

Mechanical structures for electrical and electronic equipment - Outdoor enclosures - Part 1: Design guidelines

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

|   |  |
|---|--|
| See Eesti standard EVS-EN IEC 61969-1:2020 sisaldab Euroopa standardi EN IEC 61969-1:2020 ingliskeelset teksti.     | This Estonian standard EVS-EN IEC 61969-1:2020 consists of the English text of the European standard EN IEC 61969-1:2020.          |
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ICS 31.240

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EUROPEAN STANDARD

**EN IEC 61969-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2020

ICS 31.240

Supersedes EN 61969-1:2012 and all of its amendments  
and corrigenda (if any)

English Version

**Mechanical structures for electrical and electronic equipment -  
Outdoor enclosures - Part 1: Design guidelines  
(IEC 61969-1:2020)**

Structures mécaniques pour équipement électrique et  
électronique - Enveloppes de plein air - Partie 1: Lignes  
directrices pour la conception  
(IEC 61969-1:2020)

Mechanische Bauweisen für elektrische und elektronische  
Einrichtungen - Außengehäuse - Teil 1:  
Konstruktionsleitfaden  
(IEC 61969-1:2020)

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## European foreword

The text of document 48D/720/FDIS, future edition 3 of IEC 61969-1, prepared by SC 48D "Mechanical structures for electrical and electronic equipment" of IEC/TC 48 "Electrical connectors and mechanical structures for electrical and electronic equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61969-1:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-03-16
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-06-16

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## Endorsement notice

The text of the International Standard IEC 61969-1:2020 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

|                    |      |                                     |
|--------------------|------|-------------------------------------|
| IEC 60068-2-1      | NOTE | Harmonized as EN 60068-2-1          |
| IEC 60068-2-2      | NOTE | Harmonized as EN 60068-2-2          |
| IEC 60068-2-5      | NOTE | Harmonized as EN IEC 60068-2-5      |
| IEC 60068-2-6      | NOTE | Harmonized as EN 60068-2-6          |
| IEC 60068-2-10     | NOTE | Harmonized as EN 60068-2-10         |
| IEC 60068-2-11     | NOTE | Harmonized as EN 60068-2-11         |
| IEC 60068-2-14     | NOTE | Harmonized as EN 60068-2-14         |
| IEC 60068-2-27     | NOTE | Harmonized as EN 60068-2-27         |
| IEC 60068-2-30     | NOTE | Harmonized as EN 60068-2-30         |
| IEC 60068-2-31     | NOTE | Harmonized as EN 60068-2-31         |
| IEC 60068-2-60     | NOTE | Harmonized as EN 60068-2-60         |
| IEC 60068-2-78     | NOTE | Harmonized as EN 60068-2-78         |
| IEC 60297 (series) | NOTE | Harmonized as EN IEC 60297 (series) |
| IEC 60297-3-100    | NOTE | Harmonized as EN 60297-3-100        |
| IEC 60917 (series) | NOTE | Harmonized as EN 60917 (series)     |
| IEC 60917-1        | NOTE | Harmonized as EN IEC 60917-1        |
| IEC 60917-2        | NOTE | Harmonized as EN 60917-2            |
| IEC 61587-2        | NOTE | Harmonized as EN 61587-2            |
| IEC 61587-3        | NOTE | Harmonized as EN 61587-3            |
| IEC 61969-2        | NOTE | Harmonized as EN 61969-2            |
| IEC 61969-3        | NOTE | Harmonized as EN 61969-3            |

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

| <u>Publication</u> | <u>Year</u> | <u>Title</u>  | <u>EN/HD</u>     | <u>Year</u> |
|--------------------|-------------|---|------------------|-------------|
| IEC 60068-2-75     | -           | Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests  | EN 60068-2-75    | -           |
| IEC 60417          | -           | Graphical symbols for use on equipment. Index, survey and compilation of the single sheets.   | -                | -           |
| IEC 60529          | -           | Degrees of protection provided by enclosures (IP Code)  | -                | -           |
| IEC 60695-11-10    | -           | Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods   | EN 60695-11-10   | -           |
| IEC 60721-3-2      | -           | Classification of environmental conditions - Part 3-2: Classification of groups of environmental parameters and their severities - Transportation and handling                      | EN IEC 60721-3-2 | -           |
| IEC 60721-3-4      | -           | Classification of environmental conditions - Part 3-4: Classification of groups of environmental parameters and their severities - Stationary use at non-weatherprotected locations | EN IEC 60721-3-4 | -           |
| IEC 60825-1        | -           | Safety of laser products - Part 1: Equipment classification and requirements  | EN 60825-1       | -           |
| IEC 60950-1        | -           | Information technology equipment - Safety - Part 1: General requirements  | EN 60950-1       | -           |
| IEC 61010-1        | -           | Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements  | EN 61010-1       | -           |

|                     |   |  |                |   |
|---------------------|---|--|----------------|---|
| IEC 61140           | - | Protection against electric shock - Common aspects for installation and equipment  | EN 61140       | - |
| IEC 61439-5         | - | Low-voltage switchgear and controlgear assemblies - Part 5: Assemblies for power distribution in public networks   | EN 61439-5     | - |
| IEC 61587-1         | - | Mechanical structures for electronic equipment - Tests for IEC 60917 and IEC 60297 series - Part 1: Environmental requirements, test set-up and safety aspects for cabinets, racks, subracks and chassis under indoor condition use and transportation | EN 61587-1     | - |
| IEC 62194           | - | Method of evaluating the thermal performance of enclosures   | EN 62194       | - |
| IEC 62262           | - | Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)  | EN 62262       | - |
| IEC 62305-4         | - | Protection against lightning - Part 4: Electrical and electronic systems within structures   | EN 62305-4     | - |
| ISO 15181-1         | - | Paints and varnishes - Determination of release rate of biocides from antifouling paints - Part 1: General method for extraction of biocides   | EN ISO 15181-1 | - |
| ISO 3864-2          | - | Graphical symbols - Safety colours and safety signs - Part 2: Design principles for product safety labels  | -              | - |
| ISO 7779            | - | Acoustics - Measurement of airborne noise emitted by information technology and telecommunications equipment   | EN ISO 7779    | - |
| ETSI EN 300 019-1-4 | - | Equipment Engineering (EE) - Environmental conditions and environmental tests for telecommunications equipment - Part 1-4: Classification of environmental conditions - Stationary use at non-weatherprotected locations                               | -              | - |
| ETSI EN 300 019-2-4 | - | Equipment Engineering (EE) - Environmental conditions and environmental tests for telecommunications equipment - Part 2-4: Specification of environmental tests - Stationary use at non-weatherprotected locations                                     | -              | - |
| ETSI EN 300 753     | - | Equipment Engineering (EE) - Acoustic noise emitted by telecommunications equipment  | -              | - |

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Mechanical structures for electrical and electronic equipment –  
Outdoor enclosures –  
Part 1: Design guidelines**

**Structures mécaniques pour équipement électrique et électronique –  
Enveloppes de plein air –  
Partie 1: Lignes directrices pour la conception**



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# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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**Mechanical structures for electrical and electronic equipment –  
Outdoor enclosures –  
Part 1: Design guidelines**

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Enveloppes de plein air –  
Partie 1: Lignes directrices pour la conception**

INTERNATIONAL  
ELECTROTECHNICAL  
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MECHANICAL STRUCTURES FOR ELECTRICAL AND  
ELECTRONIC EQUIPMENT – OUTDOOR ENCLOSURES –****Part 1: Design guidelines**

## FOREWORD

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International Standard IEC 61969-1 has been prepared by subcommittee 48D: Mechanical structures for electrical and electronic equipment, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

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) alignment with the content of ETSI EN 300 019 and IEC 60721 series latest editions, particularly with the actualization of climate conditions;
- b) new requirements added to reflect market requirements on environmental issues;
- c) improvement on terminology and overall editorial improvement.

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

| FDIS         | Report on voting |
|--------------|------------------|
| 48D/720/FDIS | 48D/723/RVD      |

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

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

A list of all parts in the IEC 61969 series, published under the general title *Mechanical structures for electrical and electronic equipment – Outdoor enclosures*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://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

This part of IEC 61969 is intended as a generic guide for the development of further parts within this series of standards, and it provides design guidelines for outdoor enclosures.

The products covered by IEC 61969 (all parts) are empty enclosures for outdoor locations, to be equipped with application-specific combinations of electrical and electronic equipment, and to be used at non-weather protected locations above ground.

IEC 61969 (all parts) consists of:

- a design guidelines general part (IEC 61969-1);
- a coordination dimension standard (IEC 61969-2);
- an environmental requirements and tests, safety aspects standard (IEC 61969-3).

IEC 61969-2 and IEC 61969-3 should be read in conjunction with this document.

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# MECHANICAL STRUCTURES FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – OUTDOOR ENCLOSURES –

## Part 1: Design guidelines

### 1 Scope

This part of IEC 61969 contains design guidelines for outdoor enclosures and is applicable over a wide field of mechanical, electromechanical and electronic equipment and its installation where a modular design is used.

The objectives of this document are:

- to provide an overview of specifications for enclosures focused on requirements for outdoor applications for stationary use at non-weather protected locations, and
- to achieve product integrity under outdoor conditions and to ease product selection for the sourcing of outdoor enclosures from different vendors.

These enclosures are considered to contain any equipment and provide protection for the outdoor installed facilities against unwanted environmental impacts. The installed equipment can be, but is not limited to, subracks or chassis according to IEC 60917 (all parts) or IEC 60297 (all parts). A typical outdoor enclosure is shown in Figure 1.

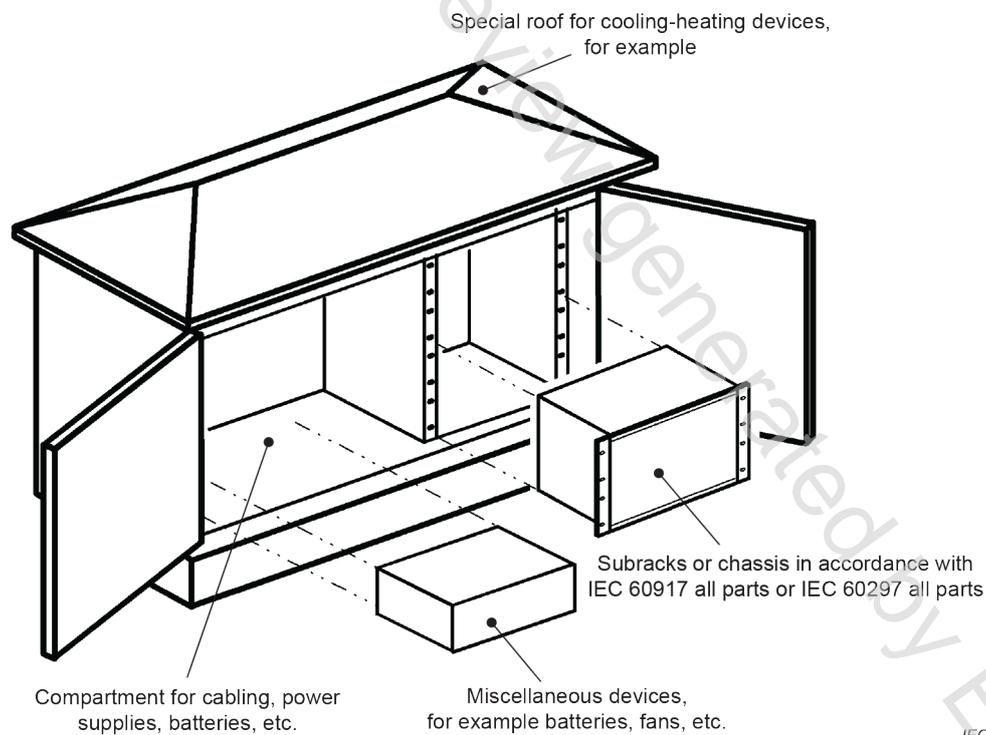


Figure 1 – Typical outdoor enclosure

## 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 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60417, *Graphical symbols for use on equipment* (available at <http://www.graphical-symbols.info/equipment>)

IEC 60529, *Degrees of protection provided by enclosures (IP code)*

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60721-3-2, *Classification of environmental conditions – Part 3-2: Classification of groups of environmental parameters and their severities – Transportation and handling*

IEC 60721-3-4, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Stationary use at non-weatherprotected locations*

IEC 60825-1, *Safety of laser products – Part 1: Equipment specification and requirements*

IEC 60950-1, *Information technology equipment – Safety – Part 1: General requirements*

IEC 61010-1, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61439-5, *Low-voltage switchgear and controlgear assemblies – Part 5: Assemblies for power distribution in public networks*

IEC 61587-1, *Mechanical structures for electronic equipment – Tests for IEC 60917 and IEC 60297 series – Part 1: Environmental requirements, test set-up and safety aspects for cabinets, racks, subracks and chassis under indoor condition use and transportation*

IEC 62194, *Methods of evaluating the thermal performance of enclosures*

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

IEC 62305-4, *Protection against lightning – Part 4: Electrical and electronic systems within structures*

ISO 1518-1, *Paints and varnishes – Determination of scratch resistance – Part 1: Constant-loading method*

ISO 3864-2, *Graphical symbols – Safety colours and safety signs*

ISO 7779, *Acoustics – Measurement of airborne noise emitted by information technology and telecommunications equipment*