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PUBLICATION FONDAMENTALE DE SÉCURITÉ

Environmental testing – Part 2-2: Tests – Test B: Dry heat

Essais d'environnement – Partie 2-2: Essais – Essai B: Chaleur sèche

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ENVIRONMENTAL TESTING –

Part 2-2: Tests – Test B: Dry heat

FOREWORD

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

This fifth edition of IEC 60068-2-2 cancels and replaces the fourth edition issued in 1974. It includes the revised text of the fourth edition, amendment 1 issued in 1993 and amendment 2 issued in 1994.

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

The main changes from the previous edition are as follows: Tests Ba and Bc have been deleted since they were more severe tests than Test Nb, IEC 60068-2-14: Change of temperature. Secondly it was considered justified to delete the 3 % value on the temperature difference between the chamber air and the wall temperatures. Thirdly it is proposed that the test specimen be powered throughout the test where required; and, finally, the annexes have been removed.

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

FDIS	Report on voting
104/412/FDIS	104/430/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 standard has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts of 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

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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:

	Tests A: Cold			Tests B: Dry heat		
Suffix letter	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a	Withdrawn			Withdrawn		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

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ENVIRONMENTAL TESTING –

Part 2-2: Tests – Test B: Dry heat

1 Scope

This standard deals with dry heat tests applicable both to heat-dissipating and non heat-dissipating specimens. For non heat-dissipating specimens, Tests Bb and Bd do not deviate essentially from earlier issues.

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

These dry heat tests 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 Test N: Change of temperature.

The dry heat tests are subdivided as follows:

Dry heat test for non heat-dissipating specimens

– with gradual change of temperature, Bb.

Dry heat tests for heat-dissipating specimens

– with gradual change of temperature, Bd;
– with gradual change of temperature, specimen powered throughout, Be.

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

2 Normative references

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

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*

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3 Terms and definitions

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

3.1
low air velocity in the working space
the 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
the 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

The temperature chamber(s) shall be constructed and verified in accordance with specifications IEC 60068-3-5 and IEC 60068-3-7.

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

A specimen is considered heat-dissipating only if the hottest point on its surface, measured in free air conditions (i.e. 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 Dry Heat Test Bb 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, the specimen shall be switched on or electrically loaded as specified for the high 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.

The chamber air flow is switched on and, once temperature stability has been achieved, the temperature of the representative points shall again be measured. If the temperatures differ from those measured without air flow by more than 5 K (or a value stated by the relevant specification) this value shall be noted in the test report and the test chamber is considered to have high velocity circulation. The specimen is then switched off and any loading conditions removed.

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4.3 Application of tests with sudden change of temperature versus tests with gradual change of temperature

In Tests Bb, Bd and Be with gradual change of temperature, the specimen is introduced into the test chamber, the latter being at the laboratory temperature. The temperature in the chamber is then increased gradually so as to cause no detrimental effects on the test specimen due to the temperature change.

4.4 Testing of heat-dissipating specimens

Tests Bd and Be describe procedures for testing heat-dissipating specimens with low air velocity circulation. This is to allow localised hot spots to develop within the specimen similar to those that would appear in installed applications.

4.5 Temperature monitoring

The air temperature in the chamber shall be measured by temperature sensors located at such a distance from the specimen that the effect of the dissipation is negligible. Suitable precautions should be taken to avoid heat radiation affecting these measurements. For more information see IEC 60068-3-5.

4.6 Packaging

For storage and transportation tests, equipment may be tested with its packaging in place. However, as these tests are steady state tests the equipment will eventually stabilise at chamber's temperature. Packaging shall be removed unless the relevant specification requires it to remain in place or heating elements are incorporated in the package.

4.7 Diagrammatic representations

To facilitate the choice of test method, a diagrammatic representation of the various procedures is given in Figure 1.

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