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Responsible committee: PEL/23 Electrical accessories

Interested committees:

Title: BS EN IEC 63418 Fixed accessories intended for household and similar purposes that supply power through an interface

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

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Responsible Committee Secretary: **Mr Simon Bounds (BSI)**Direct tel: **0208 996 7281**E-mail: simon.bounds@bsigroup.com

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



23B/1502/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 63418 ED1

DATE OF CIRCULATION:

2024-02-16

CLOSING DATE FOR COMMENTS:

2024-05-10

SUPERSEDES DOCUMENTS:

23B/1359/NP, 23B/1366B/RVN

IEC SC 23B : PLUGS, SOCKET-OUTLETS AND SWITCHES

SECRETARIAT:

Italy

SECRETARY:

Mr Cristiano Masini

OF INTEREST TO THE FOLLOWING COMMITTEES:

PROPOSED HORIZONTAL STANDARD:



Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☒ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☒ SAFETY

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "In Some Countries" clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

Fixed accessories intended for household and similar purposes that supply power through an interface

NOTE FROM TC/SC OFFICERS:

Wireless charger planned at NP stage are not considered for the time being. They will be added during maintenance if the market relevance of such wall mounting products has increased.

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FIXED ACCESSORIES INTENDED FOR HOUSEHOLD AND SIMILAR PURPOSES THAT SUPPLY POWER THROUGH AN INTERFACE**1 Scope**

This document applies to fixed accessories designed to supply power at Extra Low Voltage through a USB connected to a fixed installation not exceeding 250 V AC or to an extra low voltage DC local / private distribution network not exceeding 60 V, intended for household and similar purposes, either indoors or outdoors.

This document covers only those requirements for mounting boxes which are necessary for the tests on the accessory.

NOTE 1: Requirements for general purpose mounting boxes are given in IEC 60670.

This document defines the safety and EMC requirements for accessories that supply power through an interface.

Specifications, performance or dimensional requirements of the USB technology are not covered by this standard; these are defined in the relevant part(s) of IEC 62680.

NOTE 2: Requirements concerning wireless interface are under consideration.

The document does not apply to:

- Socket-outlets incorporating USB power supply, covered by IEC 60884-3-1;
- Transformers, reactors, power supply units and combinations thereof, covered by IEC 61558 series;
- Power electronic converter systems and equipment covered by IEC 62477-1;
- Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks covered by IEC 61980 series;
- Electric Vehicles conductive power supply system covered by IEC 61851 series;
- Appliance couplers for household and similar general purposes covered by IEC 60320 series;
- DC plugs and socket-outlets systems covered by IEC / TR 62735 series;
- Luminaires couplers covered by IEC 61995 series;
- Equipment in the field of audio/video and similar technology, information technology and communication technology covered by IEC 62368 series.
- Power supply using communication cabling such as PoE.

Accessories complying with this document are suitable for use at ambient temperatures not normally exceeding +40 °C, but their average temperature over a period of 24 h does not exceed +35 °C, with a lower limit of the ambient air temperature of –5 °C.

This document gives additional requirements for accessories provided with insulation-piercing terminals, see Annex C (normative).

2 Normative references

IEC 60068-2-75:2014, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60127 (all parts), *Miniature fuses*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

- 294 IEC 60317-0-1:2013, *Specifications for particular types of winding wires – Part 0-1: General*
295 *requirements – Enamelled round copper wire*
296 IEC 60317-0-1:2013/AMD1:2019
- 297 IEC 60423:2007, *Conduit systems for cable management – Outside diameters of conduits for*
298 *electrical installations and threads for conduits and fittings*
- 299 IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
300 IEC 60529:1989/AMD1:1999
301 IEC 60529:1989/AMD2:2013
- 302 IEC 60669 (all parts), *Switches for household and similar fixed-electrical installations*
- 303 IEC 60670 (all parts), *Boxes and enclosures for electrical accessories for household and similar*
304 *fixed electrical installations*
- 305 IEC 60670-1, *Boxes and enclosures for electrical accessories for household and similar fixed*
306 *electrical installations – Part 1: General requirements*
- 307 IEC 60695-2-10:2021, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods –*
308 *Glow-wire apparatus and common test procedure*
- 309 IEC 60695-2-11:2021, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods –*
310 *Glow-wire flammability test method for end products (GWEPT)*
- 311 IEC 60998-2-1, *Connecting devices for low-voltage circuits for household and similar purposes*
312 *– Part 2-1: Particular requirements for connecting devices as separate entities with screw-type*
313 *clamping units*
- 314 IEC 60998-2-2, *Connecting devices for low-voltage circuits for household and similar purposes*
315 *– Part 2-2: Particular requirements for connecting devices as separate entities with*
316 *screwless-type clamping units*
- 317 IEC 60717:2012, *Method for the determination of the space required by capacitors and resistors*
318 *with unidirectional terminations*
- 319 IEC 61000-3-2, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic*
320 *current emissions (equipment input current ≤ 16 A per phase)*
- 321 IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement*
322 *techniques – Electrostatic discharge immunity test*
- 323 IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement*
324 *techniques – Radiated, radio-frequency, electromagnetic field immunity test*
- 325 IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement*
326 *techniques – Electrical fast transient/burst immunity test*
- 327 IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement*
328 *techniques – Surge immunity test*
- 329 IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement*
330 *techniques – Immunity to conducted disturbances, induced by radio-frequency fields*
- 331 IEC 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement*
332 *techniques – Power frequency magnetic field immunity test*
- 333 IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement*
334 *techniques – Voltage dips, short interruptions and voltage variations immunity tests for*
335 *equipment with input current up to 16 A per phase*
- 336 IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*
- 337 IEC 61058 (all parts), *Switches for appliances*

IEC 62368-1:2023, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*

IEC 62368-3:2017, *Audio/video, information and communication technology equipment – Part 3: Safety aspects for DC power transfer through communication cables and ports*

IEC 62479:2010, *Assessment of the compliance of low-power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)*

IEC 62680 (all parts), *Universal serial bus interfaces for data and power*

IEC 62680-1-2, *Universal serial bus interfaces for data and power – Part 1-2: Common components – USB Power Delivery specification*

IEC 62680-1-3, *Universal serial bus interfaces for data and power – Part 1-3: Common components – USB Type-C® Cable and Connector Specification*

IEC 62911, *Audio, video and information technology equipment – Routine electrical safety testing in production*

CISPR 32, *Electromagnetic compatibility of multimedia equipment – Emission requirements*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

NOTE 1 Where the terms "voltage" and "current" are used, they imply RMS values, unless otherwise specified.

NOTE 2 Throughout this document the word "earthing" is used for "protective earthing" unless otherwise stated.

3.1 mounting box

box intended for mounting in or on a wall, floor or ceiling, etc., for flush or surface application, intended for use with fixed accessory

3.2 terminal

insulated or non-insulated connecting device intended for reusable electrical connection of the external conductors

3.3 termination

insulated or non-insulated connecting device intended for non-reusable electrical connection of the external conductors

3.4 clamping unit

part(s) of the terminal necessary for the mechanical clamping and the electrical connection of the conductor(s), including the parts which are necessary to ensure correct contact pressure

[SOURCE: IEC 60050-442:1998, 442-06-12]

3.5 screw-type terminal

terminal for the connection and subsequent disconnection of one conductor or the interconnection and subsequent disconnection of two or more conductors, the connection being made, directly or indirectly, by means of screws or nuts of any kind

Note 1 to entry: Term entries 3.6 to 3.9 are examples of screw-type terminals.

3.6 pillar terminal

screw-type terminal 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 to entry: 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 to entry: Examples of pillar terminals are shown in Figure 5.

3.7 stirrup terminal

pillar terminal where the clamping pressure may be applied indirectly by an intermediate clamping member when the screw is tightened

Note 1 to entry: Examples of stirrup terminals are shown in Figure 5.

3.8 screw head terminal

screw-type terminal in which the conductor is clamped under the head of the screw

Note 1 to entry: The clamping pressure may be applied directly to the head of a screw or through an intermediate part, such as a washer, clamping plate or anti-spread device.

Note 2 to entry: Examples of screw head terminals are shown in Figure 6.

3.9 stud terminal

screw-type terminal in which the conductor is clamped under a nut

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

Note 2 to entry: Examples of stud terminals are shown in Figure 6.

3.10 screwless-type terminal

connecting device for the connection and subsequent disconnection of a rigid (solid or stranded) or flexible conductor or the interconnection of two or more conductors, capable of being dismantled, the connection being made, directly or indirectly, by means of springs, parts of angled, eccentric or conical form, etc., without special preparation of the conductor concerned, other than removal of insulation

3.11 thread-forming screw

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

Note 1 to entry: An example of a thread-forming screw is shown in Figure 1.

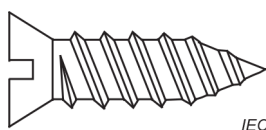


Figure 1 – Example of thread-forming screw

3.12 thread-cutting screw

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

Note 1 to entry: An example of a thread-cutting screw is shown in Figure 22.

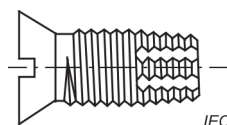


Figure 2 – Example of thread-cutting screw

3.13 rated voltage

voltage assigned by the manufacturer for a specified operating condition of an accessory

[SOURCE: IEC 60050-442:1998, 442-01-03, modified – The domain "(for accessories)" has been omitted.]

3.14 rated current

current assigned by the manufacturer for specified operating condition of an accessory

Note 1 to entry: Examples of the operating conditions are ambient condition, characteristics of the power supply, duty cycle or duty type.

[SOURCE: IEC 60050-442:1998, 442-01-02, modified – The domain "(for accessories)" has been omitted and the note to entry added.]

3.15 type test

test of one or more devices made to a certain design to show that the design meets certain specifications

3.16 routine test

test to which each individual device is subjected during and/or after manufacture to ascertain whether it complies with certain criteria

3.17 base

part of the accessory retaining current-carrying parts in position

3.18 live part

conductor or conductive part intended to be energized in normal use, including a neutral conductor, but by convention not a PEN conductor

[SOURCE: IEC 60050-826:2004, 826-12-08, modified – "operation" has been replaced with "use"; "or PEM conductor or PEL conductor" and the note to entry omitted.]

3.19 main part

assembly consisting of the base and other parts

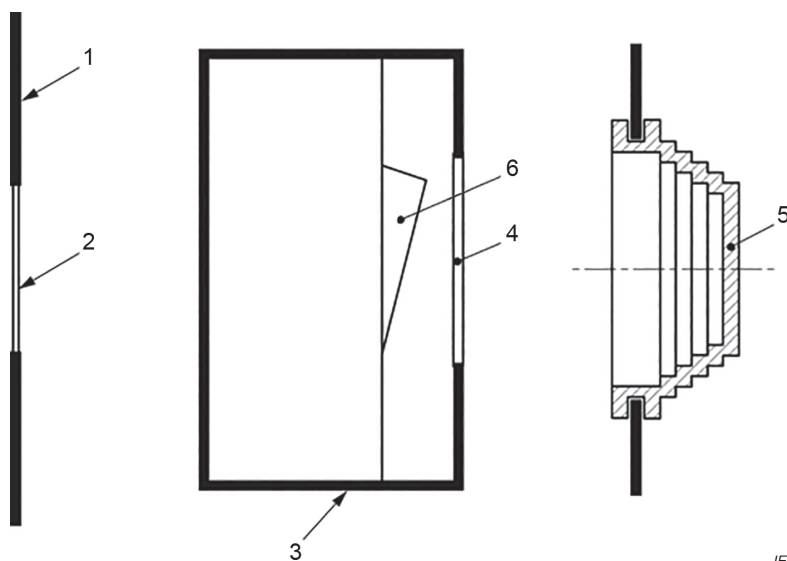
Note 1 to entry: This assembly is not intended to be dismantled at any time after manufacture.

3.20 grommet

component used to support and protect the cable or conduit at the point of entry

Note 1 to entry: A grommet may also prevent the ingress of moisture or contaminants.

Note 2 to entry: Examples of membranes and grommets are shown in Figure 3.

**Key**

- 1 Box
- 2 Entry membrane
- 3 Envelope
- 4 Protective membrane
- 5 Grommet
- 6 Accessory

Figure 3 – Examples of membranes and grommets

3.21 entry membrane

component or integral part of the accessory used to protect the cable which may be used to support the cable or conduit at the point of entry

Note 1 to entry: An entry membrane may also prevent the ingress of moisture or contaminants and may be part of a grommet.

Note 2 to entry: Examples of membranes and grommets are shown in Figure 3.

3.22 protective membrane

component or integral part of the accessory that is not intended to be penetrated in normal use and is intended to provide protection against ingress of water or solid objects and/or to allow the operation of an accessory

Note 1 to entry: Examples of membranes and grommets are shown in Figure 3.

3.23 pilot light

device incorporating a light source either integral or designed to be installed with the accessory and intended to give for example an indication of the accessory state or to indicate the accessory location

3.24 protective earthing**protective grounding, (US)**

earthing for purposes of electrical safety

[SOURCE: IEC 60050-195:2021, 195-01-11]

3.25**universal serial bus****USB**

standardized bus using serial transmission

[SOURCE: IEC 60050-171:2019, 171-04-48, modified – Note 1 to entry is deleted.]

3.26**USB port**

IEC 62680 series female connector used to supply power to a connected portable device

3.27**SELV**

electric system in which the voltage cannot exceed the value of extra-low voltage:

– under normal conditions and

– under single fault conditions, including earth faults in other electric circuits

Note 1 to entry: SELV is the abbreviation for safety extra-low voltage.

[SOURCE: IEC 60050-826:2004, 826-12-31, modified – "SELV system" has been replaced with "SELV".]

3.28**hazardous live part**

live part with a voltage higher than 25 V AC or 60 V DC ripple free in dry conditions or 12 V AC or 30 V DC in wet conditions

Note 1 to entry: Ripple free is conventionally an RMS ripple voltage not more than 10 % of the DC component.

3.29**rated output voltage**

voltage assigned by the manufacturer to USB port

3.30**rated output current**

current assigned by the manufacturer to USB port

3.31**rated output power**

electric power output assigned by the manufacturer to USB port

Note 1 to entry: The rated output power is expressed in W.

3.32**maximum output power**

highest output power attainable from the accessory

Note 1 to entry: The maximum output power can be different from the rated output power.

Note 2 to entry: The maximum output power can be shared or cumulated through several ports.

3.33**loop terminal**

terminal intended for the interconnection of conductors

3.34**working voltage**

highest RMS value of the AC or DC voltage which may occur (locally) across any insulation at rated supply voltage under no-load or normal operating conditions, transients being disregarded

Note 1 to entry: When considering the insulation system between windings not intended to be connected together, the working voltage is considered to be the highest voltage occurring on any of these windings.

[SOURCE: IEC 60050-851:2008, 851-12-31 Modified]

3.35**connecting leads**

insulated internal conductors that are brought out from the accessory for connection to the main supply

3.36**looping through function**

function of the line terminal or both the line and the neutral terminals to power other devices in the circuit of the installation

4 General requirements

Accessories and boxes of surface mounting accessories shall be so designed and constructed that, in normal use, their performance is reliable, and safety is achieved by reducing risk to a tolerable level, as defined in ISO/IEC Guide 51.

Compliance is checked by meeting all the relevant requirements and tests specified.

Where reference to IEC 62368-1 and IEC 62368-3 is made in this document, the terms, the definitions and the abbreviated terms of IEC 62368-1 and IEC 62368-3 apply. In addition the following parameters are to be applied:

- a) Overvoltage category: Minimum Cat III
- b) Pollution degree: 2
- c) Material class: min. IIIa (CTI = 175)
- d) Classification of use: By ordinary persons.

5 General remarks on tests**5.1 General**

Tests shall be carried out to prove compliance with the requirements laid down in this standard, where applicable.

Tests are carried out as follows:

- type tests shall be carried out on representative specimens of each accessory;*
- routine tests shall be carried out on the accessory or on parts of the accessory according to the requirements given in this standard.*

Subclauses 5.2 to 5.4 are applicable to type tests and 5.5 to routine tests.

In this document the term instructions is understood to mean manufacturer's instructions.

For products intended for use with more than one distribution system all the tests of Clause 16, Clause 23 and Clause 25 are performed with the combination of input voltage and relevant frequency of the considered distribution system as given in table 1, unless otherwise specified, where two further sets of three specimens are used.

Table 1 – Testing voltage and frequency

	Distribution system [V]:	Distribution system [V]:
	220/380	120/208
	230/400	120/240
	240/415	127/220
Testing voltage (V) and frequency (Hz)	230 V / 50 Hz	120 V / 60 Hz

For products intended for use with a fixed rated voltage and frequency, the tests are performed at the rated values unless otherwise specified.

For products intended for use with DC supply, the rated input voltage specified by the manufacturer is used to perform the tests of this document. If a range of DC voltage is specified, the tests are carried-out for the upper and the lower limits.

5.2 Products arrangement during test

Unless otherwise specified, the specimens are tested as delivered and under normal conditions of use.

The neutral, if any, is treated as a pole.

Accessories having provision for pilot lights shall be tested with pilot lights fitted, unless otherwise stated. The results of the tests shall be considered to apply accessories of the same type which do not have this facility.

Flush and semi-flush type accessories shall be tested, if appropriate, when installed in a box complying with the applicable standard sheet(s), if any. In case the accessory is manufactured for a specific box, the tests shall be conducted when the accessory is installed in the corresponding box as specified by the manufacturer.

Accessories which require a box to complete their enclosure are tested with their boxes.

The fixing screws of terminals, covers and cover-plates shall be tightened with a torque equal to two thirds of the values specified in Table 5 unless otherwise specified.

5.3 Ambient test condition

Unless otherwise specified, the tests are carried out in the order of the clauses, at an ambient temperature between 15 °C and 35 °C.

It is recommended that the tests are carried out at an ambient temperature of (20 ± 5) °C.

5.4 Additional samples

Clause 5.4 will be updated at a later stage.

5.5 Routine tests

Routine tests for electric strength control (Electric strength test of the accessory) are specified in Annex A.

NOTE Annex A provides routine tests that can be applied during the production of accessories.

6 Ratings

6.1 Rated input voltage

The rated voltage or the rated voltage range of the accessory shall be selected by the manufacturer according to the nominal voltage of the fixed electrical installation where the accessory is intended to be installed.

6.2 USB output ratings

The accessory shall have a rated output voltage, rated output current and rated output power not exceeding the specifications of the USB connectors, as defined in the relevant part(s) of IEC 62680.

Compliance is checked by inspection of the markings and/or the manufacturer's documentation.

7 Classification

7.1 Accessories classification

7.1.1 Accessories are classified according to the degree of protection against access to hazardous parts and against harmful effects due to the ingress of solid foreign objects as described in IEC 60529.

7.1.2 Accessories are classified according to the degree of protection against harmful effects due to the ingress of water as described in IEC 60529.

7.1.3 Classification according to the provision for earthing:

7.1.3.1 Accessories without earthing;

7.1.3.2 Accessories with earthing.

7.1.4 Classification according to the connection means:

7.1.4.1 with screw type terminals;

7.1.4.2 with screwless-type terminals;

7.1.4.3 with insulation piercing terminals (IPT);

7.1.4.4 with connecting leads.

7.1.5 Classification according to the method of application/mounting of the accessory:

7.1.5.1 surface, or

7.1.5.2 flush, or

7.1.5.3 semi flush.

7.1.6 Classification according to the method of installation:

7.1.6.1 accessories where the cover or cover-plate can be removed without displacement of the conductors (design A), or

7.1.6.2 accessories where the cover or cover-plate cannot be removed without displacement of the conductors (design B).

NOTE If an accessory has a base which cannot be separated from the cover or cover-plate, and requires a supplementary plate to meet the standard which can be removed for redecorating the wall without displacement of the conductors, it is considered to be of design A, provided the supplementary plate meets the requirements specified for covers and cover-plates.

- 628 7.1.7 according to the connection capacities of the terminals:
- 629 7.1.7.1 accessories with a connection capacity up and including 1,5 mm²;
- 630 7.1.7.2 accessories with a connection capacity up and including 2,5 mm².
- 631 7.1.8 according to the provision of loop terminals:
- 632 7.1.8.1 accessories with loop terminals;
- 633 7.1.8.2 accessories without loop terminals.
- 634 7.1.9 according to the nature of supply:
- 635 7.1.9.1 accessories powered by AC;
- 636 7.1.9.2 accessories powered by DC.
- 637 7.1.10 according to the function of the incorporated switch:
- 638 7.1.10.1 with switch for maintenance of electric installation;
- 639 7.1.10.2 with switch for switching the power supply in normal use.

640 **8 Marking**

641 **8.1 General**

642 Accessories shall be marked as follows:

- 643 – rated input voltage(s) in Volts;
- 644 – symbol for nature of supply;
- 645 – rated output power of USB port in Watt, unless the output rating is expressed in Volt and Ampere;
- 646 – for AC, the rated input frequency in Hertz, unless the power supply is designed for both 50 Hz and 60
- 647 Hz;
- 648 – the symbol for Class III accessories, if applicable;
- 649 – for DC, the polarity symbols of the DC input terminals;
- 650 – manufacturer's or responsible vendor's name, trademark or identification mark;
- 651 – type reference which may be a catalogue number;
- 652 NOTE 1 The type reference may be the series reference only.
- 653 – first characteristic numeral for the degree of protection against access to hazardous parts and against
- 654 harmful effects due to ingress of solid foreign objects, if declared to be higher than 4 in which case the
- 655 second characteristic numeral shall also be marked;
- 656 – second characteristic numeral for the degree of protection against harmful effects due to ingress of
- 657 water, if declared to be higher than 2 in which case the first characteristic numeral shall also be marked.

658 NOTE 2 The degrees of protection are based on IEC 60529.

659 In addition, accessories with screwless-type terminals shall be marked with the following:

- 660 – an appropriate marking indicating the length of insulation to be removed before the insertion of the
- 661 conductor into the screwless-type terminal;
- 662 – an indication of the suitability to accept rigid conductors only, for those accessories having this
- 663 restriction.

664 **8.2 Symbols**

665 When symbols are used, they shall be as follows:

666	Amperes	A
667	Volts	V
668	Alternating current.....	~ or AC
669	Direct current.....	— — — or DC
670	(IEC 60417-5031 (2002-10))	
671	Neutral.....	N
672	DC input positive pole.....	+
673	DC input negative pole	—
674	Protective earth.....	
675	Connect only to SELV systems.....	
676	(IEC 60417-5180 (2006-08))	
677	Watt.....	W
678	Hertz.....	Hz
679	Degree of protection, when relevant.....	IPXX
680	Degree of protection for fixed accessories also able to be installed on rough surfaces	
681	(test wall of Figures 10b and 10c)	
682	(IEC 60417-6345(2015-07))	
683	NOTE 1 In the IP code the letter "X" is replaced by the relevant number.	
684	Suitability to accept rigid conductors only	r
685	NOTE 2 Details of construction of symbols are given in IEC 60417.	
686	NOTE 3 Lines formed by the construction of the tool are not considered as part of the marking.	
687	For the marking with rated current and rated voltage the values may be used alone. These values shall	
688	be placed on one line separated by an oblique line or the figure for rated current shall be placed above	
689	the value for rated voltage, separated by a horizontal line.	
690	The marking for the nature of supply shall be placed next to the marking for rated current and	
691	rated voltage.	
692	Fixed accessories intended for household and similar purposes that supply power through an	
693	interface are not Class II equipment and shall not be marked with the symbol for class II	
694	construction.	
695	8.3 Visibility of markings	
696	the following marking shall be visible during installation:	
697	– rated input voltage and nature of supply;	
698	– rated output power of USB port in Watt, unless the output rating is expressed in Volt and Ampere;	

- 699 – rated input frequency in Hertz, unless the power supply is designed for both 50 Hz and 60 Hz;
- 700 – either the name, trade mark or identification mark of the manufacturer or of the responsible vendor;
- 701 – length of insulation to be removed before the insertion of the conductor into the screwless-type
- 702 terminal;
- 703 – an indication of the suitability to accept rigid conductors only for screwless-type terminals for those
- 704 accessories having this restriction;
- 705 – Symbol for Class III accessories, if applicable;
- 706 – the type reference, which may be a catalogue number;

707 NOTE 1 The type reference may be the series reference only.

708 - Terminals for DC accessories shall be indicated by the symbols + and –.

709 Parts such as cover plates, which are necessary for safety purposes and are intended to be sold
710 separately, shall be marked with the manufacturer's or responsible vendor's name, trade mark or
711 identification mark and type reference.

712 NOTE 2 Additional type references may be marked on the main part, or on the outside of the associated enclosure.

713 The IP code, if applicable, shall be marked so as to be easily discernible when the accessory is mounted
714 and wired as for normal use.

715 8.4 Particular requirements for markings on terminals other than phase terminals

716 Terminals intended exclusively for the neutral conductor shall be indicated by the letter N.

717 Earthing terminals for the connection of the protective conductor shall be indicated by the symbol .

718 These markings shall not be placed on screws, or any other easily removable parts.

719 NOTE "Easily removable parts" are those parts which can be removed during the normal installation of the accessory

720 Terminals provided for the connection of conductors not forming part of the main function of the
721 accessory shall be clearly identified unless their purpose is self-evident, or indicated in a wiring diagram
722 which shall be fixed to the accessory.

723 The indication of such terminals may be achieved by

724 – their being marked with graphical symbols according to IEC 60417-2 or colours and/or alphanumeric
725 system, or

726 – their being marked with their physical dimensions or relative location.

727 Leads of pilot lights are not considered to be conductors in the context of this subclause.

728 8.5 IP code marking for surface-type mounting boxes forming an integral part of 729 accessories

730 For surface-type mounting boxes forming an integral part of accessories having an IP code higher than
731 IP4X, or higher than IPX2, the IP code shall be marked on the outside of its associated enclosure so as
732 to be easily discernible when the accessory is mounted and wired as in normal use.

733 8.6 Additional requirement for marking

734 It shall be indicated either by marking or in a manufacturer's catalogue or instruction sheet which position
735 or with which special provisions (for example, box, type of mounting surface, plug, etc.) the declared
736 degree of protection of accessories having an IP code higher than IPX0 is ensured, unless this is self-
737 evident.

738 *Compliance is checked by inspection.*

739 For accessories powered by SELV circuits, it is recommended to provide the information that the
740 accessory is intended to be connected to a SELV circuit only.

741 If the accessory provides a looping through function on the input terminals through other components
742 inside the accessory, such as a PCB, then the maximum rated current of the upstream fuse/circuit
743 breaker to be installed shall be declared by the manufacturer in the instructions.

744 **8.7 Particular requirements for connecting devices of connecting leads**

745 Where the accessory is delivered with connecting leads and without a means of connection to
746 the supply, the manufacturer of the accessory shall specify in the instructions which connecting
747 device, according to the relevant standard of IEC 60998 series, shall be used.

748 The connecting device shall be specified or the following shall be defined:

749 - the type of terminal (screw/screwless/IPT);

750 - nature of supply (AC / DC);

751 - rated voltage;

752 - rated connecting capacity.

753 *Compliance is checked by inspection.*

754 **8.8 Durability**

755 Marking shall be easily legible, durable and indelible.

756 Laser marking directly on the product and marking made by moulding, pressing or engraving are not
757 subjected to this test.

758 *Compliance is checked by inspection, using normal or corrected vision, without additional magnification
759 and, if necessary, by the following test.*

760 *The test is done by rubbing the marking for 15 s with a piece of cotton cloth soaked with water and again
761 for 15 s with a piece of cotton cloth soaked with n-hexane 95 % (Chemical Abstracts Service Registry
762 Number, CAS RN, 110-54-3).*

763 *NOTE n-hexane 95 % (Chemical Abstracts Service Registry Number, CAS RN, 110-54-3) is available from a variety of chemical
764 suppliers as a high pressure liquid chromatography (HPLC) solvent.*

765 *When using the liquid specified for the test, precautions as stated in the relative material safety
766 datasheet provided by the chemical supplier shall be taken to safeguard the laboratory technicians.*

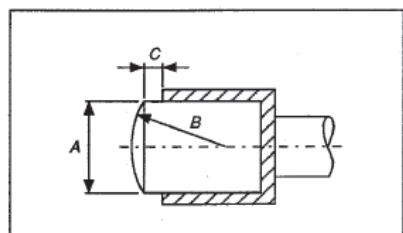
767 *The marking surface to be tested shall be dried after the test with water.*

768 *Rubbing shall commence immediately after soaking the piece of cotton, applying a compression force
769 of (5 ± 1) N at a rate of about one cycle per second (a cycle comprising a forward and backward
770 movement along the length of the marking). For markings longer than 20 mm, rubbing can be limited to
771 a part of the marking, over a path of at least 20 mm length.*

772 *The compression force is applied by means of a test piston which is wrapped with cotton comprising
773 cotton wool covered by a piece of cotton medical gauze.*

774 *The test piston shall have the dimensions specified in Figure 4 and shall be made of an elastic material
775 which is inert against the test liquids and has a Shore-A hardness of 47 ± 5 (for example synthetic
776 rubber).*

777



Dimensions mm			
	A	B	C
Dimensions	20	20	2
Tolerance	+2, -0	± 0,5	+1, -0

Figure 4 – Test piston dimensions

When it is not possible to carry out the test on the specimens due to the shape/size of the product or the marking is not accessible with the test piston:

– a suitable piece having the same characteristics as the product can be submitted to the test

or

– another test piston with different shape can be used on the condition that radius B is kept.

9 Checking of dimensions

9.1 General

Relevant mechanical dimensions of the USB connectors are given in the associated drawings in the relevant part(s) of IEC 62680.

Compliance is checked by inspection and measurement in reference to USB connectors design.

10 Protection against electric shock

10.1 General

Accessories shall ensure protection against electric shock.

For the purposes of this clause 10, lacquer, enamel and sprayed insulating coatings are not considered as insulating material.

10.2 Accessibility of hazardous live parts during normal use

Accessories shall be so designed and constructed that when they are mounted and/or wired as for normal use, hazardous live parts are not accessible, even after removal of parts which can be removed without the use of a tool.

Compliance is checked by inspection and, if necessary, by the following test.

The test is carried out on the specimen mounted as for normal use and fitted with conductors of the smallest nominal cross-sectional area, the test being then repeated using conductors of the largest nominal cross sectional area, specified in Table 2.

The standard test finger, test probe B of IEC 61032, is applied in every possible position, an electrical indicator with a voltage between 40 V and 50 V being used to show contact with the relevant parts.

For accessories where the use of thermoplastic or elastomeric material is likely to influence the requirements, one additional test is made but at an ambient temperature of $(35 \pm 2) ^\circ\text{C}$, the accessories being at this temperature.

During this additional test the accessories are subjected for 1 min to a force of 75 N, applied through the tip of a straight unjointed test finger, test probe 11 of IEC 61032. This finger with an electrical indicator as described above is applied to all places where yielding of insulating material could impair the safety of the accessory, but is not applied to membranes or the like. The finger as described is applied to thin-walled knock-outs but with a force of 10 N.

10.3 Requirements for accessible parts of accessory during normal use

10.3.1 For accessories powered by circuits other than SELV circuits, accessible parts of the accessory when wired and/or mounted as in normal use shall be made of insulating material with the exception of the following:

– small screws and the like which are isolated from hazardous live parts and which are used for the fixing of the main part and of covers, cover plates or other parts of the enclosure of accessories;

– the covers, cover plates and other parts of the enclosure of accessories made of metal which comply with the requirements of 10.3.2 or 11.2;

– accessible metal parts of USB ports.

Compliance is checked by inspection.

10.3.2 For accessories powered by circuits other than SELV circuits, covers, cover plates or other parts of the enclosure of metal shall be protected by additional insulation made by insulating linings or insulating barriers. The insulating linings or insulating barriers shall either:

– be fixed to covers, cover plates, other parts of the enclosure or the body of the accessory in such a way that they cannot be removed without being permanently damaged, or

– be so designed that:

- they cannot be replaced in an incorrect position;
- if they are omitted, the accessories are rendered inoperable or manifestly incomplete;
- there is no risk of accidental contact between hazardous live parts and metal covers, cover plates or other parts of the enclosure, for example through their fixing screws, even if a conductor should come away from its terminal;
- precautions are taken in order to prevent creepage distances or clearances becoming less than the values specified in Table 17.

Compliance is checked by inspection.

The above linings or barriers shall comply with the tests of Clauses 15 and 20.

10.4 Metal parts of the USB ports

Metal parts of the USB ports shall not be earthed.

Compliance is checked by inspection and by the test of Clause 20.

10.5 Output voltage protective measure

To ensure protection against electric shock, the USB output voltage shall be SELV.

Compliance is checked by the tests of Clause 13.15, Clause 13.16, Clause 15, Clause 20 and Clause 25.

10.6 Ventilation openings

Ventilation openings over hazardous live parts shall be so designed that a foreign body introduced into these openings shall not come into contact with any hazardous live parts when the accessory is installed as in normal use.

Compliance is checked by applying the test probe 13 of IEC 61032:1997 through the openings.

The pin of the test probe shall not touch hazardous live parts.

11 Provision for earthing

11.1 Accessories provided with earthing terminals

Earthing terminals shall comply with the appropriate requirements of Clause 12.

They shall at least be of the same size as the corresponding terminals for the supply conductors.

For accessories powered by circuits other than SELV circuits, earthing means shall be fixed to the base or to the cover, but, if fixed to the cover, they shall be automatically and reliably connected to the earthing terminal when the cover is put in place, the contact pieces being silver-plated or having a protection no less resistant to corrosion and abrasion. This connection shall be ensured under all conditions which may occur in normal use, including loosening of cover-fixing screws, careless mounting of the cover, etc. Except as mentioned above, parts of the earthing circuit shall be in one piece or shall be reliably connected together by riveting, welding, or the like.

NOTE 1 For the purpose of the requirements of this subclause, screws are not considered as parts of contact pieces.

NOTE 2 When considering the reliability of the connection between parts of the earthing circuit, the effect of possible corrosion is taken into account.

11.2 Accessible metal parts

For accessories powered by circuits other than SELV circuits, accessible metal parts of accessories which may become live in the event of an insulation fault, shall be permanently and reliably connected to the earthing terminal.

This requirement does not apply to the accessible metal parts mentioned in 10.3.2.

For the purpose of this requirement, small screws and the like, electrically separated from hazardous live parts, for fixing main parts, covers, or cover-plates, are not considered as accessible parts which may become live in the event of an insulation fault.

NOTE Care should be taken that the contact resistance between the tip of the measuring probe and the metal part under test does not influence the test results.

Compliance is checked by inspection and by the test of Clause 11.3.

11.3 Connection with the earthing terminal

The connection between the earthing terminal and accessible metal parts to be connected thereto, shall be of low resistance.

Compliance is checked by the following test.

A current of 25 A derived from an AC or DC source having a no-load voltage not exceeding 12 V is passed between the earthing terminal and each of the accessible metal parts in turn.

The voltage drop between the earthing terminal and the accessible metal part is measured, and the resistance calculated from the current and this voltage drop.

In no case shall the resistance exceed 0,05 Ω .

Care should be taken that the contact resistance between the tip of the measuring probe and the metal part under test does not influence the test results.

12 Terminals and terminations

12.1 General

Clause 12 is not applicable to accessories provided with connecting leads. Requirements for this connection means are given in clause 13.13.

All the tests on terminals, with the exception of the test of 12.3.11 and 12.3.12 shall be made after the tests of 14.1.

Rewirable accessories shall be provided with terminals having screw clamping or with screwless-type terminals.

If pre-soldered flexible conductors are used, care shall be taken that in screw-type terminals the pre-soldered area shall be outside the clamp area when connected as for normal use.

The means for clamping the conductors in the terminals shall not serve to fix any other component, although they may hold the terminals in place or prevent them from turning.

Terminals having screw-type clamping complying with IEC 60998-2-1 are considered to be in compliance with the requirements and tests of 12.2, except those of 12.2.6 and 12.2.7 and 12.2.8, provided they are chosen according to Table 2.

Terminals having screwless-type clamping complying with IEC 60998-2-2 are considered to be in compliance with the requirements and tests of 12.3 provided they are chosen according to Table 8, except for the requirements of 12.3.7 and 12.3.9. The tests of 12.3.7 and 12.3.9 shall be carried out in addition.

Compliance is checked by inspection and by the tests of 12.2 or 12.3, as applicable.

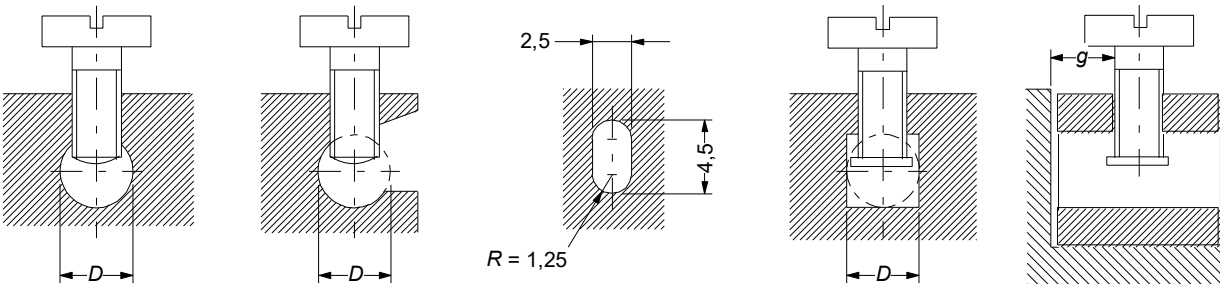
12.2 Terminals with screw clamping for external copper conductors

12.2.1 Accessories shall be provided with terminals which shall allow the proper connection of copper conductors having nominal cross-sectional areas as shown in Table 2.

Table 2 – Connectable nominal cross-sectional areas of copper conductors

	Connection capacity mm ²	Conductor cross-sectional area mm ²	Diameter of the largest conductor mm	
			Rigid (solid or stranded) copper conductors	Flexible copper conductors
Accessories according to 7.1.8.1, with loop terminal	up and including 1,5 according to 7.1.7.1	From 1 × 0,75 up and including 2 × 1,5 ^a	1,45	1,73
	up and including 2,5 according to 7.1.7.2	From 1 × 0,75 up and including 2 × 2,5 ^a	2,13	2,21
Accessories according to 7.1.8.2, without loop terminal	up and including 1,5 according to 7.1.7.1	From 1 × 0,75 up and including 1 × 1,5	1,45	1,73
	up and including 2,5 according to 7.1.7.2	From 1 × 0,75 up and including 1 × 2,5	2,13	2,21
^a Some countries require the looping-in of three conductors of 2,5 mm ² , or two conductors of 4 mm ² .				

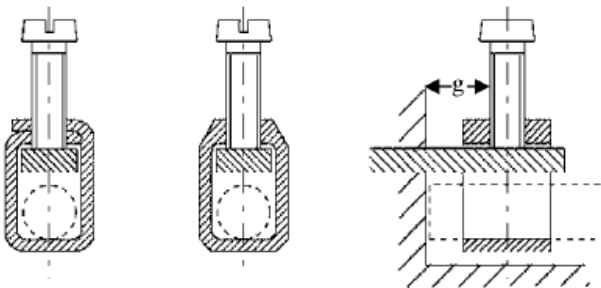
The conductor space shall be at least that specified in Figures 5 and 6.



Terminals without pressure plate Elongated hole terminal Terminals with pressure plate

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Dimensions in millimetres



Stirrup Terminal

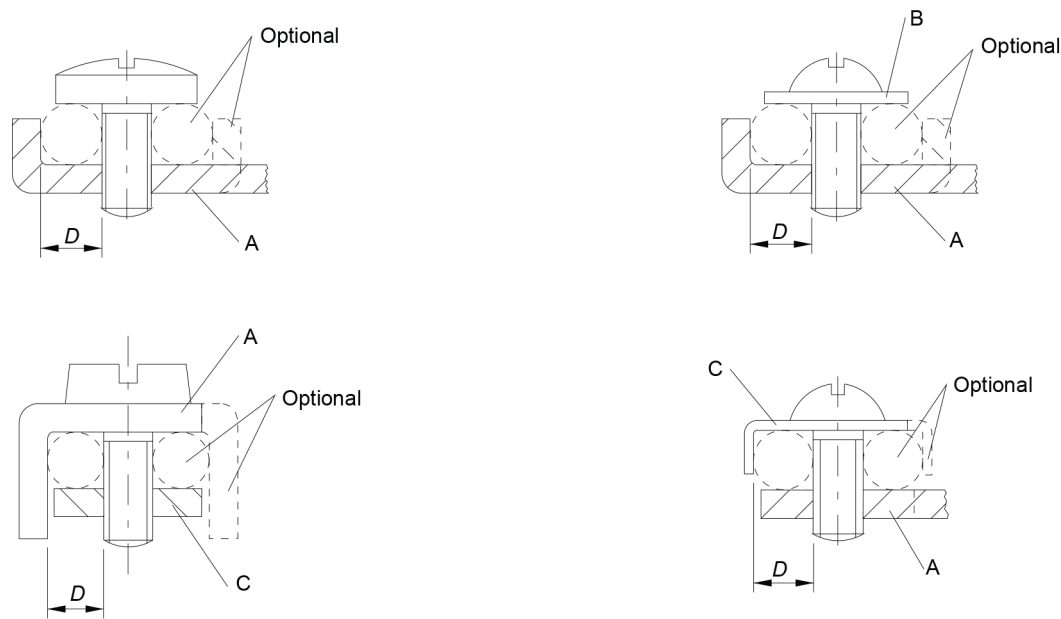
Cross-section of conductor accepted by the terminal mm ²	Minimum diameter <i>D</i> (or minimum dimensions) of conductor space mm	Minimum distance <i>g</i> between clamping screw and end of conductor when fully inserted mm		Torque Nm					
				1 ^a		2 ^a		3 ^a	
		One screw	Two screws	One screw	Two screws	One screw	Two screws	One screw	Two screws
Up to 1,5	2,5	1,5	1,5	0,2	0,2	0,4	0,4	0,4	0,4
2,5 (circular hole)	3,0	1,5	1,5	0,25	0,2	0,5	0,4	0,5	0,4
2,5 (elongated hole)	2,5 × 4,5	1,5	1,5	0,25	0,2	0,5	0,4	0,5	0,4

^a The values specified apply to screws covered by the corresponding columns in Table 5.

The part of the terminal containing the threaded hole and the part of the terminal against which the conductor is clamped by the screw may be two separate parts, as in the case of terminals provided with a stirrup.

The shape of the conductor space may differ from those shown, provided that a circle with a diameter equal to the minimum specified for *D* or the minimum outline specified for the elongated hole accepting cross-sections of conductors up to 2,5 mm² can be inscribed.

Figure 5 – Pillar terminals



Screw head terminals



Stud terminals

- Key**
- A Fixed part
 - B Washer or clamping plate
 - C Anti-spread device
 - D Conductor space
 - E Stud

IEC

Cross-section of conductor accepted by the terminal mm ²	Minimum diameter D of conductor space mm	Torque	
		3 ^a	
		One screw or stud	Two screws or studs
Up to 1,5	1,7	0,5	–
Up to 2,5	2,0	0,8	–

The values specified apply to the screws covered by the corresponding columns in Table 5.

The part which retains the conductor in position may be of insulating material provided the pressure necessary to clamp the conductor is not transmitted through the insulating material.

The second optional space for the terminal accepting cross-section of conductors up to 2,5 mm² may be used for the connection of the second conductor when it is required to connect two 2,5 mm² conductors.

Figure 6 – Screw head terminals and stud terminals

Compliance is checked by inspection, by measurement and by fitting conductors of the smallest and largest nominal cross-sectional areas specified.

12.2.2 Terminals with screw clamping shall allow the conductor to be connected without special preparation.

Compliance is checked by inspection.

NOTE The term "special preparation" covers soldering of the wires of the conductor, use of cable lugs, formation of eyelets, etc., but not the reshaping of the conductor before its introduction into the terminal or the twisting of a flexible conductor to consolidate the end.

12.2.3 Terminals with screw clamping shall have adequate mechanical strength.

Screws and nuts for clamping the conductors shall have a metric ISO thread or a thread comparable in pitch and mechanical strength.

Screws shall not be of metal which is soft or liable to creep, such as zinc or aluminium.

Compliance is checked by inspection and by the tests of 12.2.6 and 12.2.8.

NOTE SI, BA, and UN threads are considered to be comparable in pitch and mechanical strength to metric ISO thread.

12.2.4 Terminals with screw clamping shall be resistant to corrosion.

Terminals, the body of which is made of copper or copper alloy as specified in 19.5, are considered as complying with this requirement.

12.2.5 Terminals with screw clamping shall be so designed and constructed that they clamp the conductor(s) without undue damage to the conductor(s).

Compliance is checked by the following test.

The terminal is placed in the test apparatus according to Figure 7 and fitted with rigid, solid, stranded and/or flexible conductor(s), according to Table 2 first with the smallest and then with the largest nominal cross-sectional area, the clamping screw(s) or nut(s) being tightened with the torque according to Table 5.

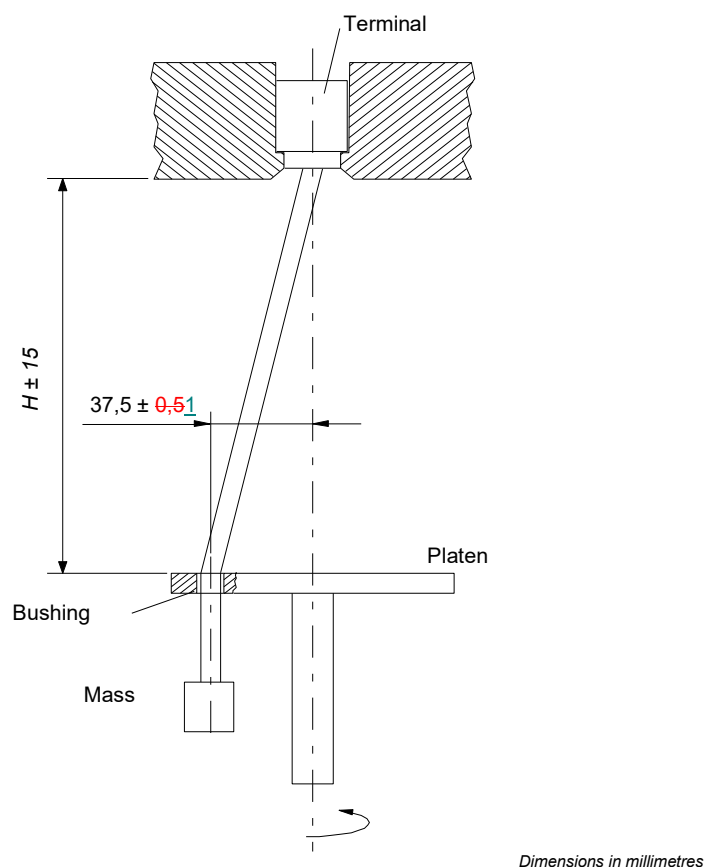


Figure 7 – Arrangement for checking damage to conductors

Care should be taken that the bushing hole is made in a way which ensures that the force extended to the cable is pure pulling force and that the transmission of any torque to the connection in the clamping means is avoided.

Terminals suitable for rigid and flexible conductors according to Table 2 are checked with rigid solid or rigid stranded conductors and on a new set of specimens with flexible conductors.

The length of the test conductor shall be 75 mm longer than the height (H) specified in Table 6.

The end of the conductor is passed through an appropriate bushing in a plate positioned at a height (H) below the equipment, as given in Table 6. The bushing is positioned in a horizontal plane such that its centre line describes a circle of 75 mm diameter, concentric with the centre of the clamping unit in the horizontal plane; the platen is then rotated at a rate of (10 ± 2) revolutions per minute.

The distance between the mouth of the clamping unit and the upper surface of the bushing shall be within ± 15 mm of the height specified in Table 9. The bushing may be lubricated to prevent binding, twisting, or rotation of the insulated conductor.

A mass as specified in Table 6 is suspended from the end of the conductor. The duration of the test is approximately 15 min.

During the test, the conductor shall neither slip out of the clamping unit nor break near the clamping unit, nor shall the conductor be damaged in such a way as to render it unfit for further use.

In the case of the flexible conductor, the breakage of a few wires shall not be taken into account provided it does not exceed 15 % of the original number of wires.

12.2.6 Terminals with screw clamping shall be so designed that they clamp the conductor reliably between metal surfaces.

Compliance is checked by inspection and by the following test.

Terminals suitable for rigid and flexible conductors according to Table 2 are checked with rigid solid or rigid stranded conductors and on a new set of specimens with flexible conductors.

The terminals are fitted first with conductors of the smallest and then with conductors of the largest cross-sectional area specified in Table 2, the terminal screws being tightened with a torque equal to two-thirds of the torque shown in the appropriate column of Table 5.

If the screw has a hexagonal head with a slot, the torque applied is equal to two-thirds of the torque shown in column 3 of Table 5.

Each conductor is then subjected to a pull as specified in Table 3, applied without jerks, for 1 min, in the direction of the axis of the conductor space.

Table 3 – Values for pull test for screw-type terminals

Nominal cross-sectional area of conductors accepted by the terminal mm ²	Pull N
Above 0,75 up to 1,5 inclusive	40
Above 1,5 up to 2,5 inclusive	50

If the clamp is provided for two or three conductors, the appropriate pull is applied consecutively to each conductor.

During the test, the conductor shall not move noticeably in the terminal.

12.2.7 Terminals with screw clamping shall be so designed or placed that neither a rigid solid conductor nor a wire of a stranded conductor can slip out while the clamping screws or nuts are tightened.

Compliance is checked by the following test.

The terminals are fitted with conductors having the largest nominal cross-sectional area specified in Table 2.

Terminals suitable for rigid and flexible conductors according to Table 2 are checked with rigid solid or rigid stranded conductors and on a new set of specimens with flexible conductors.