
Okoljsko preskušanje – 2-47. del: Preskusi – Pritrjevanje preskušancev pri preskusih vibracij, udarcev in pri podobnih dinamičnih preskusih (IEC 60068-2-47:2005)

Environmental testing – Part 2-47: Tests – Mounting of specimens for vibration, impact and similar dynamic tests (IEC 60068-2-47:2005)

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EUROPEAN STANDARD

EN 60068-2-47

NORME EUROPÉENNE

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Environmental testing
Part 2-47: Tests - Mounting of specimens for vibration,
impact and similar dynamic tests
(IEC 60068-2-47:2005)

Essais d'environnement
Partie 2-47: Essais –
Fixation de spécimens pour essais
de vibrations, d'impacts et autres essais
dynamiques
(CEI 60068-2-47:2005)

Umgebungseinflüsse
Teil 2-47: Prüfverfahren –
Befestigung von Prüflingen zur Schwing-,
Stoß- und ähnlichen dynamischen
Prüfungen
(IEC 60068-2-47:2005)

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This European Standard was approved by CENELEC on 2005-05-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 104/359/FDIS, future edition 3 of IEC 60068-2-47, prepared by IEC TC 104, Environmental conditions, classification and methods of test, was submitted to the IEC/CENELEC parallel vote and was approved by CENELEC as EN 60068-2-47 on 2005-05-01.

This European Standard supersedes EN 60068-2-47:1999 + corrigendum June 2000.

The major technical changes with regard to EN 60068-2-47:1999 are related to specific guidance on the testing of packaged products.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2006-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2008-05-01

Annex ZA has been added by CENELEC.

~~iTeh STANDARD PREVIEW~~ (standards.iteh.ai) Endorsement notice

The text of the International Standard IEC 60068-2-47:2005 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068-2-6	NOTE	Harmonized as EN 60068-2-6:1995 (not modified).
IEC 60068-2-7	NOTE	Harmonized as EN 60068-2-7:1993 (not modified).
IEC 60068-2-21	NOTE	Harmonized as EN 60068-2-21:1999 (not modified).
IEC 60068-2-27	NOTE	Harmonized as EN 60068-2-27:1993 (not modified).
IEC 60068-2-29	NOTE	Harmonized as EN 60068-2-29:1993 (not modified).
IEC 60068-2-31	NOTE	Harmonized as EN 60068-2-31:1993 (not modified).
IEC 60068-2-32	NOTE	Harmonized as EN 60068-2-32:1993 (not modified).
IEC 60068-2-57	NOTE	Harmonized as EN 60068-2-57:2000 (not modified).
IEC 60068-2-59	NOTE	Harmonized as EN 60068-2-59:1993 (not modified).
IEC 60068-2-64	NOTE	Harmonized as EN 60068-2-64:1994 (not modified).
IEC 60068-2-65	NOTE	Harmonized as EN 60068-2-65:1994 (not modified).
IEC 60068-2-75	NOTE	Harmonized as EN 60068-2-75:1997 (not modified).
IEC 60068-2-81	NOTE	Harmonized as EN 60068-2-81:2003 (not modified).

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 Where 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 60068-1	1988	Environmental testing Part 1: General and guidance	EN 60068-1 1)	1994
IEC 60068-2-55	1987	Part 2: Tests - Test Ee and guidance: Bounce	EN 60068-2-55	1993
ISO 2041	1990	Vibration and shock - Vocabulary	-	-

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1) EN 60068-1 includes corrigendum October 1988 + A1:1992 to IEC 60068-1.

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60068-2-47

Troisième édition
Third edition
2005-04

Essais d'environnement –

Partie 2-47:

Essais –

**Fixation de spécimens pour essais de vibrations,
d'impacts et autres essais dynamiques**

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Environmental testing –

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Part 2-47:

Tests –

**Mounting of specimens for vibration,
impact and similar dynamic tests**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ENVIRONMENTAL TESTING –

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

FOREWORD

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International Standard IEC 60068-2-47 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This third edition cancels and replaces the second edition, published in 1999, and constitutes a technical revision.

The major technical changes with regard to the second edition are related to specific guidance on the testing of packaged products.

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

FDIS	Report on voting
104/359/FDIS	104/366/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.

This standard forms Part 2-47 of IEC 60068 which consists of the following major parts, under the general title *Environmental testing*:

Part 1: General and guidance

Part 2: Tests

Part 3: Supporting documentation and guidance

Part 4: Information for specification writers

Part 5: Guide to drafting of test methods

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

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INTRODUCTION

This part of IEC 60068 defines the requirements and gives information regarding the mounting of components, equipment and other articles and packaged products, referred to as "specimens", when they are subjected to vibration, impact and similar dynamic tests.

In all cases, component-type specimens are mounted as stated in the relevant specification. Where these details are not specified, a number of standardized methods of mounting are given in this standard.

Equipment-type specimens should be mounted by their normal means of attachment unless otherwise stated in the relevant specification.

An attempt is made, in the first instance, to categorize specimens into either component or equipment types and then to proceed to test accordingly. If this is not possible, for example for packaged items, this standard may still be relevant, but relates to the packaging and not to the contents. It should be noted that this standard does not apply to the testing of empty packaging.

General guidance is provided in Annex A, as appropriate for both the specification writer and the test engineer. Specific guidance on the testing of packaged products is given in Annex B. Annex C provides guidance on the methodology for modifying a half sine pulse test, used as input to a packaged specimen, when the packaging is not available.

In some instances, requirements and guidance on mounting are included, partly or wholly, in the individual standards of the IEC 60068 series, for example, Test Fh. Where such a standard is called up by the relevant specification, it will need to be studied as well as this standard.

[SIST EN 60068-2-47:2005](https://standards.iteh.ai/catalog/standards/sist/af462460-d60d-446d-b55b-24074121fbc1/sist-en-60068-2-47-2005)

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ENVIRONMENTAL TESTING –

Part 2-47: Tests – Mounting of specimens for vibration, impact and similar dynamic tests

1 Scope

This part of IEC 60068 provides methods for mounting products, whether packaged or unpackaged, as well as mounting requirements for equipment and other articles, for the series of dynamic tests in IEC 60068-2, that is impact (Test E), vibration (Test F) and acceleration, steady-state (Test G). When they are fastened to the test apparatus and subjected to these tests, whether packaged or unpackaged, they are referred to as specimens.

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 60068-1:1988, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-55:1987, *Environmental testing – Part 2-55: Tests – Test Ee and guidance: Bounce*

ISO 2041:1990, *Vibration and shock – Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions used in ISO 2041 and IEC 60068-1 apply.

3.1

package

result of the packing operation, consisting of the packaging and its contents, for example, electronic devices prepared for transport

3.2

packaging

product made of any material of any nature to be used for the containment, protection, handling and delivery, for example, a corrugated fibreboard box

4 General

The relevant specification shall state whether the effect of gravitational force is important. If so, the specimen shall be mounted in such a way that the gravitational force acts in the same direction as it would in use. Where the effect of gravitational force is not important, the specimen may be mounted in any attitude.

If significant for the test results, the relevant specification shall also state

- a) the temperature limits within which the specimen shall be tested,
- b) the maximum level of magnetic interference which may be imposed on the specimen and/or the orientation of the specimen in relation to the direction of the magnetic field (for example, near an electrodynamic vibration generator),
- c) the relative humidity limits within which the specimen shall be tested.

5 Mounting, where the specimen is a component

The mounting method to be used shall be as stated in the relevant specification.

Where the method of mounting is not specified but is obvious from the design, as in Figure 1, this method shall be used. Where it is not obvious, the mounting methods shall, whenever possible, be chosen in accordance with the principles shown in Figures 2, 3 or 4, bearing in mind whether the intention is to load dynamically the leads and/or the body or to determine the internal robustness.

When the specimen is to be tested with additional leads attached, these shall be so arranged that they impose similar restraint and mass to those when the specimen is used in its normal manner.

In all cases, components shall be fastened to a rigid test fixture or directly to the mounting surface of the test apparatus. The most common failure mode for electronic components as shown in Figures 1, 2 and 3 is not failure of the component itself but of the solder connection due to flexure of the printed circuit board. Testing of the complete printed circuit board is essential.

NOTE A "rigid test fixture" is one where there are no resonances within the test range or where the requirements of the test tolerances can be met at all fixing points.

6 Mounting, where the specimen is equipment and other articles

The specimen shall be mechanically connected to the mounting surface of the test apparatus either directly or by means of a rigid test fixture (see note above), as shown in Figure 5, or as stated in the relevant specification.

NOTE In the case of acoustically induced vibration, the mounting technique is quite different and reference should be made to IEC 60068-2-65.

In cases where the normal mounting structure for the equipment is available, the relevant specification shall state if it shall be used (see also Clause A.2).

Any additional stays or straps shall be avoided. Any connections to the specimen such as cables, pipes, etc. shall be so arranged that they impose similar restraint and mass to those when the specimen is installed in its operational position. In order to achieve this, it may be necessary to fasten the cables, pipes, etc., to the fixture.

The relevant specification shall specify the size, mounting torque and associated tolerance of the fixing bolts.