Irish Standard
I.S. EN 60068-2-14:2009

Environmental testing -- Part 2-14: Tests - Test N: Change of temperature (IEC 60068-2-14:2009 (EQV))

I.S. EN 60068-2-14:2009

Incorporating amendments/corrigenda issued since publication:

This document replaces:	*This document is based on:*	*Published:*
EN 60068-2-14:1999 + EN 60068-2 -33:1999	EN 60068-2-14:2009	23 July, 2009

This document was published under the authority of the NSAI and comes into effect on:

15 January, 2010

ICS number:
19.040

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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.

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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.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ENVIRONMENTAL TESTING –

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

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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International Standard IEC 60068-2-14 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This sixth edition cancels and replaces the fifth edition, published in 1984, and its amendment 1 (1986) and constitutes a technical revision.

The major changes with regard to the previous edition concern:

- merging of the previous version of IEC 60068-2-14 with IEC 60068-2-33: *Guidance on change of temperature tests*;
- updating of the figures, changes to some of the wording and editorial corrections made for clarification.

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

FDIS	Report on voting
104/481/FDIS	104/486/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.

It has the status of a basic safety publication in accordance with IEC Guide 104.

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 maintenance result 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

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.