

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

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

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



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MECHANICAL STRUCTURES FOR 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 electronic equipment, of IEC technical committee 48: Electromechanical components and mechanical structures for electronic equipment.

This second edition cancels and replaces the first edition issued in 1999. It constitutes a technical revision.

The main technical changes with regard to the previous edition are as follows:

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

However, development showed that this intend (created with user's participation) was not satisfying the user's expectations.

Consequently, the detail standards IEC 61969-2-1 Ed 1 and IEC 61969-2-2 Ed 1 will be withdrawn when IEC 61969-2 Ed 2 is issued. The IEC 61969-2 Ed 2 co-ordination dimensions are based on IEC 60917-1. The definition outdoor cases and outdoor cabinets are merged into the definition outdoor enclosures.

The text of this standard is based on the following documents:

FDIS	Report on voting
48D/488/FDIS	48D/498/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.

A list of all parts of IEC 61969, under the general title, *Mechanical structures for electronic equipment – Outdoor enclosures*, 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 web site 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.

## 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 coordination dimension standard (IEC 61969-2 Ed 2) and an environmental requirements and tests, safety aspect standard (IEC 61969-3 Ed 2).

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# 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.

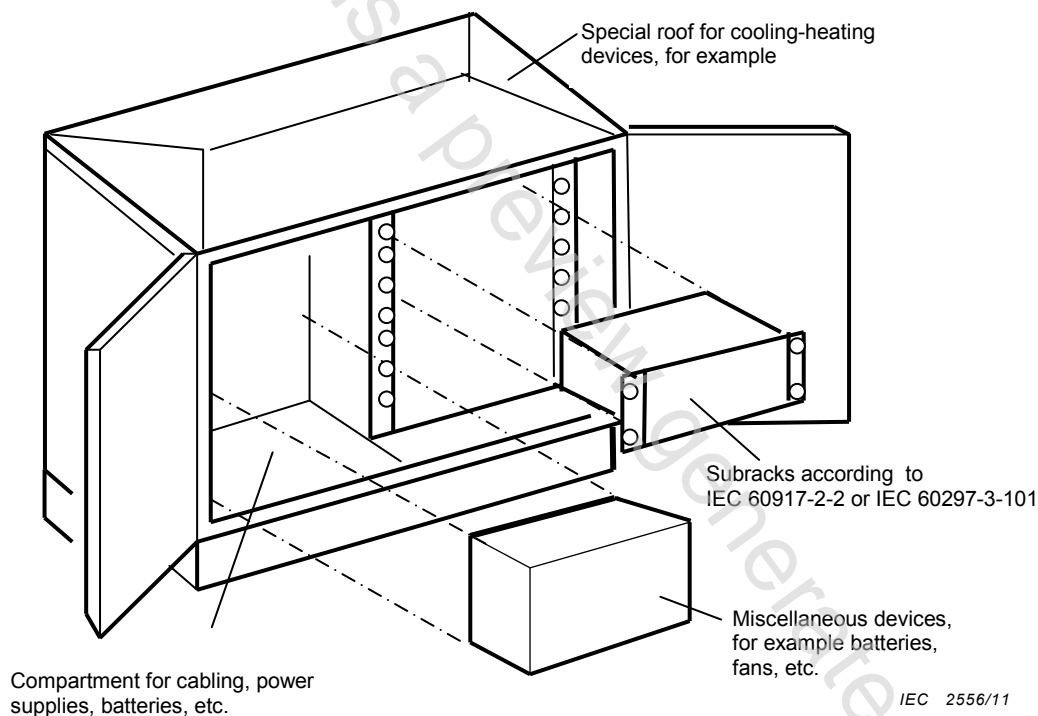


Figure 1 – Typical outdoor enclosure



## 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

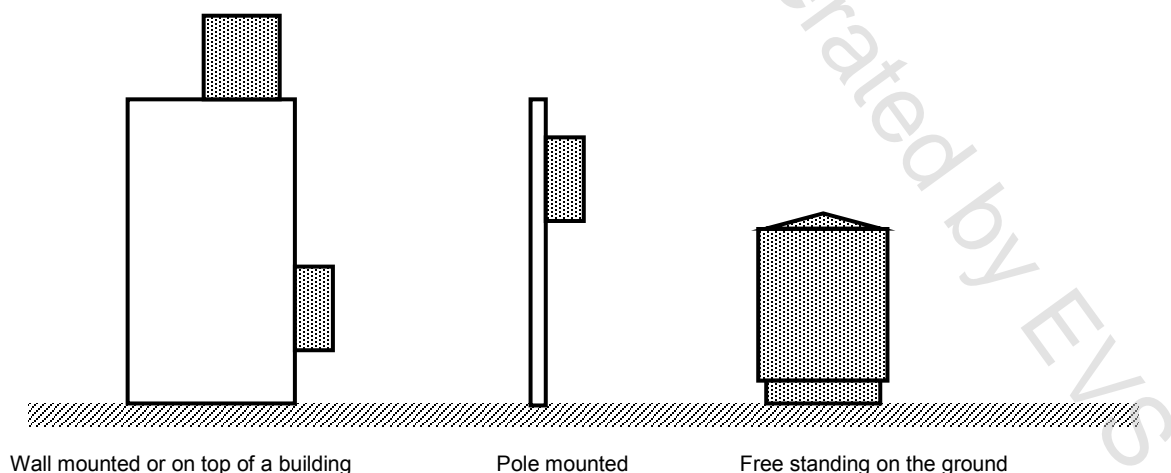
For the purposes of this document, the terms and definitions given in IEC 60050-581 and in the IEC 60917 series, as well as the following, apply.

#### 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.



**Figure 2 – Locations of outdoor enclosures**