

13 A plugs, socket-outlets, adaptors and connection units —

Part 2: Specification for 13 A switched and unswitched socket-outlets

ICS 29.120.30

Committees responsible for this British Standard

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ASTA Certification Services
 Association of Consulting Engineers
 Association of Control Manufacturers [TACMA (BEAMA Ltd.)]
 Association of Manufacturers of Domestic Electrical Appliances
 British Electrical Systems Association (BEAMA Ltd.)
 British Electrotechnical Approvals Board
 British Plastics Federation
 Consumer Policy Committee of BSI
 Department of Health
 Department of Trade and Industry (Consumer Safety Unit, CA Division)
 BEAMA Installation
 Electricity Association
 Electronic Components Industry Federation
 Institution of Electrical Engineers
 Lighting Association
 Lighting Industry Federation Ltd.
 National Inspection Council for Electrical Installation Contracting

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British Cable Makers Confederation
 British Radio and Electronic Equipment Manufacturers Association
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Foreword

This part of BS 1363 is published by BSI Standards Limited, under licence from The British Standards Institution. This part of BS 1363 has been prepared by Technical Committee PEL/23. This part of BS 1363, together with BS 1363-1:1995, supersedes BS 1363:1984.

BS 1363-2:1995+A4:2012 supersedes BS 1363-2:1995 (incorporating Amendments Nos. 1:1997, 2:2003 and 3:2007), which, however, remains current and will be withdrawn on 31 May 2015.

The start and finish of text introduced or altered by Amendment No. 3 and Amendment No. 4, respectively is indicated in the text by tags **A3** **A3** and **A4** **A4** respectively. Text introduced or altered by Amendment No. 1 and Amendment No. 2 is not tagged. Minor editorial corrections are not tagged.

BS 1363 comprises four parts covering the following.

- *Part 1: Rewirable and non-rewirable 13 A fused plugs;*
- *Part 2: Switched and unswitched socket-outlets;*
- *Part 3: Adaptors;*
- *Part 4: 13 A fused connection units: switched and unswitched.*

NOTE In order to prevent confusion with BS 1363:1984, the figure and clause numbers have been retained.

BS 6007 and BS 6500, which are called up in this part of BS 1363, have been superseded by BS EN 50525. In the transition period up until 31 December 2012 cables to BS 6007 and flexible cords to BS 6500, or cables to BS EN 50525, may be used. After that date all cables have to be to the relevant part of BS EN 50525.

The structure of BS EN 50525 and its derivation from British Standards and HD 21 and HD 22 is set out in BS EN 50525-1:2011, National Annex NA. This is reproduced in Annex H for the convenience of users of this part of BS 1363.

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

Compliance with a British Standard cannot confer immunity from legal obligations.

Attention is drawn to Statutory Instrument 1768, 1994.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 60, an inside back cover and a back cover.

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1 Scope

This part of BS 1363 specifies requirements for 13 A switched and unswitched shuttered socket-outlets for household, commercial and light industrial purposes, with particular reference to safety in normal use. The socket-outlets are suitable for the connection of portable appliances, sound-vision equipment, luminaires, etc. in a.c. circuits only, operating at voltages not exceeding 250 V r.m.s. at 50 Hz using plugs in accordance with BS 1363-1:1995.

Requirements are specified for 13 A shuttered socket-outlets in single or multiple arrangements, with or without associated controlling switches, for flush mounting in suitable boxes, e.g. complying with BS 4662, or for surface or panel mounting or for portable use. A_4 Fixed socket-outlets are intended for use with cables complying with BS 6004:2000 or BS 6007:2000, or equivalent cables to the relevant part of BS EN 50525 (see Annex H), having copper conductors. Portable socket-outlets are intended for use with flexible cords complying with BS 6500:2000, or equivalent cables to the relevant part of BS EN 50525. A_4 Socket-outlets containing devices other than fuse links, switches and indicator lamps are outside the scope of this part of BS 1363.

NOTE 1 The titles of the publications referred to in this part of BS 1363 are listed on the inside back cover.

NOTE 2 In order to maintain safety and interchangeability with plugs and socket-outlets it is necessary that these products comply with the requirements of Clause 9, Clause 12 and Clause 13 of this part of BS 1363, however their body outline need not be limited at a distance of 6.35 mm from the plug engagement A_3 surface A_3 .

NOTE 3 Requirements for electromagnetic compatibility are not given for the following reasons.

A switched or unswitched socket-outlet does not emit intolerable electromagnetic interference since significant electromagnetic disturbances are only generated during insertion and withdrawal which are not continuous.

A switched or unswitched socket-outlet is mechanical by nature of construction. The product is therefore immune from electromagnetic interference.

2 Conditions of use

Socket-outlets shall be suitable for use under the following conditions:

- a) an ambient temperature in the range -5°C to $+40^{\circ}\text{C}$, the average value over 24 h not exceeding 25°C ;

NOTE Under normal conditions of use, the available cooling air is subject to natural atmospheric variations of temperature and hence the peak temperature occurs only occasionally during the hot season, and on those days when it does occur it does not persist for lengthy periods.

- b) a situation not subject to exposure to direct radiation from the sun or other source of heat likely to raise temperatures above the limits specified in a);
- c) an altitude not exceeding 2 000 m above sea level;
- d) an atmosphere not subject to abnormal pollution by smoke, chemical fumes, rain, spray, prolonged periods of high humidity or other abnormal conditions. This is equivalent to pollution degree 2, A_3 see Annex E, and overvoltage category III, see Annex D. A_3

3 Terms and definitions

For the purposes of this part of BS 1363 the following definitions apply.

NOTE Where the terms voltage and current are used, they imply r.m.s. values, unless otherwise stated.

3.1

socket-outlet

an accessory having a set of three socket-contacts designed to engage with the pins of a corresponding plug and having means for the electrical connection of appropriate cables or flexible cords

3.2

fixed socket-outlet

a socket-outlet which with its associated enclosure is intended for use mounted in or on a fixed surface

3.3

surface-mounted socket-outlet

a socket-outlet which is intended to be mounted on a wall or other flat surface without the need for recessing

3.4

flush-mounted socket-outlet

a socket-outlet which is intended to be mounted in a box which is recessed into a wall or other flat surface. The socket-outlet plate and the socket-outlet base are regarded as forming a complete unit, and the socket-outlet plate is mounted with its back either flush with a wall or other flat-surface structure, or flush with the front of a socket-outlet box or enclosure

3.5

panel-mounted socket-outlet

a socket-outlet intended for incorporation into equipment panels or electrical trunking and which depends upon such incorporation for its enclosure

3.6

portable socket-outlet

a socket-outlet intended to be connected to, or integral with, a flexible cord, and which can easily be moved from one place to another while connected to the supply

3.7

rewirable portable socket-outlet

a portable socket-outlet so constructed that a flexible cord can be fitted or replaced using general purpose tools

3.8

non-rewirable portable socket-outlet

A4 a portable socket-outlet so constructed that it forms a complete unit with the flexible cord which cannot be replaced after assembly by the manufacturer of the portable socket-outlet **A4**

NOTE See also 13.18.

3.9

moulded-on portable socket-outlet

a non-rewirable portable socket-outlet, the manufacture of which is completed by insulating material moulded around pre-assembled component parts and the terminations of the flexible cord

3.10

fused socket-outlet

a socket-outlet having provision for a replaceable cartridge fuse link

3.11

switched socket-outlet

a socket-outlet with an associated switch to disconnect the supply to the line socket contact or to both line and neutral socket contacts

3.12

multiple socket-outlet

a combination of two or more socket-outlets

3.13

socket-outlet base

that part of the socket-outlet which carries the contacts

NOTE It may be integral with the socket-outlet plate.

3.14

socket-outlet plate

the external plate which covers the base and contact assembly of a socket-outlet and through which the pins of the plug are inserted

3.15

socket-outlet box

a box suitable for mounting one or more socket-outlets

3.16**shutter**

a movable device arranged to shield the current-carrying socket-outlet contacts automatically when a corresponding plug is removed

3.17**actuating member**

that part which is moved, e.g. pulled, pushed or turned by the user, to operate the switch mechanism

3.18**indicator lamp (pilot lamp)**

a lamp  or similar device  which illuminates to indicate that the socket-outlet contacts are energized

3.19**terminal**

a means by which the user can make an electrical connection between the appropriate cable or flexible cord and the conducting parts of the socket-outlet without the use of special tools

3.20**screw-type terminal**

a terminal in which the connection is made directly by means of screws or nuts of any kind or indirectly through an intermediate metal part such as a washer, clamping plate or anti spread device on which the screw or nut bears directly

NOTE The following are examples of screw-type terminals.

- a) A pillar terminal is a terminal in which the conductor is inserted into a hole or cavity, where it is clamped under the shank of the screw or screws.
- b) A screw terminal is a terminal in which the conductor is clamped under the head of the screw.
- c) A stud terminal is a terminal in which the conductor is clamped under a nut.

3.21**termination**

a means by which an electrical connection can be made between the appropriate flexible cord and the conducting part of the socket-outlet using special purpose tools, e.g. soldering, welding, crimping

3.22**fuse carrier**

a movable or removable part designed to carry, retain, cover and/or remove the fuse link

3.23**type test**

a test or series of tests made on a type test sample, for the purpose of checking compliance of the design of a given product with the requirements of the relevant standard

3.24**type test sample**

a sample consisting of one or more similar units or specimens submitted by the manufacturer or responsible vendor for the purpose of a type test

3.25**accessible external surface of a socket-outlet**

all surfaces which can be touched by test probe B of BS EN 61032:1998 when the socket-outlet is installed as in use

3.26**live parts**

current-carrying parts and those metal parts in contact with them during normal use

NOTE Metal parts of the earthing circuit are not considered to be current-carrying parts.

3.27**fine wire thermocouple**

a thermocouple having wires not exceeding 0.3 mm in diameter

3.28

calibrated link

a calibrated heat source for use in place of a fuse link during temperature-rise tests

3.29

resilient material

a material having the inherent capability of regaining or substantially regaining its original form when deforming loads are removed

3.30

creepage distance

the shortest distance along the surface of the insulating material between two conductive parts

3.31

clearance

shortest distance in air between two conductive parts

3.32

basic insulation

insulation applied to live parts to provide basic protection against electric shock

NOTE Basic insulation does not necessarily include insulation used exclusively for functional purposes.

3.33

supplementary insulation

independent insulation applied in addition to basic insulation, in order to provide protection against electric shock in the event of failure of basic insulation

3.34

reinforced insulation

a single insulation system applied to live parts, which provides a degree of protection against electric shock equivalent to double insulation under the conditions specified in the relevant standard

3.35

functional insulation

insulation between conductive parts which is necessary only for the proper functioning of the equipment

A3 3.36

engagement surface of a socket-outlet

that surface which cannot be touched by test probe B of BS EN 61032:1998 when Figure 11 gauge is in full engagement with the socket-outlet **A3**

A4 3.37

insignificant mass

insufficient combustible mass to constitute a fire hazard

NOTE Parts of insignificant mass are usually less than 2 g. **A4**

A4 3.38

small parts

parts where each surface lies completely within a circle of 15 mm diameter or where some of the surface lies outside the 15 mm diameter circle but in such a way that it is not possible to place a circle of 8 mm diameter on any of this remaining surface

[BS EN 60695-2-11:2001, 3.1, modified]

NOTE More information concerning small parts can be found in BS EN 60695-2-11:2001, 3.1. **A4**

4 General

Socket-outlets shall be so designed and constructed that in normal use their performance is reliable and minimizes the risk of danger to the user or to the surroundings. Such socket-outlets shall be capable of meeting all the relevant requirements and tests specified in this part of BS 1363.

Unless otherwise stated, reference to a plug within this part of BS 1363 shall mean a plug in accordance with BS 1363-1:1995.

A4 Throughout this standard, where cords to BS 6500 are referred to these may be replaced by equivalent cords (now referred to as cables) to BS EN 50525 which has superseded BS 6500; when BS 6500 is withdrawn, equivalent cables (cords) to BS EN 50525 shall be used. **A4**

5 General conditions for type testing

5.1 All tests shall be type tests.

Unless otherwise specified in this part of BS 1363 the socket-outlets shall be tested as delivered by the manufacturer or responsible vendor and under normal conditions of use, at an ambient temperature of $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, after being conditioned at normal laboratory temperature and humidity levels for at least 4 days.

Unless otherwise stated by the manufacturer, flush-mounted socket-outlets shall be tested when mounted on a corresponding insulated box complying with BS 4662:1970, the fixing screws being tightened with a torque of $0.6\text{ N}\cdot\text{m} \pm 10\%$.

Other types shall be mounted according to the manufacturer's instructions.

The socket-outlets used for the tests shall be representative of normal production items in respect of all details which may affect the test results.

Non-rewirable socket-outlets shall be supplied with an appropriate flexible cord which shall be at least 1 m long.

Socket-outlets shall be deemed to comply if no specimen fails in the complete series of tests given in Table 1.

If one specimen fails in the complete series of tests given in Table 1, then socket-outlets of that type shall be deemed to have failed to comply with this part of BS 1363, unless the socket-outlets shall be shown to be not representative of normal production or design, in which case a further type test sample shall be submitted to the test or tests in that particular group. If there is no failure in this re-test then socket-outlets of that type shall be deemed to comply with this part of BS 1363.

If more than one specimen fails in the complete series of tests given in Table 1 then socket-outlets of that type shall be deemed not to comply with this part of BS 1363.

For type testing, all tests have been included in the test schedule and shall be performed in the specified order.

NOTE 1 References to carrying out specific tests in various clauses are not intended to indicate a sequence of testing different to that in the schedule and should not be conducted as separate additional tests.

NOTE 2 Where reference to BS 6500:2000 is made equivalent flexible cords to the latest version of that standard may be used.

5.2 All inspections and tests, of any one classification (see Clause 6), shall be carried out as specified in the clauses listed in Table 1 on the number of specimens in the sample column and in the order given.

5.3 Gauges in accordance with Figure 11, Figure 12, Figure 14, and Figure 16 shall be considered to comply with the dimensional requirements if the results of the measured values are within the specified dimensions and the uncertainty of measurement at not less than 95 % confidence level does not exceed $\pm 0.005\text{ mm}$.

Table 1 — Schedule of tests

Sequence	Samples	Test	Clause no.
1	3	Inspection, measurement, gauging and manipulation	5, 6, 7, 9.1, 11.1, 9.2, 9.4, 10.1, 13.1, 13.2, 13.3, 13.9, 13.10, 13.12, 13.14, 13.15, 13.16, 13.17, 13.18, 13.20, 19.2, 19.3, 19.4, 19.6, 21, 8 ^{A4} (except Annex C) ^{A4}
2	3	General	^{A3} 5, 9.3, 21.3 (10.2, 10.3 only), 19.1, 14.2, 13.13 (9.1.1 only), 13.4.1a), 13.4.1b), 13.5, 13.6 ^{A3}
3	3		5, 13.13 (20.1.2 only), 17, 13.11, (13.11.1 only), 16, 19.5, 21.3
4	3		5, 14.1, 15, 18.1.2 (9.1, 16, 13.19, 15, 13.4.1a) 10.2, 13.6, 13.7, 13.8)
5	3		5, 14.2, 18.1.3, 20
6	3		5, 22
7	3	Materials	5, 23.2 ^{A4} , 8.2 (Annex C only) ^{A4}
8	3		5, 24, 21.3
9 ^a	3	Positive break	5, 13.11.2

NOTE The order of tests given in sequence no. 1 above is preferred but not mandatory except where required within the text of the appropriate clause.

^a An additional new set of three samples prepared with the contacts closed is supplied by the manufacturer for this test.

6 Classification

Socket-outlets shall be classified as follows:

- single or multiple;
- switched or unswitched;
- fused or unfused;
- fixed or portable;
- (if fixed) flush or surface or panel-mounting;
- (if portable) rewirable or non-rewirable;
- with or without indicator lamp.

7 Marking and labelling

7.1 Socket-outlets shall be legibly and durably marked with the following information, which shall not be placed on screws, removable washers or other easily removable parts, or upon parts intended for separate sale:

- a) either the name, trade mark or identification mark of the manufacturer or responsible vendor, which may be duplicated on a removable fuse carrier;
- b) the number of this British Standard, i.e. BS 1363¹⁾;
- c) for portable socket-outlets the number of this British Standard shall be followed by “/A”;
- d) on rewirable socket-outlets the terminals intended for the connection of the various conductors shall be identified by the symbols given in **7.5**;
- e) for fused socket-outlets, the words “FUSE” or “FUSED” or the symbol (given in **7.5**) on the engagement surface of a socket-outlet;
- f) fixed fused multiple socket-outlets shall be marked on the engagement surface with the maximum rated current of 13 A (e.g. MAX. 13A);
- g) all socket-outlets shall be marked with the following:
 - 1) rated current;
 - 2) rated volts;
 - 3) nature of supply.

Portable socket-outlets shall be marked on the accessible external surface. In the case of a non-rewirable portable socket-outlet, the rated current shall be the maximum current appropriate to the attached flexible cord as given in Table 2.

¹⁾ Marking BS 1363 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. **Text deleted**

Table 2 — Rated current and maximum fuse rating in normal use, and load for flexing and cord grip tests related to size of flexible cord

Flex cord nom cross-sectional area mm ²	Rated current A	Test current ±0.4 A A	Fuse rating A	Load for flexing test +2 %, –0 % kg	Cord grip tests	
					Load +2 %, –0 % kg	Torque ^a N·m
0.5	3	3.5	3	1	3	0.15
0.75	6	7	7 (13) ^b	1	3	0.20
1	10	11	10 (13) ^b	2	3	0.25
1.25	13	14	13	2	6	0.30
1.5	13	14	13	2	6	0.35

^a The recording of a measured value of torque in accordance with this table is considered to comply with this part of BS 1363 on condition that the uncertainty of measurement at not less than 95 % confidence level does not exceed ±10 %.

^b The figure in brackets indicates the maximum fuse rating when a non-rewirable plug/cord assembly is used with certain equipment which because of its operating characteristic needs a higher rating of fuse link.

7.1.1 Compliance shall be checked by inspection and by rubbing the markings for approximately 15 s with a cloth soaked in water, and again for approximately 15 s with a cloth soaked in an aliphatic solvent hexane with a content of aromatics of maximum 0.1 % by volume, a Kauri-butanol value of 29, initial boiling point of approximately 69 °C, and relative density of approximately 0.68.

The marking shall remain legible. Markings produced by an engraving or moulding process shall be deemed to comply without test.

7.2 Portable fused socket-outlets shall be supplied with a removable tag, label or instructions indicating the rating of the fuse link fitted, e.g. “Fitted with X ampere fuse” (where “X” denotes the rating of the fuse link).

7.2.1 Compliance shall be checked by inspection.

7.3 Portable socket-outlets fitted with a flexible cord shall be supplied with a label or instruction indicating the colour coding of the cores of the flexible cord as follows.

Wires in the mains lead shall be coloured in accordance with the following code:

Green/yellow	Earth
Blue	Neutral
Brown	Live

7.3.1 Compliance shall be checked by inspection.

7.4 Rewireable portable socket-outlets shall be provided with adequate instructions for the safe connection of the appropriate 3-core flexible cord, including clear instructions for the removal of insulation from the conductors.

7.4.1 Compliance shall be checked by inspection.

7.5 If symbols are used they shall be as follows:

amperes	A
volts	V
* alternating current	~
line	L
neutral	N
* earth	⊕ (preferred) or ≡
* fuse	⊞

NOTE 1 BS 6217 gives details of symbols marked.*

NOTE 2 For the marking of the rated current and rated voltage of the socket-outlet, figures may be used alone, the figures for the current rating being placed before or above that of the rated voltage and separated by a line.

If a symbol for nature of supply is used, it shall be placed next to the marking for rated current and rated voltage. Examples are as follows:

13 A 250 V ~ or 13/250 ~ or $\frac{13}{250}$ ~

or 13 A 250 V a.c. or 13/250 a.c. or

$\frac{13}{250}$

8 Clearances, creepage distances and solid insulation

Socket-outlets shall be constructed so that the clearances, creepage distances and solid insulation are adequate to withstand the electrical stresses taking into account the environmental influences that may occur. Clearances, creepage distances and solid insulation shall comply with the relevant

^{A3} requirements ^{A3} of 8.1, 8.2 and 8.3.

^{A3} The distance between lead wires in the pinch of a neon lamp with external resistor shall be a minimum of 1 mm.

^{A4} Text deleted ^{A4}

^{A4} Socket-outlets complying with the requirements for basic insulation shall be deemed to meet the requirements of this clause. ^{A4} If the manufacturer declares an insulation level exceeding basic insulation then the socket-outlet shall be tested accordingly.

NOTE 1 The requirements and tests are based on BS EN 60664-1.

NOTE 2 Product insulation consists of Basic Insulation and Protective Earthing as required by BS EN 61140 for Class I equipment. Mechanical strength equivalent to that which would be provided by Reinforced Insulation as listed in BS EN 61140 is achieved in BS 1363 products through the specific mechanical and material tests of BS 1363. ^{A3}

8.1 Clearances

Socket-outlets energized directly from the low-voltage supply fall into Overvoltage Category III.

The clearances shall be dimensioned to withstand the rated impulse voltage declared by the manufacturer considering the rated voltage and the Overvoltage Category as given in Annex ^{A3} D ^{A3} and the pollution degree declared by the manufacturer in accordance with Annex ^{A3} E ^{A3}.

For the measurements:

- all parts which may be removed without the use of a tool are removed and moveable parts which can be assembled in different orientations are placed in the most unfavourable position.

NOTE Moveable parts are, for example hexagonal nuts, the position of which cannot be controlled throughout an assembly.

^{A3} Text deleted ^{A3}

8.1.1 Clearances for basic insulation

The clearances for basic insulation shall not be less than the values given in Table 8 except as described below.

Smaller ^{A3} unspecified ^{A3} clearances (except those values marked in Table 8 with Note b) may be used if the socket-outlet meets the impulse withstand voltage test of Annex ^{A3} F ^{A3} at the impulse voltage specified in Annex ^{A3} D ^{A3} but only if the parts are rigid or located by mouldings or if the construction is such that it is unlikely that distances will be reduced by distortion or by movement of the parts during mounting, connection and normal use.

^{A4} Compliance shall be checked by inspection, and if necessary by measurement, or by the test of Annex F.

If clearance distances are to be measured, this shall be carried out in accordance with Annex B. ^{A4}

8.1.2 Clearances for functional insulation

The clearances for functional insulation shall not be less than the values specified for basic insulation in 8.1.1.

A4 Compliance shall be checked by inspection, and if necessary by measurement, or by the test of Annex F. If clearance distances are to be measured, this shall be carried out in accordance with Annex B. **A4**

8.1.3 Clearances for supplementary insulation

The clearances for supplementary insulation shall not be less than the values specified for basic insulation in 8.1.1.

A4 Compliance shall be checked by inspection, and if necessary by measurement, or by the test of Annex F. If clearance distances are to be measured, this shall be carried out in accordance with Annex B. **A4**

Table 8 — Minimum clearances for basic insulation

Rated impulse withstand voltage kV ^a	Minimum clearances in air up to 2 000 m above sea level mm
0.33	0.2 ^b
0.50	0.2 ^b
0.80	0.2 ^b
1.5	0.5
2.5	1.5
4.0	3
6.0	5.5

^a See Annex **A3** D **A3**. This voltage is:

- for functional insulation: the maximum impulse voltage expected to occur across the clearance;
- for basic insulation directly exposed to or significantly influenced by transient overvoltage from the low-voltage mains: the rated impulse withstand voltage of the socket-outlet;
- for other basic insulation: the highest impulse voltage that can occur in the circuit.

^b Minimum clearance values are based on BS EN 60664-1.

8.1.4 Clearances for reinforced insulation

The clearance for reinforced insulation shall be not less than the values specified for basic insulation in 8.1.1 but using the next higher step for rated impulse withstand voltage given in Table 8.

Compliance shall be checked by inspection and by measurement **A4**, or by the test of Annex F **A4**.

A3 8.1.5 Contact gap

The minimum contact gap shall be 1.2 mm in the open position.

Compliance shall be checked by measurement. **A3**

8.2 Creepage distances

The creepage distances shall be dimensioned for the voltage, which is expected to occur in normal use taking into account the pollution degree, and the material group as declared by the manufacturer.

For the measurements:

- all parts which may be removed without the use of a tool are removed and moveable parts which can be assembled in different orientations are placed in the most unfavourable position.

NOTE 1 Moveable parts are, for example hexagonal nuts, the position of which cannot be controlled throughout an assembly.

NOTE 2 A creepage distance cannot be less than the associated clearance.

Creepage distances are measured in accordance with Annex A₃ B A₃.

The relationship between material group and between comparative tracking index (CTI) values and proof tracking index (PTI) values is as follows:

Material group I	$600 \leq \text{CTI/PTI}$
Material group II	$400 \leq \text{CTI/PTI} < 600$
Material group IIIa	$175 \leq \text{CTI/PTI} < 400$
Material group IIIb	$100 \leq \text{CTI/PTI} < 175$

The CTI or PTI values are determined in accordance with Annex A₃ C A₃.

NOTE 3 For glass, ceramics and other inorganic materials which do not track, creepage distances need not be greater than their associated clearance.

8.2.1 Creepage distances for basic insulation

The creepage distances for basic insulation shall not be less than the values given in Table 9.

Compliance shall be checked by measurement.

Table 9 — Minimum creepage distances for basic insulation

Rated voltage ^a V (r.m.s.)	Pollution Degree 2			Pollution Degree 3		
up to and including	Material group ^b			Material group ^b		
	I	II	IIIa/IIIb	I	II	IIIa
250	1.3	1.8	2.5	3.2	3.6	4.0

^a This voltage is the voltage rationalized through Table 3a and Table 3b of BS EN 60664-1 based on the rated voltage.
^b Details of pollution degrees are given in Annex A₃ E A₃.

8.2.2 Creepage distances for functional insulation

The creepage distances for functional insulation shall not be less than the values specified for basic insulation in 8.2.1.

Compliance shall be checked by measurement.

8.2.3 Creepage distances for supplementary insulation

The creepage distances for supplementary insulation shall not be less than the values specified for basic insulation in 8.2.1.

Compliance shall be checked by measurement.

8.2.4 Creepage distances for reinforced insulation

The creepage distances for reinforced insulation shall not be less than those derived from twice the distance specified for basic insulation in Table 9.

Compliance shall be checked by measurement.

8.3 Solid insulation

Solid insulation for basic, A₄ functional, A₄ supplementary and reinforced insulation shall be capable of withstanding electrical stresses which may occur in normal use.

No minimum thickness is specified for solid insulation.

A₄ 8.3.1 Compliance shall be checked by tests in accordance with 15.1.3 using the values given in Table 10. A₄

 Text deleted 

 **Table 10 — Withstand voltages for insulation types**

Insulation	Test voltage V (r.m.s.)
Functional Insulation	1 500
Basic Insulation	1 500
Supplementary Insulation	1 500
Reinforced Insulation	3 000



9 Accessibility of live parts

9.1 Socket-outlets shall be so designed that when they are mounted and wired as in normal use, live parts are not accessible.

9.1.1 Compliance shall be checked by the application of the test pin shown in Figure 1 perpendicular to the accessible external surface of the socket-outlet with a force of 5_{-1}^0 N. It shall not be possible to touch live parts.

9.2 Socket-outlets shall be designed and constructed so as to protect the user against accidental contact with live parts during insertion or withdrawal of plugs.

9.2.1 Compliance shall be proved by satisfying the dimensional and gauging requirements of this part of BS 1363.

9.3 Resilient accessible external surfaces of socket-outlets shall be so designed and constructed that when assembled and wired as in normal use, there is no risk that, as a result of undue pressure, live parts could penetrate the accessible external surfaces or become so disposed as to reduce creepage and clearances below those given in Clause 8.

9.3.1 Compliance shall be checked by the following test (an example of a suitable test apparatus is shown in Figure 2).

The design of the apparatus shall be such that a steady force of 240_{-10}^0 N can be applied to those places where the possibility of a failure exists, the force being applied through a metal test pressure block as shown in Figure 2.

Each sample is subjected to the force at each chosen place in turn. During each application of force, a test voltage of $2\,000\text{ V} \pm 60\text{ V}$ 50 Hz of substantially sinusoidal waveform is applied for 60_{+5}^0 s between all live parts bonded together and the earthed test pressure block.

During the test no flashover or breakdown shall occur.

After the test it shall not be possible to touch live parts with test probe 11 of BS EN 61032:1998 applied with a force of 30_{-2}^0 N.

9.4 It shall not be possible to introduce a conducting device through the earthing socket aperture(s) of a socket-outlet in such a manner that there is a risk of making contact with any live conductor, with or without insulation.

9.4.1 Compliance shall be checked by introducing a rigid metal pin, $1_{-0.05}^0$ mm diameter $\times$ 60 mm $\pm$ 1 mm long, through the earthing socket aperture or apertures of a socket-outlet mounted and wired within an appropriate enclosure, applying a force of 5_{-1}^0 N, with the conductors in the most unfavourable positions.

10 Provision for earthing

10.1 Socket-outlets shall be so constructed that, when inserting the plug, the earth connection is made before the current-carrying pins of the plug become live. When withdrawing the plug, the current-carrying parts shall separate before the earth contact is broken.

10.1.1 Compliance shall be checked by inspection and electrical test.

10.2 All accessible metal parts of socket-outlets shall be in effective electrical contact with the earthing socket contact, except that metal parts on, or screws in or through, non-conducting material, and separated by such material from current-carrying parts in such a way that in normal use they cannot become live, need not be in effective electrical contact with the earthing socket contact.

NOTE Metal parts having an accessible surface coating of lacquer or enamel are accessible metal parts within the meaning of this requirement.

10.2.1 Compliance shall be checked by inspection and the following:

- a) for metal parts insulated from live parts, by the test described in **15.1.3**;
- b) for metal parts connected to an earthing terminal by the following test. A current of $25\text{ A} \pm 0.75\text{ A}$, derived from an a.c. source having a no-load voltage not exceeding 12 V, is passed for 60^{+5}_0 s between the earthing terminal and any accessible metal part intended to be earthed and between the earthing terminal and an earthing plug pin inserted in the earthing socket contact;
- c) the resistance between the earthing terminal and any other nominated part shall not exceed $0.05\ \Omega$.

10.3 If means are provided for electrically bonding the mounting box to the earthing circuit of the socket-outlet by means of the fixing screws the connection between the screw and earthing terminal shall be of low resistance.

10.3.1 Compliance shall be checked by the test described in **10.2.1b**) applied between the socket-outlet earthing terminals and any fixing screw in electrical contact with the earthing circuit. For the purpose of this test the socket-outlet shall be attached to its appropriate mounting box, the fixing screws being tightened to a value of two-thirds those given in Table 3a.

Table 3a — Torque values for screws and nuts

Declared diameter of screw thread mm	Torque		
	For metal screws (see Note 1) N·m	For other metal screws and nuts N·m	For screws of insulating material N·m
Up to and including 2.8	0.2	0.4	0.4
Over 2.8, up to and including 3	0.25	0.5	0.5
Over 3, up to and including 3.2	0.3	0.6	0.6
Over 3.2, up to and including 3.6	0.4	0.8	0.6
Over 3.6, up to and including 4.1	0.7	1.2	0.6
Over 4.1, up to and including 4.7	0.8	1.8	0.9
Over 4.7, up to and including 5.3	0.8	2.0	1.0
Over 5.3, up to and including 6	—	2.5	1.25

NOTE 1 This column applies to metal screws without heads if the screw when tightened does not protrude from the hole, and to other metal screws which cannot be tightened by means of a screwdriver with a blade wider than the diameter of the screw.

NOTE 2 The recording of a measured value given in this table is considered to comply with this part of BS 1363 on condition that the uncertainty of measurement at not less than 95 % confidence level does not exceed $\pm 10\%$.

11 Terminals and terminations

11.1 Terminals and terminations shall provide for effective clamping and securing of conductors connected to them, so that efficient electrical connection is made.

11.1.1 Compliance shall be checked in accordance with **11.2** to **11.9**.

11.2 Rewirable socket-outlets shall be provided with terminals as defined in **3.20**.

11.2.1 Compliance shall be checked by inspection.

11.3 Non-rewirable portable socket-outlets shall be provided with soldered, welded, crimped or similar terminations; for all these methods of termination, not more than one strand of a 0.5 mm^2 or two strands of other sized conductors shall be fractured during connection.

Screwed and “snap-on” terminals shall not be used. Crimped connections shall not be made on to pre-soldered flexible cords unless the soldered area is entirely outside the crimp.

11.3.1 Compliance shall be checked by inspection and measurement.

11.4 Terminals in rewirable portable socket-outlets shall permit the connection, without special preparation, of flexible cords having nominal conductor cross-sectional areas of 0.5 mm^2 to 1.5 mm^2 **A3** as given in Table 27 of BS 6500:2000. **A3**

11.4.1 Compliance shall be checked by inspection and fitting the appropriate conductors.

11.5 Line and neutral terminals in fixed socket-outlets shall permit the connection, without special preparation, of one, two or three 2.5 mm^2 solid or stranded or of one or two 4 mm^2 stranded conductors **A3** as given in Table 8 of BS 6004:2000. **A3**

11.5.1 Compliance shall be checked by inspection and by fitting the appropriate conductors.

11.6 Earthing terminals in fixed socket-outlets shall permit the connection, without special preparation, of one, two or three 1.5 mm^2 or 2.5 mm^2 solid or stranded or of one or two 4 mm^2 stranded conductors.

11.6.1 Compliance shall be checked by inspection and fitting the appropriate conductors.

11.7 Where pillar terminals are used they shall have clamping screws of sufficient length to extend to the far side of the conductor hole. The end of the screw shall be slightly rounded so as to minimize damage to the conductors. The sizes of the conductor hole and the clamping screw shall be such that the clearance between the sides of the major diameter of the clamping screw and the conductor hole does not exceed 0.4 mm when intended for the connection of flexible cords and 0.6 mm when intended solely for the connection of fixed wiring.

11.7.1 Compliance shall be checked by inspection and measurement.

11.8 Terminal screws shall have a declared outside diameter of not less than 3 mm or be not smaller than 6 B.A.

Thread cutting and/or thread forming screws shall not be used.

11.8.1 Compliance shall be checked by inspection and measurement.

11.9 In rewirable portable socket-outlets terminals shall be so located or shielded that should a stray strand of a flexible conductor escape when the conductors are fitted, there is negligible risk of accidental connection between live parts and accessible external surfaces, or of a stray strand bypassing the fuse link if any.

11.9.1 Compliance shall be checked by inspection, and by the following test.

A length of insulation in accordance with the manufacturer's instructions is removed from the end of a flexible conductor having a nominal cross-sectional area of 1.5 mm^2 . One free strand of the flexible conductor is left free and the other strands are fully inserted into and clamped in the terminal. The stray strand is bent, without tearing the insulation back, in every possible direction, but without making sharp bends round barriers unless a bend is reproduced by the replacement of the cover.

The free strand of a flexible conductor connected to a live terminal shall not:

- a) touch any metal part, so as to bypass any fuse link;
- b) touch any metal part which is accessible or is connected to an accessible metal part;
- c) reduce creepage distances and clearances to accessible surfaces to less than 1.3 mm .

The free strand of a flexible conductor connected to an earthing terminal shall not touch any live parts.

12 (Not used)

13 Construction of socket-outlets

13.1 The disposition of the socket contacts shall be as shown in Figure 3.

A4 The engagement surface shall be substantially flat. Any steps or profile contours on the engagement surface shall not result in the surface deviating from the plane of engagement by more than 2 mm . Holes

not exceeding 8 mm diameter for the purpose of assembly fixing shall be deemed acceptable. There shall be no projection on the engagement surface of a socket-outlet such as would prevent the full insertion of a plug. If raised marking is used it shall not project more than 0.5 mm from the engagement surface of a socket-outlet and shall allow compliance with 13.2. The spacing of the socket contacts shall correspond with that of plug pins as specified in BS 1363-1:1995. $\text{\AA}$

13.1.1 Compliance shall be checked by inspection, $\text{\AA}$ measurement $\text{\AA}$ and the use of the gauges shown in Figure 11.

$\text{\AA}$ Text deleted $\text{\AA}$

13.2 The line and neutral socket contacts in socket-outlets shall be positioned so as to make satisfactory contact with the corresponding pins of a plug in all positions that the contacts may occupy when the plug is correctly and fully inserted.

13.2.1 Compliance shall be checked by inspection and the use of the gauge shown in Figure 12 and the circuit shown in Figure 13. Both indicator lamps shall light.

13.3 On insertion of a plug into a socket-outlet, the travel of the end of either current-carrying pin from the front face of the socket-outlet to the first point of contact with the appropriate socket contact, in any position the socket contacts may occupy, shall be not less than 9.6 mm.

13.3.1 Compliance shall be checked by inspection and the use of the gauge shown in Figure 14 and the circuit shown in Figure 13. Neither indicator shall light.

13.4 Socket contacts shall be self-adjusting as to contact making and each socket contact shall be such as to make and maintain, in normal use, effective electrical and mechanical, contact with a corresponding plug pin. The means for producing the contact pressure shall be associated with each socket contact independently and shall not be dependent on insulating material. Each socket contact shall be reliably connected to the fixed parts of its terminal or termination.

13.4.1 Compliance shall be checked by the following tests and Clause 16.

a) The voltage drop between any individual line or neutral socket contact and the corresponding plug pin is measured between the terminal connecting strap at a point immediately adjacent to the socket contact and the corresponding plug pin. The voltage drop shall not exceed 25 mV at $13\text{ A} \pm 0.4\text{ A}$.

b) The withdrawal pull of a gauge as shown in Figure 16b) from any individual line or neutral socket contact is checked ensuring that neither the shutter mechanism, nor the material of the cover or base moulding, have any effect on the results of the test. The socket contact shall retain the gauge for not less than 30 s when the socket-outlet is held horizontally with the gauge hanging vertically downwards.

13.5 Line and neutral socket contacts shall withstand the stresses imposed upon them by the use of socket-outlet adaptors and the like.

13.5.1 Compliance shall be checked by the following test.

The socket-outlet is mounted with $\text{\AA}$ the engagement surface of the socket-outlet $\text{\AA}$ in the vertical plane and with the major axis of the line and neutral pins horizontal $\text{\AA}$ ensuring that the shutter mechanism does not have any effect on the results of the test $\text{\AA}$. The end E of the gauge shown in Figure 15 is inserted into the line socket aperture as far as the pin D and a mass of $750\text{ g} \pm 5\text{ g}$ is suspended from pin C for 30^{+5}_0 s .

The socket-outlet is rotated through 180° approximately about an axis perpendicular to $\text{\AA}$ the engagement surface of the socket-outlet $\text{\AA}$ and the load applied to pin C for a further 30^{+5}_0 s . The test is repeated with the gauge inserted in the neutral socket aperture. After the test the socket contact shall retain the weight gauge shown in Figure 16b) for not less than 30 s when $\text{\AA}$ the engagement surface of the socket-outlet $\text{\AA}$ is held horizontally, with the gauge hanging vertically downwards.

13.6 Earth socket contacts shall withstand the stresses imposed upon them by the attempted incorrect insertion of plugs.

13.6.1 Compliance shall be checked by the following test.

The socket-outlet is mounted with $\text{\AA}$ the engagement surface of the socket-outlet $\text{\AA}$ in the vertical plane and with the major axis of the earth pin aperture horizontal $\text{\AA}$ ensuring that the shutter mechanism does not have any effect on the results of the test $\text{\AA}$. The end A of the gauge shown in Figure 15 is inserted

into the earth socket aperture as far as the pin B, and a mass of $750 \text{ g} \pm 5 \text{ g}$ is suspended from pin D for 30^{+5}_0 s . The socket-outlet is rotated through 180° approximately about an axis perpendicular to **A4** the engagement surface of the socket-outlet **A4** and the load applied to pin D for a further 30^{+5}_0 s .

After the test the earth socket contact shall retain the weight gauge shown in Figure 16a) for not less than 30 s when **A4** the engagement surface of the socket-outlet **A4** is held horizontally with the gauge hanging vertically downwards.

13.7 The construction of the socket-outlet shall be such that when a plug is withdrawn from it, the current-carrying socket contacts are automatically screened by shutters. One socket aperture shutter shall not be capable of closing independently of the other aperture shutter. The shutters shall be operated either by the insertion of the earthing pin or by the simultaneous insertion of any two or more pins of the plug, provided that the gauge [see Figure 16b)] inserted into any current-carrying socket aperture shall not open the shutter. **A4** Compliance shall be checked by the tests of **13.7.1**. **A4**

A4 It shall not be possible to operate a shutter by inserting a 2-pin plug into a 3-pin socket-outlet. Compliance shall be checked by the tests of **13.7.2**. **A4**

13.7.1 Compliance shall be checked by inspection, by the test described in **18.1.2**, and by the application of the gauge shown in Figure 16b). The gauge and the test pin, shown in Figure 1, are applied to the shutter using a force of 5^{+0}_1 N applied perpendicular to the engagement **A3** surface **A3** of the socket-outlet.

It shall not be possible to touch current-carrying parts.

A4 **13.7.2** Earth pin operated shutters and 3-pin operated shutters shall be deemed to comply with this requirement without testing. For other shutter designs, compliance shall be checked by the following test.

A 2-pin plug complying with BS EN 50075 shall be applied to the socket line and neutral apertures with a force of 30^{+0}_2 N . The plug pins, when applied in any direction, shall not make contact with live parts. **A4**

13.8 The construction of socket-outlets shall be such as to allow for easy withdrawal of the plug.

13.8.1 Compliance shall be checked by the following test.

A plug is inserted into and withdrawn from the socket-outlet 10 times with the socket-outlet mounted as in normal use.

The plug is then inserted into the socket-outlet and a force is gradually exerted in a direction parallel to the axis of the pins.

It shall not be possible to reach a pull of 36 N without the plug coming out of the socket-outlet.

NOTE Care should be taken to remove any grease from the plug pins and socket contacts prior to the tests.

13.9 Apertures for the reception of the line and the neutral plug pins shall not exceed $7.2 \text{ mm} \times 4.8 \text{ mm}$ and for the earthing plug pin $8.8 \text{ mm} \times 4.8 \text{ mm}$.

NOTE Apertures may be shaped at their front edges to facilitate insertion of appropriate plug pins.

The holes for the line and the neutral plug pins in metal plates shall have sufficient insulating material around them to ensure compliance with Clause 8.

Earth socket contacts may be flush with the front face of covers or cover plates but shall not depend for their effectiveness on insulating material of the cover. In such a case the aperture shall be measured between the contact faces at the maximum separation.

13.9.1 Compliance shall be checked by inspection and measurement.

13.10 No part of the aperture intended for the reception of the line or neutral pin shall be less than 9.5 mm from the periphery of the **A4** engagement surface **A4** of a socket-outlet except that when a shutter is operated by the simultaneous insertion of the current-carrying pins this dimension shall be increased to not less than 18 mm from the lower edge of the socket-outlet.

NOTE The 9.5 mm and 18 mm dimensions may include a peripheral edge radius of not more than 1 mm.

13.10.1 Compliance shall be checked by inspection and measurement.

13.11 Switches shall be so constructed that undue arcing cannot occur when the switch is operated slowly.

The switch in any switched socket-outlet shall disconnect at least the supply to the line socket contact.

Double pole switches shall make or break each pole with one movement of the actuator.