



NSAI
Standards

Irish Standard
I.S. EN 60068-2-53:2010

Environmental testing -- Part 2-53: Tests and guidance: Combined climatic (temperature/humidity) and dynamic (vibration/shock) tests (IEC 60068-2-53:2010 (EQV))

I.S. EN 60068-2-53:2010

Incorporating amendments/corrigenda issued since publication:

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SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

May 2010

ICS 19.040

Supersedes EN 60068-2-50:1999, EN 60068-2-51:1999

English version

**Environmental testing -
Part 2-53: Tests and guidance: Combined climatic (temperature/humidity)
and dynamic (vibration/shock) tests
(IEC 60068-2-53:2010)**

Essais d'environnement -
Partie 2-53: Essais et guide: Essais
combinés climatiques
(température/humidité) et dynamiques
(vibrations/chocs)
(CEI 60068-2-53:2010)

Umgebungseinflüsse -
Teil 2-53: Prüfverfahren -
Prüfungen und Leitfaden -
Kombinierte klimatische
(Temperatur/Feuchte) und dynamische
(Schwingung/Schock) Prüfungen
(IEC 60068-2-53:2010)

This European Standard was approved by CENELEC on 2010-05-01. 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, Bulgaria, Croatia, 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

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Foreword

The text of document 104/499/FDIS, future edition 2 of IEC 60068-2-53, 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 60068-2-53 on 2010-05-01.

This European Standard supersedes EN 60068-2-50:1999 and EN 60068-2-51:1999.

The main changes with respect to 60068-2-50:1999 and EN 60068-2-51:1999 is to update and group tests. In this way it allows for the possibility to use different kinds of vibration excitation – sine, random or mixed mode – or shocks, with different tests for climatic conditions – cold, dry heat, change of temperature or constant and cyclic damp heat.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

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) 2011-02-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2013-05-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60068-2-53:2010 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 60068-2-33 | NOTE Harmonized as EN 60068-2-33. |
| IEC 60068-2-47 | NOTE Harmonized as EN 60068-2-47. |

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 60068-1	-	Environmental testing - Part 1: General and guidance	EN 60068-1	-
IEC 60068-2-1	-	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	-
IEC 60068-2-2	-	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	-
IEC 60068-2-6	-	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-27	-	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	-
IEC 60068-2-30	-	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	-
IEC 60068-2-64	-	Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance	EN 60068-2-64	-
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60068-2-80	-	Environmental testing - Part 2-80: Tests - Test Fi: Vibration - Mixed mode	EN 60068-2-80	-

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CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	6
3 Testing	6
3.1 General.....	6
3.2 Temperature information	7
3.3 Dynamic test information	8
3.4 Initial measurement and functional performance test.....	8
3.5 Operating condition of specimen	8
3.6 Mechanical conditioning of specimen	8
4 Final measurements	8
5 Information to be given in the relevant specification	8
6 Information to be given in the test report	9
Annex A (informative) Examples of test sequences.....	11
Annex B (informative) Guidance on combined climatic and dynamic testing	15
Bibliography.....	17
Figure A.1 – Example of test sequence with cold or dry heat testing	11
Figure A.2 – Example of test sequence with slow temperature	12
Figure A.3 – Example of test sequence with damp heat, cyclic.....	13
Figure A.4 – Example of test sequence with damp heat, constant	14
Figure B.1 – Example for a typically test set-up	16
Table 1 – Allowable combinations of IEC standards	7

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ENVIRONMENTAL TESTING –

**Part 2-53: Tests and guidance – Combined climatic
(temperature/humidity) and dynamic (vibration/shock) tests**

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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- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60068-2-53 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This second edition cancels and replaces

- the first edition of IEC 60068-2-50, published in 1983,
- the first edition of IEC 60068-2-51, published in 1983 and
- the first edition of 60068-2-53, published in 1984

and constitutes a technical revision.

The main changes with respect to the previous editions of all three standards cited above is to update and group tests. In this way it allows for the possibility to use different kinds of vibration excitation – sine, random or mixed mode – or shocks, with different tests for climatic conditions – cold, dry heat, change of temperature or constant and cyclic damp heat.

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

FDIS	Report on voting
104/499/FDIS	104/514/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 the parts in the IEC 60068 series, under the general title *Environmental testing*, 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

Equipment and components are required to function without significant reduction in performance when subjected to different environmental parameters.

The type and severity of the environmental parameters depend on the operational, transport and storage environments to which the equipment and components are subjected. The environmental effects on the performance of equipments in the tropics and subtropics are totally different from those in arctic regions. Individual parameters cause a variety of different and overlapping effects on the equipment and components.

The manufacturer attempts to ensure, and the user expects, that equipment and components will survive the environments to which they will be subjected throughout their useful life. This expectation can be assessed by exposure of the specimen to a range of simulated environmental parameters controlled in the laboratory. The severity of the environmental parameters is often increased to obtain meaningful results in a relatively short period of time. This allows assessment of the likely effects of applied environmental conditions.

The combination of temperature, humidity and vibration occurs especially in the domains of automotive, rail and aerospace environments.

ENVIRONMENTAL TESTING –

Part 2-53: Tests and guidance – Combined climatic (temperature/humidity) and dynamic (vibration/shock) tests

1 Scope

This part of IEC 60068 provides a description of test methods and guidance for testing equipment or components under combined climatic and dynamic conditions.

The purpose of combined testing is to investigate to what extent the equipment or components are affected by combined climatic and dynamic tests.

The method of combined tests detects electrical, mechanical or other physical variations.

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, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

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

IEC 60068-2-14, *Environmental testing – Part 2-14: Test – Test N: Change of temperature*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-30, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

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

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60068-2-80, *Environmental testing – Part 2-80: Tests – Test Fi: Vibration – Mixed mode*

3 Testing

3.1 General

All parameters such as temperatures, cold, dry heat, temperature change, type of vibration, exposure time to temperature, exposure time to vibration, number of shocks, repetition time of

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