IEC 61291-5-2

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# INTERNATIONAL STANDARD

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

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## 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- withdrawn,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*