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Standards

Irish Standard  
I.S. EN 61291-5-2:2017

# Optical amplifiers - Part 5-2: Qualification specifications - Reliability qualification for optical fibre amplifiers

**I.S. EN 61291-5-2:2017**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

I.S. EN 61291-5-2:2017 is the adopted Irish version of the European Document EN 61291-5-2:2017, Optical amplifiers - Part 5-2: Qualification specifications - Reliability qualification for optical fibre amplifiers

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EUROPEAN STANDARD

**EN 61291-5-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2017

ICS 33.180.30

Supersedes EN 61291-5-2:2002

English Version

**Optical amplifiers - Part 5-2: Qualification specifications -  
Reliability qualification for optical fibre amplifiers  
(IEC 61291-5-2:2017)**

Amplificateurs optiques - Partie 5-2: Spécifications de  
qualification - Qualification de fiabilité pour amplificateurs  
à fibres optiques  
(IEC 61291-5-2:2017)

Lichtwellenleiter-Verstärker - Teil 5-2:  
Anerkennungsspezifikation - Zuverlässigkeitsanerkennung  
für Lichtwellenleiter-Verstärker  
(IEC 61291-5-2:2017)

This European Standard was approved by CENELEC on 2017-03-01. 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.

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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.

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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**

**EN 61291-5-2:2017****European foreword**

The text of document 86C/1376/CDV, future edition 2 of IEC 61291-5-2, prepared by SC 86C "Fibre optic systems and active devices" of IEC/TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61291-5-2:2017.

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) 2017-12-02
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-06-02

This document supersedes EN 61291-5-2:2002.

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**Endorsement notice**

The text of the International Standard IEC 61291-5-2:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068-2-1	NOTE	Harmonized as EN 60068-2-1.
IEC 60068-2-6	NOTE	Harmonized as EN 60068-2-6.
IEC 61300-2-1	NOTE	Harmonized as EN 61300-2-1.
IEC 61300-2-2	NOTE	Harmonized as EN 61300-2-2.
IEC 61300-2-5	NOTE	Harmonized as EN 61300-2-5.
IEC 61300-2-9	NOTE	Harmonized as EN 61300-2-9.
IEC 61300-2-18	NOTE	Harmonized as EN 61300-2-18.
IEC 61300-2-19	NOTE	Harmonized as EN 61300-2-19.
IEC 61300-2-22	NOTE	Harmonized as EN 61300-2-22.
IEC 61300-2-42	NOTE	Harmonized as EN 61300-2-42.
IEC 61300-2-44	NOTE	Harmonized as EN 61300-2-44.

IEC 62005-2	NOTE	Harmonized as EN 62005-2.
IEC 62343-2	NOTE	Harmonized as EN 62343-2.
IEC 62572-3	NOTE	Harmonized as EN 62572-3.

## 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 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-731	-	International Electrotechnical Vocabulary - Chapter 731: Optical fibre communication	-	-
IEC 60068-2-2	2007	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	2007
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-21	-	Environmental testing - Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices	EN 60068-2-21	-
IEC 60068-2-27	-	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	-
IEC 60068-2-31	-	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	-
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 61291-1	-	Optical amplifiers - Part 1: Generic specification	EN 61291-1	-
IEC 61300-2-4	-	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-4: Tests - Fibre/cable retention	EN 61300-2-4	-
IEC 62005-9-1	-	Fibre optic interconnecting devices and passive components - Reliability - Part 9-1: Qualification of passive optical components	EN 62005-9-1	-



<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62005-9-2	-	Reliability of fibre optic interconnecting devices and passive optical components - Part 9-2: Reliability qualification for single fibre optic connector sets - Single mode	-	-
TIA 455-11	-	FOTP-11 Vibration Test Procedure for Fiber Optic Components and Cables	-	-

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**IEC 61291-5-2**

Edition 2.0 2017-01

# **INTERNATIONAL STANDARD**

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**Optical amplifiers –  
Part 5-2: Qualification specifications – Reliability qualification for optical fibre  
amplifiers**





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**IEC 61291-5-2**

Edition 2.0 2017-01

# **INTERNATIONAL STANDARD**

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**Optical amplifiers –  
Part 5-2: Qualification specifications – Reliability qualification for optical fibre  
amplifiers**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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ICS 33.180.30

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### OPTICAL AMPLIFIERS –

#### **Part 5-2: Qualification specifications – Reliability qualification for optical fibre amplifiers**

#### FOREWORD

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International Standard IEC 61291-5-2 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

This second edition cancels and replaces the first edition published in 2002. It constitutes a technical revision.

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

- a) removal of the contents on the relating quality management system from scope, terms and definitions, and the reliability requirements;
- b) moving fit-rate calculation to Annex B (informative);
- c) change of requirements for shock test;
- d) amendment of abbreviations related to changes a) and b).

The text of this International Standard is based on the following documents:

CDV	Report on voting
86C/1376/CDV	86C/1426/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61291 series, published under the general title *Optical amplifiers*, 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

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



## OPTICAL AMPLIFIERS –

### Part 5-2: Qualification specifications – Reliability qualification for optical fibre amplifiers

#### 1 Scope

This part of IEC 61291 applies to optical amplifiers (OAs) and optically amplified, elementary sub-systems for terrestrial applications, using active fibres (optical fibre amplifiers (OFAs)) containing rare-earth dopants, which are commercially available.

The black box approach is used in this document. The black box approach is adopted in order to give product specifications which are independent of OA implementation details. For reliability qualification purposes, some information about the internal components is needed; these internal parts are themselves treated as black boxes. This document gives requirements for the evaluation of OA reliability by combining the reliability of such internal black boxes.

The object of this document is to specify the minimum list of reliability qualification tests, requirements on failure criteria during testing and on reliability predictions, and give the relevant normative references to establish a standard method for the assessment of the reliability of OFA devices and sub-systems in order to minimize risks and to promote product development and reliability qualification.

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

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

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

IEC 60068-2-21, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-31, *Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 61291-1, *Optical fibre amplifiers – Part 1: Generic specification*

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