SLOVENSKI STANDARD

SIST EN 61291-5-2:2004

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Optični ojačevalci – 5-2. del: Kvalifikacijske specifikacije; Kvalifikacije zanesljivosti za ojačevalnike optičnih vlaken (IEC 61291-5-2:2002)*

Optical amplifiers - Part 5-2: Qualification specifications - Reliability qualification for optical fibre amplifiers (IEC 61291-5-2:2002)

ICS 33.180.30

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EUROPEAN STANDARD **EN 61291-5-2**

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ICS 33.180.30

English version

Optical amplifiers
Part 5-2: Qualification specifications - Reliability qualification for optical fibre amplifiers
(IEC 61291-5-2:2002)

Amplificateurs optiques
Partie 5-2: Spécifications de qualification - Qualification de fiabilité pour amplificateurs à fibres optiques
(CEI 61291-5-2:2002)

Lichtwellenleiter-Verstärker
Teil 5-2: Anerkennungsspezifikation - Zuverlässigkeitsanerkennung
(IEC 61291-5-2:2002)

This European Standard was approved by CENELEC on 2002-11-01. 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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, 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

Ref. No. EN 61291-5-2:2002 E

Foreword

The text of document 86C/434/FDIS, future edition 1 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 was approved by CENELEC as EN 61291-5-2 on 2002-11-01.

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)	2003-08-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2005-11-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes A, B and ZA are normative and annex C is informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61291-5-2:2002 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:

ISO 9001	NOTE	Harmonized as EN ISO 9001:2000 (not modified).
ISO 9004	NOTE	Harmonized as EN ISO 9004:2000 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

Publication	Year	Title	EN/HD	Year
IEC 60068-2-1	- [1)]	Environmental testing Part 2: Tests - Tests A: Cold	EN 60068-2-1	1993 [2)]
IEC 60068-2-2	- [1)]	Part 2: Tests - Test B: Dry heat	EN 60068-2-2	1993 [2)]
IEC 60068-2-3	- [1)]	Part 2: Tests - Test Ca: Damp heat, steady state	HD 323.2.3 S2	1987 [2)]
IEC 60068-2-6	- [1)]	Part 2: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	1995 [2)]
IEC 60068-2-14	- [1)]	Part 2: Tests - Test N: Change of temperature	EN 60068-2-14	1999 [2)]
IEC 60068-2-21	- [1)]	Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices	EN 60068-2-21	1999 [2)]
IEC 60068-2-27	- [1)]	Part 2: Tests - Test Ea and guidance: Shock	EN 60068-2-27	1993 [2)]
IEC 60068-2-32	- [1)]	Part 2: Tests - Test Ed: Free fall	EN 60068-2-32	1993 [2)]
IEC 60068-2-56	- [1)]	Part 2: Tests - Test Cb: Damp heat, steady state, primarily for equipment	HD 323.2.56 S1	1990 [2)]
IEC 61300-2-1	- [1)]	Fibre optic interconnecting devices and passive components - Basic test and measurement procedures Part 2-1: Tests - Vibration (sinusoidal)	EN 61300-2-1	1997 [2)]
IEC 61300-2-2	- [1)]	Part 2-2: Tests - Mating durability	EN 61300-2-2	1997 [2)]
IEC 61300-2-4	- [1)]	Part 2-4: Tests - Fibre/cable retention	EN 61300-2-4	1997 [2)]

[1)] Undated reference.

[2)] Valid edition at date of issue.

Publication	Year	Title	EN/HD	Year
IEC 61300-2-5	- [1]	Part 2-5: Tests - Torsion/twist	EN 61300-2-5	1997 [2]
IEC 61300-2-9	- [1]	Part 2-9: Tests - Shock	EN 61300-2-9	1997 [2]
IEC 61300-2-18	- [1]	Part 2-18: Tests - Dry heat - High temperature endurance	EN 61300-2-18	1997 [2]
IEC 61300-2-19	- [1]	Part 2-19: Tests - Damp heat (steady state)	EN 61300-2-19	1997 [2]
IEC 61300-2-22	- [1]	Part 2-22: Tests - Change of temperature	EN 61300-2-22	1997 [2]
IEC 61300-2-42	- [1]	Part 2-42: Tests - Static side load for connectors	EN 61300-2-42	1998 [2]
IEC 61291-1	- [1]	Optical fibre amplifiers Part 1: Generic specification	EN 61291-1	1998 [2]
IEC 61751	- [1]	Laser modules used for telecommunication - Reliability assessment	EN 61751	1998 [2]
ISO 9000	- [1]	Quality management systems Fundamentals and vocabulary	EN ISO 9000	2000 [2]

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
61291-5-2

Première édition
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Amplificateurs optiques –

Partie 5-2:
Spécifications de qualification – Qualification de fiabilité pour amplificateurs à fibres optiques

Optical amplifiers –

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

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Международная Электротехническая Комиссия

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL AMPLIFIERS –

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

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.

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.

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

FDIS	Report on voting
86C/434/FDIS	86C/462/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.

Annexes A and B form an integral part of this standard.

Annex C is for information only.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

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

INTRODUCTION

This International Standard is dedicated to the subject of reliability qualification of optical amplifiers. Since the technology is quite new and still evolving, amendments and new editions to this document can be expected.

Each abbreviation introduced in this International Standard is explained in the text, at least the first time it appears. However, for an easier understanding of the whole text, a list of all abbreviations used in this International Standard is given in annex C.

OPTICAL AMPLIFIERS –

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

1 Scope and object

This International Standard 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 IEC standard. 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 standard gives requirements for the evaluation of OA reliability by combining the reliability of such internal black boxes.

The objects of this International Standard are the following:

- to specify the requirements for the reliability assessment of OFAs;
- to provide assistance to the purchaser in the selection of consistently high quality OA products for his particular applications;
- to give the minimum list of reliability qualification tests, requirements on failure criteria during testing and on reliability predictions, and give the relevant normative references.

In particular, this International Standard is intended:

- 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;
- to establish means to determine the distribution of failures in time in order to enable the determination of equipment failure rates for specified end-of-life criteria.

In addition, guidance is given on:

- the controls a customer should make, prior to procurement of an OFA, on the test procedures an OFA manufacturer has in place in order to guarantee product reliability;
- the procedures to verify the reliability claims of an OFA manufacturer.

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 60068-2-1, *Environmental testing – Part 2: Tests. Tests A: Cold*

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

IEC 60068-2-3, *Environmental testing – Part 2: Tests. Test Ca: Damp heat, steady state*

IEC 60068-2-6, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14, *Environmental testing – Part 2: 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: Tests. Test Ea and guidance: Shock*

IEC 60068-2-32, *Environmental testing. Part 2: Tests. Test Ed: Free fall (Procedure 1)*

IEC 60068-2-56, *Environmental testing – Part 2: Tests. Test Cb: Damp heat, steady state, primarily for equipment*

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

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

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

IEC 61300-2-5, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-5: Tests – Torsion/twist*

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

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

IEC 61751, *Laser modules used for telecommunication – Reliability assessment*

ISO 9000, *Quality management systems – Fundamentals and vocabulary*