

BRITISH STANDARD 3676 : 1963

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**SPECIFICATION FOR
SWITCHES
FOR DOMESTIC AND
SIMILAR PURPOSES**

Confirmed

JUN 1986

BRITISH STANDARDS INSTITUTION

SPECIFICATION FOR

SWITCHES FOR DOMESTIC & SIMILAR PURPOSES

(for fixed or portable mounting)

2 **B.S. 3676 : 1963**

Incorporating amendments issued February 1966 (PD 5741),
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THIS BRITISH STANDARD, having been approved by the Electrical Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 11th November, 1963.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 9,000, fully indexed and with a note of the contents of each, will be found in the BSI Catalogue which may be purchased from BSI Sales Department. The Catalogue may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards:

B.S. 31 Steel conduits and fittings for electrical wiring.

B.S. 738 Definitions for non-ignitable and self-extinguishing properties of solid electrical insulating materials.

B.S. 3955 Electrical controls for domestic appliances.

B.S. 4662 Boxes for the enclosure of electrical accessories.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following B.S.I. references relate to the work on this standard:
Committee references, ELE/4, ELE/4/1
Draft for comment D62/9145

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CO-OPERATING ORGANIZATIONS

The Electrical Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- Admiralty
- *Air Ministry
- Associated Offices' Technical Committee
- *Association of Consulting Engineers (Incorporated)
- Association of Mining Electrical and Chemical Engineers
- *Association of Supervising Electrical Engineers
- *British Electrical and Allied Manufacturers' Association
- British Electrical Development Association
- British Railways Board
- Cable Makers' Association
- Crown Agents for Oversea Governments and Administrations
- Electric Lamp Industry Council
- *Electric Light Fittings Association
- *Electrical Contractors' Associations (Incorporated)
- Electrical Contractors' Association of Scotland
- *Electrical Research Association
- *Electricity Council, Generating Board and the Area Boards in England and Wales
- Electronic Engineering Association
- Engineering Equipment Users' Association
- Independent Cable Makers' Association
- *Institution of Electrical Engineers
- *Ministry of Aviation
- *Ministry of Labour (H.M. Factory Inspectorate)
- Ministry of Power
- *Ministry of Public Building and Works
- Municipal Passenger Transport Association (Incorporated)
- National Inspection Council for Electrical Installation Contracting
- *National Physical Laboratory (D.S.I.R.)
- Oil Companies Materials Association
- *Post Office
- Public Transport Association (Incorporated)
- South of Scotland Electricity Board
- War Office

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the Committee entrusted with the preparation of this standard:

- Conduit Fittings Manufacturers' Association
- E.D.A. Testing House
- Electrical Association for Women
- Fire Offices Committee
- Lloyd's Register of Shipping
- Women's Advisory Committee of the B.S.I

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BRITISH STANDARD SPECIFICATION FOR SWITCHES FOR DOMESTIC AND SIMILAR PURPOSES (FOR FIXED OR PORTABLE MOUNTING)

FOREWORD

This specification has been compiled to meet the request for a comprehensive British Standard for switches for use in domestic, industrial, business and similar buildings, and to co-ordinate the requirements and tests for switches.

Part 1 of this specification gives general requirements for construction, safety and performance applicable to all switches intended for the above uses. Part 2 gives additional requirements for flush type switches and associated switch plates. The requirements for switch boxes are now covered by B.S. 4662. Part 3 gives additional requirements for cord-operated ceiling switches. Attention is drawn to 1*b* and 1*c* of Clause 1, Scope, in which reference is made to switches not included in the scope of this standard.

This British Standard provides for a wide range of current ratings up to and including 45A and most types of mountings in general use, together with requirements for suitable materials and tests for ensuring adequate mechanical and electrical performance for switches under normal conditions of service.

SPECIFICATION

PART 1. GENERAL REQUIREMENTS

SECTION ONE: GENERAL

SCOPE

1. *a.* This British Standard specifies requirements for manually-operated wall, ceiling and appliance switches of the surface, semi-recessed or flush mounting type having a rating up to and including 45A and suitable for use in a.c. and d.c. circuits up to 250 volts, and switches for control of lighting fittings.

*As altered
Dec., 1969*

b. This specification applies to switches for domestic and similar general purposes, for wall or ceiling mounting, for incorporation in cords, or lamp-holders or mounting on or in suitable appliances for which the duty imposed and the operating conditions do not require a performance exceeding that covered by the tests specified in this British Standard.

c. Switches for appliances in which the conditions of service and duty differ from those stated in Clause 1*b* may be within the scope of a separate British Standard, B.S. 3955*.

*As altered
Feb., 1966*

d. This specification does not cover contactors, circuit-breakers, isolating switches, automatic temperature-responsive switches, mercury switches, switches for cooker heating elements, switch fuses or splitter units.

SERVICE CONDITIONS

2. The switches shall be suitable for use under the following conditions of service:

(i) An ambient temperature having a peak value not exceeding 40°C, with an average value not exceeding 35°C over 24 hour periods, but not subject to exposure to direct radiation from the sun or other source of heat likely to raise temperatures above the specified ambient temperature.

NOTE. Under normal conditions of service 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. Meteorological records indicate that temperatures of at least 10 degC below the peak temperature will occur within the 24 hour period, and that the average temperature over any 24 hour period that includes the peak temperature will be at least 5 degC below the peak value.

(ii) An altitude not exceeding 1000 m above sea level.

(iii) An atmosphere not subject to excessive pollution by smoke, chemical fumes, salt-laden spray, prolonged periods of high humidity or other abnormal conditions.

* B.S. 3955, 'Electrical controls for domestic appliances'.

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DEFINITIONS AND TYPES OF SWITCH

3. *a.* For the purposes of this British Standard the following definitions apply; the terms voltage and current imply the r.m.s. values unless otherwise stated:

(i) *Actuating member.* That part which is moved, pulled, pushed or turned to operate the switch mechanism.

(ii) *Appliance.* A device in which electrical energy is converted into light, heat or motion or any other form of energy or is substantially changed in its character.

(iii) *Tumbler switch.* A switch operated by moving an actuating member called a dolly, in a plane which is usually perpendicular to the base of the switch.

(iv) *Quick make and/or quick break switch.* A switch in which a quick make and/or quick break is ensured by means of a spring or otherwise, independently of the speed of operation of the actuating member.

(v) *Pole.* A conducting path in a switch equipped with a set of contacts for making, breaking and carrying the normal current through the switch.

(vi) *Surface switch.* A switch provided with a seating surface so that when mounted, it projects wholly above the surface on which it is mounted.

(vii) *Flush switch.* A switch for mounting behind or incorporated with a switch-plate, the back of the plate being flush with the surface of the wall or enclosure.

(viii) *Semi-recessed switch.* A switch for mounting with its base partially sunk into the surface of a wall or enclosure.

(ix) *Ceiling switch.* A switch for mounting on a ceiling or suitable overhead surface and operated by means of a cord or the like.

(x) *All insulated switch.* A switch of which all exposed parts, except metal screws or rivets, if any, are of insulating material.

(xi) *Switch-plate.* A plate designed to act as the cover of one or more flush switches in a box.

(xii) *Current-carrying parts.* Those metal parts through which the current flows.

(xiii) *Live parts.* Current carrying parts and those metal parts in contact with them during normal service.

(xiv) *Pillar type terminal.* A terminal in which the conductor is secured in a hole or slot by pressure from a screw, the axis of which is at an angle to the conductor.

(xv) *Current rating.* The current stated by the manufacturer as that which the switch will carry and make and break in accordance with the relevant clauses of this specification.

(xvi) *Switch-box.* A box intended to contain one or more switches and to be recessed into or mounted on a wall.

(xvii) *Voltage rating.* The voltage stated by the manufacturer as the highest declared voltage that may be normally associated with the switch.

(xviii) *Type test.* A series of tests of one or more articles, the passing of which is to be accepted as showing that all other articles of identical design, construction and material would pass the same tests.

(xix) *Final sub-circuit.* An outgoing circuit connected to a distribution board and intended to supply electrical energy direct to current-using apparatus.

(xx) *Newton.* Unit of force of Giorgi system (Symbol, N). 1 Newton = 0.102 kg force).

(xxi) *Plate mounting type switches.* Assemblies in which one or more switch mechanisms are attached to the plate and need not be removed from the plate for installation (complete switch units of various types (see Subclause 3b) may be interchangeably mounted to the switch plate). As added
Dec., 1966

(xxii) *Grid mounting type switches.* Assemblies in which switch units of various types (see Subclause 3b) can be interchangeably mounted on an intermediate supporting member or grid, arranged to be fixed to a surface mounting or flush mounting box, and having provision for the cover or switch plate to be attached to the assembly after connection and fixing of the switches. In flush mounting assemblies the grid may also provide means for final adjustment of the position of the switches in relation to the surface of the wall.

b. Types of switches are classified according to the method of connection, as follows:

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Designation	Possible connections	Installation diagrams
(i) Single pole one way switch		
(ii) Double pole one way switch		
(iii) Single pole two way and off switch		
(iv) Single pole two way switch		
(v) Intermediate switch	A	
	B	

SECTION TWO: RATING AND MARKING

CURRENT RATINGS

4. Standard current ratings are given in Table 1. Switches with other current ratings are acceptable provided that they comply in all other respects with this specification.

TABLE 1. STANDARD CURRENT RATINGS

Amperes
1
2
3
5
10
13
15
20
30
45

*As added
Dec., 1969*

MARKING

5. *a.* Every switch shall be indelibly marked with the following particulars:

- (i) The number of this British Standard*.
- (ii) Manufacturer's name or trade mark.
- (iii) Rated current in amperes.
- (iv) Rated voltage in volts.

*As altered
Feb., 1966*

NOTE. In cases where there is insufficient space on the switch, the markings (i) and (ii) can be shown on the carton or in literature.

* The mark 'B.S. 3676' on the product is a claim by the manufacturer that it complies with the requirements of the standard.

The British Standards Institution is the owner of the registered certification trade mark shown below. This mark can be used only by manufacturers licensed under the certification mark scheme operated by the B.S.I. The presence of this mark on a product is an assurance that the goods have been produced to comply with the requirements of the British Standard under a system of supervision, control and testing operated during manufacture and including periodical inspections at the manufacturers' works in accordance with the certification mark scheme operated by the B.S.I.

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b. Switches not suitable for d.c. should be marked 'a.c.' or 'a.c. only'.

*As added
June, 1969*

Switches intended for use in a.c. inductive circuits or fluorescent-lamp circuits shall be marked with an 'X' following (iii) the rated current in amperes, e.g. 10A indicates a switch with a resistive rating only or 10AX indicates a switch for use on an inductive or fluorescent-lamp or resistive load of 10A.

*As altered
Feb., 1966*

Switches having alternative ratings shall be marked accordingly. Where the intended connections are not self evident, the terminal positions shall be appropriately indicated.

SECTION THREE: REQUIREMENTS

PROTECTION AGAINST CORROSION

6. Switch parts made of ferrous metal shall be rendered sufficiently rustproof to meet the requirements of Clause 25. In the case of springs other than those used as fixing devices, and other small moving parts, a layer of grease is deemed to provide adequate protection against rust.

CONSTRUCTION OF ENCLOSURES

7. *a.* Switches shall be provided with complete enclosures which shall afford adequate protection against inadvertent contact with all live parts, except that switches designed to be installed in flush mountings or in suitable enclosures in appliances, or other equipment need not be provided with such enclosures.

For switches provided with enclosures, protection against inadvertent contact with all live parts shall be checked using test finger I of BS 3042.

NOTE. Additional requirements for switches for use with enclosures to B.S. 4662* are specified in Part 2 of this specification.

b. Enclosures of metal or insulating material shall be sufficiently strong to resist mechanical damage under normal service conditions and be so constructed that they cannot readily be deformed and brought into contact with, or allow access to, live parts. They shall also be tested in accordance with Clause 26.

c. Enclosures designed and constructed for use with flexible cords and cables, shall have suitable holes or openings for accepting, without damage to the insulation or sheathing, the cord or cables necessary to carry the rated current of the switch.

Provision shall be made to enable the ends of the conductors and the terminals to which they are connected, to be relieved from strain including twisting, when properly installed, by means of a cord-grip. Cord-grips shall be tested in accordance with Clause 29.

Where it is intended that unswitched conductors in a multicore flexible cord or cable should pass through the enclosure, adequate space shall be provided to

* See Foreword.

accommodate the uncut conductors; alternatively appropriate terminals and/or links shall be provided.

d. Where the enclosure is in the form of a switch box the thickness of the walls and base of the enclosure excluding provisions for knock-outs for cable entry shall be not less than that specified in Table 2 and the following four paragraphs.

TABLE 2. WALL THICKNESS OF BOXES AND ENCLOSURES

Material	Up to 16 mm internal depth	Above 16 mm internal depth
	mm	mm
Steel	0.9 (1.0 nominal)	1.1 (1.25 nominal)
Pressure diecast zinc	1.5	1.5
Pressure diecast aluminium	2.0	2.0
Other cast metal	2.0	2.3
Insulating material	1.5	2.0

Steel enclosures constructed in metal less than 1.5 mm thick and above 16 mm internal depth shall have the sides tied at the corners or joined together to ensure adequate strength and rigidity.

All metal tapped to receive a screw shall have sufficient thickness to allow not less than two full threads*. In moulded insulating materials there shall be not less than four full threads. The fixing holes in boxes made of insulating material shall be situated in adequately strengthened sections of the moulding.

An enclosure intended for surface mounting shall not have holes or gaps in its sides other than those expressly provided for cable entry.

Where a particular British Standard is applicable the enclosure shall then comply with that specification, e.g. flameproof enclosures complying with B.S. 229, 'Flameproof enclosure of electrical apparatus'.

NOTE. This clause does not apply to separate mounting blocks and pattresses, which are outside the scope of this specification.

* Special attention is drawn to this requirement in cases where the wall thickness is less than 1.1 mm.

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MOUNTING OF LIVE PARTS

8. *a.* Live parts shall be mounted on insulating material:

(i) that is sufficiently non-hygroscopic to comply with the tests specified in Clause 25;

(ii) that is resistant to softening by heat when tested in accordance with Clause 27; and

(iii) that is resistant to decomposition by abnormal heat and fire when tested in accordance with Clause 28.

b. Internal linings, barriers and the like of insulating material which are in contact with live parts, and external parts of switches, shall be moisture proof. Compliance shall be checked in accordance with the tests laid down in Clause 25.

c. If the design of the switch is such that an arc may impinge on the base, the base shall not char or otherwise deteriorate sufficiently to impair the safety or the performance of the switch. Compliance shall be checked in accordance with the tests laid down in Clauses 21, 22 and 23.

d. Where it is intended that the fixed wiring conductors pass through insulating supports to the terminals, each hole shall be large enough for the conductors, complete with functional insulation, necessary to carry the rated current of the switch, to pass through, any outer sheath or braiding having been removed if necessary.

For wall switches rated up to and including 15 amp, provision shall be made for connecting to each terminal two insulated conductors of a rating equivalent to the switch.

MOUNTING OF SWITCHES

9. *a.* A surface type switch or its mounting plate shall be provided with at least two fixing holes which shall be suitable for the reception of fixing screws of adequate size.

b. Surface type switches shall be designed for mounting on a flat surface.

c. Flush type switches shall be provided with means for mounting in a switch box or have means provided for flush mounting within a suitable enclosure.

d. When a flush type switch is provided with mounting lugs, strap or frame, these shall be of robust construction.

Compliance shall be checked by the mechanical strength test of Clause 26

e. Flush type switches shall be so designed that metal switch plates, when used and installed in the intended manner, will be electrically connected to the metal switch box or metal enclosure (see Clause 14).

TERMINALS

10. *a.* Terminals shall be of suitable non-ferrous metal containing not less than 54 per cent copper and of such a design and proportion that under normal