IEC 61300-2-47

Edition 4.0 2016-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-47: Tests – Thermal shocks

Dispositifs d'interconnexion et composants passifs fibroniques – Procédures fondamentales d'essais et de mesures – Partie 2-47: Essais – Chocs thermiques

IEC 61300-2-47:2016-05(en-fr)

Documents
Document Sharing Hub

Full document details: IEC 61300-2-47 2016

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2016 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue
The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org
The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue
Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,…). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org
Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary
65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

Documents
Document Sharing Hub

Full document details: IEC 61300-2-47 2016

IEC 61300-2-47

Edition 4.0 2016-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-47: Tests – Thermal shocks

Dispositifs d'interconnexion et composants passifs fibroniques – Procédures fondamentales d'essais et de mesures – Partie 2-47: Essais – Chocs thermiques

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 33.180.20

ISBN 978-2-8322-3418-1

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

Documents
Document Sharing Hub

Full document details: IEC 61300-2-47 2016

CONTENTS

FOREWORD....3
1 Scope....5
2 Normative references....5
3 General description....5
4 Apparatus....5
4.1 Testing chambers....5
4.2 Support for mounting the DUT....6
5 Procedure....6
5.1 General....6
5.2 Preconditioning....6
5.3 Initial examination and measurement....6
5.4 Testing....6
5.5 Recovery....7
5.6 Final examination and measurement....7
6 Severity....7
7 Details to be specified....8
Annex A (informative) Minimum temperature value in Finland....9
Bibliography....10

Figure 1 – Temperature change cycle....7

Documents
Document Sharing Hub

Full document details: IEC 61300-2-47 2016

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-47: Tests – Thermal shocks

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.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
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.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61300-2-47 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This fourth edition cancels and replaces the third edition published in 2010. This edition constitutes a technical revision.

This edition includes the following significant technical change with respect to the previous edition: review of temperature limit in the test severity.

Documents
Document Sharing Hub

Full document details: IEC 61300-2-47 2016

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

CDV	Report on voting
86B/3879/CDV	86B/3937A/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.

The reader's attention is drawn to the fact that Annex A lists an "in some-country" clause on differing practices of a less permanent nature relating to the subject of this standard.

A list of all parts in 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 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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

Documents
Document Sharing Hub

Full document details: IEC 61300-2-47 2016

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

Part 2-47: Tests – Thermal shocks

1 Scope

This part of IEC 61300 details a procedure for determining the suitability of a fibre optic device to withstand the effects of thermal shock. In practice, this means a very short change over time between extreme temperatures.

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 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

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

3 General description

The procedure described in this standard is conducted in accordance with IEC 60068-2-14, test Na. The device under test (DUT) is first subjected to one extreme of temperature for a given period of time. It is then subjected to the other extreme of temperature for an equal period of time.

Two test methods are considered: manual or automatic. Both methods are considered as equivalent. The reference method is the automatic one.

4 Apparatus

4.1 Testing chambers

a) Two separate chambers or one rapid temperature change rate may be used. If two chambers are used, one for the low temperature and one for the high temperature, they are located such as to allow transfer of the DUT from one chamber to the other within the prescribed time. Either manual or automatic transfer methods may be used.

b) The chambers shall be capable of maintaining the atmosphere at the appropriate temperature for the test in any region where the DUT is placed.

c) The absolute humidity of the atmosphere inside the chambers should not exceed 20 g/m^3.

   At the temperature of 60 °C and standard air pressure, the relative humidity should be less than 16 %.

d) The temperature of the walls of the hot and cold chambers shall not differ by more than 3 % and 8 % respectively from the specified ambient temperature of the test, expressed in Kelvin (tolerance of 3 % for high temperature, and 8 % for low temperature).

AVA Documents Document Sharing Hub

Full document details: IEC 61300-2-47 2016

e) The volume of the chambers and the air velocity shall be such that after insertion of the DUT, the temperature of the atmosphere shall be within the specified tolerance after a time of not more than 10 % of the exposure time.

f) The air of the chamber shall be circulated so that the air velocity, measured close to the DUT, shall be not less than 2 m/s.

4.2 Support for mounting the DUT

Unless otherwise specified in the relevant specification, the thermal conductivity of the supports for mounting the DUT shall be low, such that for practical purposes the DUT is thermally isolated. When testing several DUTs simultaneously, they shall be so placed that free circulation should be provided between DUTs, and between DUTs and chamber surfaces.

5 Procedure

5.1 General

Conduct the test according to the following procedure.

– If the component construction includes optical leads, include 1,5 m of cable in the climatic chamber for each port monitored during the test.

– If optical measurements are requested during the test by the relevant specification, these measurements shall be performed at a maximum interval of 10 min during the extreme temperature periods.

– It is not the intention of the test to record the effects of mechanical movement of the optical cables during the movement of the DUT from one environmental chamber to the other. Therefore, the physical arrangement of the cables shall ensure that movement of the DUT does not affect the optical transmission. To verify this, optical cables similar to those attached to the DUT shall be positioned alongside the cables attached to the DUT and monitored throughout the test as a control.

5.2 Preconditioning

Unless otherwise stated in the relevant specification, maintain the DUT under standard atmospheric conditions for a minimum of 2 h. Clean the mechanical and optical alignment parts of the DUT according to the manufacturer's instructions.

5.3 Initial examination and measurement

Complete initial examinations and measurements as required by the relevant specification.

5.4 Testing

a) Place the DUT in the chamber in its normal operating position (initial temperature T_s).

b) The DUT shall be subjected to a temperature cycle according to Figure 1.

c) The DUT shall be placed in the cold chamber, the atmosphere of which has been previously adjusted to the appropriate low temperature T_A. The atmosphere in the cold chamber shall be maintained at the low temperature T_A for the appropriate period t_1 (t_1 includes an initial time for temperature stabilization of atmosphere, according to 4.1 e)).

d) The DUT shall then be removed from the cold chamber and transferred to the hot chamber in a changeover time t_2 not more than 3 min. In the case of automatic two-chamber test equipment, a changeover period shall be less than 30 s. The transition time shall include the time of removal from one chamber and the insertion into the second chamber as well as any dwell time at the ambient temperature of the laboratory.

e) The atmosphere in the hot chamber shall be maintained at the high temperature T_B for the appropriate period t_1.

f) For the next cycle, the DUT shall be transferred to the cold chamber in a transition time t_2

AVA Documents
Document Sharing Hub
Full document details: IEC 61300-2-47 2016