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Title: BS EN 60068-2-1 Environmental testing

Part 2-1: Tests - Test A: Cold

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



104/1020/CD

COMMITTEE DRAFT (CD)

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SUPERSEDES DOCUMENTS:
104/967/RR

IEC TC 104 : ENVIRONMENTAL CONDITIONS, CLASSIFICATION AND METHODS OF TEST	
SECRETARIAT: Sweden	SECRETARY: Mr Henrik Lagerström
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY	

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

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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 seventh edition cancels and replaces the sixth edition published in 2008.

The major changes with regard to the previous edition concern:

- a) Revision of the introduction and scope;
- b) Including new figures and symbols for clarification purposes;
- c) Clarification of the test procedure for ascertaining high or low air velocity in the test chamber;
- d) Clarification of the requirements for measuring points around, on or in specimens;
- e) Reintroducing the nomogram procedure for the correction of the conditioning temperature when testing with high air velocity (Test Ad and Test Ae);
- f) Revision of the temperature tolerances of the test;
- g) Revision of standardized requirements for the relevant specification and test report;
- h) Including the advantages and disadvantages of the testing procedures

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

FDIS	Report on voting

144

145 Full information on the voting for the approval of this standard can be found in the report on
146 voting indicated in the above table.

147 This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

148 A list of all the parts in the IEC 60068 series, under the general title *Environmental testing*, can
149 be found on the IEC website.

150 The committee has decided that the contents of this publication will remain unchanged until the
151 maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data
152 related to the specific publication. At this date, the publication will be

- 153 • reconfirmed,
154 • withdrawn,
155 • replaced by a revised edition, or
156 • amended.

157

158

INTRODUCTION

159 The working ranges and performance of equipment and machinery can be significantly affected
160 or limited by ambient temperatures. The degree of this influence may depend on temperature
161 distributions of the environment as well as temperatures on components of the device itself. In
162 order to determine the existing degree of influence and to ensure that the device is suitably
163 designed for its ambient conditions, tests are carried out with cold and/or dry heat (IEC 60068-
164 2-2). During the test, it is to be taken into account whether the tested device itself emits heat
165 or not.

166 Reducing the air flow within the test chamber may be required to reduce the air velocity at heat-
167 dissipating specimens. This can be achieved by using air baffles or adjusting the air flow of the
168 test chamber. If the reduction of air velocity is not practical or possible due to the required test
169 conditions, this document provides an alternative test procedure without the need for adjustable
170 air flow as well as guidance on selecting the applicable test procedure.

171

ENVIRONMENTAL TESTING –

Part 2-1: Tests – Test A: Cold

1 Scope

This document specifies temperature tests at low temperatures, generally referred to as “cold tests”, that are applicable to non-heat-dissipating and heat-dissipating specimens, to determine the ability of components, equipment, or other articles to be used, transported or stored at low temperature.

This document is applicable to energized as well as not energized specimens, that normally achieve temperature stability during the test. The specimens can be packed or unpacked during the test.

This document does not specify tests to determine the impact of temperature changes on specimens.

2 Normative references

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

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

3 Terms and definitions

For the purposes of this document, the definitions given in IEC 60068-1 and IEC 60068-5-2, as well as the following definitions, apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

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.

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 Symbols

T_A	low conditioning temperature
$T_{A'}$	corrected low conditioning temperature (nomogram procedure)
T_{STD}	temperature of standard atmospheric conditions for measurement and test (15 °C to 35 °C)
T_{Ca}	measured ambient temperature in the vicinity of the specimen, either in the test chamber or the laboratory air, without forced convection (see 5.2)
T_{Cb}	measured test chamber temperature with forced convection (see 5.2)
T_S	temperature of the energized specimen at the specified conditioning temperature
T_{Sa}	temperature of the energized specimen at the temperature of standard atmospheric conditions without forced convection (see 5.2)
T_{Sb}	temperature of the energized specimen at the temperature of standard atmospheric conditions with forced convection (see 5.2)
ΔT_S	temperature difference between the energized specimen and the air
$\Delta T_{Sa/b}$	temperature difference between the energized specimen without forced convection (T_{Sa}) and with forced convection (T_{Sb}) at the temperature of standard atmospheric conditions
dT_R	temperature change rate
t_s	stabilization time of specimen temperature after exposure to the low conditioning temperature
t_{s0}	stabilization time of specimen temperature after energizing
t_1	exposure time of the specimen to the low conditioning temperature

5 Application of tests for non-heat-dissipating specimens versus tests for heat-dissipating specimens

5.1 General

A specimen is considered to be heat-dissipating only if the hottest point on its surface or any other relevant point, 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 3.11 of IEC 60068-1).

NOTE 1 In some cases, for example for test specimens with air-permeable housings, the relevant measuring points can be located inside the external housing.

Tests of heat-dissipating and non-heat-dissipating specimens generally differ in the air velocity applied. Non-heat-dissipating specimens are typically tested at high air velocity to reduce the time required to reach temperature stability. Heat-dissipating specimens are generally tested at low air velocity to allow for the formation of local hotspots similar to those that would appear in installed applications. Annex A gives an overview of the relevant test conditions and shows the relationship of suffixes between Test A: Cold and Test B: Dry heat.

Testing with low air velocity may not apply to heat-dissipating specimens with an external housing and built-in fan, provided that the representative measuring point is located at a point inside the external housing which is not affected by external air movement. It should be ensured that the induced air movement does not interfere with the operation of the built-in fan, if not specified otherwise.

NOTE 2 The induced air movement can have an influence on the operation of a built-in fan if both air movements act either in the same or opposite direction.