



SLOVENSKI STANDARD

SIST EN 61291-1:2001

01-februar-2001

Optical fibre amplifiers - Part 1: Generic specification (IEC 61291-1:1998)

Optical fibre amplifiers -- Part 1: Generic specification

Lichtwellenleiter-Verstärker -- Teil 1: Fachgrundspezifikation

Amplificateurs à fibres optiques -- Partie 1: Spécification générique

Ta slovenski standard je istoveten z: EN 61291-1:1998

[SIST EN 61291-1:2001](https://standards.iteh.ai/catalog/standards/sist/a5dc7c35-4fc4-49fe-b78c-08cf70312169/sist-en-61291-1-2001)

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ICS:

33.180.30 Optični ojačevalniki Optic amplifiers

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61291-1

August 1998

ICS 33.180.99

English version

Optical fibre amplifiers
Part 1: Generic specification
(IEC 61291-1:1998)

Amplificateurs à fibres optiques
Partie 1: Spécification générique
(CEI 61291-1:1998)

Lichtwellenleiter-Verstärker
Teil 1: Fachgrundspezifikation
(IEC 61291-1:1998)

This European Standard was approved by CENELEC on 1998-08-01. 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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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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

Foreword

The text of document 86C/193/FDIS, future edition 1 of IEC 61291-1, 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 61291-1 on 1998-08-01.

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) 1999-05-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2001-05-01

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

Endorsement notice

The text of the International Standard IEC 61291-1:1998 was approved by CENELEC as a European Standard without any modification.

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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.

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|--|---------------------------------------|----------------------|
| IEC 60793-1-1 | 1995 | Optical fibres Part 1: Generic specification Section 1: General | - | - |
| IEC 60825-1 | 1993 | Safety of laser products Part 1: Equipment classification, requirements and user's guide | EN 60825-1 + corr. February A11 | 1994 1995 1996 |
| IEC 60825-2 | 1993 | Part 2: Safety of optical fibre communication systems | EN 60825-2 + corr. March | 1994 1994 |
| IEC 60874-1 | 1993 | Connectors for optical fibres and cables Part 1: Generic specification | - | - |
| IEC 61290 | series | Optical fibre amplifiers - Basic specification | EN 61290 | series |

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**NORME
INTERNATIONALE
INTERNATIONAL
STANDARD**

**CEI
IEC**

61291-1

Première édition
First edition
1998-07

Amplificateurs à fibres optiques –

**Partie 1:
Spécification générique**

Optical fibre amplifiers –

**Part 1:
Generic specification**

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPTICAL FIBRE AMPLIFIERS –**Part 1: Generic specification**

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 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 61291-1 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/193/FDIS | 86C/217/RVD |

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Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table. [SIST EN 61291-1:2001](https://standards.iteh.ai/catalog/standards/sist/a5dc7c35-4fc4-49fe-b78c-08cf70312169/sist-en-61291-1-2001)

Annexes A, B and C are for information only.

INTRODUCTION

As far as can be determined, this is the first International Standard on the subject of optical fibre amplifiers. The technology is quite new and still emerging, hence amendments and new editions to this standard can be expected.

Each abbreviation introduced 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 is given in annex A.

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OPTICAL FIBRE AMPLIFIERS –

Part 1: Generic specification

1 General

1.1 Scope and object

This part of IEC 61291 applies to optical fibre amplifiers (OFAs) and optically amplified, elementary subsystems. It applies only to OFAs using active fibres, containing rare-earth dopants, presently commercially available.

The object of this standard is:

- to establish uniform requirements for transmission, operation, reliability and environmental properties of OFAs;
- to provide assistance to the purchaser in the selection of consistently high-quality OFA products for his particular applications.

NOTE – This International Standard has been prepared from the experience with Erbium-doped silica-based fibre amplifiers, operating in the 1 550 nm wavelength region. Future OFAs, based on different active fibres and possibly operating in different wavelengths regions, are not intended to be excluded from this International Standard and may lead to additional definitions and test methods, as well as to modifications of the existing ones.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61291. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 61291 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60793-1-1:1995, *Optical fibres – Part 1: Generic specification – Section 1: General*

IEC 60825-1:1993, *Safety of laser products – Part 1: Equipment classification, requirements and user's guide*

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IEC 60825-2:1993, *Safety of laser products – Part 2: Safety of optical fibre communication systems*

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IEC 60874-1:1993, *Connectors for optical fibres and cables – Part 1: Generic specification*

IEC 61290 (all parts), *Optical fibre amplifiers – Basic specification*

1.3 Parameters

Parameters specified for OFAs are those characterizing the transmission, operation, reliability and environmental properties of the OFA seen as a “black box” from a general point of view. In the sectional and detail specifications a subset of these parameters will be specified according to the type and application of the particular OFA device or subsystem.

2 Classification

OFAs are devices which provide optical amplification using an optical fibre as the active medium. Conventional fibres can be used, exploiting non-linear effects, such as Raman and Brillouin stimulated emission. As indicated under the scope, this generic specification applies only to OFAs using active fibres, containing rare earth dopants and presently commercially available.

Different categories of OFAs can be envisaged depending on the composition of the active fibres used and the use of the OFA itself.

These categories will be identified by a capital letter, a number and a lower case letter, as follows:

Capital letter:

A OFAs using silica-based fibres doped with Erbium ions to produce an active fibre.

Number:

- 1 Power amplifiers (post-amplifiers or booster amplifiers)
- 2 Pre-amplifiers
- 3 Line amplifiers
- 4 OAT (optically amplified transmitter)
- 5 OAR (optically amplified receiver)

Lower case letter:

- a Amplifiers for analogue, single (wavelength) channel transmission
- b Amplifiers for digital, single (wavelength) channel transmission
- c Amplifiers for digital, multi-channel (wavelength) transmission

EXAMPLE – Category A2b refers to optical pre-amplifiers for digital transmission which use a silica-based fibre doped with Erbium ions to produce an active fibre.

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The *power amplifier* is a high saturation-power OFA device to be used directly after the optical transmitter to increase its signal power level.

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The *pre-amplifier* is a very low noise OFA device to be used directly before an optical receiver to improve its sensitivity.

The *line amplifier* is a low noise OFA device to be used between passive fibre sections to increase the regeneration lengths or in correspondence with a point-multipoint connection to compensate for branching losses in the optical access network.