Environmental testing -- Part 2-27: Tests - Test Ea and guidance: Shock

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 60068-2-27:2009 sisaldab Euroopa standardi EN 60068-2-27:2009 ingliskeelset teksti.	This Estonian standard EVS-EN 60068-2-27:2009 consists of the English text of the European standard EN 60068-2-27:2009.
Standard on kinnitatud Eesti Standardikeskuse 30.06.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 30.06.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 07.05.2009.	Date of Availability of the European standard text 07.05.2009.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 19.040

Võtmesõnad: components, components specification writing, electricity, equipment, equipment specification writing, mechanical test, procedures, shock test

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60068-2-27

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ICS 19.040

Supersedes EN 60068-2-27:1993 and EN 60068-2-29:1993

English version

Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock

(IEC 60068-2-27:2008)

Essais d'environnement - Partie 2-27: Essais - Essai Ea et guide: Chocs (CEI 60068-2-27:2008)

Umgebungseinflüsse - Teil 2-27: Prüfverfahren - Prüfung Ea und Leitfaden: Schocken (IEC 60068-2-27:2008)

This European Standard was approved by CENELEC on 2009-04-22. 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, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Central Secretariat: avenue Marnix 17, B - 1000 Brussels

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Foreword

The text of document 104/448/FDIS, future edition 4 of IEC 60068-2-27, 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 60068-2-27 on 2009-04-22.

This European Standard supersedes EN 60068-2-27:1993 and EN 60068-2-29:1993.

The major technical changes with regard to EN 60068-2-27:1993 concern:

– the merging of EN 60068-2-29:1993 into this Part 2-27;

– the introduction of soft packaged specimens as defined in the IEC ad hoc working group document agreed in Stockholm:2000.

This standard is to be used in conjunction with EN 60068-1.

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) 2010-02-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2012-05-01

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 60068-2-27:2008 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 60068-2-31	NOTE	Harmonized as EN 60068-2-31:2008 (not modified).
IEC 60068-2-81	NOTE	Harmonized as EN 60068-2-81:2003 (not modified).
ISO/IEC 17025	NOTE	Harmonized as EN ISO/IEC 17025:2005 (not modified).

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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.

Publication	Year	Title	EN/HD	Year
IEC 60068-1	- [1)]	Environmental testing - Part 1: General and guidance	EN 60068-1	1994 [2)]
IEC 60068-2-47	2005	Environmental testing - Part 2-47: Tests - Mounting of specimens for vibration, impact and similar dynamic tests	EN 60068-2-47	2005
IEC 60068-2-55	- [1)]	Environmental testing - Part 2-55: Tests - Test Ee and guidance: Bounce	EN 60068-2-55	1993 [2)]
IEC 60721-3-1	- [1)]	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 1: Storage	EN 60721-3-1	1997 [2)]
IEC 60721-3-5	- [1)]	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 5: Ground vehicle installations	EN 60721-3-5	1997 [2)]
IEC Guide 104	- [1)]	The preparation of safety publications and the use of basic safety publications and group safety publications	–	–

[1)] Undated reference.

[2)] Valid edition at date of issue.

CONTENTS

INTRODUCTION

This part of IEC 60068 deals with components, equipments and other electrotechnical products, hereinafter referred to as “specimens”, which, during transportation, storage and handling, or in use, may be subjected either to conditions involving relatively infrequent non-repetitive or repetitive shocks. The shock test may also be used as a means of establishing the satisfactory design of a specimen in so far as its structural integrity is concerned and as a means of quality control. It consists of subjecting a specimen either to non-repetitive or repetitive shocks of standard pulse shapes with specified peak acceleration and duration.

Specification writers will find a list of details to be considered for inclusion in specifications in Clause 11. The necessary guidance is given in Annex A.

ENVIRONMENTAL TESTING –

Part 2-27: Tests – Test Ea and guidance: Shock

1 Scope

This part of IEC 60068 provides a standard procedure for determining the ability of a specimen to withstand specified severities of non-repetitive or repetitive shocks.

The purpose of this test is to reveal mechanical weakness and/or degradation in specified performances, or accumulated damage or degradation caused by shocks. In conjunction with the relevant specification, this may be used in some cases to determine the structural integrity of specimens or as a means of quality control (see Clause A.2).

This test is primarily intended for unpackaged specimens and for items in their transport case when the latter may be considered to be part of the specimen. If an item is to be tested unpackaged, it is referred to as a test specimen. However, if the item is packaged, then the item itself is referred to as a product and the item and its packaging together are referred to as a test specimen. When used in conjunction with IEC 60068-2-47, this standard may be used for testing packaged products. This possibility was included in the 2005 version of IEC 60068-2-47 for the first time.

This standard is written in terms of prescribed pulse shapes. Guidance for the selection and application of these pulses is given in Annex A and the characteristics of the different pulse shapes are discussed in Annex B.

Wherever possible, the test severity and the shape of the shock pulse applied to the specimen should be such as to reproduce the effects of the actual transport or operational environment to which the specimen will be subjected, or to satisfy the design requirements if the object of the test is to assess structural integrity (see Clauses A.2 and A.4).

For the purposes of this test, the specimen is always mounted to the fixture or the table of the shock testing machine during testing.

NOTE The term “shock testing machine” is used throughout this standard, but other means of applying pulse shapes are not excluded.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications in the preparation of its publications.

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, E*nvironmental testing – Part 1: General and guidance*

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

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

IEC 60721-3-1, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 1: Storage*

IEC 60721-3-5, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 5: Ground vehicle installations*

Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE The terms used are, for the most part, defined in ISO 2041[1]1 or IEC 60068-1. The following additional terms and definitions are also applicable for the purposes of this standard.

3.1
check point
point located on the fixture, on the table surface of the shock-testing machine or on the specimen as close as possible to the fixing point, and in any case rigidly connected to it

NOTE 1 A number of check points are used as a means of ensuring that the test requirements are satisfied.

NOTE 2 If more than four fixing points exist, the relevant specification should state the number of fixing points to be used as check points.

NOTE 3 In special cases, for example, for large or complex specimens, the check points will be prescribed by the relevant specification if not close to the fixing points.

NOTE 4 Where a large number of small specimens are mounted on one fixture, or in the case of a small specimen where there are a number of fixing points, a single check point (that is the reference point) may be selected for the derivation of the control signal. This signal is then related to the fixture rather than to the fixing points of the specimen(s). This procedure is only valid when the lowest resonance frequency of the loaded fixture is well above the upper frequency of the test.

3.2
fixing point
part of the specimen in contact with the fixture or the table of the shock-testing machine at a point where the specimen is normally fastened in service

NOTE If a part of the real mounting structure is used as the fixture, the fixing points are taken as those of the mounting structure and not of the specimen.

3.3
***g*n**
standard acceleration due to the earth's gravity, which itself varies with altitude and geographical latitude

NOTE For the purposes of this standard, the value of g_n is rounded up to the nearest unity, that is 10 m/s^2.

3.4
repetition rate
number of shocks per second

3.5
shock severity
combination of the peak acceleration, the duration of the nominal pulse and the number of shocks

1 Figures in square brackets refer to the bibliography.