

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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

**Structures mécaniques pour équipements électroniques – Essais pour la CEI 60917 et la CEI 60297 –  
Partie 2: Essais sismiques pour baies et bâtis**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2: Seismic tests for cabinets and racks

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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.

This bilingual version (2014-01) corresponds to the monolingual English version, published in 2000-12.

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

FDIS	Report on voting
48D/236/FDIS	48D/245/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.

The French version of this standard has not been voted upon.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

IEC 61587 consists of the following parts under the general title *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

Part 2: Seismic tests for cabinets and racks

Part 3: Electromagnetic shielding performance tests for cabinets, racks and subracks

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

Withdrawn

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

## Part 2: Seismic tests for cabinets and racks

### 1 Scope and object

This part of IEC 61587 specifies seismic requirements for cabinets or racks as defined in the IEC 60917 and IEC 60297 series. It applies, in whole or in part, only to the mechanical structures of cabinets or racks for electronic equipment, according to the IEC 60297 and the IEC 60917 series, and does not apply to electronic equipment or systems within the mechanical structures.

The object of this standard is to help ensure physical integrity and environmental performance in mechanical cabinets or racks, taking into account the need for different levels of performance in different applications and geographical regions. It is intended to give the user a high level of confidence in the selection of an equipment practice to meet specific needs. A specific test specimen has been selected (see figure 1).

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61587. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61587 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60068-2-6:1995, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-47:1999, *Environmental testing – Part 2-47: Test method – Mounting of components, equipment and other articles for vibration, impact and similar dynamic tests*

IEC 60068-2-57:1999, *Environmental testing – Part 2-57: Tests – Test Ff: Vibration – Time-history method*

IEC 60068-3-3:1991, *Environmental testing – Part 3: Guidance – Seismic test methods for equipment*

IEC 60297-1, *Dimensions of mechanical structures of the 482,6 mm (19 in) series – Part 1: Panels and racks*

IEC 60297-2, *Dimensions of mechanical structures of the 482,6 mm (19 in) series – Part 2: Cabinets and pitches of rack structures*

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

IEC 60297-4, *Mechanical structures for electronic equipment – Dimensions of mechanical structures of the 482,6 mm (19 in) series – Part 4: Subracks and associated plug-in units – Additional dimensions*

IEC 60917-2, *Modular order for the development of mechanical structures for electronic equipment practices – Part 2: Sectional specification – Interface co-ordination dimensions for the 25 mm equipment practice*

IEC 60917-2-1, *Modular order for the development of mechanical structures for electronic equipment practices – Part 2: Sectional specification – Interface co-ordination dimensions for the 25 mm equipment practice – Section 1: Detail specification – Dimensions for cabinets and racks*

IEC 60917-2-2, *Modular order for the development of mechanical structures for electronic equipment practices – Part 2: Sectional specification – Interface co-ordination dimensions for the 25 mm equipment practice – Section 2: Detail specification – Dimensions for subracks, chassis, backplanes, front panels and plug-in units*

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*

### **3 Seismic and vibration test requirements**

The loading and mounting conditions, along with the cabinet or rack size and as-tested configuration, shall be in compliance with this standard. The cabinet or rack configuration and the set-up and loading condition (shown in figure 1) are based on 5.2 of IEC 61587-1.

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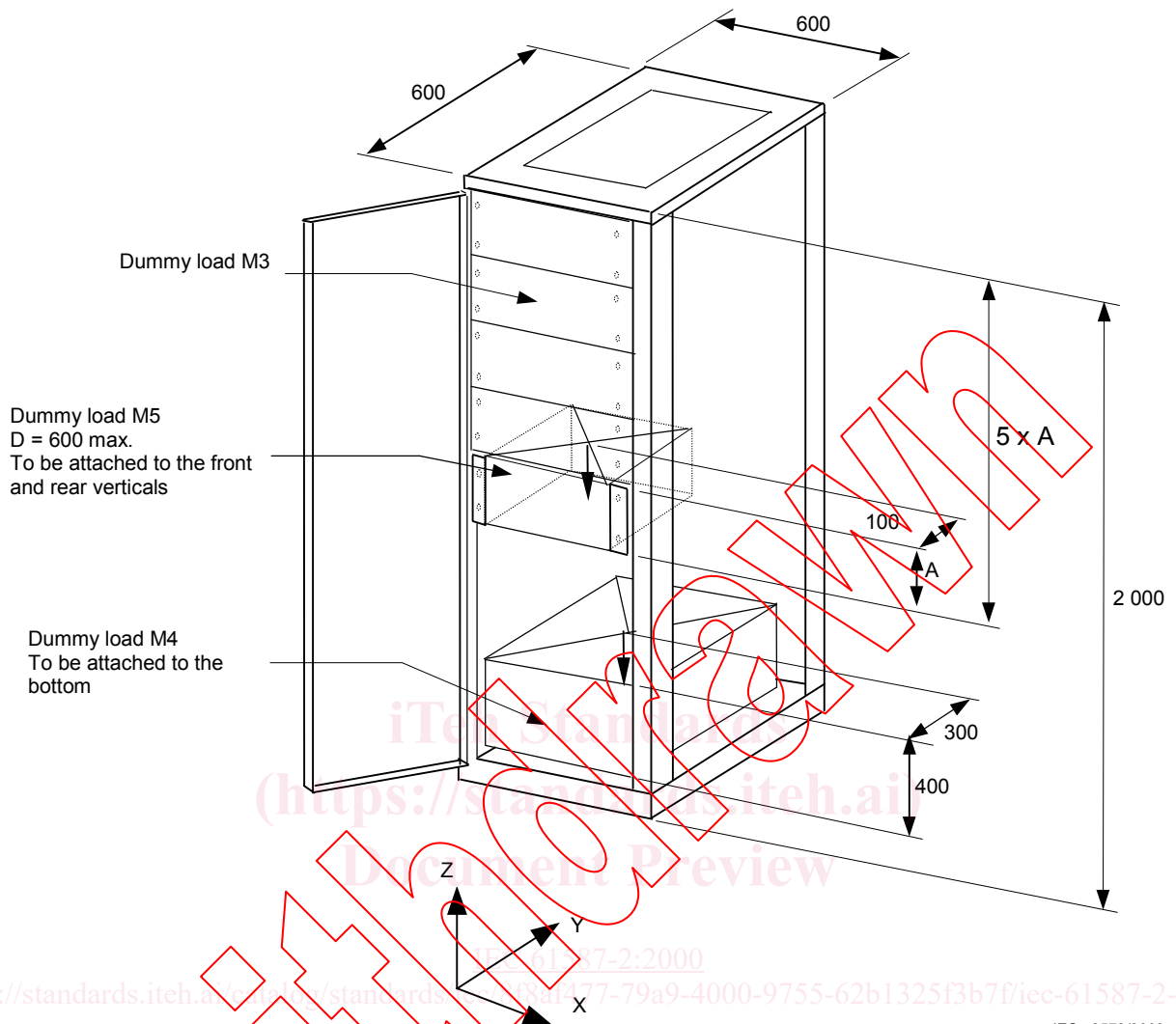


Figure 1 – Cabinet or rack configuration for test set-up

Table 1 – Load distribution within the cabinet

Cabinets according to	A mm	M3 kg	M4 kg	M5 kg	Total load kg
IEC 60297-2	265,9	25 × 4 positions	90	60	250
IEC 60917-2-1	250	25 × 4 positions	90	60	250



### 3.1 Test conditions/procedure

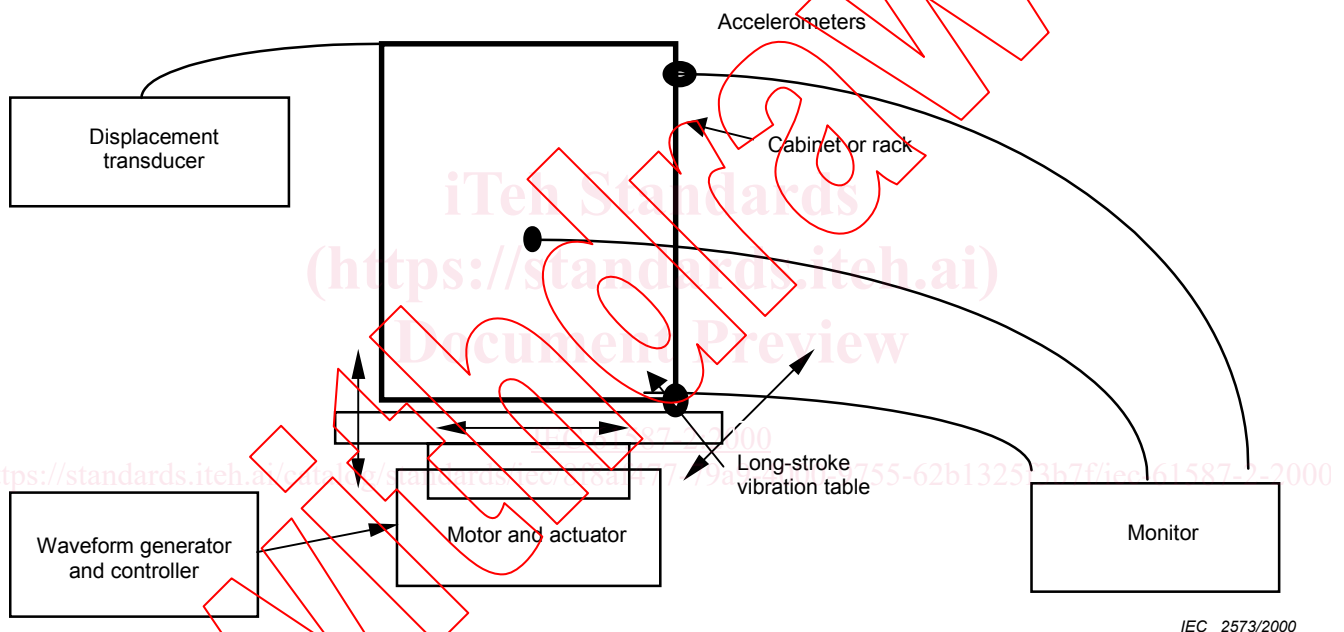
This standard describes the procedures required for testing for a single axis only.

#### 3.1.1 Seismic test

The seismic test of cabinets or racks shall be performed using a shaker table with the enclosures fully loaded with subracks or dummy loads evenly distributed throughout the height of the cabinet or rack (see figure 1).

If dummy subracks are used, they shall be loaded with dummy plug-in units similar to a typical subrack application (see IEC 61587-1).

**3.1.2** A cabinet or rack shall be mounted direct to the shaker table without using interfaces such as concrete anchors, in accordance with the intended bolt-down positions and requirements in IEC 60068-2-47. The test shall be performed under the conditions set out in figure 1. For the block diagram of the test set-up configuration, see figure 2.



**Figure 2 – Block diagram of test set-up configuration**

**3.1.3** For the purpose of this test, the test wave for the seismic test shall be a synthesized waveform as described in figures 3 and 5.

Two waveforms have been chosen, indicating two levels of severity (waveform A and waveform B). The reason for choosing two waveforms is to permit the economical manufacturing of cabinets and racks suitable for applications in differing seismic regions. The test result documentation must indicate which waveform (A or B or both) had been chosen for the purpose of the test. Figure 3 represents waveform A and is less severe (North American proposal) than waveform B (Japanese proposal) shown in figure 5.

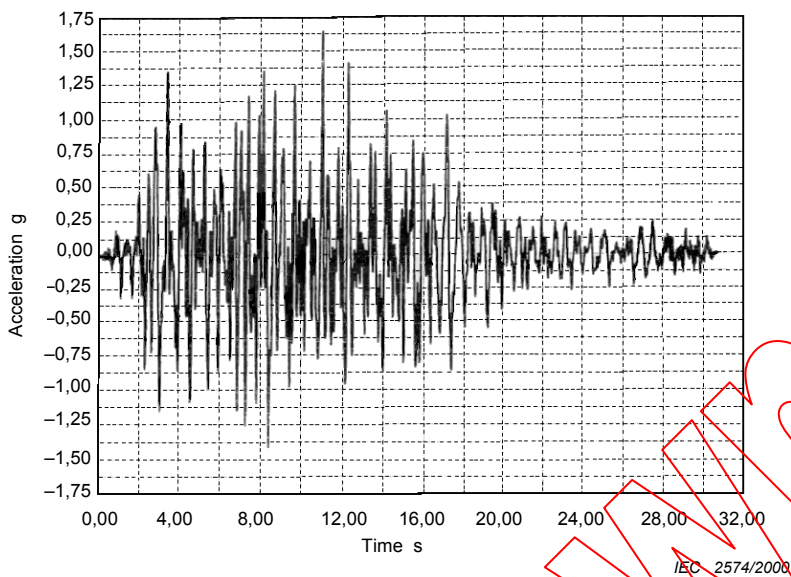


Figure 3 – Seismic synthesized waveform A

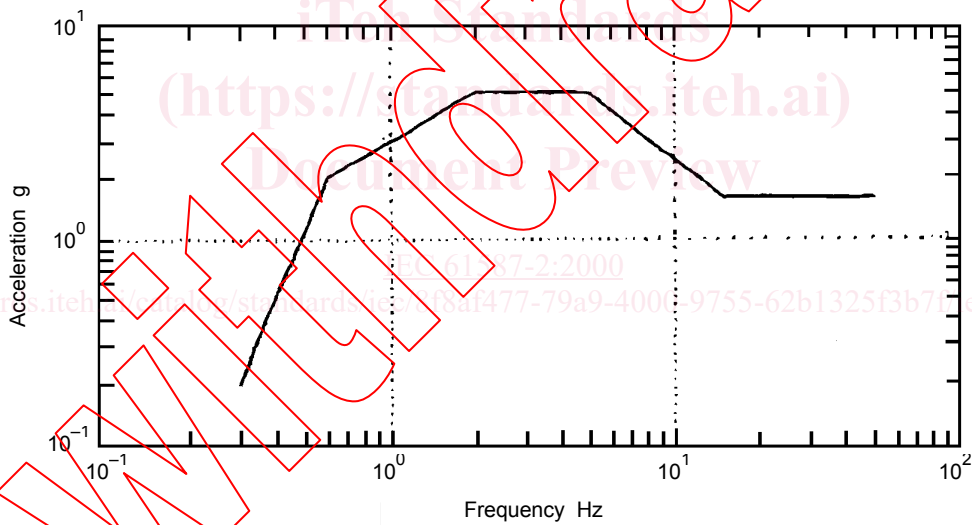


Figure 4 – Required response spectra for figure 3