.28	0.150	0.140	0.20	0.150	0.22	0.27	0.145	0.29	0.32
600	0.130	-	-	-	0.140	0.160	0.21	0.135	0.25	0.28	0.135	0.22	0.26	0.120	0.140	0.185	0.120	0.22	0.25	0.120	0.29	0.31
740	0.105	-	-	-	0.115	0.160	0.19	0.110	0.25	0.27	-	-	-	0.100	0.135	0.170	0.100	0.21	0.23	0.095	0.29	0.30
960	0.080	-	-	-	0.092	0.155	0.18	0.087	0.24	0.26	-	-	-	0.082	0.135	0.160	0.082	0.21	0.23	0.076	0.29	0.30
1200	0.064	-	-	-	0.079	0.155	0.17	0.073	0.24	0.25	-	-	-	0.070	0.135	0.150	0.070	0.21	0.22	0.063	0.28	0.29

NOTE: * Spacings larger than those specified in Method 12 (see table 4A) will result in larger voltage drop.

TABLE 4L2A

Multicore cables having thermosetting insulation, non-armoured (ALUMINIUM CONDUCTORS)

BS 5467

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor cross-sectional area	Reference Method 4 (enclosed in an insulated wall etc.)		Reference Method 3 (enclosed in conduit on a wall or ceiling, or in trunking)		Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray) or Reference Method 13 (free air)	
	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.
1	2	3	4	5	6	7	8	9
(mm²)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
16	60	55	72	64	84	76	91	77
25	78	71	94	84	101	90	108	97
35	96	87	115	103	126	112	135	120
50	115	104	138	124	154	136	164	146
70	145	131	175	156	198	174	211	187
95	175	157	210	188	241	211	257	227
120	-	180	-	216	-	245	-	263
150	-	206	-	240	-	283	-	304
185	-	233	-	272	-	323	-	347
240	-	273	-	318	-	382	-	409
300	-	313	-	364	-	440	-	471

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).
3. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C pvc insulated cables (BS 6004, BS 6346) shall be used (see also Regulation 523-01-01).

TABLE 4L2B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 90°C

Conductor cross-sectional area	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three- or four-core cable, three-phase a.c.		
1	2	3			4		
(mm^2)	(mVA/m)	(mV/A/m)			(mV/A/m)		
16	4.8	4.8			4.2		
		r	x	z	r	x	z
25	3.1	3.1	0.165	3.1	2.7	0.140	2.7
35	2.2	2.2	0.160	2.2	1.90	0.140	1.95
50	1.60	1.65	0.160	1.65	1.40	0.135	1.45
70	1.10	1.10	0.155	1.15	0.96	0.135	0.97
95	0.82	0.82	0.150	0.84	0.71	0.130	0.72
120	-	-	-	-	0.56	0.130	0.58
150	-	-	-	-	0.45	0.130	0.47
185	-	-	-	-	0.37	0.130	0.39
240	-	-	-	-	0.28	0.125	0.31
300	-	-	-	-	0.23	0.125	0.26

ALUMINIUM CONDUCTORS

TABLE 4L3A

Single-core cables having thermosetting insulation (non-magnetic armour)
(ALUMINIUM CONDUCTORS)
BS 5467
BS 6724

Ambient temperature: 30°C
CURRENT-CARRYING CAPACITY (amperes): Conductor operating temperature: 90°C

Conductor cross-sectional area	Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray)		Reference Method 12 (free air)						
					2 cables, single-phase a.c.		2 cables, d.c.		3 or 4 cables, three-phase a.c.		
	2 cables, single-phase a.c. or d.c., flat and touching	3 or 4 cables, three-phase a.c., flat and touching	2 cables, single-phase a.c. or d.c., flat and touching	3 or 4 cables, three-phase a.c., flat and touching	Horizontal flat spaced	Vertical flat spaced	Horizontal spaced	Vertical spaced	Horizontal flat spaced	Vertical flat spaced	3 cables trefoil
1	2	3	4	5	6	7	8	9	10	11	12
(mm^2)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
50	179	165	192	176	212	199	216	197	215	192	162
70	228	209	244	222	269	254	275	253	270	244	207
95	276	252	294	267	328	310	332	307	324	296	252
120	320	291	340	308	378	358	384	357	372	343	292
150	368	333	390	352	429	409	441	411	424	394	337
185	419	378	444	400	490	467	511	480	477	447	391
240	494	443	521	468	576	549	605	572	554	523	465
300	568	508	597	536	654	624	701	666	626	595	540
380	655	573	688	608	735	704	812	780	639	649	625
480	747	642	786	685	825	790	942	906	765	717	714
600	836	706	880	757	909	872	1076	1036	832	780	801
740	934	764	988	824	989	950	1250	1205	890	835	897
960	1056	838	1121	911	1094	1052	1488	1435	970	911	1014
1200	1163	903	1236	990	1187	1141	1715	1658	1043	980	1118

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).
3. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C pvc insulated cables (BS 6004, BS 6346) shall be used (see also Regulation 523-01-01).

TABLE 4L3B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 90°C

Conductor cross-sectional area	2 cables, d.c.	2 cables, single-phase a.c.						3 or 4 cables, three-phase a.c.								
		Reference Methods 1 & 11 (touching)			Reference Method 12 (spaced*)			Reference Methods 1, 11 & 12 (in trefoil touching)			Reference Methods 1 & 11 (flat and touching)			Reference Method 12 (flat spaced*)		
1	2	3			4			5			6			7		
(mm²)	(mV/A/m)	(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)			(mV/A/m)		
		r	x	z	r	x	z	r	x	z	r	x	z	r	x	z
50	1.60	1.60	0.22	1.60	1.60	0.30	1.60	1.40	0.185	1.40	1.40	0.26	1.40	1.35	0.34	1.40
70	1.10	1.10	0.21	1.15	1.10	0.29	1.15	0.96	0.180	0.98	0.97	0.25	1.00	0.99	0.33	1.05
95	0.82	0.83	0.20	0.85	0.85	0.29	0.90	0.71	0.175	0.74	0.74	0.25	0.78	0.76	0.32	0.83
120	0.66	0.66	0.20	0.69	0.69	0.28	0.74	0.57	0.170	0.60	0.60	0.24	0.64	0.63	0.31	0.70
150	0.52	0.53	0.195	0.57	0.56	0.28	0.62	0.46	0.170	0.49	0.49	0.24	0.54	0.52	0.30	0.60
185	0.42	0.43	0.190	0.47	0.46	0.27	0.54	0.38	0.165	0.41	0.40	0.24	0.47	0.44	0.30	0.53
240	0.32	0.34	0.185	0.39	0.37	0.27	0.45	0.29	0.160	0.34	0.32	0.23	0.39	0.35	0.29	0.46
300	0.26	0.27	0.185	0.33	0.30	0.26	0.40	0.24	0.160	0.29	0.26	0.23	0.34	0.29	0.29	0.41
380	0.21	0.23	0.180	0.29	0.26	0.25	0.36	0.195	0.155	0.25	0.23	0.22	0.32	0.27	0.27	0.38
480	0.160	0.185	0.175	0.25	0.23	0.25	0.34	0.160	0.155	0.22	0.20	0.21	0.29	0.24	0.26	0.35
600	0.130	0.160	0.175	0.24	0.20	0.24	0.31	0.135	0.150	0.20	0.175	0.21	0.27	0.22	0.25	0.33
740	0.105	0.140	0.170	0.22	0.190	0.22	0.29	0.120	0.145	0.190	0.165	0.195	0.26	0.21	0.22	0.30
960	0.080	0.120	0.160	0.20	0.170	0.21	0.27	0.105	0.140	0.175	0.150	0.180	0.24	0.195	0.195	0.28
1200	0.064	0.105	0.160	0.190	0.155	0.20	0.25	0.093	0.135	0.165	0.140	0.175	0.22	0.180	0.185	0.26

NOTE: * Spacings larger than those specified in Method 12 (see table 4A) will result in larger voltage drop.

TABLE 4L4A

Multicore armoured cables having thermosetting insulation
(ALUMINIUM CONDUCTORS)

BS 5467
BS 6724

CURRENT-CARRYING CAPACITY (amperes):

Ambient temperature: 30°C
Conductor operating temperature: 90°C

Conductor cross-sectional area	Reference Method 1 (clipped direct)		Reference Method 11 (on a perforated cable tray) or Reference Method 13 (free air)	
	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.	1 two-core cable, single-phase a.c. or d.c.	1 three- or four-core cable, three-phase a.c.
1	2	3	4	5
(mm^2)	(A)	(A)	(A)	(A)
16	82	71	85	74
25	108	92	112	98
35	132	113	138	120
50	159	137	166	145
70	201	174	211	185
95	242	214	254	224
120	-	249	-	264
150	-	284	-	305
185	-	328	-	350
240	-	386	-	418
300	-	441	-	488

NOTES:

1. **Where the conductor is to be protected by a semi-enclosed fuse to BS 3036, see item 6.2 of the preface to this appendix.**
2. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductor is suitable for the conductor operating temperature (see Regulation 512-02).
3. Where cables in this table are connected to equipment or accessories designed to operate at a temperature not exceeding 70°C, the current ratings given in the equivalent table for 70°C pvc insulated cables (BS 6004, BS 6346) shall be used (see also Regulation 523-01-01).

TABLE 4L4B

VOLTAGE DROP (per ampere per metre): Conductor operating temperature: 90°C

Conductor cross-sectional area	Two-core cable, d.c.	Two-core cable, single-phase a.c.			Three- or four-core cable, three-phase a.c.		
1	2	3			4		
(mm^2)	(mV/A/m)	(mV/A/m)			(mV/A/m)		
16	4.8	4.8			4.2		
		r	x	z	r	x	z
25	3.1	3.1	0.165	3.1	2.7	0.140	2.7
35	2.2	2.2	0.160	2.2	1.90	0.140	1.95
50	1.60	1.65	0.160	1.65	1.40	0.135	1.45
70	1.10	1.10	0.155	1.15	0.96	0.135	0.97
95	0.82	0.82	0.150	0.84	0.71	0.130	0.72
120	-	-	-	-	0.56	0.130	0.58
150	-	-	-	-	0.45	0.130	0.47
185	-	-	-	-	0.37	0.130	0.39
240	-	-	-	-	0.28	0.125	0.31
300	-	-	-	-	0.23	0.125	0.26

APPENDIX 5

CLASSIFICATION OF EXTERNAL INFLUENCES (Chapters 32 and 52)

This Appendix gives the classification and codification of external influences developed for IEC Publication 364-3, Second Edition 1993.

Each condition of external influence is designated by a code comprising a group of two capital letters and a number, as follows:

The first letter relates to the general category of external influence:

A Environment

B Utilisation

C Construction of buildings

The second letter relates to the nature of the external influence:

... **A**

... **B**

... **C**

The number relates to the class within each external influence:

... ... **1**

... ... **2**

... ... **3**

For example the code **AA4** signifies:

A = Environment

AA = Environment - Ambient temperature

AA4 = Environment - Ambient temperature in the range of -5°C to +40°C.

NOTE: The codification given in this Appendix is not intended to be used for marking equipment.

APPENDIX 5

CONCISE LIST OF EXTERNAL INFLUENCES

ENVIRONMENT

A

AA *Ambient (°C)*

AA1	-60°C	+5°C
AA2	-40°C	+5°C
AA3	-25°C	+5°C
AA4	-5°C	+40°C
AA5	+5°C	+40°C
AA6	+5°C	+60°C
AA7	-25°C	+55°C
AA8	-50°C	+40°C

AB *Temperature and humidity*

AC *Altitude (metres)*

AC1	≤ 2000 metres
AC2	> 2000 metres

AD *Water*

AD1	Negligible
AD2	Drops
AD3	Sprays
AD4	Splashes
AD5	Jets
AD6	Waves
AD7	Immersion
AD8	Submersion

AE *Foreign bodies*

AE1	Negligible
AE2	Small
AE3	Very Small
AE4	Light dust
AE5	Moderate dust
AE6	Heavy dust

AF *Corrosion*

AF1	Negligible
AF2	Atmospheric
AF3	Intermittent
AF4	Continuous

AG *Impact*

AG1	Low
AG2	Medium
AG3	High

AH *Vibration*

AH1	Low
AH2	Medium
AH3	High

AJ *Other mechanical stresses*

AK *Flora*

AK1	No hazard
AK2	Hazard

AL *Fauna*

AL1	No hazard
AL2	Hazard

AM *Radiation*

AM1	Negligible
AM2	Stray currents
AM3	Electromagnetic
AM4	Ionization
AM5	Electrostatics
AM6	Induction

AN *Solar*

AN1	Low
AN2	Medium
AN3	High

AP *Seismic*

AP1	Negligible
AP2	Low
AP3	Medium
AP4	High

AQ *Lightning*

AQ1	Negligible
AQ2	Indirect
AQ3	Direct

AR *Movement of air*

AR1	Low
AR2	Medium
AR3	High

AS *Wind*

AS1	Low
AS2	Medium
AS3	High

UTILIZATION

B

BA *Capability*

BA1	Ordinary
BA2	Children
BA3	Handicapped
BA4	Instructed
BA5	Skilled

BB *Resistance*

BC *Contact with earth*

BC1	None
BC2	Low
BC3	Frequent
BC4	Continuous

BD *Evacuation*

BD1	Normal
BD2	Difficult
BD3	Crowded
BD4	Difficult and crowded

BE *Materials*

BE1	No risk
BE2	Fire risk
BE3	Explosion risk
BE4	Contamination risk

BUILDING

C

CA *Materials*

CA1	Non-combustible
CA2	Combustible

CB *Structure*

CB1	Negligible
CB2	Fire propagation
CB3	Structure movement
CB4	Flexible

Environment:

Code	Class designation	Characteristics	Applications and examples
	Ambient temperature		
		The ambient temperature is that of the ambient air where the equipment is to be installed. It is assumed that the ambient temperature includes the effects of all other equipment installed in the same location. The ambient temperature to be considered for the equipment is the temperature at the place where the equipment is to be installed resulting from the influence of all other equipment in the same location, when operating, not taking into account the thermal contribution of the equipment to be installed. Lower and upper limits of the ranges of ambient temperature:	
AA1		-60°C + 5°C	
AA2		-40°C + 5°C	
AA3		-25°C + 5°C	
AA4		- 5°C +40°C	
AA5		+ 5°C +40°C	
AA6		+ 5°C +60°C	
AA7		-25°C +55°C	
AA8		-50°C +40°C	
		Ambient temperature classes are applicable only where humidity has no influence. The average temperature over a 24-hour period must not exceed 5°C below the upper limits. Combination of two ranges to define some environments may be necessary. Installations subject to temperatures outside the ranges require special consideration	

Environment continued:

Code	Class designation	Characteristics						Applications and examples
	Ambient climatic conditions (combined influence of temperature and humidity)							
		Low air temperature °C	High air temperature °C	Low relative humidity %	High relative humidity %	Low absolute humidity g/m^3	High absolute humidity g/m^3	
AB1		-60	+5	3	100	0.003	7	Indoor and outdoor locations with extremely low ambient temperatures
AB2		-40	+5	10	100	0.1	7	Indoor and outdoor locations with low ambient temperatures
AB3		-25	+5	10	100	0.5	7	Indoor and outdoor locations with low ambient temperatures
AB4		-5	+40	5	95	1	29	Weather protected locations having neither temperature nor humidity control. Heating may be used to raise low ambient temperatures
AB5		+5	+40	5	85	1	25	Weather protected locations with temperature control
AB6		+5	+60	10	100	1	35	Indoor and outdoor locations with extremely high ambient temperature influence of cold ambient temperature is prevented. Occurrence of solar and heat radiation
AB7		-25	+55	10	100	0.5	29	Indoor weather protected locations having neither temperature nor humidity control, the locations may have opening directly to the open air or be subjected to solar radiation
AB8		-50	+40	15	100	0.04	36	Outdoor and non-weather protected locations, with low and high temperatures

NOTES:

1. All specified values are maximum or limit values which will have a low probability of being exceeded.
2. The low and high relative humidities are limited by the low and high absolute humidities, so that e.g. for environmental parameters a and c, or b and d, the limit values given do not occur simultaneously

Environment continued:

Code	Class designation	Characteristics	Applications and examples
	Altitude		
AC1 AC2		≤ 2000 m > 2000 m	
	Presence of water		
AD1	Negligible	Probability of presence of water is negligible	Location in which the walls do not generally show traces of water but may do so for short periods, for example in the form of vapour which good ventilation dries rapidly
AD2	Free-falling drops	Possibility of vertically falling drops	Location in which water vapour occasionally condenses as drops or where steam may occasionally be present
AD3	Sprays	Possibility of water falling as a spray at an angle up to 60°C from the vertical	Locations in which sprayed water forms a continuous film on floors and/or walls
AD4	Splashes	Possibility of splashes from any direction	Locations where equipment may be subjected to splashed water; this applies, for example, to certain external luminaires, construction site equipment
AD5	Jets	Possibility of jets of water from any direction	Locations where hosewater is used regularly (yards, car-washing bays)
AD6	Waves	Possibility of water waves	Seashore locations such as piers, beaches, quays, etc.
AD7	Immersion	Possibility of intermittent partial or total covering by water	Locations which may be flooded and/or where water may be at maximum 150 mm above the highest point of equipment, the lowest part of equipment being not more than 1 m below the water surface
AD8	Submersion	Possibility of permanent and total covering by water	Locations such as swimming pools where electrical equipment is permanently and totally covered with water under a pressure greater than 0.1 bar
	Presence of foreign solid bodies		
AE1	Negligible	The quantity or nature of dust or foreign solid bodies is not significant	
AE2	Small objects	Presence of foreign solid bodies where the smallest dimension is not less than 2.5 mm	Tools and small objects are examples of foreign bodies of which the smallest dimension is at least 2.5 mm
AE3	Very small objects	Presence of foreign solid bodies where the smallest dimension is not less than 1 mm	Wires are examples of foreign solid bodies of which the smallest dimension is not less than 1 mm
AE4	Light dust	Presence of light deposits of dust $10 < \frac{\text{deposit}}{\text{of dust}} \leq 35 \text{mg/m}^2 \text{ a day}$	

Environment continued:

Code	Class designation	Characteristics	Applications and examples
AE5	Moderate	Presence of medium deposits of dust $35 < \text{deposit of dust} \leq 350 mg/m^2$ a day	
AE6	Heavy dust	Presence of large deposits of dust $350 < \text{deposit of dust} \leq 1000 mg/m^2$ a day	
	Presence of corrosive or polluting substances		
AF1	Negligible	The quantity or nature of corrosive or polluting substances is not significant	
AF2	Atmospheric	The presence of corrosive or polluting substances of atmospheric origin is significant	Installations situated by the sea or near industrial zones producing serious atmospheric pollution, such as chemical works, cement works; this type of pollution arises especially in the production of abrasive, insulating or conductive dusts
AF3	Intermittent or accidental	Intermittent or accidental subjection to corrosive or polluting chemical substances being used or produced	Locations where some chemical products are handled in small quantities and where these products may come only accidentally into contact with electrical equipment; such conditions are found in factory laboratories, other laboratories or in locations where hydrocarbons are used (boiler-rooms, garages, etc.)
AF4	Continuous	Continuously subject to corrosive or polluting chemical substances in substantial quantity	For example, chemical works
	Mechanical stress ***Impact***		
AG1	Low severity		Household and similar conditions
AG2	Medium severity		Usual industrial conditions
AG3	High severity		Severe industrial conditions
	Vibration		
AH1	Low severity		Household and similar conditions where the effects of vibration are generally negligible
AH2	Medium severity		Usual industrial conditions
AH3	High severity		Industrial installations subject to severe conditions

Environment continued:

Code	Class designation	Characteristics	Applications and examples
	Other mechanical stresses		
AJ	(Classification under consideration)		
	Presence of flora and/or mould growth		
AK1	No hazard	No harmful hazard or flora and/or mould growth	
AK2	Hazard	Harmful hazard or flora and/or mould growth	The hazard depends on local conditions and the nature of flora. Distinction should be made between harmful growth of vegetation or conditions for promotion of mould growth
	Presence of fauna		
AL1	No hazard	No harmful hazard from fauna	
AL2	Hazard	Harmful hazard from fauna (insects, birds, small animals)	The hazard depends on the nature of the fauna. Distinction should be made between: - presence of insects in harmful quantity or of an aggressive nature - presence of small animals or birds in harmful quantity or of an aggressive nature
	Electromagnetic, electrostatic or ionizing influence		
AM1	Negligible	No harmful effects from stray currents, electromagnetic radiation, electrostatic fields, ionizing radiation or induction	
AM2	Stray currents	Harmful hazards of stray currents	
AM3	Electro-magnetics	Harmful presence of electro-magnetic radiation	
AM4	Ionization	Harmful presence of ionizing radiation	
AM5	Electro-statics	Harmful presence of electrostatic fields	
AM6	Induction	Harmful presence of induced currents	

Environment continued:

Code	Class designation	Characteristics	Applications and examples
	Solar radiation		
AN1	Low	Intensity ≤ 500 W/m^2	
AN2	Medium	500 < intensity < 700 W/m^2	
AN3	High	700 < intensity < 1120 W/m^2	
	Seismic radiation		
AP1	Negligible	Acceleration ≤ 30 Gal	1 Gal = 1 cm/s^2
AP2	Low severity	30 < acceleration < 300 Gal	
AP3	Medium severity	300 < acceleration < 600 Gal	
AP4	High severity	600 < acceleration	Vibration which may cause the destruction of the building is outside the classification Frequency is not taken into account in the classification however, if the seismic wave resonates with the building, seismic effects must be specially considered. In general, the frequency of seismic acceleration is between 0 Hz and 10 Hz
	Lightning, ceraunic level		
AQ1	Negligible	≤ 25 days per year	
AQ2	Indirect exposure	> 25 days per year Hazard from supply arrangement	Installations supplied by overhead lines
AQ3	Direct	Hazard from exposure of equipment	Parts of installations located outside buildings. The risks AQ2 and AQ3 relate to regions with a particularly high level of thunderstorm activity.
	Movement of air		
AR1	Low	Speed ≤ 1 m/s	
AR2	Medium	1 m/s < speed ≤ 5 m/s	
AR3	High	5 m/s < speed ≤ 10 m/s	
	Wind		
AS1	Low	Speed ≤ 20 m/s	
AS2	Medium	20 m/s < speed ≤ 30 m/s	
AS3	High	30 m/s < speed ≤ 50 m/s	

Utilisation:

Code	Class designation	Characteristics	Applications and examples
	Capability of person		
BA1	Ordinary	Uninstructed persons	
BA2	Children	Children in locations intended for their occupation NOTE - This class does not necessarily apply to family dwellings	Nurseries — Requirement for inaccessibility of electrical equipment. Limitation of temperature of accessible surfaces
BA3	Handicapped	Persons not in command of all their physical and intellectual abilities (sick person, old persons)	Hospitals — Requirement for inaccessibility of electrical equipment. Limitation of temperature of accessible surfaces
BA4	Instructed	Persons adequately advised or supervised by skilled person to enable them to avoid dangers which electricity may create (operating and maintenance staff)	Electrical operating areas
BA5	Skilled	Persons with technical knowledge or sufficient experience to enable them to avoid dangers which electricity may create (engineers and technicians)	Closed electrical operating areas
	Electrical resistance of the human body		
BB	(Classification under consideration)		
	Contact of persons with earth potential		
BC1	None	Persons in non-conducting situation	Non-conducting locations
BC2	Low	Persons who do not in usual conditions make contact with extraneous-conductive-parts or stand on conducting surfaces	
BC3	Frequent	Persons who are frequently in touch with extraneous-conductive-parts or stand on conducting surfaces	Locations with extraneous-conductive-parts, either numerous or of large area
BC4	Continuous	Persons who are in permanent contact with metallic surrounding and for whom the possibility of interrupting contact is limited.	Metallic surroundings such as boilers and tanks

Utilisation continued:

Code	Class designation	Characteristics	Applications and examples
	Conditions of evacuation in an emergency		
BD1	Normal	Low density occupation, easy conditions of evacuation	Buildings of normal or low height used for habitation
BD2	Difficult	Low density occupation, difficult conditions of evacuation	High-rise buildings
BD3	Crowded	High density occupation, easy conditions of evacuation	Locations open to the public (theatres, cinemas, department stores, etc.)
BD4	Difficult and crowded	High density occupation, difficult conditions of evacuation	High-rise buildings open to the public (hotels, hospitals, etc.)
	Nature of processed or stored materials		
BE1	No signifi-cant risk		
BE2	Fire risks	Manufacture, processing or storage of flammable materials including presence of dust	Barns, wood-working shops, paper factories
BE3	Explosion risks	Processing or storage of explosive or low-flash point materials including presence of explosive dusts	Oil refineries, hydrocarbon stores
BE4	Contamin-ation risks	Presence of unprotected foodstuffs, pharmaceutics, and similar products without protection	Foodstuff industries, kitchens. Certain precautions may be necessary, in the event of fault, to prevent processed materials being contaminated by electrical equipment, e.g. by broken lamps

Construction of buildings:

Code	Class designation	Characteristics	Applications and examples
	Construction of buildings		
CA1	Non-combustible		
CA2	Combustible	Buildings mainly constructed of combustible materials	Wooden buildings
	Building design		
CB1	Negligible risks		
CB2	Propagation of fire	Buildings of which the shape and dimensions facilitate the spread of fire (e.g. chimney effects)	High-rise buildings. Forced ventilation systems
CB3	Movement	Risks due to structural movement (e.g. displacement between different parts of a building or between a building and the ground, or settlement of ground of building foundations)	Buildings of considerable length or erected on unstable ground
CB4	Flexible or unstable	Structures which are weak or subject to movement (e.g. oscillation)	Tents, air-support structures, false ceilings, removable partitions. Installations to be structurally self-supporting

APPENDIX 6

COMPLETION CERTIFICATE AND PERIODIC INSPECTION REPORT FORMS

Introduction

(i) The Completion Certificate required by Part 7 shall be made out and signed by competent persons in respect of the design, construction, inspection and testing of the work.

(ii) The Periodic Inspection Report required by Part 7 shall be made out and signed by competent persons in respect of the inspection and testing of an installation.

(iii) Competent persons will, as appropriate to their function under i) and ii) above, have a sound knowledge and experience relevant to the nature of the work undertaken and to the technical standards set down in this British Standard, be fully versed in the inspection and testing procedures contained in this Standard and employ adequate testing equipment.

(iv) Completion Certificates will indicate the responsibility for design, construction, inspection and testing, whether in relation to new work or further work on an existing installation. For large or complex installations those reponsible may provide an equivalent to this form, as identified in Regulation 741-01-01.

(v) Periodic Inspection Reports will indicate the responsibility for the inspection and testing of an installation within the extent and limitations specified on the form.

(vi) A schedule of test results as required by Part 7 shall be issued with the associated Completion Certificate or Periodic Inspection Report.

(vii) When making out and signing a form on behalf of a company or other business entity, individuals shall state for whom they are acting.

(viii) Additional forms may be required as clarification, if needed by non-technical persons, or in expansion, for larger or more complex installations.

(ix) The IEE Guidance Note 3 provides further information on inspection and testing on completion and for periodic inspections, and gives a model schedule of test results and additional forms for other purposes.

ELECTRICAL INSTALLATION COMPLETION CERTIFICATE (BS 7671 : 1992) (Notes 1 and 2)

Client's name/title: .....

DETAILS OF THE INSTALLATION

Tick boxes as appropriate

Installation Address: .....

.....

New installation ☐	Extent of installation covered by this certificate
Addition to existing installation ☐	
Alteration to existing installation ☐	(Use continuation sheet if necessary)

PARTICULARS OF THE INSTALLATION

Type of Earthing: TN-C-S ☐ TN-S ☐ TT ☐ TN-C ☐ IT ☐

Details of Earth Electrode:

Type.....Location.....Method of Measurement.....Resistance.....Ω

Characteristics of the supply at the origin of the installation:

Nominal voltage.....V Frequency.....Hz No of Phases.....Maximum demand (load).....A per phase

	Measured	Calculated	Other
Maximum prospective fault current (note 7) kA			
External earth fault loop impedance, Z_e Ω			

Overcurrent protective device at origin: Type: BS..... Rating.....A

Main switch or circuit-breaker: Number of poles..... Type: BS..... Rating.....A

(If a residual current device, rated residual operating current.....mA)

Method of protection against indirect contact:

1. Earthed equipotential bonding and automatic disconnection of supply ☐
2. Other (describe) ..... ☐

Main equipotential bonding conductors: Conductor material ..... csa .....mm^2

COMMENTS ON EXISTING INSTALLATION, IN THE CASE OF AN ALTERATION OR ADDITION

Page 1 of ..... (note 6)

DESIGN

I/We being the person(s) responsible (as indicated by my/our signatures below) for the design of the electrical installation, particulars of which are described on page 1 of this form CERTIFY that the said work for which I/we have been responsible is to the best of my/our knowledge and belief in accordance with BS 7671: 1992 - Requirements for Electrical Installations (16th Edition IEE Wiring Regulations), amended to.....(Note 3) except for the departures, if any, stated in this Certificate.

Details of departures (if any) from BS 7671: 1992 (120-02)

The extent of liability of the signatory is limited to the work described on page 1 of this form as the subject of this Certificate.

For the DESIGN of the installation

Name (IN BLOCK LETTERS): ..... Position:.....

Signature (Note 4): ..... Date (Note 3):.....

For and behalf of: .....

Address: .....

..... Postcode: .....

CONSTRUCTION

I/We being the person(s) responsible (as indicated by my/our signatures below) for the design of the electrical installation, particulars of which are described on page 1 of this form CERTIFY that the said work for which I/we have been responsible is to the best of my/our knowledge and belief in accordance with BS 7671: 1992 - Requirements for Electrical Installations (16th Edition IEE Wiring Regulations), amended to.....(Note 3) except for the departures, if any, stated in this Certificate.

Details of departures (if any) from BS 7671: 1992

The extent of liability of the signatory is limited to the work described on page 1 of this form as the subject of this Certificate.

For the CONSTRUCTION of the installation

Name (IN BLOCK LETTERS): ..... Position:.....

Signature (Note 4): ..... Date (Note 3):.....

For and behalf of: .....

Address: .....

..... Postcode: .....

INSPECTION AND TEST

I/We being the person(s) responsible (as indicated by my/our signatures below) for the design of the electrical installation, particulars of which are described on page 1 of this form CERTIFY that the said work for which I/we have been responsible is to the best of my/our knowledge and belief in accordance with BS 7671: 1992 - Requirements for Electrical Installations (16th Edition IEE Wiring Regulations), amended to.....(Note 3) except for the departures, if any, stated in this Certificate.

The extent of liability of the signatory is limited to the work described on page 1 of this form as the subject of this Certificate.

For the INSPECTION AND TEST of the installation

Name (IN BLOCK LETTERS): ..... Position:.....

Signature (Note 4): ..... Date (Note 3):.....

For and behalf of: .....

Address: .....

..... Postcode: .....

I/We RECOMMEND that the installation be further inspected and tested after an interval of not more than .....months/years (Note 5)

NOTES:

1. The Electrical Installation Completion Certificate is to be used only for the initial certification of a new installation or for an alteration or addition to an existing installation carried out in accordance with BS 7671: 1992. **It is not to be used for a Periodic Inspection** for which a Periodic Inspection Report form should be used. The **original** Certificate is to be given to the person ordering the work (Regulation 741-01-01). A **duplicate** should be retained by the contractor.
2. This Certificate is only valid if accompanied by the Schedule(s) of Test Results (see Note 6).
3. Dates to be inserted.
4. The signatures appended are those of the persons authorised by the companies executing the work of design, construction and inspection and testing respectively. A signatory authorised to certify more than one category of work should sign in each of the appropriate places.
5. The time interval recommended before the next periodic inspection must be inserted (see IEE Guidance Note 3 for guidance).
6. The page numbers for each of the Schedules of Test Results should be indicated, together with the total number of sheets involved.
7. The maximum prospective fault current recorded should be the greater of either the short-circuit current (between the live conductors) or the earth fault current (between phase conductor(s) and an exposed-conductive-part).

PERIODIC INSPECTION REPORT FOR AN ELECTRICAL INSTALLATION (BS 7671 : 1992) (Note 1)

DETAILS OF THE CLIENT

Client: .....

Address: .....

Purpose for which this Report is required: .....(Note 3)

DETAILS OF THE INSTALLATION

Occupier: .....

Address: .....

.....

Description of Premises:

Domestic		Commercial		Industrial	
Other					

Estimated age of the Electrical Installation: ..... years

Evidence of Alterations or Additions:

Yes		No		Not apparent	

If "Yes", Estimate Age: ..... years

Date of last inspection: .....

Records available

Yes		No	

Records held by: .....

Type of Earthing: TN-C-S ☐ TN-S ☐ TT ☐ TN-C ☐ IT ☐

Details of Earth Electrode:

Type.....Location.....Method of Measurement.....Resistance.....Ω

Characteristics of the supply at the origin of the installation:

Nominal voltage.....V Frequency.....Hz No of Phases.....Maximum demand (load).....A per phase

		Measured	Calculated	Other
Maximum prospective fault current (Note 4)	kA			
External earth fault loop impedance, Z_e	Ω			

Overcurrent protective device at origin: Type: BS..... Rating.....A

Main switch or circuit-breaker: Number of poles..... Type: BS..... Rating.....A

(If a residual current device, rated residual operating current.....mA)

Method of protection against indirect contact:

1. Earthed equipotential bonding and automatic disconnection of supply ☐
2. Other (describe) ..... ☐

Main equipotential bonding conductors: Conductor material ..... csa .....mm^2

EXTENT AND LIMITATIONS OF THE INSPECTION

Extent of Electrical Installation Covered by this Report (Note 5): .....

.....

Limitations: .....

.....

RECOMMENDATIONS (Note 9)

Referring to the "Schedule(s) of Inspection and Test Results", and subject to the limitations specified above

Recommendations as detailed below

☐ No remedial work required, or

The following items: .....

.....

.....

.....

One of the following numbers shall be placed alongside each of the items detailed above (Note 6).

☐ 1 requires urgent attention ☐ 2 requires improvements ☐ 3 requires further investigation

☐ 4 does not comply with BS 7671: 1992 (as amended) (This does not necessarily imply that the electrical installation is unsafe).

SUMMARY OF THE INSPECTION

Date(s) of the inspection: .....

General condition of the installation (Note 7): .....

.....

.....

..... Overall assessment: Satisfactory/Unsatisfactory

(Note 2)

SCHEDULE OF THE INSPECTION: See Sheet(s)..... attached

SCHEDULE OF TESTS: See Sheet(s)..... attached

SCHEDULE OF THE INSPECTION AND TEST RESULTS: See Sheet(s)..... attached

NEXT INSPECTION

I/We recommend that the installation should be re-inspected after an interval of not more than ..... months/years (Note 8)

DECLARATION

To the best of our knowledge and belief I/We confirm that the details recorded above and in the attached Schedule(s) of Inspection and Test Results and the Recommendations are an accurate assessment, within the limits specified, of the condition of the electrical installation as above.

INSPECTED BY:

Signature: .....

Name (BLOCK CAPITALS): .....

Date of signing: .....

REVIEWED BY:

Signature: .....

Name (BLOCK CAPITALS): .....

Date of signing: .....

For and behalf of: .....

Address: .....

NOTES:

1. This Periodic Inspection Report form shall only be used for the reporting on the condition of an existing installation.
2. The Report, normally comprising at least four pages, shall include schedules of both the inspection and the test results. Additional sheets of test results may be necessary for other than a simple installation. The page numbers of each sheet shall be indicated, together with the total number of sheets involved.
3. The intended purpose of the Periodic Inspection Report shall be identified, together with the recipient's details in the appropriate boxes.
4. The maximum prospective fault current recorded should be the greater of either the short-circuit current (between the live conductors) or the earth fault current (between phase conductor(s) and an exposed-conductive-part).
5. The 'Extent and Limitations' box shall fully identify the elements of the installation that are covered by the report and those that are not; this aspect having been agreed with the client and other interested parties before the inspection and testing is carried out.
6. The recommendation(s), if any, shall be categorised using the numbered coding 1-4 as appropriate.
7. The 'Summary of the Inspection' box shall clearly identify the condition of the installation in terms of safety.
8. Where the periodic inspection and testing has resulted in a satisfactory overall assessment, the time interval for the next periodic inspection and testing shall be given. The IEE Guidance Note 3 provides guidance on the maximum interval between inspections for various types of buildings. If the inspection and test reveals that parts of the installation require urgent attention, it would be appropriate to state an earlier re-inspection date having due regard to the degree of urgency and extent of the necessary remedial work.
9. If the space available on the model form for information on recommendations is insufficient, additional pages shall be provided as necessary.

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