

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 2
AMENDEMENT 2

**Switches for appliances –
Part 1: General requirements**

**Interrupteurs pour appareils –
Partie 1: Règles générales**

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

W

FOREWORD

This amendment has been prepared by subcommittee 23J: Switches for appliances, of IEC technical committee 23: Electrical accessories.

The text of this amendment is based on the following documents:

FDIS	Report on voting
23J/298/FDIS	23J/299/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The contents of the corrigendum of January 2009 have been included in this copy.

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Add the titles of the new Annexes U and V as follows:

Annex U (normative) Dimensions of tabs forming part of a switch

Annex V (informative)

Page 11

FOREWORD

Replace in the listing showing the differences existing in some countries, "Table 16" by "Table 17" in two places.

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1 Scope

Replace in Subclause 1.1, first paragraph, "440 V" by "480 V".

Replace Note 6 of Subclause 1.1 by the following:

NOTE 6 This part of IEC 61058 is applicable when testing incorporated switches. When other types of switches for appliances are tested, this part is applicable together with the relevant Part 2 of IEC 61058.

This part of IEC 61058 may, however, be applied for other types of switches which are not mentioned in a relevant Part 2 of IEC 61058, provided that the electrical safety is not disregarded.

Replace Subclause 1.4 by the following:

1.4 This standard also applies to switches for appliances such as

- switches intended to be connected to a flexible cable (cord switches) for which, however, particular requirements are given in IEC 61058-2-1;
NOTE In this document, the word "cable" means "cable or cord".
- switches integrated in an appliance (integrated switches);
- switches intended to be mounted separately from the appliance (independently mounted switches) other than those within the scope of IEC 60669-1, for which, however, particular requirements are given in IEC 61058-2-4;
- change-over selectors for which, however, particular requirements are given in IEC 61058-2-5.

Delete the Note in Subclause 1.5.

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2 Normative references

Delete reference IEC 60228A.

Replace references IEC 60364-4-41, IEC 60364-4-442 and IEC 60364-4-443 (including the footnotes) by the following:

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

Replace "IEC 60417-1:1998, Graphical symbols for use on equipment – Part 1: Overview and application" by

IEC 60417, *Graphical symbols for use on equipment*

Replace "IEC 60695-2-1 (all sheets), Fire hazard testing – Part 2-1: Test methods" by:

IEC 60695-2-10:2000, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2000, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

IEC 60695-2-12, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability test method for materials*

IEC 60695-2-13, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignitability test method for materials*

Add the following references to the list:

IEC 60065:2001, *Audio, video and similar electronic apparatus – Safety requirements* ¹⁾
Amendment 1 (2005)

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

IEC 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61058-2-5, *Switches for appliances – Part 2-5: Particular requirements for change-over selectors*

IEC 61210:1993, *Connecting devices – Flat quick-connect terminations for electrical copper conductors - Safety requirements*

CISPR 14-1, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

CISPR 15:2005, *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment* ²⁾
Amendment 1 (2006)

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3 Definitions

Replace in 3.2.2 the reference to IEC 60364-4-41 by the reference to IEC 61140.

Replace in 3.6.12 the second paragraph by the following:

“Examples of tabs are shown in IEC 61210 and Annex U.”

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5 General notes on tests

Replace in 5.5.1 the fourth paragraph by the following:

“the tests being carried out on d.c., provided that the d.c. voltage and current ratings for the classified type of load (see 7.1.2) are equal to, or greater than, the a.c. ratings.”

1) A consolidated edition 7.1 (2005) exists, that includes IEC 60065 (2001) and its Amendment 1.

2) A consolidated edition 7.1 (2007) exists, that includes CISPR 15 (2005) and its Amendment 1.

Replace in Table 1 the title of the 3rd column by the following:

“The number of the specimen which is submitted to the test ¹⁾”

Replace, in Table 1, Note 2) by the following:

“2) Three additional new specimens may be required according to 11.1.3.4 or Table 12, Footnote 2).”

Add in Table 1 a new note 6):

“6) Additional samples may be required for destructive tests in Clauses 20, 21 and 23.”

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6 Rating

Replace Subclause 6.1 by the following and delete the Note:

6.1 The maximum rated voltage is 480 V.

Replace Subclause 6.3 by the following:

6.3 The maximum rated current is 63 A.

Compliance of 6.1 to 6.3 is checked by inspection in conjunction with Clause 8.

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7 Classification

Replace Subclause 7.1.3.2 by the following:

7.1.3.2 – switches at which the complete switch, including the actuating member, is intended to be used in an ambient temperature higher than 55 °C or lower than 0 °C, or both:

- preferred values of maximum ambient temperature are 85 °C, 100 °C, 125 °C and 150 °C;
- preferred values of minimum ambient air temperature are – 10 °C, – 25 °C and – 40 °C;
- values differing from these preferred values are allowed, as long as the values are multiples of 5 °C.

Delete the 2nd dashed item in 7.1.3.3.

Delete the 2nd sentence of the note of 7.1.7.

Replace Subclause 7.1.9 by the following:

7.1.9 According to the glow wire temperature:

7.1.9.1 – 650 °C;

7.1.9.2 – 750 °C;

7.1.9.3 – 850 °C.

NOTE When selecting the declared glow wire temperature, consideration should be given to the requirements of the relevant appliance or equipment standard.

Replace Subclause 7.1.17 by the following:

7.1.17 According to test conditions:

7.1.17.1 – functional test conditions for electronic switches with thermal current or maximum rated resistive current;

NOTE This test condition reflects the proper functioning of the switch. This test does not simulate the actual load of the end application.

7.1.17.2 – simulated test conditions for electronic switches with type of load as classified in 7.1.2;

NOTE This test condition reflects the proper functioning of the switch. It also simulates all conditions of the end application.

7.1.17.3 – specific test conditions of end application for electronic switches, i.e. in or together with the appliance and under the cooling conditions of the appliance;

7.1.17.4 – test conditions for electronic switches according to duty-type;

Add the following new subclause:

7.1.17.5 – test conditions for switches having a contact making and breaking speed independent from the speed of actuation.

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Delete in Table 2, classification 7.1.13.3.9, the explanation “A = Auxiliary switch”

Replace Subclause 7.2 by the following:

7.2 Classification of terminals

7.2.1 – terminals intended for the connection of unprepared conductors and not requiring the use of any special purpose tool;

NOTE Twisting of a stranded conductor to consolidate the end is not considered as special preparation.

7.2.2 – terminals intended for the connection of unprepared conductors and not requiring the use of any special purpose tool but with a restricted clamping range and /or wire type;

7.2.3 – terminals intended for the connection of prepared conductors and/or requiring the use of a special purpose tool;

7.2.4 – terminals suitable for the connection of supply cables or cords with unprepared conductors and not requiring the use of any special purpose tool;

7.2.5 – terminals suitable for the connection of supply cables or cords with prepared conductors and/or requiring the use of a special purpose tool;

7.2.6 – terminals suitable for the interconnection of two or more conductors;

7.2.7 – terminals intended for the connection of rigid, solid conductors;

7.2.8 – terminals intended for the connection of rigid, solid and stranded conductors;

7.2.9 – terminals intended for the connection of flexible conductors;

7.2.10 – terminals suitable for the connection of both flexible and rigid (solid and stranded) conductors;

7.2.11 – solder terminals intended for soldering by hand with a soldering iron;

7.2.12 – solder terminals intended for soldering with a solder bath;

7.2.13 – solder terminals with provisions for securing the conductor by mechanical means and providing circuit continuity by soldering;

7.2.14 – solder terminals without provisions for securing the conductor by mechanical means. The circuit continuity is ensured by soldering solely.

7.2.15 – According to the resistance to soldering heat:

7.2.15.1 – solder terminals type 1;

7.2.15.2 – solder terminals type 2.

8 Marking and documentation

Replace rows 3.2, 4.5, 4.7, 4.16, 4.17, 5.2 and 9.2 of Table 3 by the following:

3.2	Ambient air temperature for electronic switches – cord switches and independently mounted switches if different from 0 °C to 35 °C – other switches, if different from 0 °C to 55 °C	7.1.3.4.1 or 7.1.3.4.2 7.1.3.2 or 7.1.3.3	Ma Ma	Do Do
4.5	For circuits for resistive and motor load with a power factor not less than 0,6, the rated resistive current and rated motor current and, for electronic switches, the minimum current (or power)	7.1.2.2	Ma/Do	Do
4.7	For circuits for tungsten filament lamp load, the rated resistive current and alternatively either the peak inrush lamp current or the rated lamp current, and, for electronic switches, the minimum current (or power)	7.1.2.4	Ma/Do	Do
4.16	For circuits for an inductive load with a power factor not less than 0,6	7.1.2.8	Do	Do
4.17	For circuits for specific load of motor with a locked rotor and with a power factor not less than 0,6	7.1.2.9	Do	Do
5.2	Terminals for the connection of earthing conductors shall be marked with the protective earth symbol	8.3	Ma	Ma
9.2	Glow-wire temperature, 650 °C	7.1.9.1	---	Do

Add the following rows to Table 3:

5.10	For tabs with dimensions other than those according to IEC 61210, the appropriate female connector (size, material, insulation if applicable, etc).	11.2.5.1	Do	Do
9.3	Glow-wire temperature, 750 °C	7.1.9.2	---	Do
9.4	Glow-wire temperature, 850 °C	7.1.9.3	---	Do
12.1	Test conditions for electronic switches	7.1.17.1 – 7.1.17.4	Do	Do
12.2	Test condition for switches having a contact making and breaking speed independent from the speed of actuation	7.1.17.5	Do	Do

Delete in Subclause 8.3 the “earth symbol”.

Add in Subclause 8.3 the symbol for tungsten filament lamp:

Symbol for tungsten filament lamp load..... ⊗

Replace, in Note 1 of Subclause 8.3, “IEC 60417-1” by “IEC 60417”.

Delete, in Subclause 8.3, Note 2 and the two references to Note 2.

Replace Subclause 8.4.3 by the following:

8.4.3 For circuits for resistive load and for tungsten filament lamp load, the marking shall be alternatively a or b:

NOTE The marking "a" is not recommended for new design.

- a) the peak surge current for tungsten filament lamp load is placed between square brackets and follows immediately the rated current for resistive load. The symbol for the nature of the supply is placed after the current and voltage ratings.

Resistive current, peak surge current, voltage and nature of supply may be indicated accordingly as follows:

6[16] A 250 V ~

or 6[16] / 250 ~

or $\frac{6[16]}{250}$ ~

- b) the rated current for tungsten filament lamp load is placed after the symbol for tungsten filament lamp and follows immediately the rated current for resistive load. The symbol for the nature of the supply is placed after the current and voltage ratings.

Resistive current, rated current for tungsten filament lamp load, voltage and nature of supply may be indicated accordingly as follows:

6 ⊗ 1 A 250 V ~

or 6 ⊗ 1 / 250 ~

or $\frac{6 \otimes 1}{250}$ ~

Move the last paragraph of Subclause 8.4.3 ("In cases where the switch...") to Subclause 8.4.

Delete Subclauses 8.4.5 and 8.4.6.

Renumber Subclause "8.4.7" as "8.4.5".

Replace Subclause 8.5 by the following:

8.5 Information about rated ambient temperature shall be provided by indicating the lower temperature value preceding the letter "T", the higher temperature value following the letter "T". If no lower temperature value is given, the lower temperature value is 0 °C:

25 T 85 (meaning –25 °C up to +85 °C)

T 85 (meaning 0 °C up to +85 °C)

If no information is given, for mechanical switches and electronic switches the rated ambient temperature range is 0 °C up to 55 °C.

NOTE For electronic cord switches and electronic independently mounted switches, the rated ambient temperature range is 0 °C up to 35 °C.

Replace Subclause 8.6 by the following:

8.6 The symbol for Class II equipment or appliance shall not be used for switches (symbol IEC 60417-5172 (2003-02)).

Add, in 8.9 b), “(petroleum ether)” after the words “petroleum spirit”.

Delete the Note in Subclause 8.9.

Replace Subclause 8.11 by the following:

8.11 For electronic cord switches and electronic independently mounted switches, if there are more than two terminals, the load terminal shall be marked with an arrow pointing away from the terminal or, if relevant, with the symbol mentioned in 8.3 for terminals for regulated load and any other terminals of electronic independently mounted switches shall be marked corresponding to the installation instructions.

Unless the installation of the electronic switch is made clear by the markings of the terminals, a wiring diagram shall be provided with each switch.

9 Protection against electric shock

Add the following sentence to the penultimate paragraph of 9.1.1:

“The protective impedances shall be so designed and arranged that along their surfaces and between their surfaces, the requirements according to Clause 20 are met.”

Replace Subclause 9.2 by the following:

9.2 An actuating member shall be fixed adequately if the removal of the actuating member gives access to live parts. An actuating member is considered to be fixed adequately if access to live parts can be gained only by breaking or cutting or by dismantling with the aid of a tool.

Compliance is checked by inspection, during the tests according to 18.4 and by applying the test probe B according to IEC 61032 without force.

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10 Provision for earthing

Replace in Subclause 10.5.1 the subclause references “11.1.1 and 11.1.2” by “11.1 and 11.2”.

11 Terminals and terminations

Replace Clause 11 (including tables) by the following:

11 Terminals and terminations

11.1 Terminals for unprepared copper conductors

11.1.1 Common requirements

11.1.1.1 Terminals shall be such that connection is made by means of screws, nuts, springs, wedges, eccentrics, cones or equally effective means or methods, but without requiring a special-purpose tool for connection or disconnection.

Compliance is checked by inspection.

11.1.1.2 Terminals shall be fixed in such a way that they will not work loose when the clamping means are tightened or loosened.

This requirement does not preclude floating terminals or terminals mounted on floating elements, such as those used in some stack-type switches, provided their movement does not impair the correct operation of the switch.

Compliance is checked by fastening and loosening 10 times a conductor having the maximum or declared cross-sectional area specified in Table 4, for screw-type terminals the torque applied being the torque specified in Table 20.

11.1.1.3 Terminals shall be designed or placed so that a conductor cannot slip out while being connected or while the switch is being operated as intended.

Compliance is checked by the following tests:

- a) *terminals are fitted with conductors of maximum or declared cross-sectional areas according to Table 4 and screw type terminals are tightened with the torque according to Table 20. The test is repeated with the terminal fitted with conductors of minimum cross-sectional area according to Table 4;*
- b) *for terminals intended for the connection of two or more conductors, the test is repeated with the terminal fitted with the declared numbers of conductors;*
- c) *before insertion into the terminal, wires of rigid conductors are straightened and flexible conductors are twisted in one direction, so that a uniform twist of one complete turn in a length of approximately 2 cm is obtained;*
- d) *the conductor is inserted into the terminal over a length equal to the minimum distance prescribed or, if no distance is prescribed, until an end-stop is reached or until the conductor just projects from the far side of the terminal and in the position most likely to assist a strand to escape;*
- e) *for flexible conductors the test is repeated using a new conductor which is twisted as prescribed above, but in the opposite direction.*

After the test, the conductor shall not have escaped into or through the gap between the clamping means and retaining device.

Table 4 – Resistive current carried by the terminal and related cross-sectional areas of terminals for unprepared conductors

Resistive current carried by the terminal A		Flexible conductors				Terminal size
		Cross-sectional areas mm ²				
Over	Up to and including	Minimum	Medium	Maximum		
–	3		0,5	0,75	0	
3	6	0,5	0,75	1,0	0	
6	10	0,75	1,0	1,5	1	
10	16	1,0	1,5	2,5	2	
16	25	1,5	2,5	4,0	3	
25	32	2,5	4,0	6,0	4	
32	40	4,0	6,0	10,0	5	
40	63	6,0	10,0	16,0	6	

Resistive current carried by the terminal A		Rigid conductors			Terminal size
		Cross-sectional areas mm ²			
Over	Up to and including	Minimum	Medium	Maximum	
–	3	0,5	0,75	1,0	0
3	6	0,75	1,0	1,5	1
6	10	1,0	1,5	2,5	2
10	16	1,5	2,5	4,0	3
16	25	2,5	4,0	6,0	4
25	32	4,0	6,0	10,0	5
32	40	6,0	10,0	16,0	6
40	63	10,0	16,0	25,0	7

Table 5 – (Void)

11.1.1.4 Terminals suitable for the connection of flexible conductors shall be located or shielded so that, if a wire of a flexible conductor escapes from a terminal when the conductors are fitted, there is no risk of contact between live parts and accessible metal parts, and, for switches for Class II appliances, between live parts and metal parts separated from accessible metal parts by supplementary insulation only.

Furthermore, there shall be no risk of short-circuiting those terminals which are electrically connected together by switch action.

Compliance is checked by inspection and by the following test:

- a) *at the end of a flexible conductor having the minimum or declared cross-sectional area specified in Table 4, the insulation is removed for a length of 8 mm. One wire of the flexible conductor is left free and the remainder are fully inserted into the terminal and clamped;*
- b) *the free wire is bent, without tearing the insulation back, in every possible direction, but without making sharp bends around barriers.*