IEC 60068-2-78

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

BASIC SAFETY PUBLICATION

PUBLICATION FONDAMENTALE DE SÉCURITÉ

Environmental testing –
Part 2-78: Tests – Test Cab: Damp heat, steady state

Essais d'environnement –
Partie 2-78: Essais – Essai Cab: Chaleur humide, essai continu

IEC 60068-2-78:2012

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FOREWORD

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International Standard IEC 60068-2-78 has been prepared by technical committee 104: Environmental conditions, classification, and methods of test.

This second edition cancels and replaced the first edition, published in 2001 and constitutes a technical revision.

This edition includes editorial and format changes with respect to the previous edition:

– The test chamber from IEC 60068-3-6 has been introduced.

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

FDIS	Report on voting
104/582/FDIS	104/588/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 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- withdrawn,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

This part of IEC 60068 provides a test method of high humidity at constant temperature without condensation on the specimen over a prescribed period. This test is performed to evaluate the specimen as it is influenced by the absorption and diffusion of moisture and moisture vapour.

ENVIRONMENTAL TESTING –

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1 Scope and object

This part of IEC 60068 establishes a test method for determining the ability of components or equipment to withstand transportation, storage and use under conditions of high humidity.

The object of this standard is to investigate the effect of high humidity at constant temperature without condensation on a specimen over a prescribed period.

It is applicable to small equipment or components as well as large equipment, and can be applied to both heat-dissipating and non-heat-dissipating specimens.

2 Normative references

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.

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

IEC 60068-3-6, *Environmental testing – Part 3-6: Supporting documentation and guidance – Confirmation of the performance of temperature and humidity chambers*

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

3 Terms and definitions

None.

4 General test procedure

4.1 Test chamber and measuring system

The temperature and humidity chamber shall be constructed and verified in accordance with specifications IEC 60068-3-6.

The chamber and measuring system shall be such that

– sensing devices can be located in the working space to monitor the temperature and humidity,

NOTE For heat-dissipating specimens, the temperature and humidity near the specimen may be influenced by the effect of heat dissipation from the specimen.

– condensed water is drained from the chamber and not re-used unless purified,

– no condensed water from the walls and roof of the test chamber can fall on the specimen(s),

– water utilized to maintain humidity levels has electrical conductivity of not more than 20 µS/cm,
– the specimen under test shall not be subjected to radiant heat from the chamber conditioning devices,
– injected moisture, when applicable, is injected remotely from the specimen and without being directly on it,
– the volume of the test chamber is at least five times the total volume of the specimen under test,
– a mounting device, when used, has minimum influence on the heat and humidity exchanges between specimen and surrounding conditions, unless otherwise specified in the relevant specification.

4.2 Severity

The test severity is defined by a combination of temperature, relative humidity (RH) and total test duration. Unless otherwise specified in the relevant specification, temperature and RH severities may be selected from the following:

Table 1 – Temperature and relative humidity

Temperature °C	**Relative humidity** % RH
30 ± 2	93 ± 3
30 ± 2	85 ± 3
40 ± 2	93 ± 3
40 ± 2	85 ± 3

Preferred test durations are: 12 h, 16 h, 24 h, 2 days, 4 days, 10 days, 21 days or 56 days.

The total temperature tolerance of ± 2 K is intended to take account of absolute errors in the measurement, slow changes of temperature and temperature variations of the working space. However, in order to maintain the RH within the required tolerances, it is necessary to keep the temperature difference between any two points in the working space at any moment within narrower limits. The required humidity conditions will not be achieved if such temperature differences exceed 1 K. It may also be necessary to keep short-term fluctuations within ± 0,5 K to maintain the required humidity.

4.3 Pre-conditioning

The relevant specification may call for pre-conditioning.

4.4 Testing procedure

The specimen shall be introduced into the chamber as required by the relevant specification. The specimen shall be introduced in the unpacked, switched-off, ready-for-use state, or as otherwise specified in the relevant specification.

In certain cases the relevant specification may allow the introduction of the specimen in the chamber when this is already in the condition prescribed for the test; however, condensation on the specimen shall always be avoided. This can be obtained for small specimens by pre-heating them to the chamber temperature.

Adjust the temperature in the chamber to the prescribed severity. In order to avoid condensation on the specimen, control the specimen temperature or allow the specimen to reach the temperature first and then adjust the humidity in the chamber to the prescribed severity.

Adjust the humidity to the prescribed severity within a period of time of not more than 2 h.

Expose the specimen to the test conditions and duration as specified in the relevant specification. The duration is measured from the time the specified conditions are achieved.

The relevant specification shall define the operating conditions and the period (or periods) in which they shall be carried out.

After conditioning at the prescribed severity and before the final measurement, the recovery procedure shall be followed.

4.5 Recovery procedure

The relevant specification shall prescribe the recovery method and duration. Recovery conditions are described in IEC 60068-1.

5 Measurements

5.1 Initial measurements

The specimen shall be visually inspected and electrically and mechanically checked, as required by the relevant specification.

5.2 Intermediate measurements

The relevant specification may call for measurements during the test procedure while the specimen is still in the chamber. If such measurements are required, the relevant specification shall define the measurements and the period (periods) at which they shall be carried out. For these measurements, the specimen shall not be removed from the chamber.

5.3 Final measurements

The specimen shall be visually inspected and electrically and mechanically checked, as required by the relevant specification.

6 Information to be given in the relevant specification

The following details shall be given as far as they are applicable:

a) preconditioning;
b) initial measurements;
c) details of mounting or supports;
d) state of specimen (unpowered, powered, packaged, unpackaged, etc.);
e) type of specimen – heat dissipating or non-heat dissipating;
f) test severities and tolerances
    1) temperature,
    2) relative humidity,
    3) duration;
g) intermediate measurements;
h) recovery conditions;
i) final measurements;
j) any deviation in procedure as agreed upon between customer and supplier.

7 Information to be given in the test report

As a minimum, the test report shall contain the following information. Items shown in parentheses are examples.

a)	Customer	(name and address)
b)	Test laboratory	(name and address and details of accreditation – if any)
c)	Test dates	(dates when test was run)
d)	Type of test	(Cab)
e)	Purpose of test	(development, qualification, etc.)
f)	Test standard, edition	(IEC 60068-2-78:edition used)
g)	Relevant laboratory test procedure	(code and object)
h)	Test specimen description	(drawing, photo, quantity, build status, etc.).
i)	Test chamber identity	(manufacturer, model number, unique identification, etc.)
j)	Performance of test apparatus	(set point temperature control, air flow, etc.)
k)	Uncertainties of measuring system	(uncertainties data)
l)	Calibration data	(last and next due date)
m)	Initial, intermediate and final measurements	(initial, intermediate and final measurements)
n)	Required severities	(from relevant specification)
o)	Actual test conditions	(measurement location, data, etc.)
p)	Performance of test specimens	(results of functional tests, etc.)
q)	Observations during testing and actions taken	(any pertinent observations)
r)	Summary of test	(test summary)
s)	Distribution	(distribution list)