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INTERNATIONAL STANDARD

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Fibre optic interconnecting devices and passive components - Basic test and measurement procedures -
Part 2-21: Tests - Composite temperature/humidity cyclic test

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-21: Tests - composite temperature/humidity cyclic test

FOREWORD

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IEC 61300-2-21 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics. It is an International Standard.

This third edition cancels and replaces the second edition published in 2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) update of the terms and definitions and of the details to be specified and reported;

b) update of Figure 1 and Figure 2 according to IEC 60068-2-38.

The text of this International Standard is based on the following documents:

Draft	Report on voting
86B/5264/FDIS	86B/5299/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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A list of all the parts of IEC 61300 series, under the general title, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures,* can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

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1 Scope

This part of IEC 61300 defines the resistance of a fibre optic device or component to the deteriorative effects of high temperature, humidity and cold conditions.

It is intended to reveal defects in a device under test (DUT) caused by breathing as opposed to absorption of moisture. The test covers the effect of the freezing of trapped water in cracks and fissures as well as condensation. However, the degree of condensation will vary depending on the size and thermal mass of the DUT.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60068-2-38, *Environmental testing – Part 2-38: Tests – Test Z/AD: Composite temperature/humidity cyclic test*~~

IEC 61300-1, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 1: General and guidance*

IEC 61300-3-1, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-1: Examinations and measurements - Visual examination*

IEC 61300-3-3, *Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-3: Examinations and measurements - Active monitoring of changes in attenuation and return loss*

~~IEC 61300-3-4, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-4: Examinations and measurements – Attenuation*~~

IEC 61753 (all parts), *Fibre optic interconnecting devices and passive components - Performance standards*

IEC 62005 (all parts), *Fibre optic interconnecting devices and passive components - Reliability*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61300-1 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

4 General

This procedure is conducted in accordance with IEC 60068-2-38, test Z/AD. The DUT is placed in a humidity chamber and subjected to 10 temperature-humidity cycles, each of 24 h duration. During any five of the first nine cycles after exposure to the humidity subcycle, the DUT shall be subjected to cold.

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This test differs from other cyclic damp heat tests in that it derives its increased severity from:

a) a greater number of temperature variations leading to pumping actions in a given time;

b) a greater cyclic temperature range;

c) a higher rate of change of temperature;

d) the inclusion of a number of excursions to sub-zero temperature.

This type of test is particularly important for fibre optic devices or components made of a variety of different materials.

5 Apparatus

5.1 General

The exposure to ~~moisture~~ humidity, followed by cold, can either be performed in one chamber (see 5.4) or in two separate chambers (see 5.2 and 5.3).

5.2 Chamber for the exposure to ~~moisture~~ high temperature and humidity

The chamber for the exposure to ~~moisture~~ high temperature and humidity shall be so constructed that:

a) the temperature can be varied between 25 °C ± 2 °C and 65 °C ± 2 °C in a period between 1 h 30 min and 2 h 30 min for both rising and falling temperatures;

b) the relative humidity can be maintained at 93 % RH ± 3 % RH during the periods of constant or rising temperature and between 88 % RH ± 8 % RH during the falling temperature periods;

c) ~~Care shall be taken to ensure that~~ the conditions prevailing at any point in the working space are uniform and are as similar as possible to those prevailing in the immediate vicinity of ~~suitably located~~ temperature and humidity sensing devices;

d) the air in the chamber shall be continuously stirred at a rate necessary to maintain the specified conditions of temperature and humidity;

e) the DUT shall not be subjected to radiant heat from the chamber conditioning processes;

f) condensed water is continuously drained from the chamber and not used again until it has been repurified;

g) ~~Precautions shall be taken to ensure that~~ no condensed water from the walls and roof of the test chamber can fall on the DUT.

5.3 Chamber for exposure to cold

The chamber for exposure to cold shall be so constructed that:

a) the temperature can be maintained at –10 °C ± 2 °C for a period of 3 h;

b) ~~Care shall be taken to ensure that~~ the conditions prevailing at any point in the working space are uniform and are as similar as possible to those prevailing in the immediate vicinity of ~~suitably located~~ temperature sensing devices;

c) the air in the chamber shall be continuously stirred;

d) ~~Care shall be taken that~~ the thermal capacity of the DUT does not appreciably influence conditions within the chamber.

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5.4 Temperature and humidity chamber

5.4.1 General

The temperature and humidity chamber may be used for exposure to cold in which case it shall meet the requirements of 5.2 and in addition shall be so constructed that:

a) the temperature can be lowered from 25 °C ± 2 °C to –10 °C ± 2 °C in a period of not more than 30 min;

b) the DUT can be held at a temperature of –10 °C ± 2 °C for a period of 3 h;

c) the temperature can be raised from –10 °C ± 2 °C to 25 °C ± 2 °C in a period of not more than 90 min.

5.4.2 Optical ~~source and detector~~ measurement equipment

The optical source and detector ~~used to measure changes in~~ for monitoring the attenuation and return loss shall comply with those specified in ~~IEC 61300-3-4~~ IEC 61300-3-3.

6 Procedure

6.1 Preparation of ~~specimens~~ DUT

~~Prepare the specimen according to the manufacturer's instructions or as specified in the relevant specification. The specimen shall be terminated with a sufficient length of fibre cable to facilitate connection with the optical source and the detector.~~

The DUT shall be prepared in accordance with IEC 61300-1. The DUT shall be connected to the optical source and to the detector.

Clean the optical and mechanical parts of the DUT according to the manufacturer's instructions.

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6.2 Preconditioning

Unless otherwise specified in the relevant specification, the DUT, ~~switched off,~~ ready for-use-state, shall be subjected to 55 °C ± 2 °C with a relative humidity not exceeding 20 % RH for a period of 24 h prior to the conditioning (see Figure 1).

The DUT shall then be allowed to attain thermal stability at standard atmospheric conditions for testing or as otherwise specified in the relevant specification before the initial measurements are made.

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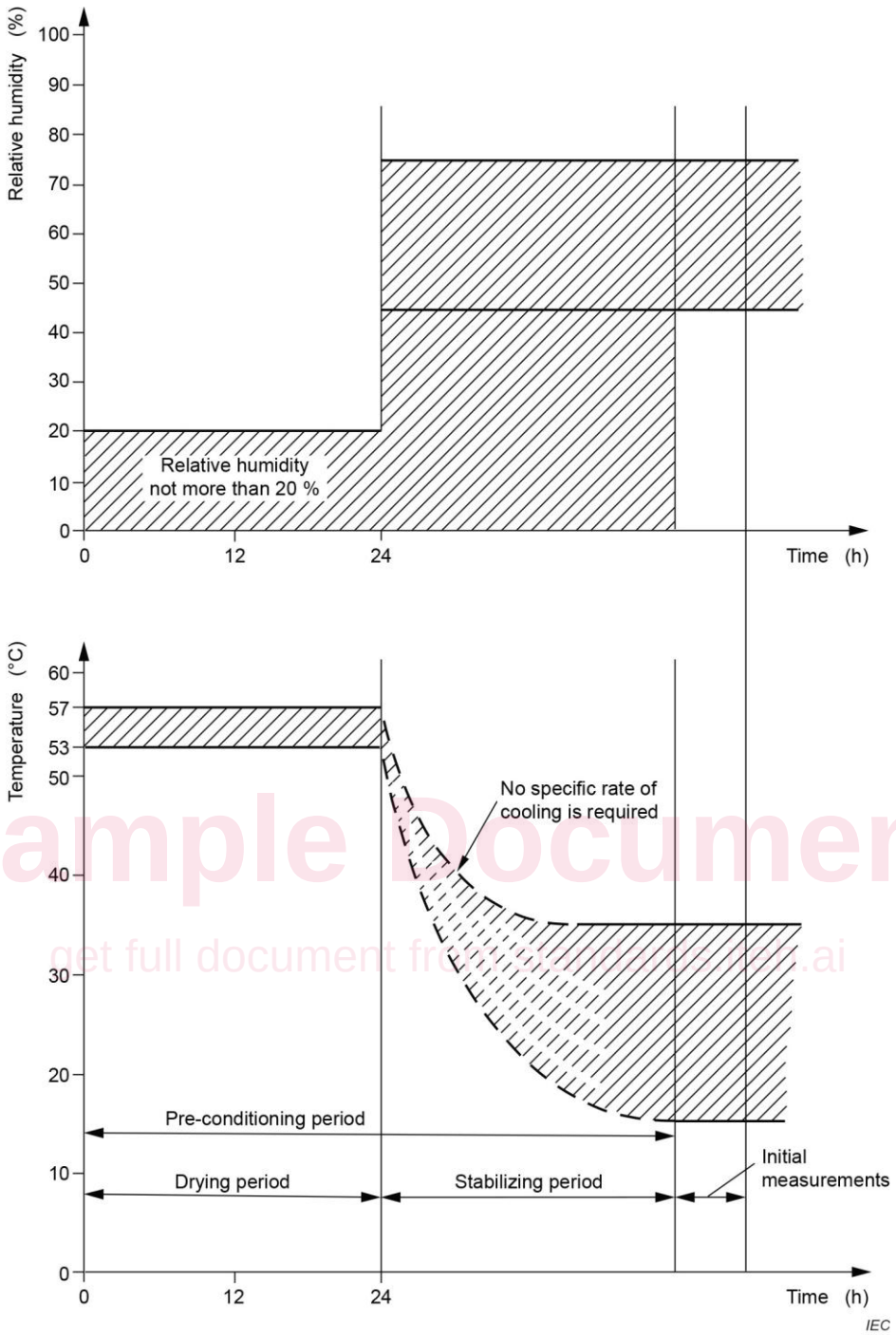


Figure 1 – Preconditioning

6.3 Initial examinations and measurements

~~The DUT shall be visually inspected and optically measured and mechanically checked as required by the relevant specification.~~

Initial examinations and measurements shall be performed in accordance with the relevant IEC 61753 performance standard or IEC 62005 reliability document. The initial visual examination shall be performed on the DUT in accordance with IEC 61300-3-1. The optical performance measurements shall be performed at the wavelength(s) specified in the relevant IEC 61753 performance standard or IEC 62005 reliability document.

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