

**Environmental testing -- Part 2-64: Tests - Test Fh:
Vibration, broadband random and guidance**

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 60068-2-64:2008 sisaldab Euroopa standardi EN 60068-2-64:2008 ingliskeelset teksti.</p> <p>Standard on kinnitatud Eesti Standardikeskuse 20.10.2008 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 12.09.2008.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 60068-2-64:2008 consists of the English text of the European standard EN 60068-2-64:2008.</p> <p>This standard is ratified with the order of Estonian Centre for Standardisation dated 20.10.2008 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p> <p>Date of Availability of the European standard text 12.09.2008.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
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English version

**Environmental testing -
Part 2-64: Tests -
Test Fh: Vibration, broadband random and guidance
(IEC 60068-2-64:2008)**

Essais d'environnement -
Partie 2-64: Essais -
Essai Fh: Vibrations aléatoires
à large bande et guide
(CEI 60068-2-64:2008)

Umgebungseinflüsse -
Teil 2-64: Prüfverfahren -
Prüfung Fh: Schwingen,
Breitbandrauschen (digital geregelt)
und Leitfaden
(IEC 60068-2-64:2008)

This European Standard was approved by CENELEC on 2008-07-01. 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, 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: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 104/456/FDIS, future edition 2 of IEC 60068-2-64, 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 60068-2-64 on 2008-07-01.

This European Standard supersedes EN 60068-2-64:1994.

The major changes with regard to EN 60068-2-64:1994 concern the removal of Method 1 and Method 2, replaced by a single method, and replacement of Annex A with suggested test spectra and removal of Annex C.

Also included in this revision is the testing of soft packed specimens.

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) 2009-04-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2011-07-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60068-2-64:2008 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 61373	NOTE	Harmonized as EN 61373:1999 (not modified).
ISO/IEC 17025	NOTE	Harmonized as EN ISO/IEC 17025:2005 (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 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 60050-300	- ¹⁾	International Electrotechnical Vocabulary - Electrical and electronic measurements and measuring instruments - Part 311: General terms relating to measurements - Part 312: General terms relating to electrical measurements - Part 313: Types of electrical measuring instruments - Part 314: Specific terms according to the type of instrument	-	-
IEC 60068-1	- ¹⁾	Environmental testing - Part 1: General and guidance	EN 60068-1	1994 ²⁾
IEC 60068-2-6	- ¹⁾	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	2008 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 60068-3-8	2003	Environmental testing - Part 3-8: Supporting documentation and guidance - Selecting amongst vibration tests	EN 60068-3-8	2003
IEC 60068-5-2	- ¹⁾	Environmental testing - Part 5: Guide to drafting of test methods - Terms and definitions	EN 60068-5-2	1999 ²⁾
IEC 60721-3	Series	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities	EN 60721-3	Series
IEC Guide 104	- ¹⁾	The preparation of safety publications and the use of basic safety publications and group safety publications	-	-
ISO 2041	- ¹⁾	Vibration and shock - Vocabulary	-	-

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Requirements for test apparatus.....	12
4.1 General.....	12
4.2 Basic motion	12
4.3 Cross-axis motion	13
4.4 Mounting	13
4.5 Measuring systems.....	13
4.6 Vibration tolerances	14
4.7 Control strategy.....	17
4.8 Vibration response investigation.....	17
5 Severities	18
5.1 Test frequency range	18
5.2 RMS value of acceleration	18
5.3 Shape of acceleration spectral density curve.....	18
5.4 Test duration	19
6 Preconditioning	19
7 Initial measurements and functional performance	19
8 Testing	19
8.1 General.....	19
8.2 Initial vibration response investigation	20
8.3 Low-level excitation for equalization prior to testing.....	20
8.4 Random testing	21
8.5 Final vibration response investigation.....	21
9 Recovery.....	21
10 Final measurements and functional performance	21
11 Information to be given in the relevant specification	22
12 Information to be given in the test report	22
Annex A (informative) Standardized test spectra.....	24
Annex B (informative) Guidance.....	30
Bibliography.....	34
Figure 1 – Tolerance bands for acceleration spectral density; initial and final slope (see B.2.3).....	14
Figure 2 – Time history of stochastically excitation; probability density function with Gaussian (normal) distribution (Example with crest factor = 3, see also 3.14 and 4.6.2)	15
Figure 3 – Statistical accuracy of acceleration spectral density versus degrees of freedom for different confidence levels (see also 4.6.3)	16

Table A.1 – Categories for spectrum: transportation	24
Table A.2 – Break points for spectrum: transportation	25
Table A.3 – Categories for spectrum: stationary installation	25
Table A.4 – Break points for spectrum: stationary installation	26
Table A.5 – Categories for spectrum: equipment in wheeled vehicles	27
Table A.6 – Break points for spectrum: equipment in wheeled vehicles	28
Table A.7 – Categories for spectrum: equipment in airplanes and helicopters	29
Table A.8 – Break points for spectrum: equipment in airplanes and helicopters	29

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INTRODUCTION

This part of IEC 60068 deals with broadband random vibration testing intended for general application to components, equipment and other products, hereinafter referred to as "specimens", that may be subjected to vibrations of a stochastic nature. The methods and techniques in this standard are based on digital control of random vibration. It permits the introduction of variations to suit individual cases if these are prescribed by the relevant specification.

Compared with most other tests, test Fh is not based on deterministic but on statistical techniques. Broad-band random vibration testing is therefore described in terms of probability and statistical averages.

It is emphasized that random testing always demands a certain degree of engineering judgement, and both supplier and purchaser should be fully aware of this fact. The writer of the relevant specification is expected to select the testing procedure and the values of severity appropriate to the specimen and its use.

The test method is based primarily on the use of an electrodynamic or a servo-hydraulic vibration generator with an associated computer based control system used as a vibration testing system.

Annexes A and B are informative annexes giving examples of test spectra for different environmental conditions, a list of details to be considered for inclusion in specifications and guidance.

ENVIRONMENTAL TESTING –

Part 2-64: Tests-Test Fh: Vibration, broadband random and guidance

1 Scope

This part of IEC 60068 demonstrates the adequacy of specimens to resist dynamic loads without unacceptable degradation of its functional and/or structural integrity when subjected to the specified random vibration test requirements.

Broadband random vibration may be used to identify accumulated stress effects and the resulting mechanical weakness and degradation in the specified performance. This information, in conjunction with the relevant specification, may be used to assess the acceptability of specimens.

This standard is applicable to specimens which may be subjected to vibration of a stochastic nature resulting from transportation or operational environments, for example in aircraft, space vehicles and land vehicles. It is primarily intended for unpackaged specimens, and for items in their transportation container when the latter may be considered as part of the specimen itself. 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. This standard may be used in conjunction with IEC 60068-2-47:2005, for testing packaged products.

If the specimens are subjected to vibration of a combination of random and deterministic nature resulting from transportation or real life environments, for example in aircraft, space vehicles and for items in their transportation container, testing with pure random may not be sufficient. See IEC 60068-3-8:2003 for estimating the dynamic vibration environment of the specimen and based on that, selecting the appropriate test method.

Although primarily intended for electrotechnical specimens, this standard is not restricted to them and may be used in other fields where desired (see Annex A).

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 60050-300: *International Electrotechnical Vocabulary – Electrical and electronic measurements and measuring instruments – Part 311: General terms relating to measurements – Part 312: General terms relating to electrical measurements – Part 313: Types of electrical measuring instruments – Part 314: Specific terms according to the type of instrument*

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

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

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

IEC 60068-3-8:2003, *Environmental testing – Part 3-8: Supporting documentation and guidance – Selecting amongst vibration tests*

IEC 60068-5-2: *Environmental testing – Part 5-2: Guide to drafting of test methods – Terms and definitions*

IEC 60721-3 (all parts), *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities*

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

ISO 2041: *Vibration and shock – Vocabulary*

3 Terms and definitions

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

NOTE The terms used are generally defined in IEC 60050-300, IEC 60068-1, IEC 60068-2-6, and IEC 60068-5-2 and ISO 2041. If a definition from one of those sources is included here, the derivation is indicated and departures from the definitions in those sources are also indicated.

3.1

cross-axis motion

motion not in the direction of the stimulus; generally specified in the two axes orthogonal to the direction of the stimulus

NOTE The cross-axis motion should be measured close to the fixing points.

3.2

actual motion

motion represented by the wideband signal returned from the reference point transducer

3.3

fixing point

part of the specimen in contact with the fixture or vibration table 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.

3.4

control methods

3.4.1

single point control

control method using the signal from the transducer at the reference point in order to maintain this point at the specified vibration level

3.4.2

multipoint control

control method using the signals from each of the transducers at the checkpoints

NOTE The signals are either continuously averaged arithmetically or processed by using comparison techniques, depending upon the relevant specification. See also 3.13.

3.5

g_n

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