IEC 60670-1

Edition 2.0 2015-03

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 60670-1:2015-03(en-fr)

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INTERNATIONAL
ELECTROTECHNICAL
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COMMISSION
ELECTROTECHNIQUE
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ICS 29.120.10

ISBN 978-2-8322-2337-6

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CONTENTS

FOREWORD 5
1 Scope 7
2 Normative references 7
3 Terms and definitions 8
4 General requirements 11
5 General notes on tests 11
6 Ratings 11
7 Classification 12
8 Marking 13
9 Dimensions 14
10 Protection against electric shock 14
11 Provision for earthing 15
11.1 Boxes and enclosures with exposed conductive parts 15
11.2 Boxes and enclosures of insulating material classified according to 7.2.2.2 and 7.2.2.3 16
11.3 Boxes or enclosures with removable sides according to 7.1.2 17
11.4 Earthing terminal/threads 17
12 Construction 18
12.1 General 18
12.2 Lids, covers or cover-plates or parts of them 18
12.2.1 General 18
12.2.2 Screw-type fixing 18
12.2.3 Non-screw-type fixing operable without the use of a tool or a key 18
12.2.4 Non screw-type fixing operable with the use of a tool or a key 24
12.3 Drain holes 25
12.4 Mounting of enclosures 25
12.5 Boxes and enclosures with inlets for flexible cables 25
12.6 Boxes and enclosures with inlets for applications other than flexible cables 25
12.7 Boxes and enclosures with a cable anchorage(s) 26
12.8 Boxes and enclosures with cable retention means 27
12.9 Knock-outs intended to be removed by mechanical impact 28
12.9.1 General 28
12.9.2 Knock-out retention 28
12.9.3 Knock-out removal 28
12.9.4 Flat surfaces surrounding knock-outs 29
12.10 Screw fixings 29
12.11 Fixing of boxes and enclosures classified according to 7.2.1 30
12.12 Fixing of flush type and semi-flush type boxes and enclosures classified according to 7.2.2.1 33
12.13 Boxes and enclosures classified according to 7.2.2.2 and 7.2.2.3 34
12.13.1 General 34
12.13.2 Boxes intended for mounting on a wood structural member of a wall 35
12.13.3 Boxes intended for mounting to a wooden structural member of a ceiling 35
12.13.4 Boxes intended for mounting to a steel-stud structural member of a wall 35

12.13.5 Internal volume of boxes and enclosures classified according to 7.2.2.2 and 7.2.2.3 36
12.13.6 Boxes intended for mounting in a finished structure 37
12.14 Cable gland entry 37
12.15 Boxes and enclosures with inlets (outlets) or spouts (hubs) for conduits 38
12.16 Internal volume of boxes and enclosures 38
13 Resistance to ageing, protection against ingress of solid objects and against harmful ingress of water 39
13.1 Resistance to ageing 39
13.2 Protection against the ingress of solid objects 41
13.3 Protection against harmful ingress of water 42
14 Insulation resistance and electric strength 47
15 Mechanical strength 49
15.1 General 49
15.2 Impact test at low temperature 49
15.3 Compression test 50
15.4 Impact test for boxes and enclosures 51
15.5 Compression test for enclosures made of natural or synthetic rubber or a mixture of both 56
16 Resistance to heat 58
16.1 Parts of insulating material necessary to retain current-carrying parts 58
16.2 Parts of insulating material not necessary to retain current-carrying parts 59
16.3 Boxes and enclosures of insulating materials classified according to 7.2.2.2 or 7.2.2.3 59
16.3.1 Mechanical strength 59
16.3.2 Parts of insulating material necessary to retain parts of the earthing circuit 60
17 Creepage distances, clearances and distances through sealing compound 60
18 Resistance of insulating material to abnormal heat and fire 61
19 Resistance to tracking 63
20 Resistance to corrosion 63
21 Electromagnetic compatibility (EMC) 63
Annex A (informative) Examples of enclosures and parts thereof 64
Bibliography 65

Figure 1 – Examples of membranes and grommets 10
Figure 2 – Demonstration of the non-penetration of the internal volume 15
Figure 3 – Earthing strap 16
Figure 4 – Test strap 17
Figure 5 – Arrangement for test on covers or cover-plates (see 12.2.3.2 and 12.2.3.3) 20
Figure 6 – Gauge for the verification of the outline of lids, covers or cover-plates 21
Figure 7 – Examples of application of the gauge of Figure 6 on covers fixed without screws on a mounting surface or supporting surface 22
Figure 8 – Compliance criteria of application of the gauge of Figure 6 23
Figure 9 – Gauge for verification of grooves, holes and reverse tapers 24
Figure 10 – Sketch showing the direction of application of the gauge of Figure 9 24
Figure 11 – Apparatus for testing the cable anchorage 27

Figure 12 – Example of mounting block for boxes to be embedded in masonry (flush type and semi-flush type) 32
Figure 13 – Example of the fixing of the auxiliary device mounted on a specimen 32
Figure 14 – Example of test apparatus for the test 33
Figure 15 – Verification of fixing means for boxes and enclosures classified according to 7.2.2.1 34
Figure 16 – Test of the force and measurement of the displacement 36
Figure 17 – Volume measurement 39
Figure 18 – Reference surfaces for boxes and enclosures 43
Figure 19 – Test wall 45
Figure 20 – Example of the protected volume 47
Figure 21 – Apparatus for impact test at low temperature 50
Figure 22 – Mounting block for flush-type boxes and enclosures in order to apply blows on the rear surface 52
Figure 23 – Sequence of blows for parts A, B, C, D, E, F and G 55
Figure 24 – Test devices for load compression test for enclosures made of natural or synthetic rubber or a mixture of both. 58
Figure 25 – Rigid crossbar 60
Figure 26 – Diagrammatic representation of the glow-wire test 62
Figure A.1 – Examples of enclosures and parts thereof 64

Table 1 – Classification of boxes and enclosures *(1 of 2)* 12
Table 2 – Forces to be applied to lids, covers, cover-plates or actuating members whose fixing is not dependent on screws 19
Table 3 – Forces and torques to be applied to cable anchorages 26
Table 4 – Tightening torques for the verification of the mechanical strength of screws 30
Table 5 – Torque test values for cable glands 38
Table 6 – Test voltage for electric strength test 48
Table 7 – Determination of parts *A, B, C, D E, F* and *G* 52
Table 8 – Height of fall for impact test 53

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 1: General requirements

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

This second edition cancels and replaces the first edition published in 2002 and its Amendment 1:2011. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition: Review of classification Table 1.

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

FDIS	Report on voting
23B/1176/FDIS	23B/1184/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.

In this publication, the following print types are used:

In this standard, the following print types are used:

– requirements proper: in roman type;
– *test specifications: in italic type;*
– explanatory matter: 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 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 website 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 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 a.c. and 1 500 V d.c. intended for household or similar fixed electrical installations, either indoors or outdoors.

Boxes and enclosures complying with this standard 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.

During the installation the temperature may be outside the above temperature range according to the classification of the boxes and the enclosures.

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

This standard may be used as a reference document for other IEC technical committees and subcommittees.

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 standard 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, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-75:1997[1], *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

[1] First edition. This edition has been replaced in 2014 by IEC 60068-2-75:2014, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

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/AMD2:2013, *Degrees of protection provided by enclosures (IP Code)*

IEC 60695-2-11:2000[2], *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

IEC 60695-10-2:2003[3], *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test*

IEC 60981:2004, *Extra-heavy duty rigid steel conduits*

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

IEC 61140:2001, *Protection against electric shock – Common aspects for installation and equipment*
IEC 61140:2001/AMD1:2004, *Protection against electric shock – Common aspects for installation and equipment*

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.

3.1
enclosure
combination of parts, such as boxes, 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.)

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

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2 First edition. This edition has been replaced in 2014 by IEC 60695-2-11:2014, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

3 Second edition. This edition has been replaced in 2014 by IEC 60695-10-2:2014, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

3.4
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

3.5
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.

3.6
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

3.7
surface mounting box or enclosure
box or enclosure which is intended for mounting on a surface

Note 1 to entry: See Annex A.

3.8
flush-mounting box or enclosure
box or enclosure which is intended for mounting flush with the surface

Note 1 to entry: See Annex A.

3.9
semi-flush mounting box or enclosure
box or enclosure which is intended to fit within a mounting surface and partially projects from the mounting surface

3.10
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

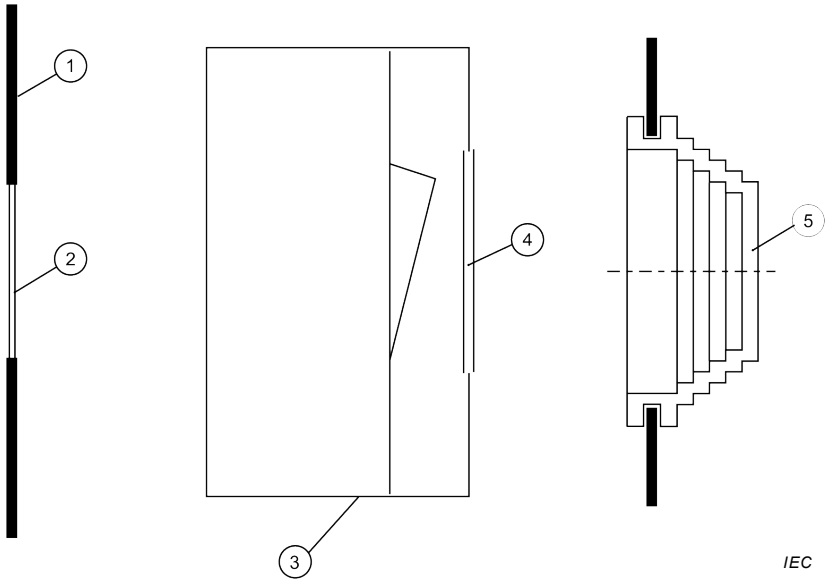
3.11
seal
material used to fill up the space between the inside of a gland and the cable passing through, usually compressed by the gland and thereby forming a joint

3.12
gasket
material introduced between mating surfaces of an enclosure which in compression forms a joint

3.13
grommet
component used to support and protect the cable or conduit at the point of entry, which 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]



Key

1 box

2 entry membrane

3 enclosure

4 protective membrane

5 grommet

Figure 1 – Examples of membranes and grommets

3.14
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).

3.15
protecting 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.

3.16
composite material
combination of metal and insulating material

3.17
spout
hub
open entry of a box permitting the insertion and containment of a conduit

3.18
cable retention
ability to limit the displacement of a fitted cable against pull forces

3.19
cable anchorage
ability to limit the displacement of a fitted flexible cable against pull and push forces and torques

3.20
blanking-plug
component used to close an open inlet or an open knock out

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 notes on tests

5.1 Tests according to this standard are type tests.

Unless otherwise specified, 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 of at least 10 days at ambient temperature and relative air humidity of between 45 % and 85 %.

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.

In case of doubt, the tests are made at an ambient temperature of +(20 ± 5) °C on a set of three new specimens.

5.2 The specimens are submitted to all the relevant tests and the requirements are satisfied if all the tests are met.

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 made 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 may be necessary, should one specimen fail. 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.

6 Ratings

See the relevant part of Parts 21 to 24 of the IEC 60670 series.

7 Classification

Boxes and enclosures are classified according to Table 1. (All classification references used in this document, directly refer to this table).

Table 1 – Classification of boxes and enclosures *(1 of 2)*

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 (outlets)[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 (hub)	
	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	
7.5 The minimum temperature during installation	7.5.1 –5 °C	
	7.5.2 –15 °C	
	7.5.3 –25 °C	

Table 1 *(2 of 2)*

Classification criteria		
7.6 The degree of protection against access to hazardous parts and against harmful effects due to the ingress of solid foreign objects according to IEC 60529 with a minimum degree of IP 2X		
7.7 The degree of protection against harmful effects due to the ingress of water according to IEC 60529		
7.8 The degree of protection of the part mounted inside the hollow walls of the boxes classified according to 7.2.2.1	7.8.1 IP 2X	
	7.8.2 > IP2X	
7.9 The provision for fixing accessories to boxes	7.9.1 Boxes supplied with screws	
	7.9.2 Boxes intended to receive screws	
	7.9.3 Boxes intended to receive claws	
	7.9.4 Boxes intended to receive other means	
[a] Boxes and enclosures may have more than one type of inlet. NOTE In the following countries the class Ha boxes and enclosures are used: BR, CH, DE, FR, IT, NO, PT, SE, UK		

8 Marking

8.1 Boxes and enclosures shall be marked with

a) the name, trade mark or identification mark of the manufacturer or the responsible vendor.

In addition enclosures shall be marked with:

b) the first characteristic numeral for the degree of protection against access to hazardous parts and against harmful effects due to ingress of solid foreign objects, if declared to be higher than 4 in which case the second characteristic numeral shall also be marked;

c) the second characteristic numeral for the degree of protection against harmful effects due to ingress of water, if declared to be higher than 2 in which case the first characteristic numeral shall also be marked;

d) the following marking 

on the cover of flush enclosures intended to be mounted on rough surfaces and where the IP is dependent on the surface (see Figure 5).

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;

e) the type reference, which may be a catalogue number;

NOTE In the following country the marking of the type reference is not used: UK.

f) for boxes and enclosures classified as in 7.2.2.2 and 7.2.2.3, the minimum internal volume in cm^3 as determined by the test in 12.16. The internal volume shall be marked on the inside of the box or enclosure. The marking on a box or enclosure shall be such that the value can be read after installation of the box in the normal manner but before the installation of the wiring devices and wiring;

The following information shall be marked on the boxes and enclosures or provided by the manufacturer on the smallest package unit or in the manufacturer's instructions which need not be provided with the product:

g) +90 °C for boxes and enclosures classified according to 7.2.1.3;