

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Boxes and enclosures for electrical accessories for household and similar fixed electrical installations –
Part 24: Particular requirements for enclosures for housing protective devices and other power dissipating electrical equipment**

**Boîtes et enveloppes pour appareillage électrique pour installations électriques fixes pour usages domestiques et analogues –
Partie 24: Exigences particulières pour les enveloppes pour dispositifs de protection et autres matériels électriques ayant une puissance dissipée**



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COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**BOXES AND ENCLOSURES FOR ELECTRICAL ACCESSORIES FOR
HOUSEHOLD AND SIMILAR FIXED ELECTRICAL INSTALLATIONS –****Part 24: Particular requirements for enclosures for housing protective
devices and other power dissipating electrical equipment**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC 60670-24 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 2011. This edition constitutes a technical revision.

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

- a) revision of requirements for protection against electric shock in Clause 10;
- b) addition of requirements for functional earthing in 11.101;
- c) revision of the requirements for fixing of flush type and semi-flush type enclosures in 12.12;

- d) revision of the requirements for resistance of insulating material to abnormal heat and to fire in Clause 18;
- e) addition of calculations to take into account the power loss of electronic devices in Clause AA.6;
- f) addition of tests and requirements for enclosures exposed to direct sunlight with the related Annex CC;
- g) addition of tests and requirements for enclosures with separate area to accommodate multimedia-equipment with the related Annex DD;
- h) addition of tests and requirements for enclosures used with connected devices or equipment with the related Annex EE.

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

Draft	Report on voting
23B/1536/FDIS	23B/1554/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.

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.

This document is to be used in conjunction with IEC 60670-1:2024. It lists the changes necessary to convert that standard into a specific standard for housing protective devices and other power dissipating electrical equipment.

Where this document states "addition", "modification" or "replacement", the relevant requirement, test specifications or explanatory matter in IEC 60670-1:2024 shall be adapted accordingly.

Clauses and subclauses, notes, figures or tables which are additional to those in IEC 60670-1:2024 are numbered starting from 101.

Additional annexes to IEC 60670-1:2024 are numbered AA, BB, etc.

In this publication the following print types are used:

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

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

Part 24: Particular requirements for enclosures for housing protective devices and other power dissipating electrical equipment

1 Scope

Replacement:

This part of IEC 60670 applies to enclosures and parts of them for housing protective devices and other power dissipating electrical equipment intended to be used with a rated voltage not exceeding 400 V and a total incoming load current not exceeding 125 A for household and similar fixed electrical installations.

These enclosures are intended to be installed in locations where unskilled persons have access. They are intended to be equipped with electrical equipment by skilled persons (installers).

These enclosures are intended to be installed where the prospective short circuit current does not exceed 10 kA unless they are protected by current limiting protective devices with a cut-off current not exceeding 17 kA.

Enclosures complying with this document are suitable for use at ambient temperature 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.

An enclosure which is an integral part of an electrical accessory and provides protection against external influences (e.g. mechanical impacts, ingress of solid objects or of water), is covered by the relevant standard for such an accessory.

This document does not apply to a low-voltage switchgear and controlgear assembly as defined in the IEC 60439 series or IEC 61439 series nor to a main entrance panel which can be part of the distribution board.

This document does not apply to surface type boxes, flush and semi-flush type boxes suitable for the housing of accessories for household and similar use such as switches, electronic switches, socket-outlets, which are covered by IEC 60670-1 only.

NOTE 1 Enclosures according to this document are mainly used for distribution board for housing protective devices and other power dissipating electrical equipment and are installed at the beginning of the electrical circuit whereas boxes according to IEC 60670-1 are installed at the end of it.

NOTE 2 A main entrance panel is a set composed of a panel or an enclosure equipped with a meter and/or the main incoming device. Main entrance panels comply with their appropriate standards or the requirements of the local supplier, if any.

NOTE 3 In the following country this document cannot be used in installations with a 230 V single-phase supply rated up to 100 A that is under the control of ordinary persons. Integration of mechanical and electrical devices into an enclosure must be verified by compliance with IEC 61439-3 [British standard EN 61439-3]: UK.

NOTE 4 In the following country this document can only be used for GP enclosures with the instructions according to Annex A. For the other types of enclosures the integration of mechanical and electrical devices into an enclosure is verified by compliance with DS EN 61439-3: DK.

2 Normative references

Addition:

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*
IEC 60364-4-41:2005/AMD1:2017

IEC 60364-5-54:2011, *Low-voltage electrical installations – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors*
IEC 60364-5-54:2011/AMD1:2021

IEC 60664-1, *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

IEC 60898-1, *Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations – Part 1: Circuit-breakers for a.c. operation*

IEC 61008-2-1, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) – Part 2-1: Applicability of the general rules to RCCB's functionally independent of line voltage*

IEC 61009-2-1, *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) – Part 2-1: Applicability of the general rules to RCBO's functionally independent of line voltage*

ISO/IEC 11801-1:2017, *Information technology – Generic cabling for customer premises – Part 1: General requirements*

ISO 178:2019, *Plastics – Determination of flexural properties*

ISO 179-1:2010, *Plastics – Determination of Charpy impact properties – Part 1: Non-instrumented impact test*

ISO 4892-2:2013, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*
ISO 4892-2:2013/AMD1:2021

3 Terms and definitions

Additions:

3.101

general purpose enclosure

GP enclosure

enclosure where integration of mechanical and electrical devices has been verified by tests carried out by the manufacturer according to this document and where the installer has to verify the installed equipment according to the instructions given in Annex AA

3.102

enclosure for pre-determined equipment

PD enclosure

enclosure where the capability to integrate pre-determined mechanical and electrical equipment has been verified according to design rules and tests according to this document carried out by the manufacturer where the installer has to verify the installed equipment following the manufacturer's instructions according to Annex BB

3.103**manufacturer's instructions**

instructions in accordance with Annex AA and Annex BB leading to a configuration of the enclosure ensuring the necessary heat dissipation

Note 1 to entry: References to standards can be given in the manufacturer's instructions.

3.104**maximum capability to dissipate power** P_{de}

maximum capability of the enclosure to dissipate in normal use the power losses of the installed devices, as declared by the manufacturer

Note 1 to entry: P_{de} is expressed in watts (W).

3.105**rated current** I_n

maximum current assigned by the manufacturer of the enclosure which can be distributed by the enclosure

3.106**blanking plate**

component used for closing the opening, for protective devices and other power dissipating electrical equipment, of an enclosure to provide basic insulation

3.107**enclosures with separate area to accommodate multimedia and communication equipment**

enclosure providing an area where multimedia and communication equipment are intended to be integrated according to the additional requirements given in Annex DD

Note 1 to entry: An enclosure with separate area to accommodate multimedia and communication equipment can be a GP or PD enclosure.

3.108**enclosure for use with connected devices or equipment**

enclosure intended to accommodate protection devices, electrical equipment dissipating power and connected devices or equipment according to the additional requirements given in Annex EE

Note 1 to entry: An enclosure for use with connected devices or equipment can be a GP or PD enclosure.

3.109**connected devices or equipment**

physical unit that can connect with other units into an interconnected infrastructure

Note 1 to entry: This physical unit can operate and communicate with the physical world through detection and action. Such equipment or device allows the switchboard to participate in this IoT infrastructure.

3.110**rated current of the equipped GP enclosure** I_{nq}

rated current to be calculated as I_{ne} multiplied by K_e

Note 1 to entry: In the absence of incoming protective and control devices, the rated current of the equipped GP enclosure is the outgoing rated current (I_{nu}).

**3.111
incoming rated current** I_{ne}

rated current or sum of the rated currents of all incoming protective and control devices, expected to be used at the same time

**3.112
outgoing rated current** I_{nu}

sum of the rated currents of all outgoing protective and control devices, expected to be used at the same time

**3.113
utilisation factor** K_e

ratio of the actual current flowing through any main incoming protective device inside the enclosure to the rated current of this device

Note 1 to entry: The utilisation factor for incoming circuits is assumed to be 0,85.

**3.114
diversity factor** K

ratio, calculated by the installer, of the rated current of the equipped GP enclosure (I_{nq}) to the outgoing rated current (I_{nu})

4 General requirements

Clause 4 of IEC 60670-1:2024 is applicable. [from standards.iteh.ai](https://standards.iteh.ai)

5 General notes on tests

Clause 5 of IEC 60670-1:2024 is applicable.

6 Ratings

Replacement:

Rated values are defined as given in Annex AA and Annex BB.

7 Classification

Clause 7 of IEC 60670-1:2024 is applicable with the following modifications:

Table 1 – Classification of boxes and enclosures

Classification criteria 7.2.2.2, 7.2.2.3, 7.8.1 and 7.9 do not apply.

Addition:

7.101 Enclosure	7.101.1 GP enclosure	
	7.101.2 PD enclosure	
NOTE 101 In the following countries only enclosures classified according to 7.101.2 can be used: BE, DE, FR and GR.		
NOTE 102 In the following country only enclosures according to 7.101.1 can be used: DK.		

8 Marking

Clause 8 of IEC 60670-1:2024 is applicable with the following modifications:

Replacement:

8.1 General

Enclosures shall be marked with

- the name, trade mark or identification mark of the manufacturer or the responsible vendor;
- IP code against ingress of solid foreign objects and against access to hazardous parts if higher than IP3X and/or if IP code against harmful ingress of water is higher than IPX0.

The IP code, if applicable, shall be marked on the outside of the enclosure so as to be easily discernible when the enclosure is mounted and wired as for normal use. The visibility of the marking is also possible after opening the door or the lid if a minimum degree of IP20 is maintained after opening;

- the symbol for class II protection, if applicable (IEC 60417-5172 (2003-02)) ;
- type designation, reference number or catalogue number;
- letter N for terminals intended exclusively for the neutral conductor, if any;
- symbol  according to IEC 60417-5019 (2006-08) for earthing terminals for the connection of the protective conductor, if any, and/or symbol  according to IEC 60417-5018 (2011-07) for functional earthing terminal for the connection of the functional earthing, if any.

Markings of neutral terminals and earthing terminals shall not be placed on screws, or any other easily removable parts.

NOTE 1 Easily removable parts are those parts which can be removed during the normal installation of the enclosure.

The following information shall be marked on enclosures or provided by the manufacturer on the smallest package unit or in the manufacturer's instructions, which are not required to be provided with the product:

g) rated voltage;

NOTE 2 For three-phase systems, the combined voltage values can be considered e.g. 230/400 V.

h) rated current as declared by the manufacturer for enclosures classified according to 7.101.2;

i) reference number of this document i.e. IEC 60670-24;

j) information for parts of enclosures intended to withstand +90 °C during the casting process of concrete into shuttering according to classification 7.2.1.3;

k) for enclosures classified according to 7.3.7 (without inlets), the necessary information concerning the openings that can be made during installation;

l) for enclosures classified according to 7.101.1, the maximum capability to dissipate power (P_{de});

In the case of an enclosure designed with ventilation openings that can be closed, for example with an accessory, the maximum capability to dissipate power (P_{de}) shall be declared by the manufacturer, for both closed and open positions.

m) for enclosures classified according to 7.2.2, their usability or not for installation in hollow walls, hollow ceilings, hollow floors or furniture;

n) the corresponding dimension sheet, if any;

p) for enclosures classified according to

- 7.101.1 the marking "GP";
- 7.101.2 the marking "PD";

q) IK-code if declared.

Addition:

8.101 Required information for instruction sheet and/or documentation

The manufacturer shall:

- provide appropriate instructions regarding the means (for instance glands, grommets, barriers, etc.) to be used to obtain the intended degree of protection;
- give information to the installer concerning the verification of the electrical continuity of the protective circuit (see Clause 11);
- give the installer the necessary instructions:
 - for enclosures classified according to 7.101.1, the manufacturer shall include in the documentation the necessary instructions for installation and how to integrate accessories as given in Annex AA;
 - for enclosures classified according to 7.101.2, the manufacturer shall include in the documentation the necessary instructions for installation according to the appropriate mounting environment as given in Annex BB.

9 Dimensions

Clause 9 of IEC 60670-1:2024 is applicable.

10 Protection against electric shock

Clause 10 of IEC 60670-1:2024 is replaced by following:

Enclosures shall have a degree of protection of at least IPXXC according to IEC 60529, when mounted and installed as for normal use, according to the manufacturer's instruction.

Enclosures are tested completed with the necessary means (such as grommets, etc.) indicated in the manufacturer's instructions and the window opening(s), if any, completely filled up with blank inserts delivered by the manufacturer and/or samples of products as declared by the manufacturer.

If doors or covers of the enclosure can be opened without the use of a key or tool, they shall be left open during the test.

Compliance is checked by the following tests.

Tests shall be carried out on parts which are accessible after installation.

The test shall be carried out in accordance with IEC 60529 where probe C of IEC 61032:1997 is applied to all places including knock-outs except membranes or the like, where yielding of insulating material could impair the safety, with a force of 3 N.

In addition, enclosures having class II protection, when mounted and installed as for normal use, shall:

- a) cover live parts of the installed equipment with insulation material, and
- b) at no point be pierced by conducting parts in such a manner that there is a possibility of a fault voltage being brought out of the enclosure, and
- c) not have conductive parts, such as plates, cover-plates or frames connected to the protective circuit.

Compliance is checked by inspection.

11 Provisions for earthing

Clause 11 of IEC 60670-1:2024 is applicable with the following modifications:

Subclauses 11.1 to 11.3 are not applicable for enclosures with class II protection.

Add the following subclauses:

11.101 The electrical continuity of the protective circuit, if any, shall be checked.

Except for enclosures having class II protection, all exposed conductive parts of the enclosure shall be connected separately or in groups to the protective circuit terminals.

Compliance is checked by inspection and, if necessary, by a continuity test of the protective circuit.

A measurement shall be carried out to verify that the resistance between the terminal of the incoming protective conductor and the exposed conductive parts shall be less than 0,05 Ω with a current of 10 A AC or 10 A DC.