IEC 60670-1

Edition 3.0 2024-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Boxes and enclosures for electrical accessories for household and similar fixed electrical installations –
Part 1: General requirements

Boîtes et enveloppes pour appareillage électrique pour installations électriques fixes pour usages domestiques et analogues –
Partie 1: Exigences générales

IEC 60670-1:2024-12(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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BOXES AND ENCLOSURES FOR ELECTRICAL ACCESSORIES FOR HOUSEHOLD AND SIMILAR FIXED ELECTRICAL INSTALLATIONS –

Part 1: General requirements

FOREWORD

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IEC 60670-1 has been prepared by subcommittee 23B: Plugs, socket-outlets and switches, of IEC technical committee 23: Electrical accessories. It is an International Standard.

This third edition cancels and replaces the second edition published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) the classifications, markings and tests of boxes and enclosures for use and installation in ambient temperature below normal use are modified;
b) the test for the durability of markings is modified;
c) a test is added for fixing screws protected by caps;

d) a normative annex is added to specify the tests applied to boxes and enclosures declared with an IK code;

e) requirements for the resistance to abnormal heat and fire of internal parts not necessary to retain current carrying parts are specified.

The text of this International Standard is based on the following documents:

Draft	Report on voting
23B/1533/FDIS	23B/1551/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

In this publication the following print types are used:

- requirements proper: in roman type.
- *test specifications: in italic type*.
- notes: in smaller roman type.

A list of all parts in the IEC 60670 series, published under the general title *Boxes and enclosures for electrical accessories for household and similar fixed installations*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

BOXES AND ENCLOSURES FOR ELECTRICAL ACCESSORIES FOR HOUSEHOLD AND SIMILAR FIXED ELECTRICAL INSTALLATIONS –

Part 1: General requirements

1 Scope

This part of IEC 60670 applies to boxes, enclosures and parts of enclosures (hereafter called "boxes" and "enclosures") for electrical accessories with a rated voltage not exceeding 1 000 V AC and 1 500 V DC intended for household or similar fixed electrical installations, either indoors or outdoors.

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

Other temperatures outside the above range can apply according to the classification of the boxes and the enclosures.

This document is intended to apply to boxes and enclosures for electrical accessories within the scope of IEC technical committee 23.

A box or an enclosure which is an integral part of an electrical accessory and provides protection for that accessory against external influences (for example mechanical impact, ingress of solid objects or water, etc.) is covered by the relevant standard for such an accessory.

This document gives test requirements for boxes and enclosures declared with IK code, see Annex B (normative).

This document also applies to types of boxes and enclosures as modified in IEC 60670-21, IEC 60670-22, IEC 60670-23, and IEC 60670-24.

This document does not apply to:

– ceiling roses;
– luminaire supporting couplers;
– boxes, enclosures and parts of enclosures specifically designed to be used for cable trunking and ducting systems complying with IEC 61084 and which are not intended to be installed outside of these systems.

2 Normative references

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

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

IEC 60112:2020, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60417, *Graphical symbols for use on equipment,* available at http://www.graphical-symbols.info/equipment

IEC 60423:2007, *Conduit systems for cable management – Outside diameters of conduits for electrical installations and threads for conduits and fittings*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

IEC 60695-2-11:2021, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

IEC 60695-10-2:2014, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test*

IEC 60981:2019, *Extra-heavy duty rigid steel conduits*

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61140:2016, *Protection against electric shock – Common aspects for installation and equipment*

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*
IEC 62262:2002/AMD1:2021

ISO/IEC Guide 51, *Safety aspects – Guidelines for their inclusion in standards*

3 Terms and definitions

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

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

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

3.1
enclosure
combination of parts, such as boxes, backplates, covers, cover-plates, lids, box extensions, accessories, etc., providing after assembly and installation as in normal use, an appropriate protection against external influences, and a defined protection against contact with enclosed live parts from any accessible direction

Note 1 to entry: See Annex A.

3.2
box
part of an enclosure provided with means for fixing a cover, cover-plate, accessory, etc., and intended to receive accessories (such as socket-outlets, switches, etc.)

Note 1 to entry: The accessory can be entirely or partly inside the enclosure.

3.3
box extension
part of an enclosure which is intended to extend a box for the purpose of either increasing the internal volume of the box or enclosure or to adjust for mounting the box flush or semi-flush with the finished surface of a wall or the like

3.4
backplate
part of a surface mounting enclosure provided with means for fixing a cover, cover-plate, accessory (such as socket-outlets, switches, etc)

3.5
lid
cover
cover-plate
part of an enclosure, not integral with or part of an accessory, which may either retain an accessory in position or enclose it

3.6
raised cover
cover intended for mounting directly onto a box to provide for the attachment of accessories and to increase the internal volume of the enclosure

Note 1 to entry: The centre portion of the cover is raised to accommodate a specific wall or ceiling thickness and to permit the mounting of the accessory on it, flush with the surface of the wall or ceiling.

3.7
exposed conductive part
conductive part of electrical equipment, which can be touched, and which is not normally live, but which can become live when basic insulation fails

3.8
surface mounting enclosure
surface mounting box
box or enclosure which is intended for mounting on a surface

Note 1 to entry: See Annex A.

3.9
flush-mounting box
flush-mounting enclosure
box or enclosure which is intended for mounting flush with the surface

Note 1 to entry: See Annex A.

3.10
semi-flush mounting box
semi-flush mounting enclosure
box or enclosure which is intended to fit within a mounting surface and partially projects from the mounting surface

3.11
cable gland
device designed to permit the entry of a cable, flexible cable or insulated conductor into an enclosure, and which provides sealing and retention and eventually may also provide other functions such as earthing, bonding, insulation, cable guarding, strain relief or a combination of these

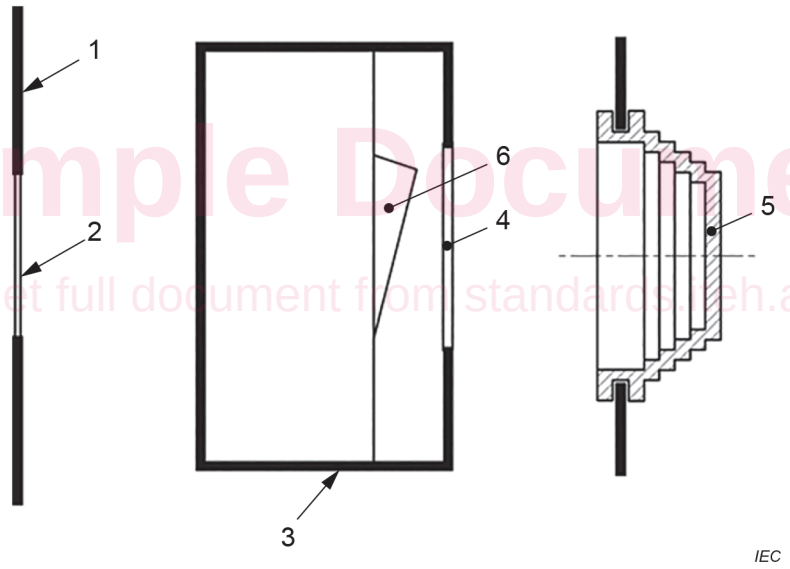
3.12
seal
material used to fill up the space between the inside of a gland and the cable passing through, usually compressed by the gland and thereby forming a joint

3.13
gasket
material introduced between mating surfaces of an enclosure which when under compression forms a joint

3.14
grommet
component used to support and protect the cable or conduit at the point of entry; it may also prevent the ingress of moisture or contaminants

Note 1 to entry: See Figure 1.

[SOURCE: IEC 60050-581:2008, 581-27-19, modified – The words "part of", "or an accessory" and "wires or" have been omitted from the definition and "or conduit" added; Note 1 to entry added.]



Key

1 box
2 entry membrane
3 enclosure
4 protective membrane
5 grommet
6 electrical accessory

Figure 1 – Examples of membranes and grommets

3.15
entry membrane
component or an integral part of an enclosure 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 (see Figure 1).

3.16
protective membrane
component or an integral part of an enclosure 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: See Figure 1.

3.17
composite material
combination of metal and insulating material

3.18
spout
hub
open entry of a box permitting the insertion and containment of a conduit

3.19
cable retention
ability to limit the displacement of a fitted cable against pull forces

3.20
cable anchorage
ability to limit the displacement of a fitted flexible cable against pull and push forces and torques

3.21
blanking-plug
component used to close an open inlet or an open knock-out

3.22
***U*$_n$**
rated voltage
voltage assigned by the manufacturer for a specific operating condition of the box or enclosure

[SOURCE: IEC 60050-442:1998, 442-01-03, modified – The symbol has been added as a term, the domain "(of accessories)" has been deleted; in the definition, "accessory" has been replaced with "box or enclosure".]

4 General requirements

Boxes and enclosures 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.

5 General remarks on tests

5.1 Test conditions and number of samples

Tests according to this document are type tests.

Unless otherwise specified in this document, boxes and enclosures are tested as delivered.

Accessories complying with other standards are not tested again.

Tests on boxes and enclosures of insulating material shall be performed after a preconditioning period of at least 48 h at ambient temperature between +15 °C and +35 °C and relative air humidity between 45 % and 85 %.

NOTE For some materials a longer preconditioning period can be requested by the manufacturer.

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

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

5.2 Compliance general requirement

The specimens are submitted to all the relevant tests and the requirements are satisfied if all the applicable tests are deemed to have been passed.

If one of the specimens does not satisfy a test due to an assembly or a manufacturing fault, that test and any preceding ones which may have influenced the results of the test shall be repeated and also the tests which follow shall be carried out in the required sequence on another full set of specimens, all of which shall comply with the requirements.

NOTE When submitting the first set of specimens, the applicant can also submit the additional set of specimens which can be necessary, if one specimen fails. The testing station will then, without further request, test the additional set of specimens and will only reject if a further failure occurs. If the additional set of specimens is not submitted at the same time, the failure of one specimen will entail rejection.

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

6 Ratings

This Clause 6 is only applicable for the purposes of the following relevant International Standards: IEC 60670-21, or IEC 60670-22, or IEC 60670-23, or IEC 60670-24.

7 Classification

Boxes and enclosures are classified according to Table 1.

Table 1 – Classification of boxes and enclosures

Classification criteria		
7.1 The nature of their material	7.1.1 Insulating	
	7.1.2 Metallic	
	7.1.3 Composite	
	7.1.4 Natural or synthetic rubber or a mixture of both	
7.2 The type of installation	7.2.1 Flush, semi-flush in solid walls, ceilings or floors	7.2.1.1 Not suitable for installation into concrete
		7.2.1.2 Suitable for installation into concrete with a maximum temperature during the casting process of +60 °C
		7.2.1.3 Suitable for installation into concrete with a maximum temperature during the casting process of +90 °C
	7.2.2 Flush or semi-flush in hollow walls, hollow ceilings, hollow floors or furniture	7.2.2.1 Class Ha
		7.2.2.2 Class Hb for walls
		7.2.2.3 Class Hb for ceilings
	7.2.3 Surface mounting on walls, ceilings, floors or furniture	
7.3 The type(s) of inlets [a]	7.3.1 With inlets for sheathed cables for fixed installations	
	7.3.2 With inlets for flexible cables	
	7.3.3 With inlets for plain or corrugated conduits	
	7.3.4 With inlets for threaded conduits	
	7.3.5 With inlets for other types of conductors/cables or conduits	
	7.3.6 With spouts (hubs)	
	7.3.7 Without inlets. Inlet openings will be made during installation	
7.4 The clamping means	7.4.1 With cable retention	
	7.4.2 With cable anchorage	
	7.4.3 With clamping means for flexible conduit	
	7.4.4 Without clamping means	