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INTERNATIONAL STANDARD

colour inside

Fibre optic interconnecting devices and passive components – Basic test and measurement procedures –
Part 2-18: Tests – Dry heat ~~– High temperature endurance~~

IEC 61300-2-18:2023-01 RLV(en)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – BASIC TEST AND MEASUREMENT PROCEDURES –

Part 2-18: Tests – Dry heat ~~– High temperature endurance~~

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IEC 61300-2-18 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 2005. This edition constitutes a technical revision.

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

a) terms and definitions updated according to IEC 61753-1:2018;

b) test severities updated according to IEC 61753-1:2018;

c) simplification of the combination of temperature and exposure time.

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

Draft	Report on voting
86B/4679/FDIS	86B/4711/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/standardsdev/publications.

A list of all parts of the IEC 61300 series, published 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- withdrawn,
- replaced by a revised edition, or
- amended.

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FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – BASIC TEST AND MEASUREMENT PROCEDURES –

Part 2-18: Tests – Dry heat ~~–~~ ~~High temperature endurance~~

1 Scope

This part of IEC 61300 details a procedure to determine the suitability of a fibre optic interconnecting device, passive component, splices or closure to withstand the environmental condition of extended high temperature that ~~may~~ occur during operation, storage and/or transport. The test is intended to indicate the performance of such devices when exposed to heat of constant temperature over a given period.

In general terms, this test provides a high temperature to induce potential failures due to softening and expansions.

This procedure does not assess the ability of a device to operate during temperature variations; in this case, IEC 61300-2-22 ~~would be~~ is used.

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 60068-2-2, *Environmental testing – Part 2-2: Tests – Test~~s~~ B: Dry heat*

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 61753-1:2018, *Fibre optic interconnecting devices and passive components – Performance standard – Part 1: General and guidance*

3 Terms and definitions

No terms and definitions are listed in this document.

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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 description

This procedure is ~~conducted~~ connected in accordance with IEC 60068-2-2, test Bb. The ~~specimen~~ device under test (DUT) is placed in an environmental chamber and subjected to a dry heat environment, which is maintained at a given temperature for a specified duration, as defined in the relevant specification. If required by the relevant specification, the attenuation of the ~~specimen~~ DUT is monitored throughout the duration of the test.

5 Apparatus

5.1 Environmental test chamber

The apparatus shall consist of an environmental chamber in accordance with IEC 60068-2-2, test Bb. The chamber shall be capable of housing the ~~specimen~~ DUT and of allowing ~~access for measurement during conditioning, if required~~ to route the optical fibre(s) of the DUT outside the chamber for connection to the optical measurement equipment. It shall also be capable of maintaining the specified temperature ~~and humidity~~ within the specified tolerances. Forced air circulation ~~may~~ can be used to maintain homogeneous conditions. Care shall be taken to ensure that the ~~specimen~~ DUT is not directly exposed to the heating or cooling elements.

5.2 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.

~~NOTE A device to record attenuation over time (*X*, *t*) should be used where the optical detector does not have the capability to monitor continuously.~~

6 Procedure

6.1 General

Conduct the procedure in accordance with IEC 60068-2-2, test Bb.

Unless otherwise stated:

– If the component construction includes optical leads, include a minimum 1,5 m of cable on each side of the component in the ~~climatic~~ environmental test chamber for ~~each port monitored~~ monitoring during the test.

– If optical measurements are requested during the test, these measurements ~~shall~~ should be performed at a maximum interval of 1 h for the performance tests.

6.2 Preconditioning

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

Unless otherwise stated, maintain the ~~specimen~~ DUT under standard atmospheric condition ~~(room temperature condition)~~ defined in IEC 61300-1 for 2 h minimum prior to the start of the test.

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NOTE Cleaning methods for optical connectors are described in IEC TR 62627-01.

6.3 Initial examinations and measurements

If specified, perform initial examinations and measurements as required by the relevant specification.

6.4 Conditioning

~~5.3.1 Set the chamber and the specimen to standard atmospheric conditions. Place the specimen in the chamber in its normal operating position including hook-ups to peripheral equipment (when required).~~

a) Test sample configuration in the chamber: see IEC 61300-1.

~~5.3.2~~

b) Adjust the chamber temperature and humidity to the specified severity. The rate of change of temperature shall not exceed 1 °C/min, averaged over a maximum period of 5 min. Allow the ~~specimen~~ DUT to reach temperature stability and maintain the temperature for the duration specified.

~~5.3.3~~

b) At the completion of the test, allow the ~~specimen~~ DUT to remain in the chamber while the temperature is gradually reduced to standard atmospheric conditions.

~~5.3.4~~

c) Where optical measurements are required during the test, measurements shall be made at a maximum interval of 1 h for performance tests. For long-term tests such as reliability qualification tests, the measurement interval should be determined appropriately. Measurements shall be made in accordance with IEC 61300-3-3 regarding monitoring change in attenuation ~~and return loss~~.

6.5 Recovery

Allow the ~~specimen~~ DUT to remain under standard atmospheric conditions for a period ~~of greater than~~ at least 2 h.

6.6 Final examinations and measurements

On completion of the test, remove all fixtures (if used during test) and make final measurements, as defined by the relevant specification, to ensure there is no permanent damage to the ~~specimen~~ DUT. The results of the final measurement shall be within the limit established in the relevant specification.

Unless otherwise specified, visually examine the ~~specimen~~ DUT in accordance with IEC 61300-3-1. Check for evidence of any degradation in the ~~specimen~~ DUT. ~~This may include, for example~~ The possible failures are as follows:

– broken, loose or damaged parts or accessories;

– breaking or damage to the cable jacket, seals, strain relief, or fibres;

– displaced, bent, or broken parts.

7 Severity

The severities are specified in IEC 61753-1. The severity consists of the combination of the temperature and exposure time. ~~The severity~~ One of severities shall be specified in the relevant specification.

~~One of the severities indicated in Table 1 shall be specified for this procedure:~~

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Table 1 shows the specified test severities in relation to the performance categories. It is recommended to verify the test severities with the relevant IEC 61753 performance standards and IEC 62005 reliability documents for the normative values.

Table 1 – Recommended severities

Performance category	Temperature °C	Duration of exposure h
C	+60	96
OP	+70	96
E	+85	96
OP+	+75	96
C^{HD}	+70	96
OP^{HD}	+85	96
$OP+^{HD}$	+85	96
NOTE Categories are defined in IEC 61753-1.		

8 Details to be specified and reported

The following details, as applicable, shall be specified in the relevant specification and shall be reported in the test report:

– temperature;
– duration of exposure;
– initial examinations and measurements and performance requirements;
– examinations and measurements during test and performance requirements;
– final examinations and measurements and performance requirements;
– deviations from test procedure;
– additional pass/fail criteria.

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