

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

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**Mechanical structures for electronic equipment -  
Outdoor enclosures -  
Part 1: Design guidelines  
(IEC 61969-1:2011)**

Structures mécaniques pour équipement  
électronique -  
Enveloppes de plein air -  
Partie 1: Lignes directrices pour la  
conception  
(CEI 61969-1:2011)

Mechanische Bauweisen für elektronische  
Einrichtungen -  
Außengehäuse -  
Teil 1: Konstruktionsleitfaden  
(IEC 61969-1:2011)

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
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## Foreword

The text of document 48D/488/FDIS, future edition 2 of IEC 61969-1, prepared by SC 48D, "Mechanical structures for electronic equipment", of IEC/TC 48, "Electromechanical components and mechanical structures for electronic equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61969-1:2012.

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) 2012-09-22
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2014-12-22

This document supersedes EN 61969-1:2000.

EN 61969-1:2012 includes the following significant technical changes with respect to EN 61969-1:2000:

a) Addition of design guidance for thermal management and noise suppression as thermal/noise management is often considered a basic requirement of an empty outdoor enclosure. If thermal management components are included in the product, the environmental impact may become the responsibility of the empty outdoor enclosure manufacturer. Therefore the acoustic limitations shall be observed.

Typically, the user of the empty outdoor enclosure follows the local regulatory acoustic requirements (sound power and/or sound pressure). Acoustic measurements may be performed on the empty outdoor enclosure fitted with thermal management components only or, if agreed between manufacturer and user at the final stage of the application specific installation.

b) Historically, EN 61969-1:2000 intended to create a market for standardized empty outdoor enclosures offered by multiple vendors. Detail standards such as EN 61969-2-1:2000 and EN 61969-2-2:2000 were issued to guide users to preferred and available solutions.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

## Endorsement notice

The text of the International Standard IEC 61969-1:2011 was approved by CENELEC as a European Standard without any modification.

## Annex ZA (normative)

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

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-581	-	International Electrotechnical Vocabulary - Part 581: Electromechanical components for electronic equipment	-	-
IEC 60068	Series	Environmental testing	EN 60068-2-1	Series
IEC 60297-3-101	-	Mechanical structures for electronic equipment - Dimensions of mechanical structures of the 482,6 mm (19 in) series - Part 3-101: Subracks and associated plug-in units	EN 60297-3-101	-
IEC 60417	Data-base	Graphical symbols for use on 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	EN 60695-11-10	-
IEC 60721	Series	Classification of environmental conditions	EN 60721-1	Series
IEC 60825-1	-	Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	-
IEC 60917	Series	Modular order for the development of mechanical structures for electronic equipment practices - Part 1: Generic standard	EN 60917	Series
IEC 60950	Series	Information technology equipment - Safety	EN 60950	Series
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 - Part 1: Climatic, mechanical tests and safety aspects for cabinets, racks, subracks and chassis	EN 61587-1	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61587-2	-	Mechanical structures for electronic equipment - Tests for IEC 60917 and IEC 60297 - Part 2: Seismic tests for cabinets and racks	EN 61587-2	-
IEC 61587-3	-	Mechanical structures for electronic equipment - Tests for IEC 60917 and IEC 60297 - Part 3: Electromagnetic shielding performance tests for cabinets, racks and subracks	EN 61587-3	-
IEC 61969	Series	Mechanical structures for electronic equipment - Outdoor enclosures	EN 61969-1	Series
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 3864	-	Safety colours and safety signs	-	-
ISO 7779	-	Acoustics - Measurement of airborne noise emitted by information technology and telecommunications equipment	EN ISO 7779	-
ISO 1518-1	-	Paints and varnishes - Determination of scratch resistance - Part 1: Constant-loading method	EN ISO 1518-1	-
ETS 300753	-	Equipment Engineering (EE) - Acoustic noise emitted by telecommunications equipment	-	-
ETS 300019-1-4	-	Equipment Engineering (EE) - Environmental conditions and environmental test for telecommunications equipment - Part 1-4: Classification of environmental conditions - Stationary use at non-weatherprotected locations	-	-
ETS 300194-2-4	-	Equipment Engineering (EE) - Environmental conditions and environmental tests for telecommunications equipment - Part 2-4: Specification of environmental tests - Stationary use at non-weatherprotected locations	-	-

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## INTRODUCTION

This standard is intended as a generic guide for the development of further standards. The products covered are empty enclosures to be equipped with application-specific solutions to be used at non-weather protected locations above ground. This standard is followed by a co-ordination dimension standard (IEC 61969-2 Ed 2) and an environmental requirements and tests, safety aspect standard (IEC 61969-3 Ed 2).



# MECHANICAL STRUCTURES FOR 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 objective of this standard is to provide an overview of specifications for enclosures focused on requirements for outdoor applications for stationary use at non-weather protected locations. These enclosures are considered to contain any equipment and provide protection for the outdoor installed facilities against unwanted environmental impacts. The installed equipment may be, but is not limited to, subracks according to IEC 60917-2-2 or IEC 60297-3-101. A typical outdoor enclosure is shown in Figure 1.

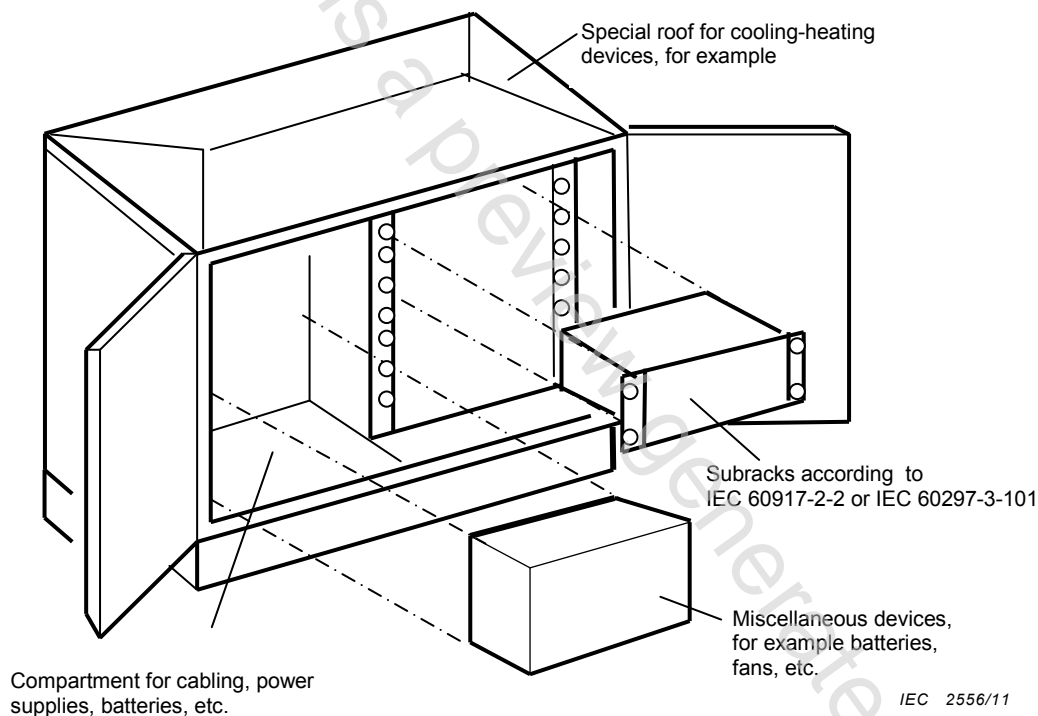


Figure 1 – Typical outdoor enclosure

## 2 Normative references

The following referenced documents are indispensable for the application 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 60050-581, *International Electrotechnical Vocabulary (IEV) – Part 581: Electromechanical components and mechanical structures for electronic equipment*

IEC 60068 (all parts), *Environmental testing*

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

IEC 60950 (all parts), *Information technology equipment – Safety*

IEC 60297-3-101, *Dimensions of mechanical structures of the 482,6 mm (19 in) series – Part 3: Subracks and associated plug-in units*

IEC 60417, *Graphical symbols for use on equipment*

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

IEC 60721 (all parts), *Classification of environmental conditions*

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

IEC 60917 (all parts), *Modular order for the development of mechanical structures for electronic equipment practices*

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 – Part 1: Climatic, mechanical tests and safety aspects for cabinets, racks, subracks and chassis*

IEC 61587-2, *Mechanical structures for electronic equipment – Tests for IEC 60917 and IEC 60297 – Part 2: Seismic tests for cabinets and racks*

IEC 61587-3, *Mechanical structures for electronic equipment – Tests for IEC 60917 and 60297 – Part 3: Electromagnetic shielding performance tests for cabinets, racks and subracks*

IEC 61969 (all parts) *Mechanical structures for electronic equipment – Outdoor enclosures*

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

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

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

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

ETS 300019-1-4, *Equipment Engineering (EE); Environmental conditions and environmental test for telecommunications equipment – Part 1-4: Classification of environmental conditions Stationary use at non-weatherprotected locations*  
+ A1:1997

ETS 300194-2-4, *Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment – Part 2-4: Specification of environmental tests Stationary use at non-weatherprotected locations*  
+ A1:1997

ETS 300753, *Equipment Engineering (EE); Acoustic noise emitted by telecommunications equipment*

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

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

### 3 Terms and definitions

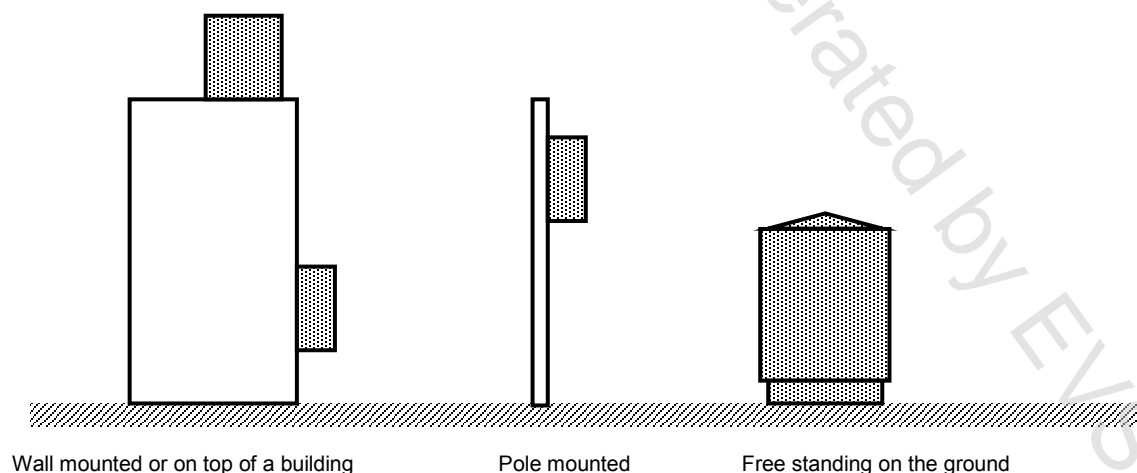
For the purposes of this document, the terms and definitions given in IEC 60050-581 and in the IEC 60917 series, as well as the following, apply.

#### 3.1

##### **outdoor enclosure**

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

NOTE An outdoor enclosure is applicable for a wide field of equipment, e.g.: communication systems, industrial/signal controls, etc. The typical installation locations are shown in Figure 2.



IEC 2557/11

**Figure 2 – Locations of outdoor enclosures**