

---

**Mehanske strukture za električno in elektronsko opremo - Ohišja na prostem - 1.  
del: Smernice za projektiranje**

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

Mechanische Bauweisen für elektrische und elektronische Einrichtungen - Außengehäuse - Teil 1: Konstruktionsleitfaden

Structures mécaniques pour les équipements électriques et électroniques - Enveloppes de plein air - Partie 1: Lignes directrices pour la conception

**Ta slovenski standard je istoveten z: prEN IEC 61969-1:2022**

**ICS:**

31.240	Mehanske konstrukcije za elektronsko opremo	Mechanical structures for electronic equipment
--------	---	--

**oSIST prEN IEC 61969-1:2022**

**en**

**iTeh STANDARD  
PREVIEW  
(standards.iteh.ai)**

oSIST prEN IEC 61969-1:2022

<https://standards.iteh.ai/catalog/standards/sist/f5e017e6-e6ca-4f71-b8b4-836c4857452f/osist-pren-iec-61969-1-2022>



# 48D/752/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: <b>IEC 61969-1 ED4</b>	
DATE OF CIRCULATION: <b>2022-05-13</b>	CLOSING DATE FOR VOTING: <b>2022-08-05</b>
SUPERSEDES DOCUMENTS: <b>48D/746/CD, 48D/750/CC</b>	

IEC SC 48D : MECHANICAL STRUCTURES FOR ELECTRICAL AND ELECTRONIC EQUIPMENT	
SECRETARIAT: Germany	SECRETARY: Mr Arno Bergmann
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input checked="" type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input checked="" type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING <b>Attention IEC-CENELEC parallel voting</b> The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

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

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

**Copyright © 2022 International Electrotechnical Commission, IEC.** All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

## 1 CONTENTS

2	CONTENTS .....	2
3	FOREWORD .....	3
4	INTRODUCTION .....	5
5	1 Scope .....	6
6	2 Normative references .....	7
7	3 Terms and definitions .....	8
8	4 Coordination dimensions .....	9
9	5 Environmental requirements, tests and safety aspects .....	9
10	5.1 Classification of environmental conditions .....	9
11	5.2 Transportation and installation related mechanical loads .....	11
12	5.3 Operational related mechanical loads .....	11
13	5.4 Static load capacity .....	11
14	5.5 Seismic performance .....	11
15	6 Electromagnetic shielding .....	11
16	7 Thermal management and acoustic noise emission .....	12
17	Bibliography .....	13
18		
19	Figure 1 – Typical outdoor enclosure .....	6
20	Figure 2 – Locations of outdoor enclosures .....	9
21		
22	Table 1 – Environmental conditions .....	10
23	Table 2 – Safety aspects .....	10
24		

iTeh STANDARD  
PREVIEW  
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/f5e017c6-e6ca-4f71-b8b4-836c4857452f/osist-pre-iec-61969-1-2022>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MECHANICAL STRUCTURES FOR ELECTRICAL AND  
ELECTRONIC EQUIPMENT – OUTDOOR ENCLOSURES –****Part 1: Design guidelines****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 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. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2020. This edition constitutes a technical revision.

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

- a) references the environmental conditions defined by the ETSI EN 300 019-1 and IEC 60721-2 series;
- b) reference made to the correct test specifications;
- c) addition of laser hazard warning in case opto-electronic equipment is used.

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

FDIS	Report on voting
48D/xxx/FDIS	48D/xxx/RVD

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

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

80 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in  
81 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available  
82 at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are  
83 described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

84 The committee has decided that the contents of this document will remain unchanged until the  
85 stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the  
86 specific document. At this date, the document will be

- 87 • reconfirmed,
- 88 • withdrawn,
- 89 • replaced by a revised edition, or
- 90 • amended.

91

92

**ITEH STANDARD  
PREVIEW  
(standards.iteh.ai)**

[oSIST prEN IEC 61969-1:2022](https://standards.iteh.ai/catalog/standards/sist/f5e017e6-e6ca-4f71-b8b4-836c4857452f/osist-pren-iec-61969-1-2022)

[https://standards.iteh.ai/catalog/standards/sist/f5e017e6-  
e6ca-4f71-b8b4-836c4857452f/osist-pren-iec-61969-1-  
2022](https://standards.iteh.ai/catalog/standards/sist/f5e017e6-e6ca-4f71-b8b4-836c4857452f/osist-pren-iec-61969-1-2022)

93

## INTRODUCTION

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

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

99 IEC 61969 (all parts) consists of:

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

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

104

105

# **iTeh STANDARD PREVIEW (standards.iteh.ai)**

[oSIST prEN IEC 61969-1:2022](https://standards.iteh.ai/catalog/standards/sist/f5e017e6-e6ca-4f71-b8b4-836c4857452f/osist-pren-iec-61969-1-2022)

[https://standards.iteh.ai/catalog/standards/sist/f5e017e6-  
e6ca-4f71-b8b4-836c4857452f/osist-pren-iec-61969-1-  
2022](https://standards.iteh.ai/catalog/standards/sist/f5e017e6-e6ca-4f71-b8b4-836c4857452f/osist-pren-iec-61969-1-2022)

# 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 for electrical and electronic equipment 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.

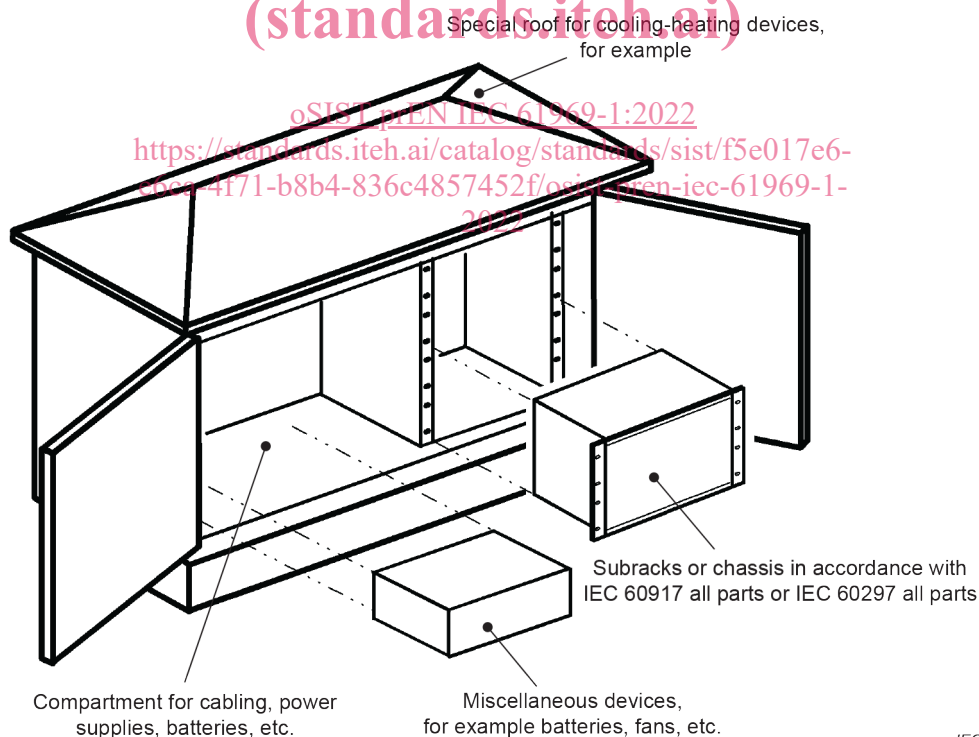


Figure 1 – Typical outdoor enclosure



**2 Normative references**

- 128
- 129 The following documents are referred to in the text in such a way that some or all of their content  
130 constitutes requirements of this document. For dated references, only the edition cited applies.  
131 For undated references, the latest edition of the referenced document (including any  
132 amendments) applies.
- 133 IEC 60417, *Graphical symbols for use on equipment* (available at [http://www.graphical-](http://www.graphical-symbols.info/equipment)  
134 [symbols.info/equipment](http://www.graphical-symbols.info/equipment))
- 135 IEC 60529, *Degrees of protection provided by enclosures (IP code)*
- 136 IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical*  
137 *flame test methods*
- 138 IEC 60721-3-2, *Classification of environmental conditions – Part 3-2: Classification of groups*  
139 *of environmental parameters and their severities – Transportation and handling*
- 140 IEC 60721-3-4, *Classification of environmental conditions – Part 3: Classification of groups of*  
141 *environmental parameters and their severities – Stationary use at non-weatherprotected*  
142 *locations*
- 143 IEC 60754-2, *Test on gases evolved during combustion of materials from cables - Part 2:*  
144 *Determination of acidity (by pH measurement) and conductivity*
- 145 IEC 60825-1, *Safety of laser products – Part 1: Equipment specification and requirements*
- 146 IEC 61010-1, *Safety requirements for electrical equipment for measurement, control, and*  
147 *laboratory use – Part 1: General requirements*
- 148 IEC 61034-2, *Measurement of smoke density of cables burning under defined conditions - Part*  
149 *2: Test procedure and requirements*
- 150 IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*
- 151 IEC 61300-2-10, *Fibre optic interconnecting devices and passive components - Basic test and*  
152 *measurement procedures - Part 2-10: Tests - Crush and load resistance*
- 153 IEC 61300-2-56, *Fibre optic interconnecting devices and passive components - Basic test and*  
154 *measurement procedures - Part 2-56: Tests - Wind resistance of mounted housing*
- 155 IEC 61439-5, *Low-voltage switchgear and controlgear assemblies – Part 5: Assemblies for*  
156 *power distribution in public networks*
- 157 IEC 61587-1, *Mechanical structures for electronic equipment – Tests for IEC 60917 and*  
158 *IEC 60297 series – Part 1: Environmental requirements, test set-up and safety aspects for*  
159 *cabinets, racks, subracks and chassis under indoor condition use and transportation*
- 160 IEC 61587-2, *Mechanical structures for electronic equipment - Tests for IEC 60917 and 60297*  
161 *- Part 2: Seismic tests for cabinets and racks*
- 162 IEC 61587-3, *Mechanical structures for electronic equipment - Tests for IEC 60917 and*  
163 *IEC 60297 - Part 3: Electromagnetic shielding performance tests for cabinets and subracks*
- 164 IEC 61969-2, *Mechanical structures for electronic equipment – Outdoor enclosures – Part 2:*  
165 *Coordination dimensions*
- 166 IEC 61969-3, *Mechanical structures for electrical and electronic equipment – Outdoor*  
167 *enclosures – Part 3: Environmental requirements, tests and safety aspects*

- 168 IEC 62194, *Methods of evaluating the thermal performance of enclosures*
- 169 IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against*  
170 *external mechanical impacts (IK code)*
- 171 IEC 62305-4, *Protection against lightning – Part 4: Electrical and electronic systems within*  
172 *structures*
- 173 IEC 62368-1, *Audio/video, information and communication technology equipment - Part 1:*  
174 *Safety requirements*
- 175 ISO 1518-1, *Paints and varnishes – Determination of scratch resistance – Part 1: Constant-*  
176 *loading method*
- 177 ISO 3864-2, *Graphical symbols – Safety colours and safety signs*
- 178 ISO 7779, *Acoustics – Measurement of airborne noise emitted by information technology and*  
179 *telecommunications equipment*
- 180 ETSI EN 300 019-1-2, *Environmental Engineering (EE); Environmental conditions and*  
181 *environmental tests for telecommunications equipment; Part 1-2: Classification of*  
182 *environmental conditions; Transportation*
- 183 ETSI EN 300 019-1-4, *Equipment Engineering (EE) – Environmental conditions and*  
184 *environmental tests for telecommunications equipment – Part 1-4: Classification of*  
185 *environmental conditions – Stationary use at non-weatherprotected locations*
- 186 ETSI EN 300 019-2-2, *Environmental Engineering (EE) – Environmental conditions and*  
187 *environmental tests for telecommunications equipment – Part 2-2: Specification of*  
188 *environmental tests – Transportation*
- 189 ETSI EN 300 019-2-4, *Equipment Engineering (EE) – Environmental conditions and*  
190 *environmental tests for telecommunications equipment – Part 2-4: Specification of*  
191 *environmental tests – Stationary use at non-weatherprotected locations*
- 192 ETSI EN 300 753, *Equipment Engineering (EE) – Acoustic noise emitted by*  
193 *telecommunications equipment*

### 194 **3 Terms and definitions**

195 For the purposes of this document, the following terms and definitions apply.

196 ISO and IEC maintain terminological databases for use in standardization at the following  
197 addresses:

- 198 • IEC Electropedia: available at <https://www.electropedia.org/>
- 199 • ISO Online browsing platform: available at <https://www.iso.org/obp>

#### 200 **3.1**

##### 201 **outdoor enclosure**

202 enclosure exposed to an outdoor environment, for stationary use at non-weatherprotected  
203 locations, for the protection of electrical and electronic equipment installed inside against  
204 outdoor environmental conditions

205 Note 1 to entry: An outdoor enclosure is applicable for wide field of equipment, (e.g. communication system,  
206 industrial or signal control, etc.)

207 Note 2 to entry: The typical installation locations of outdoor enclosures are shown in Figure 2.