

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



BASIC SAFETY PUBLICATION

PUBLICATION FONDAMENTALE DE SÉCURITÉ

**Environmental testing – Part 2-67: Tests – Test Cy: Damp heat, steady state, accelerated test primarily intended for components**

**Essais d'environnement – Partie 2-67: Essais – Essai Cy: Essai continu de chaleur humide, essai accéléré applicable en premier lieu aux composants**

<https://standards.iteh.ai/catalog/standards/iec/007f46a0-509c-4de6-97a9-8f84a0b904ba/iec-60068-2-67-1995>





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IEC 60068-2-67

Edition 1.1 2019-07  
CONSOLIDATED VERSION

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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 00.000

ISBN 978-2-8322-7140-7

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### ENVIRONMENTAL TESTING –

#### Part 2-67: Tests – Test Cy: Damp heat, steady state, accelerated test primarily intended for components

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**IEC 60068-2-67 edition 1.1 contains the first edition (1995-12) [documents 50B/360/FDIS and 50B/373/RVD] and its amendment 1 (2019-07) [documents 104/831/FDIS and 104/838/RVD].**

**In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.**

International Standard IEC 60068-2-67 has been prepared by subcommittee 50B: Climatic tests, of IEC technical committee 50: Environmental testing.

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

IEC 60068 consists of the following parts, under the general title: Environmental testing.

- Part 1: General and guidance
- Part 2: Tests
- Part 3: Background information
- Part 4: Information for specification writers – Test summaries
- Part 5: Guide to drafting of test methods

Annexes A and B are for information only.

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## ENVIRONMENTAL TESTING –

### Part 2-67: Tests – Test Cy: Damp heat, steady state, accelerated test primarily intended for components

#### 1 Scope

This International Standard provides a standard test procedure for the purpose of evaluating, in an accelerated manner, the resistance of small electrotechnical products, primarily non hermetically sealed components, to the deteriorative effect of damp heat.

The test is not intended to evaluate external effects such as corrosion and deformation.

#### 2 General description

In this test the specimen is subjected to very high levels of unsaturated damp heat for a relatively long period.

Electrical bias is usually applied.

The test provides a number of preferred durations at a relative humidity of 85 % and a temperature of 85 °C.

In the case of plastic encapsulated components degradation results from absorption of water-vapour by the plastic and penetration of moisture along terminals.

#### 3 Description of test apparatus

##### 3.1 The test chamber

[IEC 60068-2-67:1995](https://standards.iteh.ai/catalog/standards/iec/007f46a0-509c-4de6-97a9-8f84a0b904ba/iec-60068-2-67-1995)

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The chamber shall be so constructed that:

- a) it can produce the temperature and relative humidity given in table 1 for a minimum period of 2 000 h without interruption;
- b) it is capable of providing controlled conditions of temperature and relative humidity during testing, and the ramp-up to and ramp-down from specified test conditions;
- c) the temperature and humidity of the chamber can be monitored by means of sensing devices located in the working space and/or other areas giving the same results;
- d) any water shall be continuously drained from the working space and not re-used;
- e) condensed water is not allowed to fall on the specimen;
- f) the materials used in the construction shall not cause any significant corrosion of the specimen, or degradation of the quality of the humidifying water (see clause B.1).

The temperature tolerance of  $\pm 2$  °C is intended to take account of absolute errors in the measurement, fluctuations of the chamber temperature at any point and variations between any two points within the working space.

However, in order to maintain the relative humidity within the specified tolerance of  $\pm 5$  %, it is necessary to keep the difference between any two points in the working space (at any instant) within narrower limits.

The specified humidity tolerance will be exceeded if such temperature differences exceed 1,5 °C. It is also necessary to restrict the short-term temperature fluctuations due to cycling of the chamber heater to a similar value.

The specimen should not significantly impede the air flow.

Condensation shall not be allowed to form on the specimen at any time during the test.

### 3.2 The humidifying water

~~Distilled or deionised water shall be used. The water shall have a resistivity of not less than 0,5 MΩcm at 23 °C. The pH value shall be between 6,0 and 7,2 at 23 °C.~~

~~Before the water is placed in the humidifier, all internal parts of the chamber shall be cleaned. Guidance on cleaning is given in clause B.3.~~

~~The humidifier and/or test chamber shall be purged of all water after each test.~~

Distilled or deionised water shall be used. The water resistivity shall be between 2 000 Ωm to 500 Ωm corresponding to a conductivity between 5 µS/cm to 20 µS/cm at +23 °C. Before the water is placed in the humidifier or storage tank of the chamber, all internal parts of the chamber shall be cleaned. Guidance on cleaning is given in Clause B.3.

NOTE A conductivity lower than 5 µS/cm might harm the humidifier system. A conductivity higher than 20 µS/cm can cause limescale or other mineral deposits to form on parts of the humidifier system or specimen.

## 4 Severities

The test severity, defined by the duration, shall be defined in the relevant specification. Unless otherwise specified, one of the durations given in table 1 shall be used.

**Table 1 – Severities**

Temperature °C <sup>1)</sup>	Relative humidity % <sup>2)</sup>	Duration <sup>3) 4)</sup> h			
		I	II	III	IV
85	85	168	504	1 000	2 000
1) Tolerance for temperature:		± 2 °C in the chamber working space			
2) Tolerance for relative humidity:		± 5 %			
3) Tolerance for duration:		+5 0 %			
4) Definition of duration:		see 7.4.2			
NOTE – It is not recommended that a test should be restarted; however, if it is required to subject the specimen to a longer duration than 2 000 h then the test shall be recommenced in accordance with the requirements of clause 7. The test shall be recommenced within 96 h of the end of the ramp-down period of the previous test.					
During the interval between the tests the specimen shall be held under standard atmospheric conditions for measurement and tests, unless otherwise specified in the relevant specification.					

## 5 Preconditioning

The relevant specification may prescribe preconditioning.

## 6 Initial measurements

The specimen shall be submitted to the visual, dimensional and functional checks prescribed by the relevant specification.

## 7 Testing

7.1 With the chamber and specimen at the laboratory conditions of temperature, pressure and humidity, the specimen shall be installed in the working space in the chamber.

7.2 The specimen shall not be subjected to radiant heat from the heaters or the chamber wall.

If required by the relevant specification, a specific mounting structure shall be used. The heat conductivity and the thermal capacity of the mounting fixtures shall be sufficiently low so that for all practical purposes the specimen is thermally isolated.

Care shall be exercised in the choice of mounting structure and mounting fixture materials to minimize the effects of contamination and to minimize degradation due to corrosion and other mechanisms (see clause B.1).

7.3 If required by the relevant specification the specimen shall have a bias voltage applied during testing. Guidance on the application of bias is given in clause B.2.

The bias voltage (or bias voltage cycle) shall be applied to the specimen when the temperature and the relative humidity have reached the stable state and continue until the specimen is under recovery conditions.

### 7.4 Test cycle

7.4.1 The temperature and relative humidity of the chamber shall be raised to their appropriate values. During this period the temperature and the relative humidity shall not exceed the specified value. Condensed water is not allowed on the specimen at any time during the test cycle. Stabilization of temperature and humidity shall take place within 3 h.

7.4.2 The temperature and relative humidity shall be maintained within the prescribed limits for a duration as specified in the relevant specification. The duration shall commence as soon as the conditions have stabilized.

7.4.3 At the end of the specified duration, the chamber temperature and relative humidity shall be restored to standard atmospheric conditions for measurement and tests in not less than 1 h and not more than 4 h.

During this period, the temperature and the relative humidity shall not exceed the specified value. The bias shall be maintained during this period.

7.4.4 On completion of the cooling period the specimen shall be subjected to the recovery procedure.

## 8 Intermediate measurements

The relevant specification may require electrical and/or mechanical checks during testing.

If it is required to make intermediate measurements, the relevant specification shall define the measurements and period(s) during testing after which they shall be carried out. The measurements shall not cause any change to the test conditions.

Measurements preceded by recovery which would require removal of the specimen from the chamber are not permissible during testing.

## 9 Recovery

Upon completion of testing the specimen shall be allowed to recover. Unless otherwise specified in the relevant specification, recovery shall be not less than 2 h and not more than 24 h at standard atmospheric conditions for measurement and tests.

## 10 Final measurements

The specimen shall be submitted to the visual, dimensional, and functional checks prescribed by the relevant specification.

## 11 Information to be given in the relevant specification

When this test is included in a relevant specification, the following details shall be given, in so far as they are applicable. The relevant specification shall supply information as required in the clauses listed below, paying particular attention to the items marked with an asterisk (\*), as this information is always required.

	Clause/subclause
a) Test severity (duration)* .....	4
b) Atmospheric conditions between tests (if not standard).....	4
c) Preconditioning* .....	5
d) Initial measurements* .....	6
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