

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 60068-2-53:2010 sisaldab Euroopa standardi EN 60068-2-53:2010 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 31.08.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 14.05.2010.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 60068-2-53:2010 consists of the English text of the European standard EN 60068-2-53:2010.

This standard is ratified with the order of Estonian Centre for Standardisation dated 31.08.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.

Date of Availability of the European standard text 14.05.2010.

The standard is available from Estonian standardisation organisation.

ICS 19.040

Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

Right to reproduce and distribute Estonian Standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:
Aru str 10 Tallinn 10317 Estonia; www.evs.ee; Phone: +372 605 5050; E-mail: info@evs.ee

**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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

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 H: 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	-

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

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.

This document is a preview generated by EVS

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