



NSAI
Standards

Irish Standard
I.S. EN 62074-1:2014

Fibre optic interconnecting devices and passive components - Fibre optic WDM devices -- Part 1: Generic specification

I.S. EN 62074-1:2014

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN 62074-1:2014

Published:

2014-04-04

This document was published under the authority of the NSAI and comes into effect on:

2014-04-15

ICS number:

33.180.01

33.180.20

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

EN 62074-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2014

ICS 33.180.01; 33.180.20

Supersedes EN 62074-1:2009

English version

**Fibre optic interconnecting devices and passive components -
Fibre optic WDM devices -
Part 1: Generic specification
(IEC 62074-1:2014)**

Dispositifs d'interconnexion et dispositifs
passifs à fibres optiques -
Dispositifs WDM à fibres optiques -
Partie 1: Spécification générique
(CEI 62074-1:2014)

Lichtwellenleiter -
Verbindungselemente und passive
Bauteile -
Lichtwellenleiter-WDM-Bauteile -
Teil 1: Fachgrundspezifikation
(IEC 62074-1:2014)

This European Standard was approved by CENELEC on 2014-03-13. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 86B/3700/FDIS, future edition 2 of IEC 62074-1, 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 approved by CENELEC as EN 62074-1:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-12-13
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-03-13

This document supersedes EN 62074-1:2009.

EN 62074-1:2014 includes the following significant technical changes with respect to EN 62074-1:2009:

- substantial updating to the definitions;
- the addition of informative Annexes C to G, giving examples of technical information concerning WDM devices.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 62074-1:2014 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60027	series	Letter symbols to be used in electrical technology	EN 60027	series
IEC 60050-731	-	International Electrotechnical Vocabulary (IEV) Chapter 731: Optical fibre communication	-	-
IEC 60695-11-5	-	Fire hazard testing Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	-
IEC 60825-1	-	Safety of laser products Part 1: Equipment classification and requirements	EN 60825-1	-
IEC/TR 61931	-	Fibre optic - Terminology	-	-
ISO 129-1	-	Technical drawings - Indication of dimensions and tolerances Part 1: General principles	-	-
ISO 286-1	-	Geometrical product specifications (GPS) - ISO code system for tolerances on linear sizes Part 1: Basis of tolerances, deviations and fits	EN ISO 286-1	-
ISO 1101	-	Geometrical product specifications (GPS) - Geometrical tolerancing - Tolerances of form, orientation, location and run-out	EN ISO 1101	-
ISO 8601	-	Data elements and interchange formats - Information interchange - Representation of dates and times	-	-

This page is intentionally left blank



IEC 62074-1

Edition 2.0 2014-02

INTERNATIONAL STANDARD



**Fibre optic interconnecting devices and passive components – Fibre optic
WDM devices –
Part 1: Generic specification**





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2014 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.

IEC Central Office
3, rue de Varembe
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 more than 30 000 terms and definitions in English and French, with equivalent terms in 14 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 55 000 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.



IEC 62074-1

Edition 2.0 2014-02

INTERNATIONAL STANDARD



**Fibre optic interconnecting devices and passive components – Fibre optic
WDM devices –
Part 1: Generic specification**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE **XA**

ICS 33.180.01, 33.180.20

ISBN 978-2-8322-1379-7

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
3.1 Basic term definitions.....	8
3.2 Component definitions	9
3.3 Performance parameter definitions	10
4 Requirements	25
4.1 Classification	25
4.1.1 General	25
4.1.2 Type.....	25
4.1.3 Style.....	25
4.1.4 Variant.....	26
4.1.5 Assessment level.....	26
4.1.6 Normative reference extension	27
4.2 Documentation.....	27
4.2.1 Symbols	27
4.2.2 Specification system.....	27
4.2.3 Drawings	28
4.2.4 Measurements	29
4.2.5 Test data sheets	29
4.2.6 Instructions for use	29
4.3 Standardization system.....	29
4.3.1 Performance standards.....	29
4.3.2 Reliability standard	30
4.3.3 Interlinking.....	30
4.4 Design and construction.....	31
4.4.1 Materials	31
4.4.2 Workmanship.....	31
4.5 Performance requirements	31
4.6 Identification and marking	31
4.6.1 General	31
4.6.2 Variant identification number	31
4.6.3 Component marking.....	32
4.6.4 Package marking.....	32
4.7 Safety	32
Annex A (informative) Transfer matrix.....	34
A.1 General.....	34
A.2 Transfer matrix	34
A.3 Transfer matrix coefficient.....	35
A.4 Logarithmic transfer matrix	35
Annex B (informative) Specific performances of WDM devices for bidirectional transmission system (example).....	37
B.1 Generic.....	37
B.2 Definition of near-end isolation and near-end crosstalk	38
Annex C (informative) Transfer matrix as applications of WDM devices (example).....	40

C.1	Generic.....	40
C.2	Wavelength multiplexer.....	40
C.3	Wavelength demultiplexer.....	41
C.4	Wavelength multiplexer/demultiplexer.....	42
C.5	Wavelength router.....	43
C.6	Wavelength channel add/drop.....	44
Annex D	(informative) Example of technology of thin film filter WDM devices.....	46
D.1	General.....	46
D.2	Thin film filter technology.....	46
D.3	Typical characteristics of thin film filter.....	47
Annex E	(informative) Example of technology of fibre fused WDM devices.....	48
E.1	General.....	48
E.2	Typical characteristics of fibre fused WDM devices.....	49
Annex F	(informative) Example of arrayed waveguide grating (AWGs) technology.....	50
F.1	General.....	50
F.2	Typical characteristics of AWG.....	50
Annex G	(informative) Example of FBG filter technology.....	52
G.1	General.....	52
G.2	Typical characteristics of FBG filter.....	53
Bibliography	54
Figure 1	– Example of a six-port device, with two input and four output ports.....	8
Figure 2	– Illustration of channel wavelength range.....	11
Figure 3	– Illustration of insertion loss.....	12
Figure 4	– Illustration of ripple.....	12
Figure 5	– Illustration of channel insertion loss variation.....	13
Figure 6	– Illustration of isolation wavelength.....	14
Figure 7	– Illustration of isolation wavelength range.....	15
Figure 8	– Illustration of adjacent channel isolation.....	16
Figure 9	– Illustration of non-adjacent channel isolation.....	17
Figure 10	– Illustration of maximum adjacent channel crosstalk.....	18
Figure 11	– Illustration of maximum non-adjacent channel crosstalk.....	19
Figure 12	– Illustration of channel extinction ratio.....	21
Figure 13	– Illustration of free spectral range.....	22
Figure 14	– Illustration of polarization dependent centre wavelength (PDCW).....	23
Figure 15	– Illustration of X dB bandwidth.....	25
Figure 16	– Wavelength-selective branching device.....	26
Figure 17	– Wavelength-selective branching device.....	26
Figure 18	– Wavelength-selective branching device.....	26
Figure 19	– Wavelength-selective branching device.....	26
Figure A.1	– Example of a six-port device, with two input and four output ports.....	34
Figure A.2	– Illustration of transfer matrix coefficient.....	35
Figure B.1	– Uni-directional and bi-directional transmission system application of a 1 x 2 DM device.....	37
Figure B.2	– Illustration of a four-wavelength bidirectional system.....	39

Figure C.1 – Example of a wavelength multiplexer	40
Figure C.2 – Example of a wavelength demultiplexer	41
Figure C.3 – Example of a wavelength multiplexer/demultiplexer	42
Figure C.4 – Example of a wavelength router.....	43
Figure C.5 – Example of wavelength channel add/drop	44
Figure D.1 – Schematic configuration of a thin film filter WDM device	46
Figure D.2 – Structure of multilayer thin film	47
Figure D.3 – Typical characteristics of 1 510 nm and C-band WDM device using thin film filter technology.....	47
Figure E.1 – Structure of a fused bi-conical tapered 2x2 coupler.....	48
Figure E.2 – Typical scheme for a fused coupler.....	49
Figure E.3 – Typical characteristics of a fibre fused WDM device.....	49
Figure F.1 – Basic configuration of AWG	50
Figure F.2 – Example of AWG characteristics	51
Figure G.1 – Usage of fibre Bragg grating filter	52
Figure G.2 – Function and mechanism of fibre Bragg grating	52
Figure G.3 – Example of FBG filter characteristics	53
Table 1 – Three-level IEC specification structure	27
Table 2 – Standards interlink matrix.....	31

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – FIBRE OPTIC WDM DEVICES –

Part 1: Generic specification

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 62074-1 has been prepared by subcommittee SC 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This second edition cancels and replaces the first edition, published in 2009, and constitutes a technical revision.

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

- a) substantial updating to the definitions;
- b) the addition of informative Annexes C to G, giving examples of technical information concerning WDM devices.

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

FDIS	Report on voting
86B/3700/FDIS	86B/3722/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 in the IEC 62074 series, published under the general title *Fibre optic interconnecting devices and passive components – Fibre optic wdm devices*, 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.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – FIBRE OPTIC WDM DEVICES –

Part 1: Generic specification

1 Scope

This part of IEC 62074 applies to fibre optic wavelength division multiplexing (WDM) devices. These have all of the following general features:

- they are passive, in that they contain no optoelectronic or other transducing elements; however they may use temperature control only to stabilize the device characteristics; they exclude any optical switching functions;
- they have three or more ports for the entry and/or exit of optical power, and share optical power among these ports in a predetermined fashion depending on the wavelength;
- the ports are optical fibres, or optical fibre connectors.

This standard establishes uniform requirements for the following:

- optical, mechanical and environmental properties.

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 60027 (all parts), *Letter symbols to be used in electrical technology*

IEC 60050-731, *International Electrotechnical Vocabulary – Chapter 731: Optical fibre communication*

IEC 60695-11-5, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 61931, *Fibre optics – Terminology*

ISO 129-1, *Technical drawings – Indication of dimensions and tolerances – Part 1: General principles*

ISO 286-1, *Geometrical product specifications (GPS) – ISO coding system for tolerances of linear sizes – Part 1: Bases of tolerances and fits*

ISO 1101, *Geometrical product specifications (GPS) – Geometrical tolerancing – Tolerances of form, orientation, location and run-out*

ISO 8601, *Data elements and interchange formats – Information interchange – Representation of dates and times*

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-