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Standards

Irish Standard  
I.S. EN 61587-2:2011

Mechanical structures for electronic equipment - Tests for IEC 60917 and IEC 60297 -- Part 2: Seismic tests for cabinets and racks (IEC 61587-2:2011 (EQV))

## I.S. EN 61587-2:2011

*Incorporating amendments/corrigenda issued since publication:*

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English version

**Mechanical structures for electronic equipment -  
Tests for IEC 60917 and IEC 60297 -  
Part 2: Seismic tests for cabinets and racks  
(IEC 61587-2:2011)**

Structures mécaniques pour équipements  
électroniques -  
Essais pour la CEI 60917  
et la CEI 60297 -  
Partie 2: Essais sismiques pour baies et  
bâti  
(CEI 61587-2:2011)

Mechanische Bauweisen für elektronische  
Einrichtungen -  
Prüfungen für IEC 60917 und IEC 60297 -  
Teil 2: Seismische Prüfungen für  
Schränke und Gestelle  
(IEC 61587-2:2011)

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## I.S. EN 61587-2:2011

EN 61587-2:2011

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### Foreword

The text of document 48D/471/FDIS, future edition 2 of IEC 61587-2, 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 61587-2:2011.

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) 2012-06-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2014-09-29

This document supersedes EN 61587-2:2001.

EN 61587-2:2011 includes the following significant technical changes with respect to EN 61587-2:2001:

EN 61587-2:2001 specified the test condition with one size of the cabinet, and one load distribution. The specified acceleration condition for the test specimen was single-axis and one of the RRS (required response spectra) specified in the standard was selected. The test was aimed to obtain the reference for the structural strength of the enclosure against the specified seismic intensity. Earthquakes are actually random phenomena that are much more carefully simulated by tri-axial simultaneous operation. The demand of tri-axial excitation has emerged as a more accurate representation of an earthquake.

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 61587-2:2011 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 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.

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 60068-2-6	-	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60068-2-47	-	Environmental testing - Part 2-47: Tests - Mounting of specimens for vibration, impact and similar dynamic tests	EN 60068-2-47	-
IEC 60068-2-57	-	Environmental testing - Part 2-57: Tests - Test Ff: Vibration - Time- history method	EN 60068-2-57	-
IEC 60068-3-3	-	Environmental testing - Part 3: Guidance - Seismic test methods for equipments	EN 60068-3-3	-
IEC 60297	Series	Dimensions of mechanical structures of the 482,6 mm (19 in) series	EN 60297	Series
IEC 60917	Series	Modular order for the development of mechanical structures for electronic equipment practices	EN 60917	Series

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**MECHANICAL STRUCTURES FOR ELECTRONIC EQUIPMENT –  
TESTS FOR IEC 60917 AND IEC 60297 –**

**Part 2: Seismic tests for cabinets and racks**

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.
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International Standard IEC 61587-2 has been prepared by subcommittee 48D: Mechanical structures for electronic equipment, of IEC technical committee 48: Electromechanical components and mechanical structures for electronic equipment.

The second edition of this standard replaces the first edition issued in 2000 and constitutes a technical revision.

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

Edition 1.0 specified the test condition with one size of the cabinet, and one load distribution. The specified acceleration condition for the test specimen was single-axis and one of the RRS (required response spectra) specified in the standard was selected. The test was aimed to obtain the reference for the structural strength of the enclosure against the specified seismic intensity. Earthquakes are actually random phenomena that are much more carefully simulated by tri-axial simultaneous operation. The demand of tri-axial excitation has emerged as a more accurate representation of an earthquake.



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

FDIS	Report on voting
48D/471/FDIS	48D/486/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 61587 series, under the general title: *Mechanical structures for electronic equipment – Tests for IEC 60917 and IEC 60297*, 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

Edition 1.0 of this standard specified the seismic test for the cabinets or racks according to IEC 60297 and IEC 60917. The specified test applied to the structure of the enclosure and did not apply to the whole system.

Edition 1.0 specified the test condition with one size of the cabinet, and one load distribution. The specified acceleration condition for the test specimen was single-axis and one of the RRS (required response spectra) specified in the standard was selected. The test was aimed to obtain the reference for the structural strength of the enclosure against the specified seismic intensity.

The electronic system consists of two or more subracks. Two or more plug-in units that perform signal processing are installed in each subrack. The size, i.e.: height, width and depth, and the weight of each subrack may vary for each electronic system. So, various types of cabinets or racks to equip the electronic system are currently demanded. Therefore, many types of cabinets or racks are required to install the equipment.

Earthquakes are actually random phenomena that are much more carefully simulated by tri-axial simultaneous operation. The demand of tri-axial excitation has emerged as a more accurate representation of an earthquake.

Edition 2.0 of this standard has been reviewed in consideration of these demanded conditions. However, it is impossible to perform the seismic test under all of the cabinet or rack conditions. The aim of this standard is then to evaluate the reference of the cabinet or rack structure with a common examination method. The seismic test is therefore assumed to be performed on one set of cabinet dimensional conditions (i.e. height, width and depth) and one set of load distribution conditions in the cabinet. The input acceleration for the test specimen is assumed to be selected and applied either single-axial or tri-axial. Single-axis acceleration was already specified in Edition 1.0 of this standard. Therefore, the RRS (required response spectra) for tri-axial acceleration have been added. According to this standard, the examination should be performed in the same manner, so as to obtain a reference for the evaluation of the structural strength of the tested cabinet or rack.

The user who requests an individual structural cabinet or rack condition, such as a different cabinet size or a different load distribution in the cabinet, and requests different seismic acceleration intensity, can perform the test by changing the corresponding condition specified in this standard. In this case, the test result is treated as an individual evaluation, not to be taken as a reference.

## MECHANICAL STRUCTURES FOR ELECTRONIC EQUIPMENT – TESTS FOR IEC 60917 AND IEC 60297 –

### Part 2: Seismic tests for cabinets and racks

#### 1 Scope

This part of IEC 61587 specifies seismic tests for cabinets and racks accommodated with IEC 60917 and 60297 series. It applies, in whole or in part, only to the mechanical structures of cabinets and racks for electronic equipment according to the above cited series of standards, while it does not apply to the electronic equipment or systems deemed to be installed within these mechanical structures. This standard does not apply either to a cabinet or a rack having an anti-seismic isolation structure, either external or internal.

This standard aims to provide test conditions and criteria that constitute a reference to evaluate the ability of the mechanical structure of the cabinets or racks to acceptably withstand specified seismic intensities. For this purpose, this standard specifies test specimen conditions, such as dimensions (i.e. height, width and depth) of the cabinet and the rack, load distribution, structural test condition and the RRS (required response spectra) of single-axis or tri-axis acceleration as the seismic test wave condition. The single-axis or tri-axis acceleration is selectable.

#### 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 60068-2-6: *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-47: *Environmental testing – Part 2-47: Tests – Mounting of specimens for vibration, impact and similar dynamic tests*

IEC 60068-2-57: *Environmental testing – Part 2-57: Tests – Test Ff: Vibration – Time-history method*

IEC 60068-3-3: *Environmental testing – Part 3: Guidance – Seismic test methods for equipments*

IEC 60297 (all parts): *Mechanical structures for electronic equipment – Dimensions of mechanical structures of the 482,6 mm (19 in) series*

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

#### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60068-2-6, IEC 60068-3-3, IEC 60068-2-47 and IEC 60068-2-57 apply.

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