



BSI Standards Publication

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

Part 4: 13 A fused connection units: switched and unswitched – Specification

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Summary of pages

This document comprises a front cover, an inside front cover, pages I to IV, pages 1 to 51, an inside back cover and a back cover.

Foreword

Publishing information

This part of BS 1363 is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 June 2023. It was prepared by Technical Committee PEL/23, *Electrical accessories*. A list of organizations represented on this committee can be obtained on request to the committee manager.

Supersession

This part of BS 1363 supersedes BS 1363-4:2016+A1:2018 which remains current and will be withdrawn on 30 June 2026.

Relationship with other publications

BS 1363 comprises the following five parts:

- *Part 1: Rewirable and non-rewirable 13 A fused plugs – Specification;*
- *Part 2: 13 A switched and unswitched socket-outlets – Specification;*
- *Part 3: Adaptors – Specification;*
- *Part 4: 13 A fused connection units: switched and unswitched – Specification;*
- *Part 5: Fused conversion plugs – Specification.*

Information about this document

This is a full revision of the document, and introduces the following principal changes:

- the Scope now covers operating frequencies from 50 Hz to 60 Hz;
- current carrying parts made of brass are required to have a minimum content of 58% copper;
- new requirements have been added for switch actuating force test for double-pole switches;
- mounting box clearance requirements for flush mounted connection units have been modified.

The numbering of figures within this standard remains as in the previous version; however, future revisions will implement consecutive numbering throughout.

[Annex G](#) gives details of the annex renumbering from the 2016 editions of BS 1363, Part 1 to Part 5 to the 2023 editions.

This publication can be withdrawn, revised, partially superseded or superseded. Information regarding the status of this publication can be found in the Standards Catalogue on the BSI website at bsigroup.com/standards, or by contacting the Customer Services team.

Where websites and webpages have been cited, they are provided for ease of reference and are correct at the time of publication. The location of a webpage or website, or its contents, cannot be guaranteed.

Presentational conventions

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

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

Requirements in this standard are drafted in accordance with the *Rules for the structure and drafting of UK standards:2022*, subclause **G.1.1**, which states, “Requirements should be expressed using wording such as: ‘When tested as described in Annex A, the product shall ...’”. This means that only those products that are capable of passing the specified test will be deemed to conform to this standard.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

Contractual and legal considerations

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The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

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

In particular, attention is drawn to the following specific regulations:

- The Plugs and Sockets etc. (Safety) Regulations 1994. SI No. 1768 [[1](#)].

1 Scope

This part of BS 1363 specifies requirements for 13 A fused fixed connection units for household, commercial and light industrial purposes, with particular reference to safety in normal use. The connection units are suitable for the connection of appliances, in a.c. circuits only, operating at voltages not exceeding 250 V r.m.s. and frequencies from 50 Hz to 60 Hz.

Requirements are specified for connection units incorporating a fuse-link conforming to BS 1362:1973+A3:2021.

Requirements are specified for 13 A connection units with or without associated controlling switches, for flush mounting in suitable enclosures, e.g. boxes conforming to [BS 4662](#), or for surface or panel mounting. Connection units are intended for use with cables conforming to [BS 6004](#) having copper conductors. Connection units with cable outlets are additionally intended for use with flexible cables, conforming to the relevant part of [BS EN 50525](#) on the load (output) side.

This standard does not apply to connection units incorporating screwless terminals for the connection of external conductors of the following types:

- a) flat quick-connect terminals;
- b) insulation-piercing connecting devices; and
- c) twist-on connecting devices.

Certain installations require the inclusion of intumescent and acoustic pads and this might have an effect on the conformance of the connection unit to the requirements of this standard. This might influence temperature rise and internal clearances. Verification of suitability of the connection unit needs to be obtained from the manufacturer.

NOTE Requirements for electromagnetic compatibility are not given for the following reason:

A connection unit is mechanical by nature of construction. A connection unit does not emit intolerable electromagnetic interference and the product is immune from electromagnetic interference.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions, or limits the application, of this document¹⁾. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[BS 1362:1973+A3:2021](#), *Specification for general purpose fuse links for domestic and similar purposes (primarily for use in plugs)*

[BS 4662:2006+A1:2009](#), *Boxes for flush mounting of electrical accessories – Requirements and test methods and dimensions*

[BS 6004:2012+A1:2020](#), *Electric cables – PVC insulated and PVC sheathed cables for voltages up to and including 300/500 V, for electric power and lighting*

[BS EN 50525-2-11:2011](#), *Electric cables – Low voltage energy cables of rated voltages up to and including 450/750 V (U₀/U) – Part 2-11: Cables for general applications – Flexible cables with thermoplastic PVC insulation*

[BS EN 50525-2-21:2011](#), *Electric cables – Low voltage energy cables of rated voltages up to and including 450/750 V (U₀/U) – Part 2-21: Cables for general applications – Flexible cables with crosslinked elastomeric insulation*

¹⁾ Documents that are referred to solely in an informative manner are listed in the Bibliography.

BS EN 60529:1992+A2:2013, *Degrees of protection provided by enclosures (IP code)*

[BS EN 60664-3](#), *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

[BS EN 60664-5](#), *Insulation coordination for equipment within low-voltage systems – Part 5: Comprehensive method for determining clearances and creepage distances equal to or less than 2 mm*

[BS EN 60695-10-2](#), *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

[BS EN 61032:1998](#), *Protection of persons and equipment by enclosures – Probes for verification*

[BS EN 61180:2016](#), *High-voltage test techniques for low voltage equipment – Definitions, test and procedure requirements, test equipment*

[BS EN IEC 60112:2020](#), *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

[BS EN IEC 60664-1:2020](#), *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

[BS EN IEC 60695-2-11:2021](#), *Fire hazard testing – Part 2-11: Glowing/hot wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

[BS EN ISO 9453:2020](#), *Soft solder alloys – Chemical compositions and forms*

IEC 60038, *IEC standard voltages*

3 Terms and definitions

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

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

3.1 accessible external surface of a connection unit

surface of a connection unit within touching distance of test probe B specified in BS EN 61032:1998 with the connection unit installed as in use

3.2 actuating member

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

3.3 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.

3.4 cable outlet connection unit

fixed wiring device as in [3.15](#) having provision for a flexible cable

3.5 calibrated link

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

3.6 clamp type (screwless) terminal

terminal for the connection and subsequent disconnection of one or more conductor(s), the connection being made directly or indirectly by means of springs, wedges or the like

3.7 clearance

shortest distance in air between two conductive parts

3.8 connection unit base

part of the fused connection unit which carries live parts

NOTE It might be integral with the fused connection unit plate.

3.9 connection unit plate

external plate which covers the base and live parts of a fused connection unit

3.10 creepage distance

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

3.11 fine wire thermocouple

thermocouple having wires not exceeding 0.3 mm in diameter

3.12 flush-mounted connection unit

fused connection unit as in [3.15](#), [3.4](#) or [3.26](#), which is intended to be mounted in a box which is recessed into a wall or other flat surface

NOTE The fused connection unit plate and the base are regarded as forming a complete unit, and the connection unit plate is mounted with its back either flush with a wall or other flat-surfaced structure, or flush with the front of a box or enclosure.

3.13 functional insulation

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

3.14 fuse carrier

moveable or removable part designed to carry, retain, cover and/or remove the fuse-link

3.15 fused connection unit

device associated with the fixed wiring of an installation which facilitates the connection of equipment, and having provision for a replaceable cartridge fuse-link

NOTE The device might include its dedicated enclosure.

3.16 indicator lamp (pilot lamp)

lamp or similar device which illuminates to indicate that the connection unit load terminals are energized

3.17 insignificant mass

insufficient combustible mass to constitute a fire hazard

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

3.18 isolation

function intended to make dead for reasons of safety all or a discrete section of the electrical installation by separating the electrical installation or section from every source of electrical energy

3.19 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.

3.20 panel-mounted connection unit

fused connection unit intended for incorporation into equipment panels or electrical trunking and which depends upon such incorporation for its enclosure

3.21 reinforced insulation

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

3.22 screw-type terminal

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.

3.23 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

[SOURCE: BS EN IEC 60695-2-11:2021, 3.15, modified]

NOTE More information concerning small parts can be found in BS EN IEC 60695-2-11:2021, 4.4.

3.24 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

3.25 surface-mounted connection unit

fused connection unit as in 3.15, 3.4 or 3.26, which is intended to be mounted on a wall or other flat surface without the need for recessing

3.26 switched connection unit

fused connection unit as in 3.15 or 3.4, with an associated switch to disconnect the supply to both line and neutral load terminals

3.27 terminal

means by which the user is able to make an electrical connection between the appropriate cable or flexible cable and the conducting parts of the connection unit without the use of special tools

3.28 type test

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

3.29 type test sample

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

4 Conditions of use

Fused connection units shall be suitable for use under the following conditions:

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

NOTE 1 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; and
- d) an atmosphere not subject to abnormal pollution by smoke, chemical fumes or other abnormal conditions.

NOTE 2 This is equivalent to pollution degree 2 (see [Annex A](#)) and Overvoltage Category III (see [Annex B](#)).

5 General

Connection units 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 connection units shall be capable of meeting all the relevant requirements and tests specified in this part of BS 1363.

6 General conditions for type testing

6.1 All tests shall be type tests.

Unless otherwise specified in this part of BS 1363, connection units 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 connection units shall be tested when mounted on a corresponding box conforming to the dimensional requirements of [BS 4662](#), the fixing screws being tightened with a torque of $0.6\text{ Nm} \pm 10\%$. Other types shall be mounted according to the manufacturer's instructions.

Connection units having a declared IP rating shall be tested as a complete assembly (connection unit and enclosure) when mounted in accordance with the manufacturer's instructions and conditions of use.

Connection units used for the tests shall be representative of normal production items in respect of all details which might affect the test results.

Connection units shall be deemed to conform to this part of BS 1363 if no sample fails in the complete series of tests given in [Table 1](#).

Table 1 — *Schedule of tests*

Sequence	Sample	Tests	Clause number
1	3	Inspection, measurement and manipulation	6, 7, 8, 10, 12.1 (except 12.9), 14 (14.1, 14.2, 14.3, 14.4 and 14.7), 20 (20.2, 20.3 and 20.4 only), 9 (except Annex C), 22
2	3	General	6, 11, 20.1, 15.2, 14.5 (10.1.1 only), 21.1.3
3	3		6, 15.1, 16, 14.5 (21.1.2 and 18.1.3 only), 18.1.2, 14.6, 17
4	3		6, 15.1, 16, 19
5	3	Materials	6, 23
6	3		6, 24.2, 9.2 (Annex C only)
7	3		6, 25
8 ^{A)}	3	Positive break	6, 14.6
9	3	Isolation	6, 16.2
10	3	Ingress protection	6, 14.9
11	3	Additional tests for connection units with screwless terminals	6, 15.1, 12.9

NOTE The order of tests given in sequence 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 might be required.

If one sample fails in the complete series of tests given in [Table 1](#), then connection units of that type shall be deemed to have failed to conform to this part of BS 1363, unless the connection unit is 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 retest then connection units of that type shall be deemed to conform to this part of BS 1363.

If more than one sample fails in the complete series of tests given in [Table 1](#) then connection units of that type shall be deemed not to conform to 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 Reference 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.

- 6.2** All inspections and tests of any one classification (see [Clause 7](#)), shall be carried out as specified in the clauses listed in [Table 1](#) on the number of samples in the sample column and in the order given.

7 Classification and ratings

7.1 Classification

Connection units shall be classified as follows:

7.1.1 According to switching capability:

- a) switched; or
- b) unswitched.

7.1.2 According to method of mounting:

- a) fixed flush;
- b) fixed surface; or

- c) fixed panel-mounting.

7.1.3 According to provision for outgoing flexible cable:

- a) with outgoing flexible cable; or
- b) without outgoing flexible cable.

7.1.4 According to indicator type:

- a) with indicator lamp; or
- b) without indicator lamp.

7.1.5 According to the IP rating if declared.

7.1.6 According to the type of terminal:

- a) connection units with screw-type terminals;
- b) connection units with screwless terminals for rigid conductors only; or
- c) connection units with screwless terminals for rigid and flexible conductors.

7.2 Ratings

The rated current of all connection units shall be 13 A.

The rated voltage of connection units shall be 250 V.

8 Marking and labelling

8.1 Connection units 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 or trademark of the manufacturer or responsible vendor, which might be duplicated on a removable fuse carrier;
- b) the number of this British Standard, i.e. BS 1363²⁾;
- c) terminals intended for the connection of the various conductors shall be identified by the symbols given in [8.2](#);
- d) the words “FUSE” or “FUSED” or the symbol (given in [8.2](#)) on the external accessible surface of a connection unit or fuse carrier;
- e) all connection units shall be marked with:
 - 1) rated current;
 - 2) rated voltage;
 - 3) nature of supply;
 - 4) incoming (in or supply) terminals; and
 - 5) outgoing (out or load) terminals;

²⁾ 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. Such a declaration is not to be confused with second or third-party certification of conformity. Further testing and conformity certification remains at the discretion of the manufacturer and is not a requirement of this standard.

- f) for connection units with screwless terminals:
- 1) an appropriate marking indicating the length of insulation to be removed before insertion of the conductor into the screwless terminal;
 - 2) an indication of the suitability to accept rigid conductors only for those connection units having this restriction;
 - 3) an indication of the suitability to accept flexible conductors only for those connection units having this restriction; and
- g) where the declared IP classification is higher than IP20 then the IP classification shall be marked. The marking shall be discernible when the connection unit is mounted and wired as in normal use.

8.1.1 Conformity 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 approximately 69 °C and a relative density of approximately 0.68. The marking shall remain legible. Markings produced by an engraving or moulding process shall be deemed to conform without test.

8.2 If symbols are used they shall be as follows:

amperes	A
volts	V
alternating current	~
line	L
neutral	N
earth	 (preferred) or 

NOTE The letter "E" may be used in addition to either of these symbols.

fuse	
For screwless terminals suitable for rigid conductors only	r
For screwless terminals suitable for flexible conductors only	f
Degree of protection, where relevant	IPXX

For the marking of the rated current and rated voltage of the connection unit 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

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

9 Clearances, creepage distances and solid insulation

Connection units 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 might occur. Clearances, creepage distances and solid insulation shall conform to the relevant

subclauses of [9.1](#), [9.2](#), [9.3](#) and [9.4](#). The distance between lead wires in the pinch of a neon lamp with external resistor shall be a minimum of 1 mm.

Connection units conforming to the requirements for basic insulation shall be deemed to meet the requirements of this clause. If the manufacturer declares an insulation level exceeding basic insulation then the connection unit shall be tested accordingly.

NOTE 1 The requirements and tests are based on [BS EN IEC 60664-1:2020](#).

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 specific mechanical and material tests.

9.1 Clearances

Connection units energized directly from the low voltage supply fall into Overvoltage Category III.

The clearances shall withstand the rated impulse voltage declared by the manufacturer considering the rated voltage and the Overvoltage Category as given in [Annex B](#) and the pollution degree declared by the manufacturer in accordance with [Annex A](#).

For the measurements, all parts which are removeable without the use of a tool shall be removed and moveable parts which can be assembled in different orientations shall be placed in the most unfavourable position.

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

9.1.1 Clearances for basic insulation

The clearances for basic insulation shall be not less than the values given in [Table 2](#).

Conformity shall be checked by inspection, and if necessary, by measurement or by the test of [Annex D](#).

Smaller clearances, other than those values marked in [Table 2](#) with footnote “B”, shall be permitted if the plug meets the impulse withstand voltage test of [Annex D](#) at the impulse voltage specified in [Table D.1](#). This exception shall apply 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.

If clearance distances are to be measured, this shall be carried out in accordance with [Annex E](#).

9.1.2 Clearances for functional insulation

The clearances for functional insulation shall be not less than the values specified for basic insulation in [9.1.1](#).

Conformity shall be checked by inspection, and if necessary, by measurement or by the test of [Annex D](#).

If clearance distances are to be measured, this shall be carried out in accordance with [Annex E](#).

9.1.3 Clearances for supplementary insulation

The clearances for supplementary insulation shall be not less than the values specified for basic insulation in [9.1.1](#).

Conformity shall be checked by inspection, and if necessary, by measurement or by the test of [Annex D](#).

If clearance distances are to be measured, this shall be carried out in accordance with [Annex E](#).

Table 2 — 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	3.0
6.0	5.5

^{A)} See [Annex B](#). This voltage is:

- for functional insulation: the minimum 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 connection unit;
- for other basic insulation: the highest impulse voltage that can occur in the circuit.

^{B)} Minimum clearance values are based on [BS EN IEC 60664-1](#).

9.1.4 Clearances for reinforced insulation

The clearances for reinforced insulation shall be not less than the values specified for basic insulation in [9.1.1](#) but using the next higher step for rated impulse withstand voltage given in [Table 2](#).

Conformity shall be checked by inspection and by measurement, or by the test of [Annex D](#).

9.1.5 Contact gap

The minimum contact gap shall be 3 mm in the open position.

Conformity shall be checked by measurement.

9.2 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 are removeable without the use of a tool shall be removed and moveable parts which can be assembled in different orientations shall be 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 shall be measured in accordance with [Annex E](#).

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 shall be determined in accordance with [Annex C](#).

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

9.2.1 Creepage distances for basic insulation

The creepage distances for basic insulation shall be not less than the values given in [Table 3](#).

Conformity shall be checked by measurement.

Table 3 — Minimum creepage distances (mm) for basic insulation

Rated voltage ^{A)} V (r.m.s.)	Pollution degree 2 ^{B)}			Pollution degree 3 ^{B)}		
Up to and including	Material group			Material group		
—	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 [BS EN IEC 60664-1:2020](#), Table F.3a) and Table F.3b) based on the nominal voltage of the supply system.

^{B)} Details of pollution degrees are given in [Annex A](#).

9.2.2 Creepage distances for functional insulation

The creepage distances for functional insulation shall be not less than the values specified for basic insulation in [9.2.1](#).

Conformity shall be checked by measurement.

9.2.3 Creepage distances for supplementary insulation

The creepage distances for supplementary insulation shall be not less than the values specified for basic insulation in [9.2.1](#).

Conformity shall be checked by measurement.

9.2.4 Creepage distances for reinforced insulation

The creepage distances for reinforced insulation shall be not less than those derived from twice the distance specified for basic insulation in [Table 3](#).

Conformity shall be checked by measurement.

9.3 Solid insulation

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

No minimum thickness is specified for solid insulation.

9.3.1 Conformity shall be checked by tests in accordance with [16.1.3](#) using the values given in [Table 4](#).

Table 4 — 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

9.4 Requirements for printed wiring boards and equivalent construction

Printed wiring boards and equivalent constructions within a connection unit shall conform to BS EN 60664-5.

Where coating, potting or moulding is used they shall conform to BS EN 60664-3.

10 Accessibility of live parts

10.1 Connection units shall be so designed and constructed that when they are mounted and wired as in normal use, live parts are not accessible even after removal of parts which can be removed without the use of a tool.

10.1.1 Conformity shall be checked by the application of test probe 11 of BS EN 61032:1998 to the accessible external surface of the connection unit applied with a force of 5_{-1}^0 N in the most unfavourable position, followed by the application of test probe B. It shall not be possible to touch live parts.

11 Provision for earthing

11.1 All accessible metal parts of connection units shall be in electrical contact with the earthing terminal(s) 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 terminal(s) of the connection unit.

Metal parts having an accessible surface coating of lacquer or enamel shall be tested as accessible metal parts.

11.1.1 Conformity shall be checked by inspection and the following:

- a) for metal parts insulated from live parts, by the test described in [16.1.3](#);
- 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, shall be passed for 60_{-0}^{+5} s between the earthing terminal and any accessible metal part intended to be earthed.

The resistance between the earthing terminal and any other nominated part shall not exceed $0.05\ \Omega$.

11.2 If means are provided for electrically bonding the mounting box to the earthing circuit of the connection unit by means of the fixing screws, the connection between the screw and earthing terminal shall be of low resistance.

11.2.1 Conformity shall be checked by the test described in [11.1.1b](#)) applied between the connection unit earthing terminal(s) and any fixing screw in electrical contact with the earthing circuit. For the purpose of this test the connection unit shall be attached to its appropriate mounting box, the fixing screws being tightened to a value of two thirds those given in [Table 5](#).