

## **Environmental testing -- Part 2-1: Tests - Test A: Cold**

Environmental testing -- Part 2-1: Tests - Test A:  
Cold

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 60068-2-1:2007 sisaldab Euroopa standardi EN 60068-2-1:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 19.06.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 60068-2-1:2007 consists of the English text of the European standard EN 60068-2-1:2007.</p> <p>This document is endorsed on 19.06.2007 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b> This part of IEC 60068 deals with cold tests applicable to both non heat-dissipating and heatdissipating specimens. For non heat-dissipating specimens, Tests Ab and Ad do not deviate essentially from earlier issues. Test Ae has been added primarily for testing equipment that requires being operational throughout the test, including the conditioning periods. The object of the cold test is limited to the determination of the ability of components, equipment or other articles to be used, transported or stored at low temperature. Cold tests cover by this standard do not enable the ability of specimens to withstand or operate during the temperature variations to be assessed. In this case, it would be necessary to use IEC 60068-2-14.</p>	<p><b>Scope:</b> This part of IEC 60068 deals with cold tests applicable to both non heat-dissipating and heatdissipating specimens. For non heat-dissipating specimens, Tests Ab and Ad do not deviate essentially from earlier issues. Test Ae has been added primarily for testing equipment that requires being operational throughout the test, including the conditioning periods. The object of the cold test is limited to the determination of the ability of components, equipment or other articles to be used, transported or stored at low temperature. Cold tests cover by this standard do not enable the ability of specimens to withstand or operate during the temperature variations to be assessed. In this case, it would be necessary to use IEC 60068-2-14.</p>
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**ICS** 19.040

**Võtmesõnad:** climatic test, cold test, component, components specifications writing, electricity, equipment, equipment specifications writing, procedures

English version

**Environmental testing -  
Part 2-1: Tests -  
Test A: Cold  
(IEC 60068-2-1:2007)**

Essais d'environnement -  
Partie 2-1: Essais -  
Essai A: Froid  
(CEI 60068-2-1:2007)

Umgebungseinflüsse -  
Teil 2-1: Prüfverfahren -  
Prüfung A: Kälte  
(IEC 60068-2-1:2007)

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

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

The text of document 104/407/FDIS, future edition 6 of IEC 60068-2-1, 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 60068-2-1 on 2007-04-01.

This European Standard supersedes EN 60068-2-1:1993 + A1:1993 + A2:1994.

EN 60068-2-1:2007 deals with cold tests applicable both to non heat-dissipating and heat-dissipating specimens. For non heat-dissipating specimens, Tests Ab and Ad do not deviate essentially from earlier issues. Test Ae has been added primarily for testing equipment that requires being operational throughout the test including the conditioning periods.

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) 2008-01-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2010-04-01

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 60068-2-1:2007 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-1	1988	Environmental testing - Part 1: General and guidance	EN 60068-1 <sup>1)</sup>	1994
IEC 60068-2-14	- <sup>2)</sup>	Environmental testing - Part 2: Tests - Test N: Change of temperature	EN 60068-2-14	1999 <sup>3)</sup>
IEC 60068-3-1	- <sup>2)</sup>	Environmental testing - Part 3: Background information - Section 1: Cold and dry heat tests	EN 60068-3-1	1999 <sup>3)</sup>
IEC 60068-3-5	- <sup>2)</sup>	Environmental testing - Part 3-5: Supporting documentation and guidance - Confirmation of the performance of temperature chambers	EN 60068-3-5	2002 <sup>3)</sup>
IEC 60068-3-7	- <sup>2)</sup>	Environmental testing - Part 3-7: Supporting documentation and guidance - Measurements in temperature chambers for tests A and B (with load)	EN 60068-3-7	2002 <sup>3)</sup>
IEC 60068-5-2	- <sup>2)</sup>	Environmental testing - Part 5: Guide to drafting of test methods - Terms and definitions	EN 60068-5-2	1999 <sup>3)</sup>
IEC 60721	Series	Classification of environmental conditions	EN 60721	Series

<sup>1)</sup> EN 60068-1 is based on IEC 60068-1:1988 + corr. October 1988 and A1:1992.

<sup>2)</sup> Undated reference.

<sup>3)</sup> Valid edition at date of issue.

# INTERNATIONAL STANDARD

**IEC**  
**60068-2-1**

Sixth edition  
2007-03

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**Environmental testing –**

**Part 2-1:  
Tests – Test A: Cold**

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



Reference number  
IEC 60068-2-1:2007(E)

## Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

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# INTERNATIONAL STANDARD

**IEC**  
**60068-2-1**

Sixth edition  
2007-03

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## Environmental testing –

### Part 2-1: Tests – Test A: Cold

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Международная Электротехническая Комиссия

PRICE CODE

**N**

*For price, see current catalogue*



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ENVIRONMENTAL TESTING –****Part 2-1: Tests – Test A: Cold**

## FOREWORD

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International Standard IEC 60068-2-1 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This sixth edition cancels and replaces the fifth edition issued in 1990. It includes the revised text of the fifth edition, amendment 1 issued in 1993 and amendment 2 issued in 1994.

This sixth edition deals with cold tests applicable both to non heat-dissipating and heat-dissipating specimens. For non heat-dissipating specimens, Tests Ab and Ad do not deviate essentially from earlier issues. Test Ae has been added primary for testing equipment that requires being operational throughout the test including the conditioning periods.

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

FDIS	Report on voting
104/407/FDIS	104/410/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 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

**Relationship of suffixes between tests a: cold and tests b: dry heat**

The relationship of suffixes between Tests A: Cold, and Tests B: Dry heat, is shown in the following table:

Suffix letter	Tests A: Cold			Tests B: Dry heat		
	Specimen type	Temperature change	Air velocity	Specimen type	Temperature change	Air velocity
a	Withdrawn			Withdrawn		
b	Non heat	Gradual	High preferred	Non heat	Gradual	High preferred
c	Withdrawn			Withdrawn		
d	Heat dissipating	Gradual	Low preferred	Heat	Gradual	Low preferred
e	Heat dissipating, powered throughout	Gradual	Low preferred	Heat, powered throughout	Gradual	Low preferred

## ENVIRONMENTAL TESTING –

### Part 2-1: Tests – Test A: Cold

#### 1 Scope and object

This part of IEC 60068 deals with cold tests applicable to both non heat-dissipating and heat-dissipating specimens. For non heat-dissipating specimens, Tests Ab and Ad do not deviate essentially from earlier issues. Test Ae has been added primarily for testing equipment that requires being operational throughout the test, including the conditioning periods.

The object of the cold test is limited to the determination of the ability of components, equipment or other articles to be used, transported or stored at low temperature.

Cold tests cover by this standard do not enable the ability of specimens to withstand or operate during the temperature variations to be assessed. In this case, it would be necessary to use IEC 60068-2-14.

The cold tests are subdivided as follows:

- *Cold tests for non heat-dissipating specimens*
  - with gradual change of temperature, Ab;
- *Cold test for heat-dissipating specimens*
  - with gradual change of temperature, Ad,
  - with gradual change of temperature, specimen powered throughout, Ae.

The procedures given in this standard are normally intended for specimens that achieve temperature stability during the performance of the test procedure.

Temperature chamber(s) are constructed and verified in accordance with specifications IEC 60068-3-5 and IEC 60068-3-7.

Further guidance for dry heat and cold tests can be found in IEC 60068-3-1 and general guidance in IEC 60068-1.

#### 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 60068-1:1988, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-14, *Basic environmental test procedures – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-3-1, *Environmental testing – Part 3: Background information – Section one: Cold and dry heat tests*

IEC 60068-3-5, *Environmental testing – Part 3-5: Supporting documentation and guidance – Confirmation of the performance of temperature chambers*

IEC 60068-3-7, *Environmental testing – Part 3-7: Supporting documentation and guidance – Measurements in temperature chambers for tests A and B (with load)*

IEC 60068-5-2, *Environmental testing – Part 5-2: Guide to drafting of test methods – Terms and definitions*

IEC 60721 (all parts), *Classification of environmental conditions*

### **3 Terms and definitions**

For the purposes of this document, the definitions given in IEC 60068-5-2, as well as the following definitions, apply.

#### **3.1**

##### **low air velocity in the working space**

velocity of conditioning airflow within a working space which is sufficient to maintain conditions but low enough so that the temperature at any point on the test specimen is not reduced by more than 5 K by the influence of the circulation of the air (if possible, not more than 0,5 m/s)

#### **3.2**

##### **high air velocity in the working space**

velocity of conditioning airflow within a working space, which in order to maintain conditions, also reduces the temperature at any point on the test specimen by more than 5 K by the influence of the circulation of the air

### **4 Application of tests for non heat-dissipating specimens versus tests for heat-dissipating specimens**

#### **4.1 General**

A specimen is considered to be heat-dissipating only if the hottest point on its surface, measured in free air conditions (i.e. with low air velocity circulation), is more than 5 K above the ambient temperature of the surrounding atmosphere after temperature stability has been reached (see 4.8 of IEC 60068-1). When the relevant specification calls for a storage or transportation test, or does not specify an applied load during the test, the Cold Test Ab will apply.

#### **4.2 Ascertaining high or low air velocity in the test chamber**

Under standard atmospheric conditions for measurements and test (see IEC 60068-1) with an air velocity <0,2 m/s achieved without induced air movement, the specimen shall be switched on or electrically loaded as specified for the low temperature at which the test is to be carried out.

When temperature stability of the specimen has been reached, the temperature of a number of representative points around or on the specimen shall be measured using a suitable monitoring device. The temperature rise that occurs at each point shall then be noted.