



NSAI
Standards

Irish Standard
I.S. EN 60068-1:2014

Environmental testing -- Part 1: General and guidance

I.S. EN 60068-1:2014

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

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

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN 60068-1:2014

Published:

2014-03-21

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

2014-04-01

ICS number:

19.040

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

EN 60068-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2014

ICS 19.040

Supersedes EN 60068-1:1994

English version

**Environmental testing -
Part 1: General and guidance
(IEC 60068-1:2013)**

Essais d'environnement -
Partie 1: Généralités et lignes directrices
(CEI 60068-1:2013)

Umgebungseinflüsse -
Teil 1: Allgemeines und Leitfaden
(IEC 60068-1:2013)

This European Standard was approved by CENELEC on 2013-11-11. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 104/618/FDIS, future edition 7 of IEC 60068-1, prepared by IEC/TC 104 "Environmental conditions, classification and methods of test" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60068-1:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-09-21
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-11-11

This document supersedes EN 60068-1:1994.

EN 60068-1:2014 includes the following significant technical changes with respect to EN 60068-1:1994:

- updated normative reference list;
- indication of normative and informative annexes;
- new informative Annex C, *Environmental test tailoring*.

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

Endorsement notice

The text of the International Standard IEC 60068-1:2013 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 60068-2-14	NOTE	Harmonized as EN 60068-2-14.
IEC 60068-2-20	NOTE	Harmonized as EN 60068-2-20.
IEC 60068-2-27	NOTE	Harmonized as EN 60068-2-27.
IEC 60068-2-38	NOTE	Harmonized as EN 60068-2-38.
IEC 60068-3-1	NOTE	Harmonized as EN 60068-3-1.
IEC 60529	NOTE	Harmonized as EN 60529.
IEC 60721	NOTE	Harmonized in EN 60721 series (not modified).

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 60068-2	series	Environmental testing Part 2: Tests	EN 60068-2	series

This page is intentionally left blank



IEC 60068-1

Edition 7.0 2013-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

**Essais d'environnement –
Partie 1: Généralités et lignes directrices**





THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2013 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.
If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

Useful links:

IEC publications search - www.iec.ch/searchpub

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,...).

It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Liens utiles:

Recherche de publications CEI - www.iec.ch/searchpub

La recherche avancée vous permet de trouver des publications CEI en utilisant différents critères (numéro de référence, texte, comité d'études,...).

Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

Just Published CEI - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications de la CEI. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (VEI) en ligne.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.



IEC 60068-1

Edition 7.0 2013-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

**Essais d'environnement –
Partie 1: Généralités et lignes directrices**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX



ICS 19.040

ISBN 978-2-8322-1110-6

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	7
2 Normative references	8
3 Terms and definitions	8
4 Standard atmospheric conditions	11
4.1 Standard reference atmosphere	11
4.2 Standard atmospheres for referee measurements and tests	12
4.3 Standard atmospheric conditions for measurements and tests.....	12
4.4 Recovery conditions	13
4.4.1 General	13
4.4.2 Controlled recovery conditions.....	13
4.4.3 Recovery procedure	14
4.5 Standard conditions for assisted drying	14
5 Use of test methods.....	14
6 Climatic sequence	14
7 Component climatic category.....	15
8 Application of tests	15
9 Significance of the numerical value of a quantity	15
9.1 General	15
9.2 Quantity expressed as nominal value with tolerance.....	15
9.3 Quantity expressed as a range of values	16
Annex A (normative) Component climatic category	18
Annex B (informative) General guidance	19
Annex C (informative) Environmental test tailoring.....	25
Bibliography.....	31
Figure C.1 – Environmental test tailoring process	26
Table 1 – Standard atmospheres for referee measurements and tests	12
Table 2 – Standard atmospheres for measurements and tests	13
Table 3 – Standard conditions for assisted drying	14
Table B.1 – Choice of tests as a function of objectives and applications	21
Table B.2 – General sequence of tests	23
Table B.3 – Principal effects of single environmental parameters.....	24
Table C.1 – Test tailoring process with information flow and the corresponding activities	27

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ENVIRONMENTAL TESTING –

Part 1: General and guidance

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 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 60068-1 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This seventh edition cancels and replaces the sixth edition, published in 1988, and constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

- updated normative reference list;
- indication of normative and informative annexes;
- new informative Annex C, *Environmental test tailoring*.

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

FDIS	Report on voting
104/618/FDIS	104/627/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, published under the general title *Environmental testing*, can be found on the IEC website.

This standard should be used in conjunction with the relevant specification which will define the tests to be used, the required degree of severity for each of them, their order (if relevant), and the permissible performance limits.

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

The IEC 60068 series contains fundamental information on environmental testing procedures and severities of tests. In addition, this Part 1 contains information on atmospheric conditions for measurement and testing.

It is intended to be used in those cases where a relevant specification for a certain type of product (electrical, electromechanical or electronic equipment and devices, their subassemblies and constituent parts and components), hereinafter referred to as the “specimen”, is to be prepared, so as to achieve uniformity and reproducibility in the environmental testing of this product.

NOTE 1 Although primarily intended for electrotechnical products, many of the environmental testing procedures in Part 2 of this series are equally applicable to other industrial products.

The expression “environmental conditioning” or “environmental testing” covers the natural and artificial environments to which specimens may be subjected and exposed to in practice so that an assessment can be made of their performance under conditions of storage, transportation, installation and use.

The requirements for the performance of specimens subjected to environmental conditioning are not covered by this standard. The relevant specification for the specimen under test defines the allowed performance limits during and after environmental testing.

When drafting a relevant specification or purchasing contract, only those tests should be specified that are necessary for the relevant specimen, taking into account the technical and economic aspects.

The IEC 60068 series consists of:

- a) this first part, IEC 60068-1 – *General and guidance*, which deals with generalities;
- b) the second part, IEC 60068-2 – *Tests* – which publishes particular tests separately for different applications;
- c) the third part, IEC 60068-3 – *Supporting documentation and guidance*, which deals with background information on a family of tests.

The families of tests comprising Part 2 of the IEC 60068 series are designated by the following upper-case letters:

- A: Cold
- B: Dry heat
- C: Damp heat (steady-state)
- D: Damp heat (cyclic)
- E: Impact (for example shock and rough handling shocks)
- F: Vibration
- G: Acceleration (steady state)
- H: (Awaiting allocation)

NOTE 2 Originally allotted to storage tests.

- J: Mould growth
- K: Corrosive atmospheres (for example salt mist)
- L: Dust and sand
- M: Air pressure (high or low)
- N: Change of temperature

P: (Awaiting allocation)

NOTE 3 Originally allotted to “flammability”.

Q: Sealing (including panel sealing, container sealing and protection against ingress and leakage of fluid)

R: Water (for example rain, dripping water)

S: Radiation (for example solar, but excluding electromagnetic)

T: Soldering (including resistance to heat from soldering)

U: Robustness of terminations (of components)

V: (Awaiting allocation)

NOTE 4 Originally allocated to “acoustic noise” but “vibration, acoustically induced” will now be Test Fg, one of the “vibration” family of tests.

W: (Awaiting allocation)

Y: (Awaiting allocation)

The letter X is used as a prefix together with a second lower-case letter providing for extension of the list of families of tests, e.g. Test Xa: Immersion in cleaning solvents. The letter Z is used to denote combined tests and composite tests as follows: Z is followed by a solidus (slash) and a group of lower-case letters relating to the combined or composite stresses, for example Test Z/am: Combined cold and low air pressure tests.

If appropriate, a test may be designated as “primarily intended for components” or “primarily intended for equipment”.

To provide for future expansion within a family of tests and to maintain consistency of presentation, each family of tests may be subdivided. The subdivisions are identified by the addition of a (lower-case) second letter, for example:

U: Robustness of terminations and integral mounting devices

Test Ua: Subdivided as Test Ua₁: Tensile; and Test Ua₂: Thrust

Test Ub: Bending

Test Uc: Torsion

Test Ud: Torque

This subdivision is made even though only one test is published and no further tests are immediately contemplated in the relevant family.

In order to avoid confusion with numbers, the letters i, l, o and O are not used.

ENVIRONMENTAL TESTING –

Part 1: General and guidance

1 Scope

The IEC 60068 series includes a series of methods for environmental testing along with their appropriate severities, and prescribes various atmospheric conditions for measurements and tests designed to assess the ability of specimens to perform under expected conditions of transportation, storage and all aspects of operational use.

Although primarily intended for electrotechnical products, this standard is not restricted to them and may be used in other fields where desired.

Other methods of environmental testing, specific to the individual types of specimen, may be included in the relevant specifications.

The framework of environmental test tailoring process is given in order to assist the production of test specifications with appropriate tests and test severities.

The IEC 60068 series provides a series of uniform and reproducible environmental, climatic, dynamic and combined tests, performed and measured under standard atmospheric conditions, for those preparing specifications and those engaged in the testing of products.

These test methods are based upon available international engineering experience and judgement and are primarily designed to provide information on the following properties of specimens:

- a) the ability to operate within specified limits of temperature, pressure, humidity, mechanical stress or other environmental conditions and combinations of these conditions;
- b) the ability to withstand conditions of transportation, storage and installation.

NOTE 1 The IEC 60721 series provides a system for classification of environmental conditions and gives relevant definitions.

The tests in this standard permit the comparison of the performance of sample products. To assess the quality or useful life of a given production lot, the test methods should be applied in accordance with a suitable sampling plan and may be supplemented by appropriate additional tests, if necessary.

NOTE 2 ISO defines "quality" as the degree to which a set of inherent characteristics fulfils requirements..

NOTE 3 "Useful life": under given conditions, the time interval beginning, at a given instant of time, and ending when the failure intensity becomes unacceptable or when the item is considered unrepairable as a result of a fault.

To provide tests appropriate to the different intensities of an environmental condition, some of the test procedures have a number of degrees of severity. These different degrees of severity are obtained by varying the time, temperature, air pressure or some other determining factor, separately or in combination.

As the tests and their degrees of severity should be based on real environmental conditions that a particular specimen might encounter, the framework and the necessary phases for the environmental test tailoring process are provided. The test tailoring process may be used to produce the required relevant test specification for the particular specimen.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-