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Optical fibres – **iTeh STANDARD PREVIEW**
Part 1-50: Measurement methods and test procedures – Damp heat (steady
state) tests
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Fibres optiques – [IEC 60793-1-50:2014](https://standards.iteh.ai/catalog/standards/sist/e502ecc2-67de-4f08-856d-)
Partie 1-50: Méthodes de mesure et procédures d'essai – Essais de chaleur
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRES –

**Part 1-50: Measurement methods and test procedures –
Damp heat (steady state) tests**

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International Standard IEC 60793-1-50 has been prepared by subcommittee 86A: Fibres and cables, of IEC technical committee 86: Fibre optics.

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

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

- harmonization of the content with sectional specifications of relevant fibre types;
- extension of the applicability of the standard to class C single-mode fibres.

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

CDV	Report on voting
86A/1526/CDV	86A/1572/RVC

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.

A list of all parts in the IEC 60793 series, published under the general title *Optical fibres*, 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

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OPTICAL FIBRES –

Part 1-50: Measurement methods and test procedures – Damp heat (steady state) tests

1 Scope

This part of IEC 60793 provides a practical method for evaluating fibre performance in a defined environment.

The purpose of this standard is to determine the suitability of optical fibre sub-category A1a to A1d multimode fibres and class B and C single-mode fibres to withstand the environmental condition of high humidity and high temperature which may occur in actual use, storage and/or transport. The test is primarily intended to permit the observation of effects of high humidity at constant temperature over a given period. This procedure is conducted in accordance with IEC 60068-2-78, Test Cab.

NOTE The applicability of this test to other fibre categories is under study.

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 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60793-1-31, *Optical fibres – Part 1-31: Measurement methods and test procedures – Tensile strength*

IEC 60793-1-32, *Optical fibres – Part 1-32: Measurement and test procedures – Coating strippability*

IEC 60793-1-33, *Optical fibres – Part 1-33: Measurement methods and test procedures – Stress corrosion susceptibility*

IEC 60793-1-40:2001, *Optical fibres – Part 1-40: Attenuation measurement methods*

IEC 60793-2-10, *Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres*

IEC 60793-2-50, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single mode fibres*

IEC 60793-2-60, *Optical fibres – Part 2-60: Product specifications – Sectional specification for class C single-mode intraconnection fibres*

3 Apparatus

3.1 Chamber

The apparatus consists of an environmental chamber in accordance with IEC 60068-2-78, Test Cab. The chamber shall be capable of housing the specimen and of allowing access for measurement during conditioning. It shall also be capable of maintaining the specified temperature and humidity within the specified tolerances. Forced air circulation may be used to maintain homogeneous conditions. The chamber and accessories shall be constructed and arranged in such a manner as to avoid condensation dripping on the specimen.

3.2 Humidifier

De-mineralized or de-ionized water is used to obtain the specified humidity. No rust or corrosion contaminants shall be imposed on the specimen by the test facility. The water added to the humidifier shall be controlled according to the manufacturer's instructions.

3.3 Other apparatus

Additional apparatus may be necessary to perform the examinations and measurements (or as specified in the detail specification).

4 Sampling and specimens

For optical measurements, the length of the specimen shall be at least 1 000 m for fibre sub-categories A1a to A1d, and at least 2 000 m for fibre class B and C, to allow the required measurement repeatability. The amount of the specimen outside of the test chamber shall be minimized, and if it exceeds 10 % of the overall specimen length, this should be reported.

The preparation of the specimen shall have no detrimental effect on the fibre whilst under test conditions. Unless otherwise defined in the detail specification, it is recommended that the fibre sample be loosely coiled and dusted with a material such as talcum powder, to allow the coils to move freely against each other. The specimen may be coiled horizontally or vertically, with a minimum bend diameter of 150 mm to avoid any macro-bend effects.

A length of the control specimen shall be removed prior to the test to enable the completion of required mechanical measurements for comparison to measurements made after the test. This specimen should not be dusted.

5 Procedure

5.1 General

Conduct the procedure in accordance with IEC 60068-2-78, Test Cab, with the temperature, humidity and exposure time as given below:

Temperature	Relative humidity	Exposure time
+85 °C	85 %	30 days

5.2 Optical measurements

Attenuation measurement shall be carried out at the wavelength specified in the relevant specification using either IEC 60793-1-40:2001, Annex B (insertion loss) or IEC 60793-1-40:2001, Annex C (backscattering) before, during (once the specimen has stabilized at the specified temperature and relative humidity) and after the test. Attenuation changes shall be recorded.

Other optical measurements may be required if specified in the relevant product specification

5.3 Mechanical measurements

The fibre coating strip force shall be measured before and after the test, using the method described in IEC 60793-1-32. The control specimen (see Clause 4) is used to evaluate the change in strippability.

The tensile strength shall be measured on the aged specimens, according to IEC 60793-1-31.

The stress corrosion susceptibility parameter, dynamic n value (n_d), shall be measured on the aged specimens as per IEC 60793-1-33. .

5.4 Preconditioning

If specified, the specimen shall be preconditioned, as required by the detail specification.

5.5 Conditioning

Stabilize the chamber and the specimen to standard atmospheric conditions prior to the reference measurements being taken.

Adjust the chamber temperature and humidity to the specified severity. Allow the specimen to reach temperature stability and maintain the temperature and humidity for the duration specified.

At the completion of the test, allow the specimen to remain in the chamber while the temperature is reduced to standard atmospheric conditions. The rate of change of temperature shall not exceed 1 °C/min, averaged over a maximum period of 5 min. The detail specification may call for measurements during conditioning. If required, the detail specification shall specify the measurements to be taken and when to take them. Do not remove the specimen(s) from the chamber whilst these measurements are being made.

5.6 Recovery

Unless otherwise required by the relevant specification, the specimen shall remain under standard atmospheric condition for recovery for a period greater than 12 h but not more than 48 h. The detail specification may call for measurements during recovery. If required, the detail specification shall specify the measurements to be taken and when to take them.

6 Pass/fail criteria

The applicable specification limits can be found in the relevant sectional specification of IEC 60793-2-10 for A1 fibres, IEC 60793-2-50 for B fibres and IEC 60793-2-60 for C fibres.

7 Results

7.1 Information to be provided with each test

- date and title of test
- identification of specimen
- length of specimen
- nominal wavelength(s) at which the test was performed
- attenuation change
- coating strip force

- tensile strength results (median value and 15th percentile)
- dynamic n value (n_d)

7.2 Information to be available upon request

Description of all key equipment.

8 Specification information

The detail specification shall specify the following information:

- pass/fail criteria;
- information to be reported;
- any deviations to the procedure that apply.

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