IEC 61300-2-18

Edition 3.0 2023-01
REDLINE VERSION

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~~

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 61300-2-18:2005. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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

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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.

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.

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:~~

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.

Bibliography

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

IEC 61300-2-22, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-22: Tests – Change of temperature*

IEC 61300-3-6, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-6: Examinations and measurements – Return loss*

IEC 62005 (all parts), *Reliability of fibre optic interconnecting devices and passive components*

IEC TR 62572-4, *Fibre optic active components and devices – Reliability standards – Part 4: Guidelines for optical connector end-face cleaning methods for receptacle style optical transceivers*

IEC TR 62627-01, *Fibre optic interconnecting devices and passive components – Part 01: Fibre optic connector cleaning methods*

IEC 61300-2-18

Edition 3.0 2023-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Dispositifs d'interconnexion et composants passifs fibroniques – Procédures fondamentales d'essais et de mesures –
Partie 2-18: Essais – Chaleur sèche

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-18: Tests – Dry heat

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

Part 2-18: Tests – Dry heat

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 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 is used.

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

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- ISO Online browsing platform: available at https://www.iso.org/obp

4 General description

This procedure is connected in accordance with IEC 60068-2-2, test Bb. The 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 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 DUT and of allowing 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 within the specified tolerances. Forced air circulation can be used to maintain homogeneous conditions. Care shall be taken to ensure that the DUT is not directly exposed to the heating or cooling elements.

5.2 Optical measurement equipment

The optical source and detector for monitoring the attenuation and return loss shall comply with those specified in IEC 61300-3-3.

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 environmental test chamber for monitoring during the test.

– If optical measurements are requested during the test, these measurements 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 DUT according to the manufacturer's instructions.

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

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

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

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 DUT to reach temperature stability and maintain the temperature for the duration specified.

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

d) 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.

6.5 Recovery

Allow the DUT to remain under standard atmospheric conditions for a period 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 DUT. The results of the final measurement shall be within the limit established in the relevant specification.

Unless otherwise specified, visually examine the DUT in accordance with IEC 61300-3-1. Check for evidence of any degradation in the DUT. 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. One of severities shall be specified in the relevant specification.

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– duration of exposure;
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– examinations and measurements during test and performance requirements;
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Bibliography

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IEC TR 62572-4, *Fibre optic active components and devices – Reliability standards – Part 4: Guidelines for optical connector end-face cleaning methods for receptacle style optical transceivers*

IEC TR 62627-01, *Fibre optic interconnecting devices and passive components – Part 01: Fibre optic connector cleaning methods*

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DISPOSITIFS D'INTERCONNEXION ET COMPOSANTS PASSIFS FIBRONIQUES – PROCÉDURES FONDAMENTALES D'ESSAIS ET DE MESURES –

Partie 2-18: Essais – Chaleur sèche

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L'IEC 61300-2-18 a été établie par le sous-comité 86B: Dispositifs d'interconnexion et composants passifs à fibres optiques, du comité d'études 86 de l'IEC: Fibres optiques. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2005. Cette édition constitue une révision technique.

La présente édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) les termes et définitions ont été mis à jour conformément à l'IEC 61753-1:2018;

b) les sévérités d'essais ont été mises à jour conformément à l'IEC 61753-1:2018;

c) Une simplification de la combinaison de la température et de la durée de l'exposition a été effectuée.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
86B/4679/FDIS	86B/4711/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

Une liste de toutes les parties de la série IEC 61300, publiées sous le titre général: *Dispositifs d'interconnexion et composants passifs fibroniques – Procédures fondamentales d'essais et de mesures*, se trouve sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

DISPOSITIFS D'INTERCONNEXION ET COMPOSANTS PASSIFS FIBRONIQUES – PROCÉDURES FONDAMENTALES D'ESSAIS ET DE MESURES –

Partie 2-18: Essais – Chaleur sèche

1 Domaine d'application

La présente partie de l'IEC 61300 décrit une procédure destinée à déterminer l'aptitude d'un dispositif d'interconnexion fibronique, d'un composant passif fibronique, des épissures ou d'un boîtier fibronique à supporter des conditions d'environnement à haute température prolongée présentes pendant le fonctionnement, le stockage et/ou le transport. L'essai est destiné à indiquer la performance de tels dispositifs lorsqu'ils sont exposés à une chaleur avec une température constante sur une période donnée.

En termes généraux, cet essai fournit une température haute qui induit des défaillances potentielles du fait du ramollissement et de la dilatation.

Cette procédure ne vise pas à évaluer l'aptitude d'un dispositif à fonctionner pendant les variations de température; dans ce cas, c'est l'IEC 61300-2-22 qui s'applique.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60068-2-2, *Essais d'environnement – Partie 2-2: Essais – Essai B: Chaleur sèche*

IEC 61300-1, *Dispositifs d'interconnexion et composants passifs fibroniques – Procédures fondamentales d'essais et de mesures – Partie 1: Généralités et recommandations*

IEC 61300-3-1, *Dispositifs d'interconnexion et composants passifs à fibres optiques – Méthodes fondamentales d'essais et de mesures – Partie 3-1: Examens et mesures – Examen visuel*

IEC 61300-3-3, *Dispositifs d'interconnexion et composants passifs à fibres optiques – Méthodes fondamentales d'essais et de mesures – Partie 3-3: Examens et mesures – Contrôle actif des variations de l'affaiblissement et de l'affaiblissement de réflexion*

IEC 61753-1:2018, *Dispositifs d'interconnexion et composants passifs fibroniques – Norme de performance – Partie 1: Généralités et recommandations*

3 Termes et définitions

Aucun terme n'est défini dans le présent document.

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse https://www.electropedia.org/