

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Fibre optic interconnecting devices and passive components performance standard –
Part 082-2: Pigtailed single-mode fibre optic 1,31/1,55 μm WWDM devices for category C – Controlled environment**

[IEC 61753-082-2:2008](https://standards.iteh.ai/catalog/standards/sist/d10c435f-c407-4af2-bf48-100000000000/iec-61753-082-2-2008)

[https://standards.iteh.ai/catalog/standards/sist/d10c435f-c407-4af2-bf48-](https://standards.iteh.ai/catalog/standards/sist/d10c435f-c407-4af2-bf48-100000000000/iec-61753-082-2-2008)

**Norme de qualité de fonctionnement des dispositifs d'interconnexion et composants passifs à fibres optiques –
Partie 082-2: Dispositifs WWDM 1,31/1,55 μm à fibres optiques unimodales munies d'amorce pour la catégorie C – Environnement contrôlé**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2008 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 la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: 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.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

[IEC 61753-082-2:2008](mailto:IEC.61753-082-2:2008)

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch

Tel.: +41 22 919 02 11

Fax: +41 22 919 03 00

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) 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 CEI

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

- Catalogue des publications de la CEI: www.iec.ch/searchpub/cur_fut-f.htm

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: www.iec.ch/online_news/justpub

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: www.iec.ch/webstore/custserv/custserv_entry-f.htm

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: csc@iec.ch

Tél.: +41 22 919 02 11

Fax: +41 22 919 03 00



INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Fibre optic interconnecting devices and passive components performance standard –
Part 082-2: Pigtailed single-mode fibre optic 1,31/1,55 μm WWDM devices for category C – Controlled environment**

<https://standards.iteh.ai/catalog/standards/sist/d10c435f-c407-4af2-bf48-577777777777/iec-61753-082-2:2008>

**Norme de qualité de fonctionnement des dispositifs d'interconnexion et composants passifs à fibres optiques –
Partie 082-2: Dispositifs WWDM 1,31/1,55 μm à fibres optiques unimodales munies d'amorce pour la catégorie C – Environnement contrôlé**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

P

CONTENTS

| | |
|--|----|
| FOREWORD..... | 3 |
| 1 Scope..... | 5 |
| 2 Normative references | 5 |
| 3 Test procedure | 6 |
| 4 Test report..... | 7 |
| 5 Reference components..... | 7 |
| 6 Performance requirements | 7 |
| 6.1 Dimensions | 7 |
| 6.2 Test details and requirements | 7 |
| Annex A (normative) Sample size and grouping requirements..... | 14 |
| Bibliography..... | 15 |
| | |
| Table 1 – Operating wavelength range..... | 7 |
| Table 2 – Test details and requirements | 7 |
| Table A.1 – Sample size and grouping of tests | 14 |

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

[IEC 61753-082-2:2008](#)

<https://standards.iteh.ai/catalog/standards/sist/d10c435f-c407-4af2-bf48-e08d55d440c6/iec-61753-082-2-2008>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIBRE OPTIC INTERCONNECTING DEVICES AND
PASSIVE COMPONENTS PERFORMANCE STANDARD –**
**Part 082-2: Pigtailed single-mode fibre optic
1,31/1,55 μm WWDM devices for category C –
Controlled environment**

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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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 61753-082-2 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/2697/FDIS | 86B/2714/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 2.

A list of all parts of the IEC 61753 series, published under the general title *Fibre optic interconnecting devices and passive components performance standard*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[IEC 61753-082-2:2008](#)

<https://standards.iteh.ai/catalog/standards/sist/d10c435f-c407-4af2-bf48-e08d55d440c6/iec-61753-082-2-2008>

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS PERFORMANCE STANDARD –

Part 082-2: Pigtailed single-mode fibre optic 1,31/1,55 μm WWDM devices for category C – Controlled environment

1 Scope

This part of IEC 61753 contains the minimum initial test and measurement requirements and severities which a fibre optic 1,31/1,55 μm WWDM (*wide wavelength division multiplexing*) device shall satisfy in order to be categorised as meeting the IEC standard, category C, controlled environment. The requirements cover devices with single-mode pigtails.

2 Normative references

The following referenced documents are indispensable for the application 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 60793-2-50, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres*

IEC 61300 (all parts), *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures*

IEC 61300-2-1, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-1: Tests – Vibration (sinusoidal)*

IEC 61300-2-4, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-4: Tests – Fibre/cable retention*

IEC 61300-2-9, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-9: Tests – Shock*

IEC 61300-2-14, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-14: Tests – Optical power handling and damage threshold characterisation*

IEC 61300-2-17, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-17: Tests – Cold*

IEC 61300-2-18, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-18: Tests – Dry heat – High temperature endurance*

IEC 61300-2-19, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-19: Tests – Damp heat (steady state)*

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

IEC 61300-2-42, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-42: Tests – Static side load for connectors*

IEC 61300-2-44, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-44: Tests – Flexing of the strain relief of fibre optic devices*

IEC 61300-3-2, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-2: Examinations and measurements – Polarization dependence of attenuation in a single-mode fibre optic device*

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 61300-3-7, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-7: Examinations and measurements – Wavelength dependence of attenuation and return loss*

IEC 61300-3-20, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-20: Examinations and measurements – Directivity of fibre optic branching devices*

IEC 61753-021-2, *Fibre optic interconnecting devices and passive components performance standard – Part 021-2: Grade C/3 single-mode fibre optic connectors for category C – Controlled environment*

ITEH STANDARD PREVIEW
(standards.iteh.ai)

3 Test procedure

[IEC 61753-082-2:2008](#)

<https://standards.iteh.ai/catalog/standards/sist/d10c435f-c407-4af2-bf48-108155d440c6/iec-61753-082-2-2008>

Unless otherwise specified, all test methods are in accordance with IEC 61300 series standard. Each test defines the number of samples to be evaluated. The samples used for each test are intended to be previously unstressed new samples but may also be selected from previously used samples if desired. The samples shall be terminated onto single-mode fibres as per IEC 60793-2-50, Type B 1.1, in either coated fibres (primary and secondary) or reinforced cable format. All measurements shall be carried out at normal room conditions, unless otherwise stated.

All tests are to be carried out to validate performance over the required operating wavelength range. All tests shall be carried out over the complete optical wavelength range.

The operating wavelength ranges are different for different variants of WWDM and may vary depending on the application. The operating wavelength ranges for used WWDM are pointed out in Table 1.

Table 1 – Operating wavelength range

| | Operating wavelength range | Operating wavelength range |
|-----------|----------------------------|----------------------------|
| Variant 1 | 1290 nm – 1330 nm | 1530 nm – 1570 nm |
| Variant 2 | 1270 nm – 1350 nm | 1510 nm – 1590 nm |

NOTE Other variants with different nominal channel central wavelengths and operating wavelength ranges can be defined similarly in accordance with IEC/PAS 62074-1.

4 Test report

Fully documented test reports and supporting evidence shall be prepared and be available for inspection as evidence that the tests have been carried out and complied with.

5 Reference components

The testing for these components does not require the use of reference components.

6 Performance requirements

6.1 Dimensions

Dimensions shall comply with either an appropriate IEC interface standard or with those given in appropriate manufacturers drawings, where the IEC interface standard does not exist or cannot be used.

<https://standards.iteh.ai/catalog/standards/sist/d10c435f-c407-4af2-bf48-c08d55d440c6/iec-61753-082-2-2008>

6.2 Test details and requirements

The requirements are given only for pigtailed WDM devices. The connector performances shall be in compliance with IEC 61753-021-2.

Table 2 – Test details and requirements

| No | Tests | Requirement | Details | |
|----|---------------------------------------|--|---|---|
| 1 | Attenuation IEC 61300-3-7 | $\leq 1,3$ dB Attenuation shall be met over the operating wavelength range according to Table 1 | Launch patchcord length: Source type: Launch conditions: Other requirements: | ≥ 2 m Unpolarised The wavelength of the source shall be longer than cut-off wavelength of the fibre Test results should be obtained under measurement uncertainty of $\pm 0,1$ dB |
| 2 | Wavelength Isolation IEC 61300-3-7 | ≥ 15 dB (Type A) ≥ 40 dB (Type B) Wavelength isolation shall be met over the operating wavelength range according to Table 1 | Launch patchcord length: Source type: Launch conditions: Other requirements: | ≥ 2 m Unpolarised The wavelength of the source shall be longer than cut-off wavelength of the fibre Test results should be obtained under measurement uncertainty of $\pm 0,1$ dB |

| No | Tests | Requirement | Details | |
|----|--|--|--|--|
| 3 | Out of band attenuation IEC 61300-3-7 | <p>≥ 20 dB</p> <p>Out of band attenuation shall be met over the operating wavelength range according to Table 1</p> | <p>Launch patchcord length:</p> <p>Source type:</p> <p>Launch conditions:</p> <p>Other requirements:</p> | <p>≥ 2 m</p> <p>Unpolarised</p> <p>The wavelength of the source shall be longer than cut-off wavelength of the fibre</p> <p>Test results should be obtained under measurement uncertainty of ± 0,1 dB</p> |
| 4 | Directivity IEC 61300-3-20 | <p>≥ 35 dB Class T</p> <p>≥ 60 dB Class V</p> <p>Directivity shall be met over the operating wavelength range according to Table 1</p> | <p>Source:</p> <p>Other requirements:</p> | <p>LD</p> <p>Test results should be obtained under measurement uncertainty of ± 1 dB</p> <p>All ports not under test shall be terminated to avoid unwanted reflections contributing to the measurement</p> <p>The directivity shall be measured between any pair of input or output ports</p> <p>NOTE Because of the high cost of this test, the buyer and the manufacturer may agree to discard it. However, the potential negative effect of this parameter on system performance must not be neglected.</p> |
| 5 | Return Loss IEC 61300-3-7 | <p>≥ 35 dB Type T</p> <p>≥ 60 dB Type V</p> <p>Return loss shall be met over the operating wavelength range according to Table 1</p> | <p>Source:</p> <p>Other requirements:</p> | <p>LD</p> <p>Test results should be obtained under measurement uncertainty of ± 1 dB</p> <p>All ports not under test shall be terminated to avoid unwanted reflections contributing to the measurement</p> <p>NOTE Because of the high cost of this test, the buyer and manufacturer may agree to discard it. However, the potential negative effect of this parameter on system performance must not be neglected.</p> |
| 6 | Polarisation dependent loss IEC 61300-3-2 | <p>≤ 0,2 dB</p> <p>PDL shall be met over the operating wavelength range according to Table 1</p> | <p>Launch patchcord length:</p> <p>Source type:</p> <p>Other requirements:</p> | <p>≥ 2 m</p> <p>LD</p> <p>Test results should be obtained under measurement uncertainty of ± 0,05 dB</p> |

iTeH STANDARD PREVIEW
(standards.iteh.ai)
IEC 61753-082-2:2008
<https://standards.iteh.ai/catalog/standards/sist/d10c435f-c407-4af2-b1e08d55d440c6/iec-61753-082-2-2008>

| No | Tests | Requirement | Details | |
|----|--|---|---|--|
| 7 | Optical power handling and damage threshold characterisation IEC 61300-2-14 | <p>≥100 mW</p> <p>After the test the attenuation limits of test No. 1 shall be met</p> <p>After the test the isolation limits of test No.2 shall be met</p> <p>After the test the out of band attenuation limits of test No.3 shall be met</p> <p>After the test the return loss limits of test No.5 shall be met</p> | <p>Source type:</p> <p>Max. total input power to be applied:</p> <p>Max. channel input power to be applied:</p> <p>Power increments:</p> <p>Test duration:</p> <p>Other requirements:</p> | <p>LD</p> <p>+ 20 dBm</p> <p>+ 6 dBm</p> <p>3 dB</p> <p>30 min at each power level</p> <p>Test results should be obtained under attenuation measurement uncertainty of ± 0,1 dB</p> <p>Test results should be obtained under return loss measurement uncertainty of ± 1 dB</p> |
| 8 | Cold IEC 61300-2-17 | <p>During the test the attenuation value shall be measured at a maximum interval of 1 h</p> <p>During and after the test the attenuation limits of test No.1 shall be met, and the attenuation shall be within ±0,5 dB of the original value. During the test monitoring shall be according to IEC 61300-3-3</p> <p>After the test the isolation limits of test No.2 shall be met</p> <p>After the test the out of band attenuation limits of test No.3 shall be met</p> <p>After the test the return loss limits of test No.5 shall be met</p> | <p>Temperature:</p> <p>Duration of the exposure:</p> <p>Maximum sampling interval during the test:</p> <p>Measurements required:</p> | <p>- 10 °C ± 2 °C</p> <p>96 h</p> <p>1 h</p> <p>Attenuation shall be measured before, during and after the test</p> <p>Return loss shall be measured before, during and after the test</p> |

| No | Tests | Requirement | Details | |
|----|---|--|--|---|
| 9 | Dry Heat – High Temperature Endurance IEC 61300-2-18 | During the test the attenuation value shall be measured at maximum interval of 1 h during the first 16 h, and thereafter at a maximum interval of 24 h until completion of the test During and after the test the attenuation limits of test No.1 shall be met, and the attenuation shall be within $\pm 0,5$ dB of the original value. During the test monitoring shall be according to IEC 61300-3-3 After the test the isolation limits of test No.2 shall be met After the test the out of band attenuation limits of test No.3 shall be met After the test the return loss limits of test No.5 shall be met | Temperature: Duration of the exposure: Maximum sampling interval during the test: Measurements required: | + 60 °C \pm 2 °C 96 h 1 h Attenuation shall be measured before, during and after the test Return loss shall be measured before, during and after the test |
| 10 | Change of Temperature IEC 61300-2-22, test Nb | During the test the attenuation value shall be measured at maximum interval of 30 min. During the test, the attenuation limits of test No.1 shall be met. During and after the test the attenuation shall be within $\pm 0,5$ dB of the original value at ambient conditions. During the test monitoring shall be according to IEC 61300-3-3 After the test the isolation limits of test No.2 shall be met. After the test the out of band attenuation limits of test No.3 shall be met After the test the return loss limits of test No.5 shall be met | High temperature: Low temperature: Number of cycles: Rate of temperature change: Duration at extreme temperatures: Maximum sampling interval during the test: Measurements required: | + 60 °C \pm 2 °C - 10 °C \pm 2 °C 5 1 °C/min ... 2 °C/min 1 h 30 min Attenuation shall be measured before, during and after the test Return loss shall be measured before, during and after the test |