

# 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**

<https://standards.iteh.ai/catalog/standards/sist/3ec91268-0246-4c60-be9c-1e3112e6127d/iec-60670-24-2011>

**Boîtes et enveloppes pour appareillage électrique pour installations électriques fixes pour usages domestiques et analogues –**

**Partie 24: Exigences particulières pour enveloppes pour appareillages de protection et autres appareillages électriques ayant une puissance dissipée**



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2011 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland  
Email: [inmail@iec.ch](mailto:inmail@iec.ch)  
Web: [www.iec.ch](http://www.iec.ch)

## About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

## About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: [www.iec.ch/online\\_news/justpub](http://www.iec.ch/online_news/justpub)

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

[IEC 60670-24.2011](mailto:IEC.60670-24.2011@iec.ch)

- Electropedia: [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: [www.iec.ch/webstore/custserv](http://www.iec.ch/webstore/custserv)

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: [csc@iec.ch](mailto:csc@iec.ch)

Tel.: +41 22 919 02 11

Fax: +41 22 919 03 00

## A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

## A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

- Catalogue des publications de la CEI: [www.iec.ch/searchpub/cur\\_fut-f.htm](http://www.iec.ch/searchpub/cur_fut-f.htm)

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: [www.iec.ch/online\\_news/justpub](http://www.iec.ch/online_news/justpub)

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: [www.iec.ch/webstore/custserv/custserv\\_entry-f.htm](http://www.iec.ch/webstore/custserv/custserv_entry-f.htm)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: [csc@iec.ch](mailto:csc@iec.ch)

Tél.: +41 22 919 02 11

Fax: +41 22 919 03 00

# 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**

<https://standards.iteh.ai/catalog/standards/sist/3ec91268-0246-4c60-be9c-405a7701-6074-4001/iec-60670-24-2011>

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

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

PRICE CODE  
CODE PRIX



ICS 29.120.10

ISBN 978-2-88912-391-9

## CONTENTS

FOREWORD.....	4
1 Scope .....	6
2 Normative references.....	6
3 Definitions .....	7
4 General requirements .....	8
5 General notes on tests.....	8
6 Ratings .....	8
7 Classification .....	8
8 Marking .....	8
9 Dimensions.....	10
10 Protection against electric shock.....	10
11 Provisions for earthing.....	11
12 Construction .....	11
13 Resistance to ageing, protection against ingress of solid foreign objects and against harmful ingress of water .....	12
14 Insulation resistance and electric strength .....	12
15 Mechanical strength.....	12
16 Resistance to heat.....	12
17 Creepage distances, clearances and distances through sealing compound.....	12
18 Resistance of insulating material to abnormal heat and to fire.....	13
19 Resistance to tracking.....	13
20 Resistance to corrosion .....	14
21 Electromagnetic compatibility .....	14
101 Verification of the maximum capability to dissipate power ( $P_{de}$ ) .....	14
102 Verification of temperature rise .....	15
Annex AA (normative) Instructions to be given by the manufacturer of the GP enclosure to the installer how to integrate accessories, and example of calculation .....	22
Annex BB (normative) Instructions to be given by the manufacturer of the PD enclosure to the installer how to integrate accessories .....	30
Bibliography.....	32
Figure 101 – Arrangement for the verification of the maximum capability to dissipate power ( $P_{de}$ ) and for verification of temperature rise of surface type enclosures .....	17
Figure 102 – Heating resistor for the verification of the maximum capability to dissipate power ( $P_{de}$ ).....	18
Figure 103 – Position of the resistor for enclosures designed or intended to be fitted with rail mounting modular accessories and electrical equipment.....	19
Figure 104 – Position of the resistor(s) for enclosures other than those designed or intended to be fitted with rail mounting accessories and electrical equipment .....	20
Figure 105 – Position of the resistor(s) for enclosures other than those designed or intended to be fitted with rail mounting accessories and electrical equipment and allowing the mounting of several accessories and electrical equipment in different positions .....	21

Table 1 – Classification of boxes and enclosures .....	8
Table 101 – Creepage distances, clearances and distances through sealing compound .....	13
Table 102 – Diversity factor .....	16
Table 103 – Temperatures of accessible surfaces .....	17
Table AA.1 – Diversity factor .....	24
Table AA.2 – Tests and verifications .....	25
Table AA.3 – Calculation of $P_{dp}$ .....	28
Table AA.4 – Calculation of $P_{au}$ .....	29

## iTeh STANDARD PREVIEW (standards.iteh.ai)

IEC 60670-24:2011

<https://standards.iteh.ai/catalog/standards/sist/3ec91268-0246-4c60-be9c-6d060277a7e6/iec-60670-24-2011>

## 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60670-24 has been prepared by subcommittee 23B: Plugs, socket-outlets and switches, of IEC technical committee 23: Electrical accessories.

This second edition cancels and replaces the first edition published in 2005 and constitutes a technical revision.

The following major changes from the first edition are introduced:

- new definition for basic, general purpose enclosures (GP enclosure) and enclosures for pre-determined equipment (PD enclosure);
- new classification and marking for general purpose enclosure (GP enclosure) and enclosure for pre-determined equipment (PD enclosure);
- required data for instruction sheet and/or documentation according to the type of enclosure;

- adequate space to allow mounting and connection of the accessories (fully equipped) as declared by the manufacturer;
- requirements for general purpose enclosure (GP enclosure) as in Clause 101;
- requirements for enclosure for pre-determined equipment (PD enclosure) as in Clause 102;
- instructions to be given by the manufacturer of the GP enclosure to the installer how to integrate accessories and example of calculation given in Annex AA;
- instructions to be given by the manufacturer of the PD enclosure to the installer how to integrate accessories given in Annex BB.

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

FDIS	Report on voting
23B/982/FDIS	23B/992/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This standard shall be used in conjunction with IEC 60670-1. 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 Part 24 states "addition", "modification" or "replacement", the relevant requirement, test specifications or explanatory matter in Part 1 shall be adapted accordingly.

Clauses and subclauses, notes, figures or tables which are additional to those in Part 1 are numbered starting from 101.

Additional annexes to Part 1 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.

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

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

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

# 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 where unskilled persons have access. They are intended to be integrated with electrical equipment on site by skilled persons (installers).

They 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 standard are suitable for use, after installation, at ambient temperature not normally exceeding 25 °C, but occasionally reaching 35 °C over 24 h, max. 40 °C and min. –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 standard does not apply to a low-voltage switchgear and controlgear assembly (ASSEMBLY) as defined in the IEC 60439 or IEC 61439 series of standards nor to a main entrance panel which may or may not be part of the distribution board.

NOTE 1 A main entrance panel is a set composed by 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 2 In the following country this standard 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 60439-3 [British standard EN 60439-3]: UK.

NOTE 3 In the following country this standard 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 60439-3: DK.

### 2 Normative references

#### *Addition:*

IEC 60417, *Graphical Symbols for Use on Equipment*

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*

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

### 3 Definitions

*Addition:*

#### 3.101

##### **basic enclosure**

##### **BE**

enclosure containing only mounting means

#### 3.102

##### **general purpose enclosure**

##### **GP enclosure**

empty enclosure or basic enclosure where integration of mechanical and electrical devices has been verified by tests carried out by the manufacturer according to the present standard and where the installer has to verify the installed equipment by information given in Annex AA

#### 3.103

##### **enclosure for pre-determined equipment**

##### **PD enclosure**

empty enclosure or basic enclosure where the capability to integrate pre-determined mechanical and electrical equipment has been verified according to design rules and tests according to the present standard carried out by the manufacturer where the installer has to verify the installed equipment following the design instruction declared by the manufacturer according to Annex BB

#### 3.104

##### **manufacturer's design instructions**

instructions in accordance to Annexes AA and BB leading to a configuration of the enclosure ensuring the necessary heat dissipation. Standards can be part of those manufacturer design instructions.

#### 3.105

##### **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  $P_{de}$  is expressed in watts (W).

#### 3.106

##### **rated current**

##### **$I_n$**

current assigned by the manufacturer of the enclosure corresponding to the highest rated current of the incoming device(s) to be installed in the enclosure

### 3.107

#### rated voltage

$U_n$

voltage assigned by the manufacturer of the enclosure

## 4 General requirements

This clause of Part 1 is applicable.

## 5 General notes on tests

This clause of Part 1 is applicable.

## 6 Ratings

*Replacement:*

Void.

## 7 Classification

This clause of Part 1 is applicable with the following modifications:

**Table 1 – Classification of boxes and enclosures**

*Classification criteria 7.7.2 and 7.7.3.1 do not apply.*

<https://standards.iteh.ai/catalog/standards/sist/3ec91268-0246-4c60-be9c-6d060277a7e6/iec-60670-24-2011>

*Addition:*

7.101 Empty enclosure	7.101.1 GP enclosure	
	7.101.2 PD enclosure	
7.102 Basic enclosure	7.102.1 GP enclosure	
	7.102.2 PD enclosure	
NOTE 101 In the following countries only enclosures classified according to 7.101.2 and 7.102.2 can be used: BE, DE, FR and GR.		
NOTE 102 In the following country only enclosures according to 7.101.1 and 7.102.1 can be used: DK.		

## 8 Marking

This clause of Part 1 is applicable with the following modifications:



*Replacement:*

### 8.1 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 allowed after opening the door or the lid if a minimum degree of IP20 is maintained after opening;

- c) the symbol for total insulation, if applicable (IEC 60417-5172 (2003-02)) ;
- d) type designation, reference number or catalogue number;
- e) letter N for terminals intended exclusively for the neutral conductor, if any;
- f) symbol  according to IEC 60417-5019 (2006-08) for earthing terminals for the connection of the protective conductor, if any.

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

The following information shall be marked on the boxes and enclosures or provided by the manufacturer on the smallest package unit or in the instructions of the manufacturer:

- g) rated voltage;
- h) rated current as declared by the manufacturer for enclosures classified according to 7.101.2 and 7.102.2;
- i) reference number of this standard i.e. IEC 60670-24;
- j) maximum temperature during the building process if 90 °C;
- 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 and 7.102.1, the maximum capability to dissipate power ( $P_{de}$ );

NOTE 1 In case of an enclosure designed with ventilation openings, the maximum capability to dissipate power ( $P_{de}$ ) should be declared by the manufacturer, for both closed and open openings.

- m) for enclosures classified according to 7.7 the usability for hollow wall installation;
- n) the corresponding dimension sheet, if any;
- p) for enclosures classified according to
- 7.101.1 and 7.102.1 the marking "GP";
  - 7.101.2 and 7.102.2 the marking "PD"

NOTE 2 Easily removable parts are those parts which can be removed during the normal installation of the enclosure.

*Addition:*

### 8.101 Required data for instruction sheet and/or documentation

The manufacturer shall

- provide appropriate instructions regarding the means (for instance glands, grommets, barriers...) 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 to the installer the necessary instructions:
  - for enclosures classified according to 7.101.1 and 7.102.1 the manufacturer shall include in the documentation accompanying the enclosure the necessary instructions for installation and how to integrate accessories as given in Annex AA;
  - for enclosures classified according to 7.101.2 and 7.102.2 the manufacturer shall include in the documentation accompanying the enclosure the necessary instructions

for installation according to the appropriate mounting environment as given in Annex BB.

## 9 Dimensions

This clause of Part 1 is applicable.

## 10 Protection against electric shock

This clause of Part 1 is applicable with the following modifications:

*Deletion of the 2<sup>nd</sup> paragraph.*

*Addition:*

**10.101** Enclosures are tested completed with the necessary means (such as grommets...) indicated in the manufacturer's instruction 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.

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

When mounted and installed as for normal use, enclosures with total insulation shall

- a) completely enclose the installed equipment in insulating 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.

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 inspection and in case of doubt by the following test.*

*Enclosures shall be tested with test probe C according to IEC 61032 applied for 1 min with a force of 3 N, and the test probe shall not enter that part of the enclosure where live parts are to be installed according to the manufacturer's instructions.*

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

*In addition, all enclosures according to 7.1.1 and 7.1.3 with parts of thermoplastic or elastomeric material shall be subjected for 1 min to a force applied through the tip of test probe C of IEC 61032 but at an ambient temperature of  $(35 \pm 2) ^\circ\text{C}$ , the enclosure being at this temperature.*

*The probe is applied to*

- all places except membranes or the like, where yielding of insulating material could impair the safety, with a force of 3 N;
- knock-outs with a force of 3 N.

## 11 Provisions for earthing

This clause of Part 1 is applicable with the following addition:

*Addition:*

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

Except for enclosures intended to be used for total insulation, 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  $\Omega$  with a current of 10 A a.c. or d.c..*

## 12 Construction

This clause of Part 1 is applicable with the following modifications:

### 12.1 Lids, covers or cover-plates or parts of them

*Replacement:*

Lids, covers, cover plates or parts of them, which are intended to ensure protection against electric shock, shall be held in place effectively. They shall be removable only by the use of a tool and/or a key.

#### 12.11 Enclosures classified according to 7.7.1

*Replacement:*

Enclosures for hollow walls classified according to 7.7.1 shall provide suitable means for fixing the enclosure to hollow walls.

*Compliance is checked by inspection.*

*Addition:*

**12.101** Enclosures for hollow walls shall have provisions for retention means for cables or means to use a separate retention device or devices.

NOTE In the following country, cables are retained using fixing means applied during installation by the installer: UK.

*Compliance is checked by inspection.*

**12.102** Enclosures shall have enough space to allow mounting and connection of the accessories (fully equipped) as declared by the manufacturer, in safe way.

*Compliance is checked by inspection and in case of doubt by manual test using samples of products as declared by the manufacturer and complying with the relevant standard, if any.*

*Any generally available conductors having the largest nominal cross-sectional area as declared by the manufacturer shall be used.*

### **13 Resistance to ageing, protection against ingress of solid foreign objects and against harmful ingress of water**

This clause of Part 1 is applicable with the following modification:

#### **13.2 Protection against the ingress of solid foreign objects**

*Replacement of the first paragraph:*

Enclosures shall provide a degree of protection of at least IP3X against the ingress of solid foreign objects in accordance with their declared IP code with the lid closed, if any.

In the case of an enclosure with a door or a lid which can be opened without the use of a tool during normal use, a minimum degree of IP20 shall be maintained after opening the door or the lid.

NOTE In the following countries in the case of an enclosure with a door or a lid which can be opened without the use of a tool during normal use, a minimum degree of IP30 shall be maintained after opening the door or the lid: DE, DK.

### **14 Insulation resistance and electric strength**

This clause of Part 1 is applicable.

### **15 Mechanical strength**

This clause of Part 1 is applicable.

*Addition:*

**15.101** PD enclosure shall provide a degree of protection against external mechanical impact in accordance with their declared IK code.

*Compliance is checked by the relevant test of IEC 62262.*

### **16 Resistance to heat**

This clause of Part 1 is applicable.

### **17 Creepage distances, clearances and distances through sealing compound**

*Replacement:*

Creepage distances, clearances and distances through sealing compound shall not be less than the value shown in Table 101.

**Table 101 – Creepage distances, clearances and distances through sealing compound**

Rated voltage V	Creepage distance, clearance and distance through sealing compound mm
130	1,5
>130 and ≤250	3,0
>250 and ≤400	4,0

*Compliance is checked by measurement between the following parts:*

*Creepage distances and clearances:*

- *between live parts of different polarity;*
- *between live parts and*
  - *metal covers and enclosures without insulating lining;*
  - *the surface on which the enclosure is mounted.*

*Distances through sealing compound:*

- *between live parts covered with sealing compound and the surface on which the enclosure is mounted.*

*For multi-way terminal devices and terminals without fixing means but with protection, distances are measured between live parts and any opening which represents the closest point liable to touch any other part when the terminal is fitted with conductors having the largest cross-sectional area.*

[IEC 60670-24:2011](https://standards.iteh.ai/catalog/standards/sist/3ec91268-0246-4c60-be9e-6d060377a7cf/iec-60670-24-2011)

*In cases where various terminals or connecting devices may be mounted in the enclosure, the most unfavourable combinations shall be tested.*

## **18 Resistance of insulating material to abnormal heat and to fire**

This clause of Part 1 is applicable with the following modifications:

*Replacement of the table by the following:*

By the test made at 650 °C	By the test made at 850 °C	By the test made at 960 °C
- for parts of insulating material not necessary to retain current-carrying parts in position (even though they are in contact with them), and - for parts of insulating material retaining earthing terminal in position.	- for parts of insulating material, necessary to retain parts of the earthing circuit in position (with the exception of parts of insulating material needed to retain the earth terminal in position in an enclosure), and - for parts of insulating material of enclosures classified according to 7.7.	- for parts of insulating material necessary to retain current-carrying parts in position.

NOTE Accessories complying with other standards, e.g. connecting devices incorporated but not integrated into the enclosure, are not considered as part of the enclosures.

## **19 Resistance to tracking**

This clause of Part 1 is applicable.