SLOVENSKI STANDARD
SIST EN 62005-3:2002

01-september-2002

Reliability of fibre optic interconnecting devices and passive components - Part 3: Relevant tests for evaluating failure modes and failure mechanisms for passive components (IEC 62005-3:2001)

Reliability of fibre optic interconnecting devices and passive components -- Part 3: Relevant tests for evaluating failure modes and failure mechanisms for passive components

Zuverlässigkeit von LWL-Verbindungselementen und passiven Bauelementen -- Teil 3: Geeignete Prüfverfahren zur Ermittlung von Ausfallmoden und Ausfallmechanismen von passiven Bauteilen

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 62005-3:2002
https://standards.iteh.ai/catalog/standards/sist/e83af715-b714-4a87-96e4-
dff3ad6700dd/sist-en-62005-3-2002

Fiabilité des dispositifs d'interconnexion et des composants passifs à fibres optiques -- Partie 3: Essais significatifs pour l'évaluation des modes et mécanismes de défaillance des composants passifs

Ta slovenski standard je istoveten z: **EN 62005-3:2001**

ICS:

33.180.20	Povezovalne naprave za optiļ na vlakna	Fibre optic interconnecting devices

SIST EN 62005-3:2002 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

SIST EN 62005-3:2002

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62005-3:2002
https://standards.iteh.ai/catalog/standards/sist/e83af715-b714-4a87-96e4-dff7afd9006d/sist-en-62005-3-2002

SIST EN 62005-3:2002

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62005-3

June 2001

ICS 33.180.20

English version

Reliability of fibre optic interconnecting devices and passive components Part 3: Relevant tests for evaluating failure modes i:EN62005-2{2001}and failure mechanisms for passive components

(IEC 62005-3:2001)

Fiabilité des dispositifs d'interconnexion et des composants passifs à fibres optiques
Partie 3: Essais significatifs pour l'évaluation des modes et mécanismes de défaillance des composants passifs
(CEI 62005-3:2001)

Zuverlässigkeit von LWL-Verbindungselementen und passiven Bauelementen
Teil 3: Geeignete Prüfverfahren zur Ermittlung von Ausfallmoden und Ausfallmechanismen von passiven Bauteilen
(IEC 62005-3:2001)

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 62005-3:2002
https://standards.iteh.ai/catalog/standards/sist/e83af715-b714-4a87-96e4-dff7afd9006d/sist-en-62005-3-2002

This European Standard was approved by CENELEC on 2001-05-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

© 2001 CENELEC - All rights of exploitation in any form and by any means reserved worldwide for CENELEC members.

Ref. No. EN 62005-3:2001 E

SIST EN 62005-3:2002

Foreword

The text of document 86B/1439/FDIS, future edition 1 of IEC 62005-3, prepared by SC 86B, Fibre optic interconnecting devices and passive components, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62005-3 on 2001-05-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2002-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2004-05-01

Endorsement notice

The text of the International Standard IEC 62005-3:2001 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, add the following note after the title:

NOTE All International Standards mentioned have been harmonized as European Standards.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 62005-3:2002
https://standards.iteh.ai/catalog/standards/sist/e83af715-b714-4a87-96e4-dff7afd9006d/sist-en-62005-3-2002

SIST EN 62005-3:2002

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
62005-3

Première édition
First edition
2001-03

Fiabilité des dispositifs d'interconnexion et des composants passifs à fibres optiques –

Partie 3: Essais significatifs pour l'évaluation des modes et mécanismes de défaillance des composants passifs

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Reliability of fibre optic interconnecting devices and passive components –

SIST EN 62005-3:2002
https://standards.iteh.ai/catalog/standards/sist/e83af715-b714-4a87-96e4-

Part 3: Relevant tests for evaluating failure modes and failure mechanisms for passive components

© IEC 2001 Droits de reproduction réservés — Copyright - all rights reserved

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'éditeur.

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 the publisher.

International Electrotechnical Commission 3, rue de Varembé Geneva, Switzerland
Telefax: +41 22 919 0300 e-mail: inmail@iec.ch IEC web site http://www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE Q

Pour prix, voir catalogue en vigueur
For price, see current catalogue

SIST EN 62005-3:2002

CONTENTS

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 62005-3:2002
https://standards.iteh.ai/catalog/standards/sist/e83af715-b714-4a87-96e4-dff7afd9006d/sist-en-62005-3-2002

SIST EN 62005-3:2002

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

RELIABILITY OF FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS –

Part 3: Relevant tests for evaluating failure modes and failure mechanisms for passive components

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 62005-3:2002
https://standards.iteh.ai/catalog/standards/sist/82af715-b714-4-87-96ed-
SIST EN 62005-3:2002

International Standard IEC 62005-3 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

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

FDIS	Report on voting
86B/1439/FDIS	86B/1498/RVD

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 3.

IEC 62005 consists of the following parts, under the general title *Reliability of fibre optic interconnecting devices and passive components:*

– Part 1: Introductory guide and definitions
– Part 2: Quantitative assessment of reliability based on accelerated ageing tests – Temperature and humidity, steady state

SIST EN 62005-3:2002

– Part 3: Relevant tests for evaluating failure modes and failure mechanisms for passive components
– Part 4: Product screening
– Part 5: Reliability accelerated tests to standardized service environments [2)]
– Part 6: Use of field data to determine, specify and improve component reliability [2)]

The committee has decided that the contents of this publication will remain unchanged until 2003. At this date, the publication will be:

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 62005-3:2002
https://standards.iteh.ai/catalog/standards/sist/e83af715-b714-4a87-96e4-dff7afd9006d/sist-en-62005-3-2002

2) Under consideration.

SIST EN 62005-3:2002

RELIABILITY OF FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS –

Part 3: Relevant tests for evaluating failure modes and failure mechanisms for passive components

1 Scope

This part of IEC 62005 focuses on failure mechanisms associated with interconnecting devices and passive components. In order to estimate reliability by the acceleration testing described in IEC 62005-2, it is important to determine the dominant failure mechanism and the related test. This part of IEC 62005 introduces a choice of relevant tests from all the IEC 61300 series tests for each known failure mechanism and failure effects related to certain failure modes. (In IEC 62005-5, extension of severity depending on environmental category and performance request will be given.)

2 Choice of relevant tests

Figure 1 shows the guidelines for the choice of relevant tests. At the first stage, relevant tests are selected by considering the device type of passive optical components. Then, at the second stage, relevant tests are refined by considering known failure mechanisms for each device. Each set of relevant tests for a particular device and for a particular known failure mechanism is obtained by this procedure. After that, suitable test conditions should be selected.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 62005-3:2002
https://standards.iteh.ai/catalog/standards/sist/e83af715-b714-4a87-96e4-dff7afd9006d/sist-en-62005-3-2002

3 Typical failure points

A typical passive optical component consists of different parts (the optical element, the package, the pigtail, joints, etc.) as shown in Figure 2. Each passive component exhibits failures that can be referred to these parts and that can be common for a large class of devices: failure mode, failure mechanisms, failure effects; a set of relevant tests is shown in Table 1. Table 2 is more specific for each device type.

4 Failure modes and known failure mechanisms

For any component under consideration, a potential failure mode and effect analysis (PFMEA) should be carried out. Table 2 shows selected relevant tests by the procedure of Figure 1 for known failure mechanism or failure effects for each type of commercially available and testable devices. It must be emphasized that the list of known failure mechanisms and failure effects is not exhaustive. If new technology and new passive components become commercially available, they should be added to Table 2. Relevant tests are listed with the failure effect and the dominant known failure mechanism. As other relevant tests or methods of failure mode excitation become known, these should also be added in a supplementary table and published.

SIST EN 62005-3:2002

5 Criteria for the choice of stress conditions – Step stress method

The severity and the duration of the test are the main sensitive points in reliability estimations. The severity indicated for the test by the references is mainly intended for quality evaluation and may be not sufficient for accelerated ageing tests. “Insufficient” means that failures or observable degradation may occur in an unacceptably long time (too low acceleration). On the other hand, the use of too high acceleration could result in failure mechanisms that are not typical for the devices in their usual operating environments.

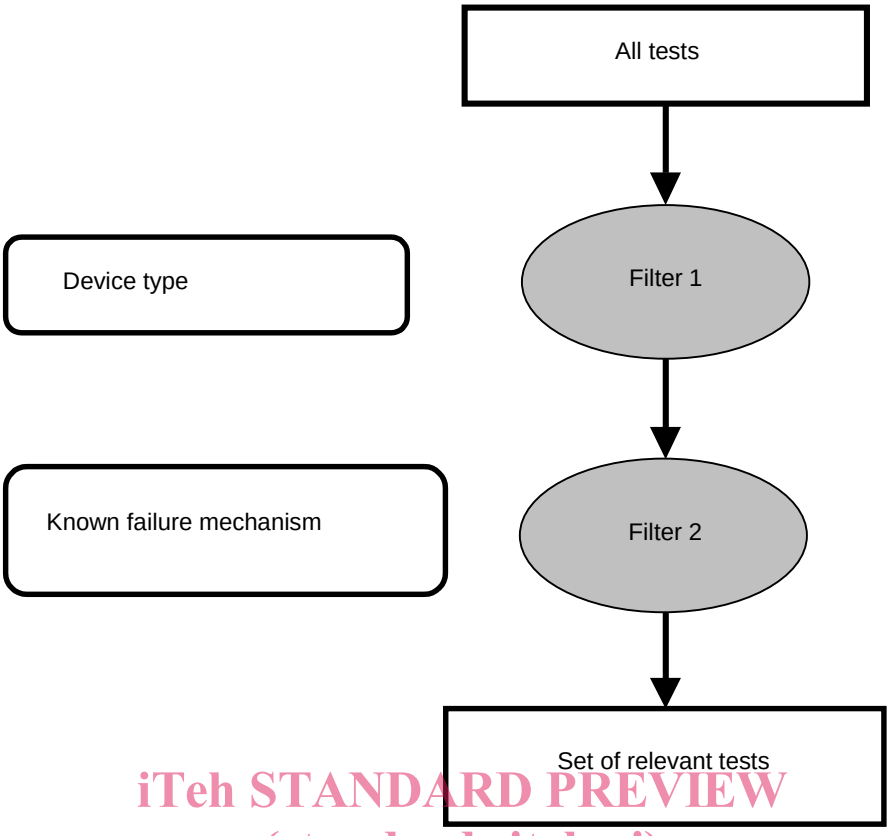
A feasible way to identify failure mechanisms and to establish bounds for the test severity is the step stress method: a significative sample of devices, possibly after product screening, is aged at an increasing level of stress, starting from the operating conditions. Each testing condition is performed for a relatively short time (for instance 150 h); after that, temperature and/or humidity is increased. The severity increase should be high enough to avoid "memory effects" (ageing behaviour in one step is independent from ageing in the previous ones) but without causing an atypical failure mechanism (at least at the first steps).

In some cases, the degradation rates are recorded at each step. It is possible to extrapolate a preliminary relationship between degradation with temperature and/or humidity. If the degradation rates of more severe conditions are not consistent with an extrapolated acceleration law, this can also mean that a new failure mechanism has been induced.

The results of step stress testing can be used to corroborate the results of the extended reliability assessment programme, but they cannot be considered as a conclusive reliability evaluation.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 62005-3:2002
https://standards.iteh.ai/catalog/standards/sist/e83af715-b714-4a87-96e4-dff7afd9006d/sist-en-62005-3-2002

SIST EN 62005-3:2002



iTeh STANDARD PREVIEW
(standards.iteh.ai)

Figure 1 – Choice of relevant tests

SIST EN 62005-3:2002
https://standards.iteh.ai/catalog/standards/sist/e83af715-b714-4a87-96e4-187afd9006d/sist-en-62005-3-2002

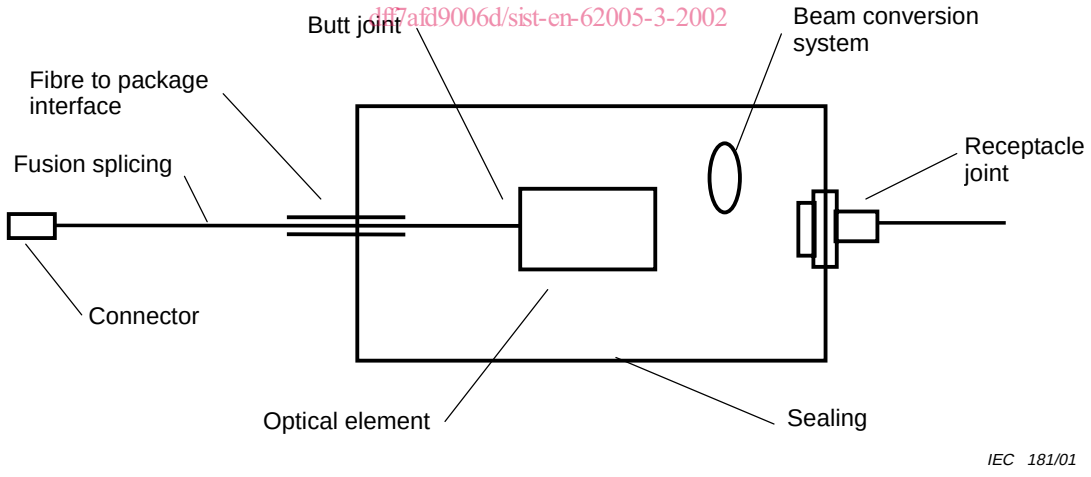


Figure 2 – Typical constituent parts and failure points