# Environmental testing -- Part 2-14: Tests - Test N: Change of temperature

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

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|---|---|
| Käesolev Eesti standard EVS-EN 60068-2-14:2009 sisaldab Euroopa standardi EN 60068-2-14:2009 ingliskeelset teksti. | This Estonian standard EVS-EN 60068-2-14:2009 consists of the English text of the European standard EN 60068-2-14:2009. |
| Standard on kinnitatud Eesti Standardikeskuse 30.09.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas. | This standard is ratified with the order of Estonian Centre for Standardisation dated 30.09.2009 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 23.07.2009. | Date of Availability of the European standard text 23.07.2009. |
| Standard on kättesaadav Eesti standardiorganisatsioonist. | The standard is available from Estonian standardisation organisation. |



**ICS** 19.040

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 60068-2-14

July 2009

ICS 19.040

Supersedes EN 60068-2-14:1999 and EN 60068-2-33:1999

English version

# Environmental testing - Part 2-14: Tests - Test N: Change of temperature

(IEC 60068-2-14:2009)

Essais d'environnement - Partie 2-14: Essais - Essai N: Variation de température (CEI 60068-2-14:2009)

Umgebungseinflüsse - Teil 2-14: Prüfverfahren - Prüfung N: Temperaturwechsel (IEC 60068-2-14:2009)

This European Standard was approved by CENELEC on 2009-07-01. 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: Avenue Marnix 17, B - 1000 Brussels**



Ref. No. EN 60068-2-14:2009 E

## Foreword

The text of document 104/481/FDIS, future edition 6 of IEC 60068-2-14, 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 60068-2-14 on 2009-07-01.

This European Standard supersedes EN 60068-2-14:1999 and EN 60068-2-33:1999.

The major changes with regard to EN 60068-2-14:1999 concern:

– merging of EN 60068-2-14:1999 and EN 60068-2-33:1999: *Guidance on change of temperature tests*;

– updating of the figures, changes to some of the wording and editorial corrections made for clarification.

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) | 2010-04-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2012-07-01 |

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 60068-2-14:2009 was approved by CENELEC as a European Standard without any modification.

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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 | Series | Environmental testing | EN 60068 | Series |
| IEC 60068-2-1 | -[1)] | Environmental testing - Part 2-1: Tests - Test A: Cold | EN 60068-2-1 | 2007[2)] |
| IEC 60068-2-2 | -[1)] | Environmental testing - Part 2-2: Tests - Test B: Dry heat | EN 60068-2-2 | 2007[2)] |
| IEC 60068-2-17 | -[1)] | Environmental testing - Part 2-17: Tests - Test Q: Sealing | EN 60068-2-17 | 1994[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

A change of temperature test is intended to determine the effect on the specimen of a change of temperature or a succession of changes of temperature.

It is not intended to show effects which are due only to high or low temperatures. For these effects, the dry heat test or the cold test should be used.

The effect of such tests is determined by

– values of high and low conditioning temperature between which the change is to be effected,
– the conditioning times for which the test specimen is kept at these temperatures,
– the rate of change between these temperatures,
– the number of cycles of conditioning,
– the amount of heat transfer into or from the specimen.

Guidance on the choice of suitable test parameters for inclusion in the detail specification is given throughout this standard.

# ENVIRONMENTAL TESTING –

# Part 2-14: Tests – Test N: Change of temperature



## 1 Scope

This part of IEC 60068 provides a test to determine the ability of components, equipment or other articles to withstand rapid changes of ambient temperature. The exposure times adequate to accomplish this will depend upon the nature of the specimen.

## 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 (all parts), *Environmental testing*

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 60068-2-17, *Environmental testing – Part 2-17: Tests – Test Q: Sealing*

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

## 3 Field conditions of changing temperature

It is common in electronic equipment and components that changes of temperature occur. Parts inside equipment undergo slower changes of temperature than those on an external surface when the equipment is not switched on.

Rapid changes of temperature may be expected

– when equipment is transported from warm indoor environments into cold open air conditions or vice versa,
– when equipment is suddenly cooled by rainfall or immersion in cold water,
– in externally mounted airborne equipment,
– under certain conditions of transportation and storage.

Components will undergo stresses due to changing temperature when high temperature gradients build up in an equipment after being switched on, e.g. in the neighbourhood of high wattage resistors, radiation can cause rise of surface temperature in neighbouring components while other portions are still cool.

Artificially cooled components may be subjected to rapid temperature changes when the cooling system is switched on. Rapid changes of temperature in components may also be induced during manufacturing processes of equipment. Both the number and amplitude of temperature changes and the time interval between them are important.