

BS 5733:2010+A1:2014



BSI Standards Publication

General requirements for electrical accessories – Specification

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Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence for The British Standards Institution, and came into effect on 31 July 2010. It was prepared by Technical Committee PEL/23, *Electrical accessories*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

BS 5733:2010+A1:2014 supersedes BS 5733:2010, which is withdrawn.

Information about this document

BS 5733:2010 incorporated technical changes only. It did not represent a full review or revision of the standard, which will be undertaken in due course.

The principal changes from the previous edition were as follows.

- a) The standard now includes requirements for maintenance-free accessories.
- b) Clause **10** on clearances, creepage distances and solid insulation has been revised, and Clause **24** has been deleted.
- c) New Annexes B to F have been added.

The principal changes introduced by Amendment No. 1 are as follows.

- a) In **8.1** a new requirement has been specified for accessories incorporating screwless terminals.
- b) Amendments have been made to Tables 2, 5 and 6A.
- c) Amendments have been made to Clauses 14 and 19.

Text introduced or altered by Amendment No. 1 is indicated in the text by tags **A1** **A1**. Minor editorial changes are not tagged.

Hazard warnings

WARNING. This British Standard calls for the use of substances and/or procedures that can be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Use of this document

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

Presentational conventions

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

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

Contractual and legal considerations

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

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

1 Scope

1.1 This British Standard specifies requirements and tests to check the safety in normal use of electrical accessories which are not covered by other specific British Standards.

Such accessories are intended for use in household, commercial and light industrial premises where:

- the nominal supply voltage does not exceed 250 V a.c. single-phase, 50 Hz to 60 Hz or 250 V d.c.;
- the rated current of the accessory does not exceed 63 A.

Unless otherwise stated by the manufacturer, accessories conforming to this standard are intended for connection by cables or flexible cords conforming to BS 6004, BS 6007, BS 6500 or BS 7211.

1.2 This standard also covers:

- “plug-in” and other accessories in which electrical accessory components such as plug-pins, socket-contacts, switches, terminals, etc. are incorporated (see 5.1);
- maintenance free accessories (see 3.31).

1.3 Accessories conforming to this standard are suitable for use under the following conditions of service:

- an ambient temperature in the range -5 °C to +40 °C, the average value over 24 h not exceeding 25 °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.

- a situation not subject to direct radiation from the sun or other source of heat likely to raise temperatures above the limits specified above;
- an altitude not exceeding 2 000 m above sea-level;
- an atmosphere not subject to excessive pollution by smoke, chemical fumes, or other abnormal conditions.

NOTE 2 Accessories conforming to this standard may be suitable for use in other conditions, subject to agreement between manufacturer and user. Information given in a manufacturer's catalogue may take the place of such an agreement.

1.4 Requirements for electromagnetic compatibility are not given, as accessories do not in themselves produce extraneous emissions, nor is their functioning affected by external emissions. Therefore no emission or immunity tests are necessary.

It should be noted that accessories containing active electronic components, other than luminous indicating devices, may be susceptible to, or emit, electromagnetic interference.

2 Normative references

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

BS 546, *Two-pole and earthing-pin plugs, socket-outlets and socket-outlet adaptors*

BS 646, *Specification for cartridge fuse-links (rated up to 5 amperes) for a.c. and d.c. service*

BS 1362, *Specification for general purpose fuse links for domestic and similar purposes (primarily for use in plugs)*

BS 1363-2, *13 A plugs, socket-outlets, adaptors and connection units – Part 2: Specification for 13 A switched and unswitched socket-outlets*

BS 1363-3:1995+A3:2007, *13 A plugs, socket-outlets, adaptors and connection units – Part 3: Specification for adaptors*

BS 1858:2002, *Electric cables – Accessories – Bitumen based filling compounds*

BS 6004, *Electric cables – PVC insulated non-armoured cables for voltages up to and including 450/750 V, for electric power, lighting and internal wiring*

BS 6007, *Electric cables – Single-core unsheathed heat resisting cables for voltages up to and including 450/750 V, for internal wiring*

BS 6500:2000+A3:2005, *Electric cables – Flexible cords rated up to 300/500 V, for use with appliances and equipment intended for domestic, office and similar environments*

BS 7211, *Electric cables – Thermosetting insulated, non-armoured cables for voltages up to and including 450/750 V, for electric power, lighting and internal wiring, and having low emission of smoke and corrosive gases when affected by fire*

BS EN 60064, *Tungsten filament lamps for domestic and similar general lighting purposes – Performance requirements*

BS EN 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

BS EN 60112:2003+A1:2009, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

BS EN 60529, *Degrees of protection provided by enclosures (IP code)*

BS EN 60669-1:1999+A2:2008, *Switches for household and similar fixed electrical installations – Part 1: General requirements*

BS EN 60695-2-11:2001, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

BS EN 60695-10-2:2003, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test*

BS EN 61032:1998, *Protection of persons and equipment by enclosures – Probes for verification*

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

- 3.1 accessory**
device associated with an electrical installation excluding the switchgear and cables
- 3.2 fixed accessory**
accessory intended to be connected to the fixed wiring of an installation
- 3.3 flush accessory**
fixed accessory intended for mounting substantially into a fixed surface, generally into a box
- 3.4 surface accessory**
fixed accessory intended for mounting onto a fixed surface
- 3.5 panel mounted accessory**
accessory intended for incorporation into equipment panels or electrical trunking and which depends upon such incorporation for its enclosure
- 3.6 portable accessory**
accessory not intended for fixed mounting and which may have provision for the connection of a flexible cord
- 3.7 rewirable accessory**
accessory so constructed that a cable or flexible cord may be fitted or replaced using general purpose tools
- 3.8 non-rewirable accessory**
accessory supplied complete with an appropriate cable or flexible cord but having no provision for replacement by the user and no provision for dismantling the accessory using general purpose tools
- 3.9 fused accessory**
accessory having provision, internally, for a replaceable cartridge fuse-link
- 3.10 infrequent use**
use of an accessory, which, although providing a means of connection between equipment and an electrical supply, is intended only to provide disconnection at infrequent intervals
- NOTE Examples include the following:*
- a) fuse holders;
 - b) clock connectors;
 - c) accessories requiring connection/disconnection by means of a tool;
 - d) accessories, the connection/disconnection of which is evidently intended to be infrequent, e.g. up to 100 operations during its life expectancy.
- 3.11 flush box**
device intended to be flush mounted into a fixed surface and having one open side to accept a flush accessory
- 3.12 surface box**
device intended to be mounted on a fixed surface and having one open side to accept a cover plate or a plate-mounted accessory

3.13 enclosure

complete outer protective case for an accessory

NOTE It may be integral with the complete assembly, as in a surface accessory or a portable accessory, or it may comprise a flush accessory mounted in a corresponding box.

3.14 plug

accessory having contacts designed to engage with the contacts of a socket-outlet, also incorporating means for the electrical connection and mechanical retention of flexible cables or cords

3.15 socket-outlet

accessory having socket-contacts designed to engage with the contacts of a plug and having terminals for the connection of cables or cords

3.16 shutter

movable part incorporated into a socket-outlet arranged to shield at least the live socket-outlet contacts automatically when the plug is withdrawn

3.17 adaptor

portable accessory having plug-pins, intended to engage with the contacts of a corresponding socket-outlet, and having socket-outlet contacts to accommodate one or more plugs

3.18 switch

device designed to make or break the current in one or more electric circuits

3.19 functional switch

switch not intended for safety isolating purposes

3.20 flex-outlet

unfused accessory intended for connection to the fixed wiring of an installation and having provision for the connection of a flexible cord to supply a fixed or stationary appliance

3.21 fused flex-outlet

flex-outlet incorporating a replaceable cartridge fuse-link to protect the flexible cord

NOTE A clock-connector is an example of a fused flex-outlet.

3.22 in-line cord connector

coupling device comprising a plug part and a socket part, both having provision for flexible cords which enter the respective accessories in an axial line coincident with the engagement axes of the two parts

3.23 terminal

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

3.24 screw type terminal

terminal for the connection and subsequent disconnection of one conductor or the inter-connection of two or more conductors capable of being disconnected, the connection being made directly or indirectly by means of screws or nuts

3.25 pillar terminal

terminal with screw clamping in which the conductor is inserted into a hole or cavity, where it is clamped under the end of the screw or screws

NOTE 1 The clamping pressure may be applied directly by the end of the screw or through an intermediate clamping member to which pressure is applied by the end of the screw.

NOTE 2 Examples of pillar terminals are shown in Figure 1.

3.26 stud terminal

terminal with screw clamping in which the conductor is clamped under a nut

NOTE 1 The clamping pressure may be applied directly by a suitably shaped nut or through an intermediate part, such as a washer, a clamping plate or an anti-spread device.

NOTE 2 Examples of stud terminals are shown in Figure 2.

3.27 saddle terminal

terminal with screw clamping in which the conductor is clamped under a saddle by means of two or more screws or nuts

NOTE Examples of saddle terminals are shown in Figure 3.

3.28 lug terminal

screw terminal or a stud terminal, designed for clamping a cable lug or bar by means of a screw or nut

NOTE Examples of lug terminals are shown in Figure 4.

3.29 mantle terminal

terminal with screw clamping in which the conductor is clamped against the base of a slot, in a threaded stud, by means of a nut

NOTE 1 The conductor is clamped against the base of the slot by a suitably shaped washer under the nut, by a central peg if the nut is a cap nut, or by equally effective means for transmitting the pressure from the nut to the conductor within the slot.

NOTE 2 Examples of mantle terminals are shown in Figure 5.

3.30 screwless terminal

connecting device for the connection and subsequent disconnection of either:

- a) a rigid (solid or stranded) or flexible conductor; or
- b) the interconnection of two conductors capable of being disconnected,

without special preparation of the conductor concerned other than removal of insulation

NOTE The connection may be made directly or indirectly by one of several methods, e.g. springs, or angled, eccentric or conical parts.

3.31 maintenance free accessory

accessory which does not require further inspection, testing or maintenance after installation in a circuit, and which incorporates screwless terminals (see **14.5**) and cable clamps to secure any associated cables

3.32 cable clamp

accessory or part of a component to grip the cable to provide strain relief and absorb mechanical stress which would otherwise be transmitted to the termination

3.33 termination

method of making an electrical connection between the appropriate cable or flexible cord and the conducting part of the accessory using special purpose tools

NOTE Special purpose tools are used in processes such as soldering, welding or crimping.

3.34 live parts

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

NOTE Metal parts of the earthing circuit are not considered to be live parts.

3.35 accessible external surface

surface of an accessory which can be touched by test probe 11 of BS EN 61032:1998 when the accessory is properly assembled and correctly wired, and is carrying current as in normal use

3.36 type test

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

3.37 type test sample

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

3.38 ambient temperature

temperature in the room or area in which a type test is conducted, measured in the same horizontal plane as the accessory under test, at a distance of approximately 1 m from the accessory and in a position not adversely affected by other heat sources nor by cooling air currents

3.39 rated current

current assigned to the accessory by the manufacturer

3.40 rated voltage

voltage assigned to the accessory by the manufacturer

3.41 rough-use plug

plug designed to withstand severe mechanical handling

NOTE Rough-use plugs are identified by additional marking in accordance with 8.1c). They are not intended for gross misuse. For instance, a plug should not be withdrawn from a socket-outlet by pulling on the attached flexible cord.

3.42 thread-forming tapping screw

tapping screw having an uninterrupted thread which, by screwing in, forms a thread by displacing material

NOTE An example of a thread-forming tapping screw is shown in Figure 6.

3.43 thread-cutting tapping screw

tapping screw having an interrupted thread which, by screwing in, makes a thread by removing material

NOTE An example of a thread-cutting tapping screw is shown in Figure 7.

- 3.44 lighting distribution unit**
assembly of more than one outlet specifically designated for the connection of luminaires contained within an enclosure; the outlets having female contacts designed to engage with the contacts of a male connector
- 3.45 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.
- 3.46 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
- 3.47 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
- 3.48 functional insulation**
insulation between conductive parts which is necessary only for the proper functioning of the equipment
- 3.49 class I**
method of protection against electric shock which does not rely on basic insulation only, but which includes means for the connection of exposed-conductive-parts to a protective conductor in the fixed wiring of the installation
- 3.50 normal use**
use of an accessory for the purpose for which it was made, and in the manner intended by the manufacturer
- 3.51 resilient material**
material having the inherent capability of regaining, or substantially regaining, its original form when deforming loads are removed

Figure 1 Examples of pillar terminals

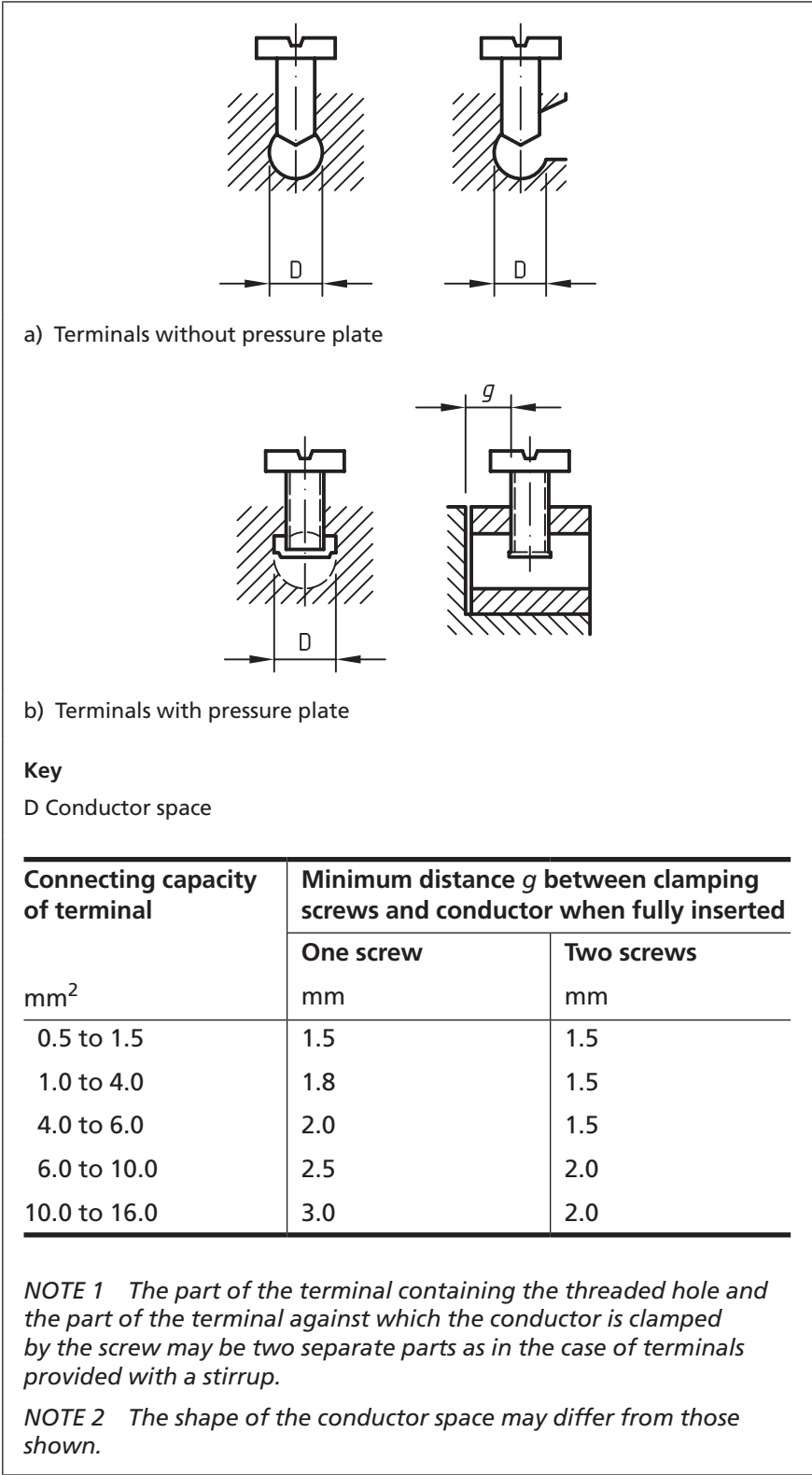


Figure 2 Examples of screw terminals and stud terminals

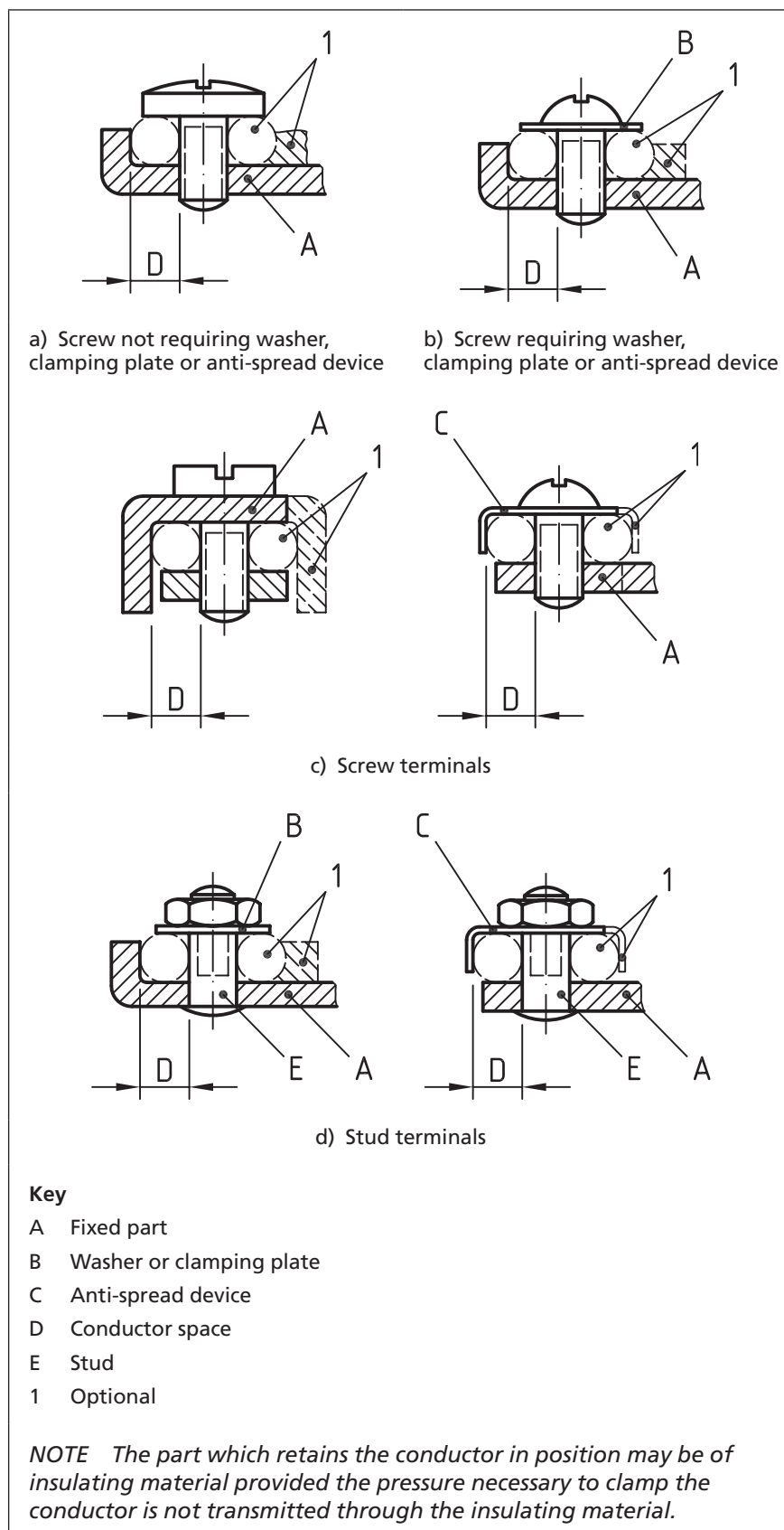


Figure 3 Examples of saddle terminals

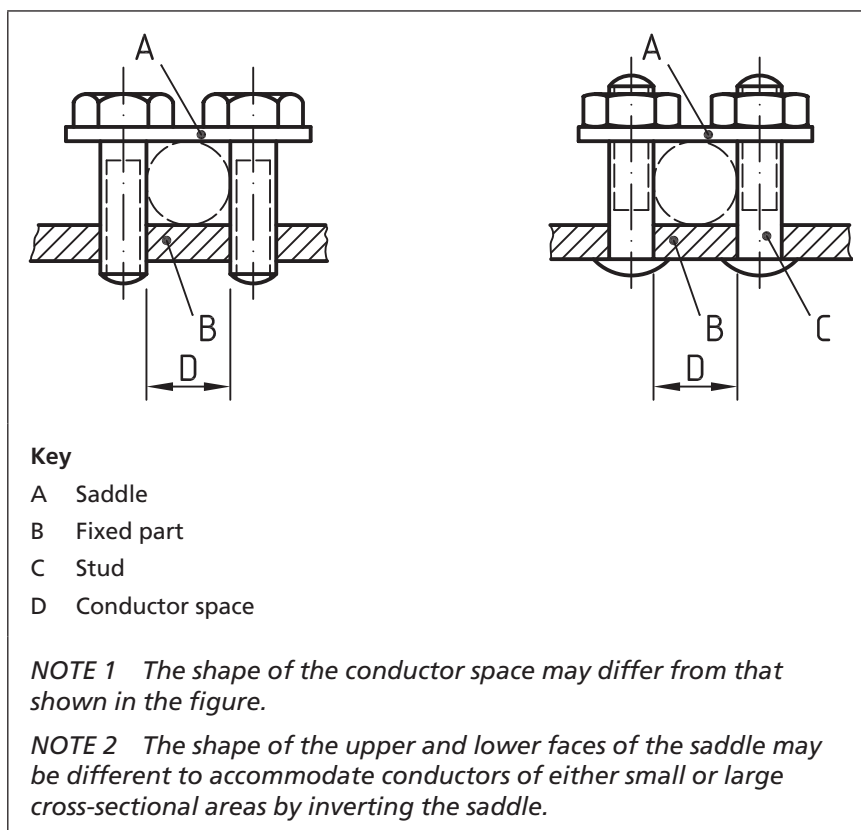


Figure 4 Examples of lug terminals

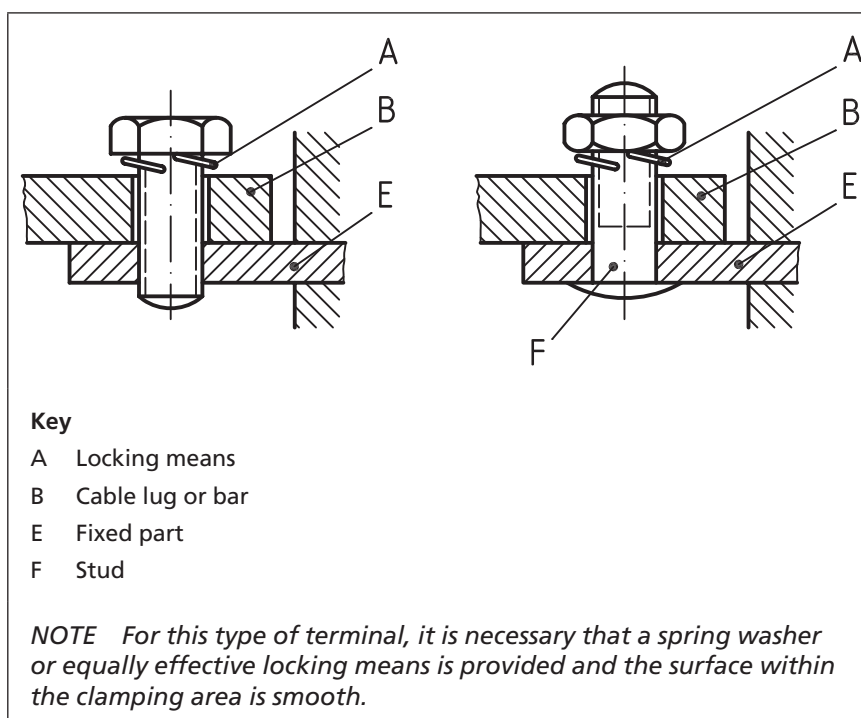


Figure 5 Examples of a mantle terminal

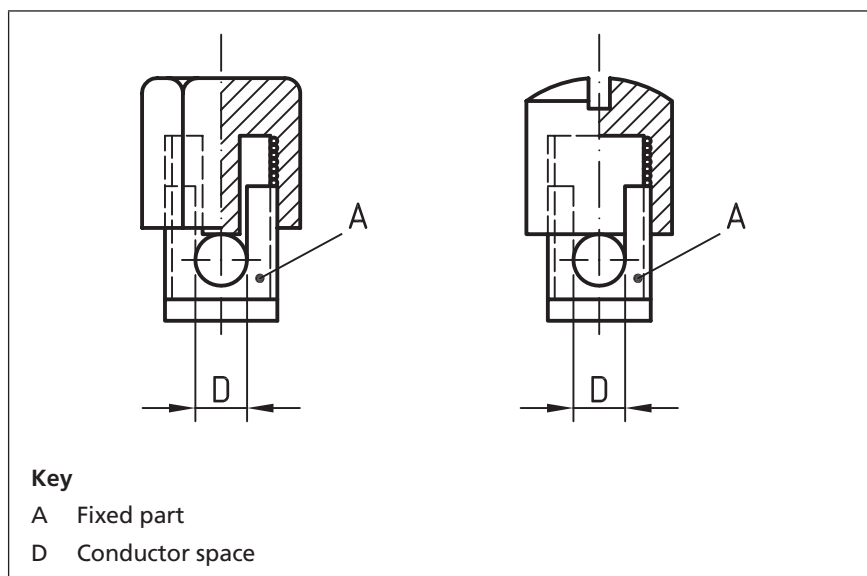


Figure 6 Thread forming tapping screw

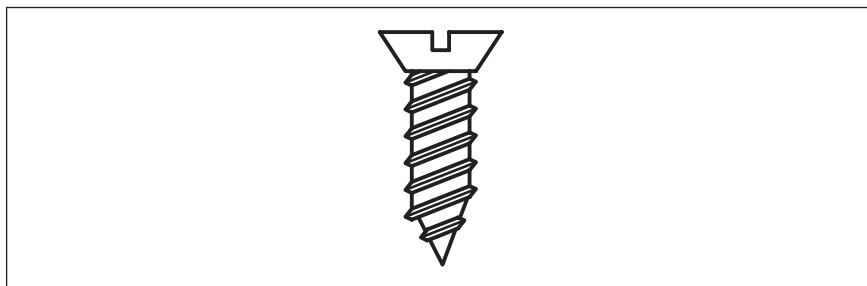
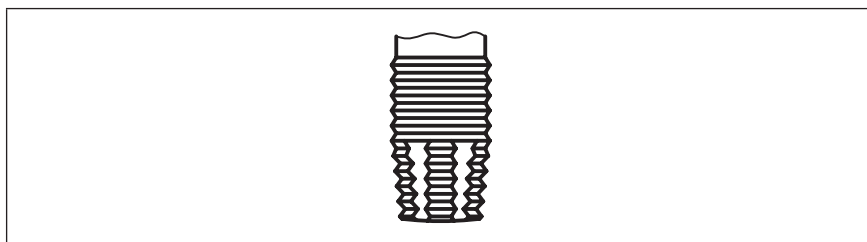


Figure 7 Thread cutting tapping screw



4 Classification

Accessories are classified, as appropriate, as the following:

- a) fixed or portable;
- b) flush or surface or panel-mounting;
- c) rewirable or non-rewirable;
- d) fused or unfused;
- e) switched or unswitched;
- f) with or without provision for earthing;

g) according to the degree of protection against harmful ingress of water:

- 1) ordinary, not higher than IPX0;
- 2) splash-proof, IPX4;
- 3) jet-proof, IPX5;

NOTE The IP ratings are defined in BS EN 60529.

h) for normal use or rough-use;

i) maintenance free.

5 General requirements

5.1 Incorporated components such as plug-pins, socket-contacts, switches, electronic components, printed circuit boards, transformers, timers and control devices shall conform to the relevant British Standard. Where no relevant standard for an incorporated component exists, the requirements of this standard shall apply.

5.2 Accessories shall be so designed and constructed that, in normal use, their performance is reliable and minimizes risk of danger to the user or surroundings.

6 Type testing

6.1 Type test samples shall be submitted to tests in the order specified in **6.3**.

Where components such as plug-pins, socket-contacts, switches, electronic components, printed circuit boards, transformers, timers and control devices, etc., conforming to other British Standards are incorporated, relevant test results obtained during their original conformity procedures may be accepted in order to avoid duplication of testing.

6.2 Unless otherwise specified in this standard the accessories 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.

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

Non-rewirable accessories shall be supplied with an appropriate cable, flexible cord or extensible lead. Except as specified in **21.3.3** and **21.3.5**, the cord or lead shall be at least 1 m long, including the length of any protective sleeve.

6.3 A total of at least 9 accessories, of any one type, shall be submitted to inspection and tests in the following order:

- a) three accessories: Clauses **5** to **10** (except Annex C) (inspection, measurement, gauging and manipulation);
- b) three accessories: Clauses **11** to **22** (general tests);
- c) up to three accessories: Clause **23** (material test);
- d) two dismantled accessories: Annex C and Clause **25** (material tests).

NOTE 1 The two dismantled accessories may be accessories that have been tested in accordance with item a).

NOTE 2 If any particular test is needed to be repeated, as part of the normal sequence, this is specified in the appropriate test method.

6.4 Accessories shall be deemed to conform if no accessory fails in the complete series of tests given in **6.3**. If one accessory fails in any group in the complete series of tests specified in **6.3**, then accessories of that type shall be deemed to have failed to conform to this standard, unless that accessory is shown to be not representative of normal production or design, in which case a further set of accessories shall be submitted to the test or tests in that group. If there is no failure in this retest then accessories of that type shall be deemed to conform to this standard.

If more than one accessory fails in the complete series of tests given in **6.3** then accessories of that type shall be deemed to have failed to conform to this standard.

7 Rating

Accessories shall have the following:

- a) a rated voltage not exceeding 250 V a.c. and/or 250 V d.c.; and
- b) a rated current not exceeding 63 A.

Conformity shall be checked by inspection of the marking and by the relevant tests given in this standard.

8 Marking

8.1 Information to be marked on accessories

Accessories shall be marked with the information given in items a) and b) in the following list. The other information listed shall be marked if relevant:

- a) the name or trade mark of the manufacturer or responsible vendor;
- b) the number of this British Standard i.e. BS 5733 ¹⁾;
- c) for rough-use plugs and for portable socket-outlets, the number of the standard shall be followed by "/A";
- d) terminal identification, if this is relevant;
- e) the rated current;
- f) the rated voltage;
- g) the nature of supply if this is relevant;
- h) for fused accessories, the word "FUSE" or "FUSED", or the appropriate symbol specified in **8.4**. The fuse marking shall be on the visible exterior of the accessory when in use;

¹⁾ Marking BS 5733 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 third-party certification of conformity.

- i) for other than ordinary accessories, an indication of the degree of protection, e.g. IPX4 or IPX5;
- j) in rewirable accessories where cord anchorages are not intended to clamp effectively cords and/or cables smaller than the minimum size appropriate to the accessory, the minimum and maximum sizes for which the cord anchorage is provided, as given in Clause 16, e.g. 6 mm² to 16 mm², shall be marked in an area adjacent to the anchorage;
- k) for accessories incorporating screwless terminals, the length of insulation to be removed, see 14.3.7;
- l) for accessories classified according to Clause 4i) as maintenance free, the appropriate symbol specified in 8.4 (see 14.5);
-  m) for accessories incorporating screwless terminals, where the maximum conductor size is not in conformity with Table 2 this shall be marked on the accessory. 

NOTE The information designated in items j) and k) may be shown on the product and/or the packaging unit.

8.2 Safety information

Where it is necessary, for safe operation, that the user should be aware of any particular characteristics of the accessory, the necessary information shall be given by markings on the accessory itself or, where this is not practicable, in instructions which may accompany it.

8.3 Visibility of marking

The marking specified in 8.1 shall be visible up to the time of installation, but need not be visible thereafter. The marking specified in 8.2, if on the accessory, shall be visible after installation.

8.4 Symbols for marking accessories

If symbols are used they shall be as follows:

Amperes	A
Volts	V
*Alternating current	~
*Direct current	----
Line	L
Neutral	N
*Earth	 preferred or 
*On	I
*Off	O
*Fuse	
Cord/cable size	mm ² or mm
Maintenance free	

NOTE IEC 60417-DB gives guidance on symbols marked *. However, strictly proportional reductions may not be practical in certain media

and interpretative licence is permissible, provided that a clear graphical representation of symbol is produced which communicates the intention.

8.5 Marking of rated current and voltage

The marking of rated current, voltage and nature of supply shall be marked in one of the following ways:

- a) for marking of rated current and rated voltage for a.c. accessories:

10A 250V ~ or 10/250 ~ or $\frac{10}{250}$ ~
or 10A 250V a.c. or 10/250 a.c.

- b) for marking of rated current and rated voltage for d.c. accessories:

10A 250V ---- or 10/250 ---- or $\frac{10}{250}$ ----
or 10A 250V d.c. or 10/250 d.c.

- c) for marking of rated current and rated voltage for accessories which have a dual voltage rating:

10A 125-230V ~ or $\frac{10}{125-230}$ ~

- d) for marking of rated current and rated voltage for accessories with an a.c. and a d.c. current rating:

10A ---- 16A ~ 250V or 10 ---- 16 ~/250 or $\frac{10 \text{ ---- } 16}{250}$ ~

or 10A d.c. 16A a.c. 250V or 10 d.c. 16 a.c./250 or $\frac{10 \text{ d.c. } 16 \text{ a.c.}}{250}$

- e) for marking of ratings for accessories with an a.c. and a d.c. current rating where the rated voltages are different, separate markings as shown in a), b) or c) above shall be used.

8.6 Inspection

Conformity to the requirements of 8.1 to 8.5 shall be checked by inspection.

8.7 Durability and legibility of markings

8.7.1 General

Marking on the accessory shall be legible and durable and shall not be placed on screws, washers or other easily removable parts.

8.7.2 Test for legibility

Conformity shall be checked by inspection, using normal or corrected vision without additional magnification.

8.7.3 Test for durability

Marking made by engraving, moulding, or a similar permanent process, is deemed to conform to the requirement for durability, without the need for testing.

Unless the marking is made by engraving, moulding or a similar permanent process, the marking shall be rubbed by hand, for

approximately 15 s using a piece of cloth soaked in water and again for approximately 15 s with a piece of cloth soaked in 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 65 °C, a dry point of approximately 69 °C, and a relative density of approximately 0.68. When tested by this method, the marking shall remain legible.

9 Dimensions

Where products have dimensional requirements which are important for interchangeability with products conforming to other standards, the relevant dimensions shall be within the tolerances specified in the relevant standard.

For products or components which are intended to be interchangeable with products or components conforming to other standards, conformity shall be checked by inspection, measurement or gauges as specified in the relevant standards.

For products or components which are intended to be interchangeable with products or components for which there are no applicable standards, the products or components shall have dimensions and tolerances in accordance with those specified by the manufacturer or responsible vendor. Conformity shall be checked by inspection, measurement or gauges.

10 Clearances, creepage distances and solid insulation

10.1 General

Accessories energized directly from the low-voltage supply shall be Overvoltage Category III in accordance with Annex D.

Accessories 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 conform to the relevant requirements of **10.2**, **10.3** and **10.4**.

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

Accessories shall conform to the requirements for basic insulation in **10.2.2** and **10.3.2** and for functional insulation in **10.2.3** and **10.3.3**.

If the manufacturer declares an insulation level exceeding basic insulation then the accessory 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 specified for BS 5733 products through the specific mechanical and material requirements of BS 5733.

10.2 Clearances

10.2.1 General

The clearances shall be dimensioned to withstand the rated impulse voltage declared by the manufacturer taking into account the rated voltage and the overvoltage category as given in Annex D and the pollution degree declared by the manufacturer in accordance with Annex E.

For the measurements, all parts which can be removed 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.

10.2.2 Clearances for basic insulation

The clearances for basic insulation shall be not less than the values given in Table 1A except as described below.

It shall be permissible to use smaller unspecified clearances [except those values marked in Table 1A with a reference to Footnote ^{B)}] if the accessory passes the impulse withstand voltage test of Annex F at the impulse voltage specified in Annex D, 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.

Conformity 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.

Table 1A 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 D. 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 accessory;
- 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.

10.2.3 Clearances for functional insulation

The clearances for functional insulation shall be not less than the values specified for basic insulation in **10.2.2**.

Conformity 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.

10.2.4 Clearances for supplementary insulation

The clearances for supplementary insulation shall be not less than the values specified for basic insulation in **10.2.2**.

Conformity 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.

10.2.5 Clearances for reinforced insulation

The clearances for reinforced insulation shall be not less than the values specified for basic insulation in **10.2.2** but using the next higher step for rated impulse withstand voltage given in Table 1A.

Conformity shall be checked by inspection and by measurement, or by the test of Annex F.

10.2.6 Contact gap

The minimum clearance between current-carrying parts separated by the action of the switch shall be 1.2 mm in the open position.

Conformity shall be checked by measurement.

10.3 Creepage distances

10.3.1 General

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

For the measurements, all parts which can be removed 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 B.

The relationship between material group and the comparative tracking index (CTI) values and proof tracking index (PTI) values shall be 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 clearances.

10.3.2 Creepage distances for basic insulation

The creepage distances for basic insulation shall be not less than the values given in Table 1B. Conformity shall be checked by measurement.

Table 1B Minimum creepage distances for basic insulation

Rated voltage ^{A)} V (r.m.s.)	Minimum creepage distance mm					
	Pollution degree 2 ^{B)}			Pollution degree 3 ^{B)}		
	Material group I	Material group II	Material group IIIa/IIIb	Material group I	Material group II	Material group IIIa
≤250	1.3	1.8	2.5	3.2	3.6	4.0

^{A)} This voltage is the voltage rationalized in accordance with BS EN 60664-1:2007, Table F.3a and Table F.3b.

^{B)} Details of pollution degrees are given in Annex E.

10.3.3 Creepage distances for functional insulation

The creepage distances for functional insulation shall be not less than the values specified for basic insulation in 10.3.2.

Conformity shall be checked by measurement.

10.3.4 Creepage distances for supplementary insulation

The creepage distances for supplementary insulation shall be not less than the values specified for basic insulation in 10.3.2.

Conformity shall be checked by measurement.

10.3.5 Creepage distances for reinforced insulation

The creepage distances for reinforced insulation shall be not less than twice the distances specified for basic insulation in Table 1B.

Conformity shall be checked by measurement.

10.4 Solid insulation

10.4.1 General

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

NOTE No minimum thickness is specified for solid insulation.

10.4.2 Basic, supplementary and functional solid insulation

Basic, supplementary and functional solid insulation shall each withstand the required impulse voltage declared by the manufacturer of the accessory, as specified in 10.2.2 for Overvoltage Category III.

Conformity shall be checked by tests in accordance with Annex F, followed by tests in accordance with 19.3 using the values given in Table 1C.

10.4.3 Reinforced solid insulation

Reinforced solid insulation shall be dimensioned to withstand the required impulse voltage, but one step higher than that specified for basic insulation in 10.4.2.

Conformity shall be checked by tests in accordance with Annex F, followed by tests in accordance with 19.3 using the values given in Table 1C.

Table 1C Withstand test voltages for solid insulation types

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

11 Accessibility of live parts

11.1 Accessories shall be so constructed and enclosed that there is protection against accidental contact with live parts when the accessories are correctly assembled or mounted and connected for their intended purpose. Live parts shall not be accessible without the use of a tool even after the removal of parts which can be removed without the use of a tool.

When tested using test probe 11 of BS EN 61032:1998 applied with a force of 5_{-1}^0 N in every position which would be possible with the accessories correctly assembled or mounted and connected for their intended purpose and with conductors of the smallest cross-sectional area appropriate to the accessories, there shall be no contact between the test probe and any live part. The test shall be repeated with the accessories fitted with conductors of the largest cross-sectional area appropriate to the accessories.

For accessories incorporating plug-pins and/or socket-contacts not conforming to another British Standard, test probe 11 of BS EN 61032:1998 shall be applied in every possible position when the accessories are in partial or complete engagement with corresponding accessories.

An electrical indicator with a voltage of $45\text{ V} \pm 5\text{ V}$ shall be used to show contact with the relevant part.

11.2 Accessories which incorporate shutters to provide increased protection against electric shock shall be so constructed that live parts protected by the shutters are not accessible with the test pin shown in Figure 8 even after the removal of parts which can be removed without the use of a tool.