

AS/NZS 60670.1:2021



Australian/New Zealand Standard™

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

Part 1: General requirements (IEC 60670-1:2015 (ED.2.0) MOD)



AS/NZS 60670.1:2021

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee EL-004, Electrical Accessories. It was approved on behalf of the Council of Standards Australia on 12 October 2021 and by the New Zealand Standards Approval Board on 6 October 2021.

This Standard was published on 22 October 2021.

The following are represented on Committee EL-004:

- Australian Chamber of Commerce and Industry
- Australian Industry Group
- Better Regulation Division (Fair Trading, Safework NSW, TestSafe)
- Consumer Electronics Suppliers Association
- Consumers Federation of Australia
- Electrical Regulatory Authorities Council, Australia
- Engineers Australia
- International Accreditation New Zealand
- Joint Accreditation System of Australia & New Zealand
- National Electrical Communications Association
- Plastics Industry Pipe Association of Australia
- Plastics New Zealand
- The Manufacturers' Network
- WorkSafe New Zealand

This Standard was issued in draft form for comment as DR AS/NZS 60670.1:2021.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

www.standards.govt.nz

ISBN 978 1 76113 568 2

Australian/New Zealand Standard™

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

**Part 1: General requirements (IEC 60670-1:2015
(ED.2.0) MOD)**

Originated as AS/NZS IEC 60670.1:2012.
Second edition AS/NZS 60670.1:2021.



© IEC Geneva Switzerland 2021 — All rights reserved

© Standards Australia Limited/the Crown in right of New Zealand, administered by the New Zealand Standards Executive 2021

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of either the IEC or the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth) or the Copyright Act 1994 (New Zealand). If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please see the contact details on the back cover or the contact us page of the website for further information.

Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-004, Electrical Accessories, to supersede AS/NZS IEC 60670.1:2012, *Boxes and enclosures for electrical accessories for household and similar fixed electrical installations, Part 1: General requirements*.

The objective of this document is to specify requirements for 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 conforming to 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 document is intended to apply to boxes and enclosures for electrical accessories within the scope of EL-004 committee.

This document may be used as a reference document for other electrical 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 document does not apply to —

- (a) ceiling roses;
- (b) luminaire supporting couplers; and
- (c) boxes, enclosures and parts of enclosures specifically designed to be used for cable trunking and ducting systems conforming to IEC 61084 and which are not intended to be installed outside of these systems.

This document is an adoption with national modifications, and has been reproduced from, IEC 60670-1:2015, *Boxes and enclosures for electrical accessories for household and similar fixed electrical installations – Part 1: General requirements*. The modifications are additional requirements and are set out in [Appendix ZZ](#), which has been added at the end of the source text. [Appendix ZZ](#) lists the modifications to IEC 60670-1:2015, for the application of this document in Australia and New Zealand.

As this document has been reproduced from an International Standard the following applies:

- (i) In the source text “this part of IEC 60670” should read “this document”.
- (ii) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

NOTES

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

**BOXES AND ENCLOSURES FOR ELECTRICAL ACCESSORIES FOR
HOUSEHOLD AND SIMILAR FIXED ELECTRICAL INSTALLATIONS –****Part 1: General requirements**

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 60670-1 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 60068-2-75:1997¹, *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*