

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Boxes and enclosures for electrical accessories for household and similar fixed electrical installations –

Part 22: Particular requirements for connecting boxes and enclosures

Boîtes et enveloppes pour appareillage électrique pour installations électriques fixes pour usage domestique et analogue –

Partie 22: Règles particulières concernant les boîtes et enveloppes de connexion

<https://www.intelstandards.com/standards/iec/a396ec26-1b00-4979-b327-9d866a931c76/iec-60670-22-2003>





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2015 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 l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
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.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

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 It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

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

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 60 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) 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 IEC

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

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

Plus de 60 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.



IEC 60670-22

Edition 1.1 2015-03
CONSOLIDATED VERSION

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Boxes and enclosures for electrical accessories for household and similar fixed electrical installations –
Part 22: Particular requirements for connecting boxes and enclosures**

**Boîtes et enveloppes pour appareillage électrique pour installations électriques fixes pour usage domestique et analogue –
Partie 22: Règles particulières concernant les boîtes et enveloppes de connexion**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.120.10

ISBN 978-2-8322-2588-2

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

REDLINE VERSION

VERSION REDLINE



Boxes and enclosures for electrical accessories for household and similar fixed electrical installations –

Part 22: Particular requirements for connecting boxes and enclosures

Boîtes et enveloppes pour appareillage électrique pour installations électriques fixes pour usage domestique et analogue –

Partie 22: Règles particulières concernant les boîtes et enveloppes de connexion

CONTENTS

FOREWORD.....	3
1 Scope.....	5
2 Normative references	5
3 Definitions	5
4 General requirements	6
5 General notes on tests	6
6 Ratings.....	7
7 Classification.....	7
8 Marking	7
9 Dimensions	8
10 Protection against electric shock	8
11 Provision for earthing	8
12 Construction.....	8
13 Resistance to ageing, protection against ingress of solid objects and against harmful ingress of water	9
14 Insulation resistance and electric strength.....	9
15 Mechanical strength	10
16 Resistance to heat.....	10
17 Creepage distances, clearances and distances through sealing compound	11
18 Resistance of insulating material to abnormal heat and to fire	12
19 Resistance to tracking	12
20 Resistance to corrosion	12
21 Electromagnetic compatibility (EMC)	12
Annex AA (informative).....	14
Annex BB (informative) Schematic presentation of connecting devices as a basis for the definitions	15
Figure 101 – Single terminal device	13
Figure 102 – Multiway terminal device	13
Figure AA.1 – Four examples of connecting boxes/enclosures	14
Figure BB.1 – Schematic presentation	15
Table 101 – Relationship between rated connecting capacity and test current	11
Table 102 – Creepage distances, clearances and distances through sealing compound	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 22: Particular requirements for connecting boxes and enclosures

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.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60670-22 edition 1.1 contains the first edition (2003-05) [documents 23B/700/FDIS and 23B/704/RVD] and its amendment 1 (2015-03) [documents 23B/1174/FDIS and 23B/1182/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 60670-22 has been prepared by subcommittee 23B: Plugs, socket-outlets and switches, of IEC Technical Committee 23: Electrical accessories.

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 connecting boxes and enclosures.

In this publication:

- a) the following print types are used:
 - requirements proper: in roman type.
 - *test specifications: in italic type.*
 - notes: in smaller roman type.
- b) subclauses, figures or tables which are additional to those in Part 1 are numbered starting from 101.

Annex AA and Annex BB ~~is~~ are for information only.

The committee has decided that the contents of the base publication and its amendment 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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

Part 22: Particular requirements for connecting boxes and enclosures

1 Scope

This clause of Part 1 applies with the following addition:

Add after the fourth paragraph:

This standard applies to connecting boxes for junction(s) and/or tapping(s).

NOTE Unless otherwise stated, throughout the document the term “boxes” also applies to “enclosures”.

2 Normative references

This clause of Part 1 applies with the following addition:

IEC 60998 (series), *Connecting devices for low-voltage circuits for household and similar purposes*

IEC 60999-1:1999, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)*

[IEC 60670-22:2003](https://standards.iteh.ai/catalog/standards/iec/a396ec26-1b00-4979-b327-9d866a931c76/iec-60670-22-2003)

3 Definitions

This clause of Part 1 applies with the following additions:

3.101

connecting box

junction box

box allowing connection of conductors

3.101.1

junction connecting box

connecting box allowing connection of one or more junctions

3.101.2

tapping connecting box

connecting box allowing connection of one or more taps from one or more main conductors

NOTE Connecting boxes according to 3.101.1 and 3.101.2 may be combined.

3.101.3

cord outlet connecting box

connecting box allowing one or more connections to be made between a fixed installation and a flexible cable

3.102

connecting box with ~~integral~~ **integrated clamping units**

connecting box in which clamping units are permanently retained as an ~~integral~~ **integrated** part of the box (see Annex AA)

3.103

connecting box with incorporated terminals or connecting devices

connecting box with detachable terminals or connecting devices retained within the box by mechanical means (see Annex AA)

3.104

connecting box with provisions for subsequent incorporation of terminals or connecting devices

connecting box with provisions for incorporating terminals or connecting devices to be retained within the box by mechanical means (see Annex AA)

3.105

connecting box for floating terminals or connecting devices

connecting box intended to accommodate terminals or connecting devices but without provision to retain them (see Annex AA)

3.106

rated connecting capacity

cross-sectional area of the largest conductors as declared by the manufacturer

3.107

terminal

~~insulated or non insulated re-usable connecting device intended for electrical connection of conductors of cables~~

conductive part of one pole comprising one or more clamping unit(s) and insulation if necessary

[IEC 60670-22:2003](https://standards.iteh.ai/catalog/standards/iec/a396ec26-1b00-4979-b327-9d866a931c76/iec-60670-22-2003)

3.108

clamping unit

part(s) of a 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

3.109

connecting device

device for the electrical connection of two or more conductors comprising one or more terminals and if necessary, insulation and/or ancillary parts

NOTE For a schematic representation of connecting devices see Figure BB.1 of Annex BB.

4 General requirements

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

Connecting devices incorporated in connecting boxes shall comply with the requirements of the IEC 60998 series; integrated clamping units shall comply with the requirements of the IEC 60999 series.

NOTE In the following countries terminal blocks according to IEC 60947-7-1 and -7-2 are allowed to be incorporated in connecting boxes: DE.

5 General notes on tests

This clause of Part 1 applies with the following addition:

5.2 Add at the end:

Connecting boxes with provision for subsequent incorporation of ~~terminals or connecting devices~~ clamping units are tested with the ~~terminals or connecting devices~~ clamping units recommended by the manufacturer.

Connecting devices according to the IEC 60998 series need not be tested again.

NOTE 1 In the following countries terminal blocks according to IEC 60947-7-1 and -7-2 need not be tested again:
DE

NOTE 2 In the following countries connecting boxes shall be tested either:

- with their incorporated terminals or connecting devices or
- with the terminals or connecting devices recommended by the manufacturer for connecting boxes with provision for subsequent incorporation of terminals or connecting devices:

UK.

6 Ratings

This clause of Part 1 is replaced by:

6.1 The preferred values of the rated voltage of the integrated or incorporated connecting devices are ~~125 V–130 V~~, 250 V, ~~300 V~~, ~~400 V–450 V~~, 500 V, 600 V, 690 V–~~750 V~~, 800 V, 1 000 V a.c. and 1 500 V d.c.

6.2 The standard rated connecting capacities are 0,2 mm², 0,34 mm², 0,5 mm², 0,75 mm², 1 mm², 1,5 mm², 2,5 mm², 4 mm², 6 mm², 10 mm², 16 mm², 25 mm², 35 mm².

NOTE 1 For the time being, designation by wire gauge may be used in some countries (for example AWG in US and CA), instead of the cross-sectional areas expressed in mm².

NOTE 2 The approximate relation between mm² and AWG sizes is given in Appendix A of IEC 60999-1.

NOTE 3 In UK, a standard connecting capacity of 1,25 mm² is used.

NOTE 4 In Japan, standard connecting capacities of 0.9 mm², 1.25 mm², 2.0 mm², 3.5 mm², 5.5 mm², 8 mm², 14 mm², 22 mm² are used.

7 Classification

This clause of Part 1 applies with the following addition:

Add the following:

7.101 The method of fixing the terminals or connecting devices in the connecting box	7.101.1 With integrated clamping units	
	7.101.2 With incorporated terminals or connecting devices	
	7.101.3 With provisions for subsequent incorporation of terminals or connecting devices	
	7.101.4 Without fixing (for floating terminals or connecting devices)	

8 Marking

This clause of Part 1 applies with the following additions:

8.1 Add after j):

- k) rated insulation voltage for boxes with integrated or incorporated terminals or connecting devices (see note 1),

- l) rated connecting capacity (see notes 1 and 2),
- m) maximum number of conductors to be placed in the box (see notes 1 and 2).

The information l) and m) are optional for boxes classified according to 7.101.4.

- n) Boxes and enclosures classified according to 7.101.1 or 7.101.2 shall be marked with an appropriate rated current which does not exceed the test current given in Table 101.

NOTE 1 In the case of:

- integrated clamping units, k), l) and n) should be marked on the boxes,
- incorporated terminals or connecting devices, the marking k), l) and n) if marked on the box or on the incorporated terminals or connecting devices, should be visible during installation,
- empty boxes for floating terminals or connecting devices classified according to 7.101.4, the marking l) and m), if marked on the box, should be visible during installation.

NOTE 2 The manufacturer may mark or declare more than one combination of l) and m). This information is mandatory for boxes classified according to 7.101.4 in the following countries: DE and SE.

Add the following subclause:

8.101 When symbols are used they shall be as follows:

Volt..... V

Rated connecting capacity mm² or □ or AWG

9 Dimensions

This clause of Part 1 applies.

10 Protection against electric shock

This clause of Part 1 applies. [IEC 60670-22:2003](https://standards.iteh.ai/catalog/standards/iec/a396ec26-1b00-4979-b327-9d866a931c76/iec-60670-22-2003)

<https://standards.iteh.ai/catalog/standards/iec/a396ec26-1b00-4979-b327-9d866a931c76/iec-60670-22-2003>

11 Provision for earthing

This clause of Part 1 applies.

12 Construction

This clause of Part 1 applies with the following modifications:

12.1 Add after the first paragraph:

In connecting boxes where the fixing means of covers or cover-plates serve also to fix the connecting device, it shall maintain the connecting device in the correct position after removal of the cover or cover-plate.

Compliance is checked by inspection.

Add the following subclauses:

12.101 Connecting boxes shall have adequate space to allow the correct connection of conductors which are specified in the relevant sections of the particular requirements of Parts 2 of IEC 60998, concerning the number and cross-sectional area of the conductors.

Compliance is checked by fitting the maximum number of conductors of the maximum cross-sectional area if it is the worst case. If not, the most unfavourable combination shall be checked.

This test shall be carried out in conjunction with that of 12.102.

For boxes classified according to 7.101.4 the test is made only if l) and m) of 8.1 are marked or declared.

12.102 Retention means for terminals or connecting devices shall withstand the mechanical stresses occurring during installation and normal use.

Compliance is checked by connecting conductors in accordance with the relevant Part(s) 2 of IEC 60998 for the type of the connecting device used.

After the test there shall be no harmful deformation, cracks or similar damage which would lead to non-compliance with this part.

12.103 Connecting boxes classified according to 7.101.1, 7.101.2 and 7.101.3 shall comply with the temperature rise requirements of Clause 16.102.

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

This clause of Part 1 applies with the following addition:

13.3.3 *Replace the last paragraph by the following:*

The specimens, except connecting boxes classified according to 7.101.4, shall withstand an electric strength test specified in 14.2 which shall be started within 5 min of the completion of the test according to this subclause.

14 Insulation resistance and electric strength

This clause of Part 1 applies with the following addition:

Add the following:

14.2.101 *For boxes with integrated or incorporated terminals or connecting devices, the measurements are made consecutively as indicated below.*

Each clamping unit of a connecting device shall be connected alternatively with conductors of the smallest and the largest cross-sectional area.

The insulation resistance is then measured with a d.c. voltage of approximately 500 V applied, the measurement being made 1 min after application of the voltage.

- a) *between all clamping units connected together and the body for connecting devices without fixing means or between all clamping units connected together and the mounting base for connecting devices with fixing means;*
- b) *between each clamping unit and all others connected to the body for connecting devices without fixing means or between each clamping unit and all others connected to the mounting base for connecting devices with fixing means.*

The metal foil is applied in such a way that the sealing compound, if any, is effectively tested.

15 Mechanical strength

This clause of Part 1 applies with the following amendment:

15.4 2 Replace the ~~note sixth paragraph~~ by the following:

NOTE Damage to the finish, small dents which do not reduce creepage distances or clearances below the value specified in Table 102 and small chips which do not adversely affect the protection against electric shock or harmful ingress of water are disregarded.

16 Resistance to heat

This clause of Part 1 applies with the following addition:

Add the following subclauses:

16.101 Connecting devices having parts of insulating material shall be sufficiently resistant to heat.

Compliance is checked by the test of 16.101.1 to 16.101.3.

16.101.1 The specimens or portions of the specimens are kept for 1 h in a heating cabinet at a temperature of $(85 \pm 2)^\circ\text{C}$.

During the test they shall not undergo any change impairing their further use and sealing compound if any, shall not flow to such an extent that live parts are exposed.

After the test and after the specimens have been allowed to cool to approximately ambient temperature, there shall be no access to live parts which are normally not accessible when the specimens are mounted as in normal use, even if the test probe B of IEC 61032 is applied with a force not exceeding 5 N.

After the test, markings shall still be legible.

16.101.2 Parts of the insulating material not necessary to retain current carrying parts and parts of the earthing circuit in position, even though they are in contact with them, are subjected to a ball-pressure test as described in clause 16.1 of Part 1 but at a temperature of $(70 \pm 2)^\circ\text{C}$ or $(40 \pm 2)^\circ\text{C}$, plus the highest temperature rise determined for the relevant part during the test of 16.102.4, whichever is the higher.

16.101.3 Parts of the insulating material necessary to retain current carrying parts and parts of the earthing circuit in position are subjected to a ball pressure test in a heating cabinet at a temperature of $(125 \pm 2)^\circ\text{C}$.

16.102 Connecting devices integrated ~~or incorporated~~ in connecting boxes shall be so constructed that the temperature rise in normal use does not exceed the value specified in 16.102.4.

Compliance is checked by the tests of 16.102.1 to 16.102.3.

NOTE In the following countries connecting devices integrated or incorporated in connecting boxes shall be so constructed that the temperature rise in normal use does not exceed the values specified in 16.102.4. Compliance is checked by the tests of 16.102.1 to 16.102.3: UK.

16.102.1 Connecting devices with a single terminal (see Figure 101) having one or more clamping units shall be connected to conductors in the intended manner and the most unfavourable conditions.