



IEC 62208

Edition 3.0 2023-06
COMMENTED VERSION

INTERNATIONAL STANDARD



**Empty enclosures for low-voltage switchgear and controlgear assemblies –
General requirements**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.130.20

ISBN 978-2-8322-7110-0

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	4
INTRODUCTION	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Classification	10
5 Electromagnetic compatibility (EMC requirements)	11
6 Information to be given regarding the enclosure	11
6.1 General	11
6.2 Marking	11
6.3 Documentation	12
6.3.1 General	12
6.3.2 Dimensions	12
6.3.3 Mounting arrangements	13
6.3.4 Permissible loads	13
6.3.5 Lifting and transport support	13
6.3.6 Protective circuit measures	13
6.3.7 Thermal power dissipation capability	13
7 Service conditions	13
7.1 General	13
7.2 Normal service conditions	14
7.2.1 Ambient air temperature	14
7.2.2 Humidity conditions	14
7.3 Special service conditions	14
7.4 Conditions during transport and storage	15
8 Design and construction	15
8.1 General	15
8.2 Static loads	16
8.3 Lifting and transport support	16
8.4 Access to the interior of the enclosure	16
8.5 Protective circuit	16
8.6 Dielectric strength	16
8.5 Protection against electric shock	17
8.5.1 General	17
8.5.2 Requirements for earth continuity within the class I enclosure	17
8.5.3 Requirements for class II enclosure	18
8.6 Degree of protection Protection against mechanical impact (IK code)	18
8.7 Degree of protection Protection against contact with live parts, ingress of solid foreign bodies and water (IP code)	18
8.8 Protection against corrosion	18
8.9 Enclosures constructed of or covered by insulating material	18
9 Type tests	18
9.1 General	18
9.2 General conditions of tests	19
9.3 Marking	20
9.4 Static loads	20

9.5	Lifting.....	21
9.6	Mechanical operation.....	21
9.7	Axial loads of metal inserts	21
9.8	Degree of protection against external mechanical impacts (IK code).....	22
9.9	Degree of protection (IP code)	23
9.9.1	Degree of protection against access to hazardous parts and against the ingress of solid foreign objects indicated by first characteristic numeral.....	23
9.9.2	Degree of protection against ingress of water as indicated by second characteristic numeral	23
9.9.3	Degree of protection against hazardous parts as indicated by additional letter	24
9.10	Properties of insulating materials	24
9.10.1	Thermal stability.....	24
9.10.2	Resistance to normal heat	24
9.10.3	Resistance to abnormal heat and fire due to internal electric effects.....	25
9.11	Dielectric strength.....	26
9.11.1	General.....	26
9.11.2	Preconditioning	26
9.11.3	Enclosures without metal elements inside the protected space.....	26
9.11.4	Enclosures having metal elements inside the protected space	27
9.11.5	Results to be obtained.....	27
9.12	Effective earth continuity between the exposed-conductive-parts of the class I enclosure and the protective circuit	27
9.13	Resistance to ultra-violet (UV) radiation	28
9.13.1	Verification by test.....	28
9.13.2	Verification by comparison to a reference design	29
9.14	Resistance to corrosion	29
9.14.1	General.....	29
9.14.2	Test procedure	29
9.14.3	Results to be obtained.....	30
9.15	Thermal power dissipation capability	30
9.15.1	General.....	31
9.15.2	Determination of the power dissipation capability by test.....	31
9.15.3	Determination of the power dissipation capability by calculation and comparison	31
9.15.4	Determination of the power dissipation capability by calculation method.....	31
Annex A (informative) List of notes concerning certain countries.....		33
Bibliography.....		34
List of comments.....		35
Table 1 – Climatic conditions.....		14
Table 2 – Number of samples to be tested and order of test per sample.....		19
Table 3 – Axial loads of metal inserts.....		22
Table 4 – Dielectric test voltage.....		27

INTERNATIONAL ELECTROTECHNICAL COMMISSION

EMPTY ENCLOSURES FOR LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES – 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.

This commented version (CMV) of the official standard IEC 62208:2023 edition 3.0 allows the user to identify the changes made to the previous IEC 62208:2011 edition 2.0. Furthermore, comments from IEC SC 121B experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 62208 has been prepared by subcommittee 121B: Low-voltage switchgear and controlgear assemblies, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage. It is an International Standard.

This third edition cancels and replaces the second edition published in 2011. This edition constitutes a technical revision.

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

- a) consideration of the modifications introduced in IEC 61439-1:2020;
- b) alignment of test procedures with the newest relevant standards.

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

Draft	Report on voting
121B/180/FDIS	121B/180/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The reader's attention is drawn to the fact that Annex A lists all of the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this document.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The "colour inside" logo on the cover page of this document 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.

INTRODUCTION

The purpose of this document is to harmonize as far as practicable all rules and requirements of a general nature applicable to empty enclosures for low-voltage switchgear and controlgear assemblies, in order to obtain uniformity of requirements and verification for empty enclosures and to avoid the need for verification in other standards.

EMPTY ENCLOSURES FOR LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES – GENERAL REQUIREMENTS

1 Scope

This document applies to empty enclosures, as provided by the enclosure manufacturer, prior to the incorporation of switchgear and controlgear components by ~~the user, as supplied by the enclosure~~ the assembly manufacturer. **1**

This document specifies general definitions, classifications, characteristics and test requirements of enclosures to be used as part of switchgear and controlgear assemblies (e.g. in accordance with the product standard in the IEC 61439 series), the rated voltage of which does not exceed 1 000 V AC or 1 500 V DC, and suitable for general use for either indoor or outdoor applications.

NOTE 1 Additional requirements ~~may~~ could apply for specific applications.

~~NOTE 2 The United States of America (USA) uses enclosure "Type" designations according to NEMA 250. The NEMA Enclosure Type designations specify additional environmental requirements for conditions such as corrosion, rust, icing, oil, and coolants. For this reason, the IEC Enclosure Classification Designations IP are used with an enclosure Type designation number appropriate for these markets.~~ **2**

NOTE 2 Empty enclosures according to this document are suitable for mounting of electrical components.

This document does not apply to enclosures which are covered by other specific products standards (e.g. ~~IEC 60670 series~~ IEC 60670-24).

Compliance with the safety requirements of the applicable product standard for the final product produced using an empty enclosure is the responsibility of the assembly manufacturer. **3**

NOTE 3 This document ~~may~~ could serve as a basis for other technical committees.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-11:1981/2021, ~~Basic~~ *Environmental testing procedures – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60085:2007, *Electrical insulation – Thermal evaluation and designation*

IEC 60364 (all parts), *Low-voltage electrical installations*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*⁴
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

IEC 60695-2-10:~~2000~~2021, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:~~2000~~2021, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test methods for end-products (GWEPT)*

IEC 60695-10-2:2014, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

IEC 60695-11-5:2016; *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC TR 60890:2014, *A method of temperature-rise verification of low-voltage switchgear and controlgear assemblies by calculation*

~~IEC 61439-1:2011, *low voltage switchgear and controlgear assemblies – Part 1: General rules*~~²

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*
IEC 62262:2002/AMD1:2021

ISO 178:~~2004~~2019, *Plastics – Determination of flexural properties*

~~ISO 179 (all parts), *Plastics – Determination of Charpy impact properties*~~

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

ISO 179-2:2020, *Plastics – Determination of Charpy impact properties – Part 2: Instrumented impact test*

ISO 2409:~~2007~~2020, *Paints and varnishes – Cross-cut test*

ISO 4628-3:~~2003~~2016, *Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 3: Assessment of degree of rusting*

ISO 4892-2:~~2006~~2013, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc ~~sources~~ lamps*
~~Amendment 1 (2009)~~

ISO 11469:~~2000~~2016, *Plastics – Generic identification and marking of plastic products*

⁴ ~~There is a consolidated edition 2.1 (2001) that includes IEC 60529 (1989) and its Amendment 1 (1999).~~

² ~~To be published.~~

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Empty enclosures for low-voltage switchgear and controlgear assemblies –
General requirements**

**Enveloppes vides destinées aux ensembles d'appareillage à basse tension –
Exigences générales**

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Classification.....	10
5 Electromagnetic compatibility (EMC)	11
6 Information to be given regarding the enclosure	11
6.1 General.....	11
6.2 Marking.....	11
6.3 Documentation.....	11
6.3.1 General	11
6.3.2 Dimensions.....	12
6.3.3 Mounting arrangements	12
6.3.4 Permissible loads	12
6.3.5 Lifting and transport support.....	12
6.3.6 Protective measures	12
6.3.7 Thermal power dissipation capability	13
7 Service conditions	13
7.1 General.....	13
7.2 Normal service conditions	13
7.3 Special service conditions.....	13
7.4 Conditions during transport and storage.....	14
8 Design and construction	14
8.1 General.....	14
8.2 Static loads.....	14
8.3 Lifting and transport support	14
8.4 Access to the interior of the enclosure	15
8.5 Protection against electric shock.....	15
8.5.1 General	15
8.5.2 Requirements for earth continuity within the class I enclosure	15
8.5.3 Requirements for class II enclosure	15
8.6 Protection against mechanical impact (IK code).....	16
8.7 Protection against contact with live parts, ingress of solid foreign bodies and water (IP code)	16
8.8 Protection against corrosion.....	16
8.9 Enclosures constructed of or covered by insulating material	16
9 Type tests	16
9.1 General.....	16
9.2 General conditions of tests.....	16
9.3 Marking.....	17
9.4 Static loads.....	17
9.5 Lifting	18
9.6 Mechanical operation.....	18
9.7 Axial loads of metal inserts	18
9.8 Degree of protection against external mechanical impacts (IK code).....	19

9.9	Degree of protection (IP code)	20
9.9.1	Degree of protection against access to hazardous parts and against the ingress of solid foreign objects indicated by first characteristic numeral.....	20
9.9.2	Degree of protection against ingress of water as indicated by second characteristic numeral	20
9.9.3	Degree of protection against hazardous parts as indicated by additional letter	21
9.10	Properties of insulating materials	21
9.10.1	Thermal stability	21
9.10.2	Resistance to normal heat	21
9.10.3	Resistance to abnormal heat and fire due to internal electric effects	22
9.11	Dielectric strength.....	23
9.11.1	General	23
9.11.2	Preconditioning.....	23
9.11.3	Enclosures without metal elements inside the protected space	23
9.11.4	Enclosures having metal elements inside the protected space	24
9.11.5	Results to be obtained	24
9.12	Effective earth continuity between the exposed-conductive-parts of the class I enclosure and the protective circuit.....	24
9.13	Resistance to ultra-violet (UV) radiation	24
9.13.1	Verification by test.....	24
9.13.2	Verification by comparison to a reference design	25
9.14	Resistance to corrosion	26
9.14.1	General	26
9.14.2	Test procedure	26
9.14.3	Results to be obtained	27
9.15	Thermal power dissipation capability.....	27
9.15.1	General	27
9.15.2	Determination of the power dissipation capability by test	27
9.15.3	Determination of the power dissipation capability by calculation and comparison.....	28
9.15.4	Determination of the power dissipation capability by calculation method	28
Annex A (informative)	List of notes concerning certain countries.....	29
Bibliography	30
Table 1	– Climatic conditions	13
Table 2	– Number of samples to be tested and order of test per sample	17
Table 3	– Axial loads of metal inserts.....	19
Table 4	– Dielectric test voltage	24

INTERNATIONAL ELECTROTECHNICAL COMMISSION

EMPTY ENCLOSURES FOR LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES – 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.

IEC 62208 has been prepared by subcommittee 121B: Low-voltage switchgear and controlgear assemblies, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage. It is an International Standard.

This third edition cancels and replaces the second edition published in 2011. This edition constitutes a technical revision.

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

- a) consideration of the modifications introduced in IEC 61439-1:2020;
- b) alignment of test procedures with the newest relevant standards.

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

Draft	Report on voting
121B/180/FDIS	121B/180/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The reader's attention is drawn to the fact that Annex A lists all of the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this document.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

INTRODUCTION

The purpose of this document is to harmonize as far as practicable all rules and requirements of a general nature applicable to empty enclosures for low-voltage switchgear and controlgear assemblies, in order to obtain uniformity of requirements and verification for empty enclosures and to avoid the need for verification in other standards.

EMPTY ENCLOSURES FOR LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR ASSEMBLIES – GENERAL REQUIREMENTS

1 Scope

This document applies to empty enclosures, as provided by the enclosure manufacturer, prior to the incorporation of switchgear and controlgear components by the assembly manufacturer.

This document specifies general definitions, classifications, characteristics and test requirements of enclosures to be used as part of switchgear and controlgear assemblies (e.g. in accordance with the product standard in the IEC 61439 series), the rated voltage of which does not exceed 1 000 V AC or 1 500 V DC, and suitable for general use for either indoor or outdoor applications.

NOTE 1 Additional requirements could apply for specific applications.

NOTE 2 Empty enclosures according to this document are suitable for mounting of electrical components.

This document does not apply to enclosures which are covered by other specific products standards (e.g. IEC 60670-24).

Compliance with the safety requirements of the applicable product standard for the final product produced using an empty enclosure is the responsibility of the assembly manufacturer.

NOTE 3 This document could serve as a basis for other technical committees.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-11:2021, *Environmental testing – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60085:2007, *Electrical insulation – Thermal evaluation and designation*

IEC 60364 (all parts), *Low-voltage electrical installations*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

IEC 60695-2-10:2021, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2021, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test methods for end-products (GWEPT)*

IEC 60695-10-2:2014, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

IEC 60695-11-5:2016; *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC TR 60890:2014, *A method of temperature-rise verification of low-voltage switchgear and controlgear assemblies by calculation*

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*
IEC 62262:2002/AMD1:2021

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

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

ISO 179-2:2020, *Plastics – Determination of Charpy impact properties – Part 2: Instrumented impact test*

ISO 2409:2020, *Paints and varnishes – Cross-cut test*

ISO 4628-3:2016, *Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 3: Assessment of degree of rusting*

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

ISO 11469:2016, *Plastics – Generic identification and marking of plastic products*

SOMMAIRE

AVANT-PROPOS	34
INTRODUCTION.....	36
1 Domaine d'application	37
2 Références normatives	37
3 Termes et définitions	38
4 Classification	40
5 Compatibilité électromagnétique (CEM).....	41
6 Renseignements à donner concernant l'enveloppe	41
6.1 Généralités	41
6.2 Marquage	41
6.3 Documentation.....	41
6.3.1 Généralités	41
6.3.2 Dimensions.....	42
6.3.3 Dispositions de montage.....	42
6.3.4 Charges admissibles	42
6.3.5 Support de levage et de transport.....	42
6.3.6 Mesures de protection	42
6.3.7 Capacité à dissiper la chaleur.....	42
7 Conditions d'emploi	43
7.1 Généralités	43
7.2 Conditions normales d'emploi	43
7.3 Conditions spéciales d'emploi	43
7.4 Conditions relatives au transport et au stockage	44
8 Conception et construction	44
8.1 Généralités	44
8.2 Charges statiques	44
8.3 Support de levage et de transport	44
8.4 Accès à l'intérieur de l'enveloppe	44
8.5 Protection contre les chocs électriques	45
8.5.1 Généralités	45
8.5.2 Exigences relatives à la continuité de la terre dans l'enveloppe de classe I.....	45
8.5.3 Exigences relatives à l'enveloppe de classe II	45
8.6 Protection contre les impacts mécaniques (code IK)	46
8.7 Protection contre les contacts avec des parties actives, contre la pénétration de corps solides étrangers et d'eau (code IP)	46
8.8 Protection contre la corrosion	46
8.9 Enveloppes constituées ou recouvertes de matériau isolant.....	46
9 Essais de type	46
9.1 Généralités	46
9.2 Conditions générales d'essai	46
9.3 Marquage	47
9.4 Charges statiques	48
9.5 Levage.....	48
9.6 Fonctionnement mécanique	48
9.7 Charges axiales des inserts métalliques	49

9.8	Degré de protection contre les impacts mécaniques externes (code IK)	49
9.9	Degré de protection (code IP)	50
9.9.1	Degré de protection contre l'accès aux parties dangereuses et contre la pénétration de corps solides étrangers indiqué par le premier chiffre caractéristique	50
9.9.2	Vérification du degré de protection contre la pénétration de l'eau indiqué par le deuxième chiffre caractéristique	50
9.9.3	Degré de protection contre l'accès aux parties dangereuses indiqué par la lettre additionnelle	51
9.10	Propriétés des matériaux isolants	51
9.10.1	Stabilité thermique	51
9.10.2	Résistance à la chaleur normale	52
9.10.3	Résistance à la chaleur anormale et au feu dus aux effets électriques internes	52
9.11	Rigidité diélectrique	53
9.11.1	Généralités	53
9.11.2	Préconditionnement	53
9.11.3	Enveloppes sans éléments métalliques à l'intérieur de l'espace protégé	54
9.11.4	Enveloppes avec éléments métalliques à l'intérieur de l'espace protégé	54
9.11.5	Résultats à obtenir	54
9.12	Continuité réelle de la terre entre les parties conductrices exposées de l'enveloppe de classe I et le circuit de protection	54
9.13	Résistance aux rayonnements ultraviolets (UV)	55
9.13.1	Vérification par essai	55
9.13.2	Vérification par comparaison à une conception de référence	56
9.14	Résistance à la corrosion	56
9.14.1	Généralités	56
9.14.2	Procédure d'essai	56
9.14.3	Résultats à obtenir	57
9.15	Capacité à dissiper la chaleur	57
9.15.1	Généralités	57
9.15.2	Détermination de la capacité à dissiper la chaleur par essai	58
9.15.3	Détermination de la capacité à dissiper la chaleur par calcul et comparaison	58
9.15.4	Détermination de la capacité à dissiper la chaleur par une méthode de calcul	58
Annexe A (informative) Liste des notes concernant certains pays		59
Bibliographie		60
Tableau 1 – Conditions climatiques		43
Tableau 2 – Nombre d'échantillons à soumettre aux essais et ordre des essais par échantillon		47
Tableau 3 – Charges axiales des inserts métalliques		49
Tableau 4 – Tension d'essai diélectrique		54

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

ENVELOPPES VIDES DESTINÉES AUX ENSEMBLES D'APPAREILLAGE À BASSE TENSION – EXIGENCES GÉNÉRALES

AVANT-PROPOS

- 1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de la IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
- 2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
- 3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevet.

L'IEC 62208 a été établie par le sous-comité 121B: Ensembles d'appareillages à basse tension, du comité d'études 121 de l'IEC: Appareillages et ensembles d'appareillages basse tension. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2011. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) prise en compte des modifications introduites dans l'IEC 61439-1:2020;
- b) alignement des procédures d'essai sur les toutes nouvelles normes applicables.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
121B/180/FDIS	121B/180/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/publications.

L'attention du lecteur est attirée sur le fait que l'Annexe A énumère tous les articles qui traitent des différences à caractère moins permanent inhérentes à certains pays, concernant le sujet du présent document.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

INTRODUCTION

Le présent document a pour objet d'harmoniser autant que possible toutes les règles et exigences d'ordre général applicables aux enveloppes vides destinées aux ensembles d'appareillages à basse tension, afin d'uniformiser les exigences et la vérification des enveloppes vides et d'éviter de faire appel à d'autres normes pour la vérification.

ENVELOPPES VIDES DESTINÉES AUX ENSEMBLES D'APPAREILLAGE À BASSE TENSION – EXIGENCES GÉNÉRALES

1 Domaine d'application

Le présent document s'applique aux enveloppes vides, dans l'état dans lequel elles sont fournies par le fabricant d'enveloppes, avant incorporation des composants d'appareillage par le fabricant de l'ensemble.

Le présent document spécifie les définitions, les classifications, les caractéristiques et les exigences d'essai générales des enveloppes à utiliser en tant que partie d'ensembles d'appareillage (selon par exemple la norme de produit de la série IEC 61439), dont la tension assignée ne dépasse pas 1 000 V en courant alternatif ou 1 500 V en courant continu pour usage général extérieur ou intérieur.

NOTE 1 Des exigences supplémentaires peuvent s'appliquer dans le cas de certaines applications particulières.

NOTE 2 Les enveloppes vides conformes au présent document sont adaptées au montage de composants électriques.

Le présent document ne s'applique pas aux enveloppes qui sont couvertes par d'autres normes de produits spécifiques (par exemple par l'IEC 60670-24).

La conformité aux exigences de sécurité de la norme de produit applicable au produit final réalisé à partir d'une enveloppe vide est de la responsabilité du fabricant de l'ensemble.

NOTE 3 Le présent document peut servir de base pour d'autres comités d'étude.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60068-2-2:2007, *Essais d'environnement – Partie 2-2: Essais – Essai B: Chaleur sèche*

IEC 60068-2-11:2021, *Essais d'environnement – Partie 2-11: Essais – Essai Ka: Brouillard salin*

IEC 60068-2-30:2005, *Essais d'environnement – Partie 2-30: Essais – Essai Db: Essai cyclique de chaleur humide (cycle de 12 h + 12 h)*

IEC 60085:2007, *Isolation électrique – Évaluation et désignation thermiques*

IEC 60364 (toutes les parties), *Installations électriques à basse tension*

IEC 60529:1989, *Degrés de protection procurés par les enveloppes (Code IP)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

IEC 60695-2-10:2021, *Essais relatifs aux risques du feu – Partie 2-10: Essais au fil incandescent/chauffant – Appareillage et méthode commune d'essai*

IEC 60695-2-11:2021, *Essais relatifs aux risques du feu – Partie 2-11: Essais au fil incandescent/chauffant – Méthode d'essai d'inflammabilité pour produits finis (GWEPT)*

IEC 60695-10-2:2014, *Essais relatifs aux risques du feu – Partie 10-2: Chaleurs anormales – Essai à la bille*

IEC 60695-11-5:2016, *Essais relatifs aux risques du feu – Partie 11-5: Flammes d'essai – Méthode d'essai au brûleur-aiguille – Appareillage, dispositif d'essai de vérification et lignes directrices*

IEC TR 60890:2014, *Méthode de vérification par calcul des échauffements pour les ensembles d'appareillage à basse tension*

IEC 62262:2002, *Degrés de protection procurés par les enveloppes de matériels électriques contre les impacts mécaniques externes (Code IK)*
IEC 62262:2002/AMD1:2021

ISO 178:2019, *Plastiques – Détermination des propriétés en flexion*

ISO 179-1:2010, *Plastiques – Détermination des caractéristiques au choc Charpy – Partie 1: Essai de choc non instrumenté*

ISO 179-2:2020, *Plastiques – Détermination des caractéristiques au choc Charpy – Partie 2: Essai de choc instrumenté*

ISO 2409:2020, *Peintures et vernis – Essai de quadrillage*

ISO 4628-3:2016, *Peintures et vernis – Évaluation de la dégradation des revêtements – Désignation de la quantité et de la dimension des défauts, et de l'intensité des changements uniformes d'aspect – Partie 3: Évaluation du degré d'enrouillement*

ISO 4892-2:2013, *Plastiques – Méthodes d'exposition à des sources lumineuses de laboratoire – Partie 2: Lampes à arc au xénon*

ISO 11469:2016, *Plastiques – Identification générique et marquage des produits en matière plastique*