



SLOVENSKI STANDARD

SIST EN 61281-1:2001

01-februar-2001

Fibre optic communication subsystems - Part 1: Generic specification (IEC 61281-1:1999)

Fibre optic communication subsystems -- Part 1: Generic specification

Lichtwellenleiter-Kommunikationsuntersysteme -- Teil 1: Fachgrundspezifikation

Sous-systèmes de télécommunications par fibres optiques -- Partie 1: Spécification générique

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Ta slovenski standard je istoveten z: EN 61281-1:1999

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ICS:

| | | |
|-----------|---------------------------------------|--------------------------------|
| 33.180.01 | Sistemi z optičnimi vlakni na splošno | Fibre optic systems in general |
|-----------|---------------------------------------|--------------------------------|

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English version

Fibre optic communication subsystems
Part 1: Generic specification
(IEC 61281-1:1999)

Sous-systèmes de télécommunications
par fibres optiques
Partie 1: Spécification générique
(CEI 61281-1:1999)

Lichtwellenleiter-
Kommunikationsuntersysteme
Teil 1: Fachgrundspezifikation
(IEC 61281-1:1999)

This European Standard was approved by CENELEC on 1999-04-01. 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.

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/225/FDIS, future edition 1 of IEC 61281-1, 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 61281-1 on 1999-04-01.

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) 2000-01-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2002-01-01

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 and B are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61281-1:1999 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 60793-2 | 1992 | Optical fibres Part 2: Product specification | - | - |
| IEC 60794-2 | 1989 | Optical fibre cables Part 2: Product specification | - | - |
| IEC 60874-1 | 1993 | Connectors for optical fibres and cables Part 1: Generic specification | - | - |
| IEC 61291-1 | 1998 | Optical fibre amplifiers Part 1: Generic specification | EN 61291-1 | 1998 |

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NORME
INTERNATIONALE
INTERNATIONAL
STANDARD

CEI
IEC
61281-1

Première édition
First edition
1999-01

**Sous-systèmes de télécommunications
par fibres optiques –**

**Partie 1:
Spécification générique**

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Fibre (optic communication) subsystems –

Part 1: [SIST EN 61281-1:2001](#)

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Generic specification

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
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For price, see current catalogue*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIBRE OPTIC COMMUNICATION SUBSYSTEMS –**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 61281-1 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/225/FDIS | 86C/233/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.

Annexes A and B are for information only.

FIBRE OPTIC COMMUNICATION SUBSYSTEMS –

Part 1: Generic specification

1 Scope

This part of IEC 61281 is a generic specification for fibre optic communication subsystems (FOCSs), and is structured according to the IEC Quality Assessment System (IECQ).

Subsystems are classified in families having a common sectional specification. Each sectional specification is supplemented by blank detail specifications, and detail specifications appropriate to the specific individual type or types of subsystems.

The parameters defined herein form a specifiable minimum set of specifications that are common to all fibre optic subsystems. Additional parameters may be needed depending on the particular application and technology. Those additional parameters will be specified in the relevant sectional specification and/or detail specification, as appropriate.

Each specified parameter may be measured using one of the test procedures. The use of these parameters for system design is given in design guides.

2 Normative references (standards.iteh.ai)

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61281. 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 61281 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 60793-2:1992, *Optical fibres – Part 2: Product specification*

IEC 60794-2:1989, *Optical fibre cables – Part 2: Product specification*

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

IEC 61291-1:1998, *Optical fibre amplifiers – Part 1: Generic specification*

3 Definitions

For the purpose of this part of IEC 61281, the following functional and operational definitions apply. Within a definition, terms defined elsewhere are in italics.

3.1

active optical device

an *optical device* having gain of power

NOTE – Examples include active *branching devices*, *optical amplifiers*, *optical modulators*, *optical regenerators*, and *optical repeaters*.

3.2

attenuation

the reduction of power (expressed in dB) between the end points of a *fibre optic cable plant* or of a *passive optical device*

3.3

attenuator, optical

a *passive optical device* which produces a controlled signal attenuation when inserted in the optical path

3.4

bandwidth

the difference (expressed in Hz) between the highest and lowest modulation frequencies at which the modulus of the power spectrum or of the complex transfer function is one-half of the peak value of the modulus

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3.5

basic fibre optic system (BFOS)

the serial combination of a transmit terminal device, a fibre optic link, and a receive terminal device

3.6

bit-error ratio (BER)

the number of errored bits divided by the total number of bits, over some stipulated period of time

3.7

branching device (BD)

an *optical device* which has three or more optical ports

NOTE – Branching devices may be either passive (PBD) or active (ABD).

3.8

carrier-to-noise ratio (CNR)

the ratio (expressed in dB) of carrier power to noise power in a channel of defined bandwidth, prior to any non-linear processing

3.9**centre wavelength**

the mean of the closest spaced *half-power wavelengths*, one above and one below the *peak wavelength* of an optical spectrum

NOTE – Other spectral wavelengths are centroidal wavelengths, half-power wavelengths, and peak wavelengths.

3.10**centroidal wavelength**

the mean or average wavelength of an optical spectrum

NOTE – Other spectral wavelengths are *centre wavelengths*, *half-power wavelengths*, and *peak wavelengths*.

3.11**chirping**

a change of the wavelength or optical frequency of an intensity-modulated *transmitter* as a function of the instantaneous intensity of the modulating signal

NOTE – When chirped signals are transmitted through optical fibre, the signal waveform is distorted by *chromatic dispersion*. This process may cause a degradation in the *quality of performance*, designated as a chirping penalty.

3.12**combiner, optical**

a wavelength-independent *branching device* in which the number of input ports exceeds the number of output ports

3.13**connector, fibre optic**

a fibre optic component providing optical interconnection/disconnection of *fibre optic cable sections*, *optical devices*, and *terminal devices*

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3.14**(chromatic) dispersion**

the rate of change in group delay to wavelength (usually expressed in ps/nm) between the end points of the *fibre optic cable plant*

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3.15**environmental conditions**

the range of temperatures, humidity, vibration levels, etc. within which the *optical device* can be stored, or operated, or shipped and still meet all its specified parameter values

3.16**extinction ratio**

in a digital transmission system, the ratio (expressed in dB) of the average power level of logical "1" to the average power level of logical "0"

3.17**fibre optic cable plant (FOCP)**

the serial combination of *fibre optic cable sections*, *connectors*, and *splices* providing the optical path between two *terminal devices*, between two *optical devices*, or between a *terminal device* and an *optical device*

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3.18**fibre optic cable section**

a single (unjointed) optical fibre cable

3.19**fibre optic communication system**

an assembly of *fibre optic subsystems* for transmitting information

3.20**fibre optic link (FOL)**

the serial combination of a *fibre optic cable plant* and *optical devices*, providing the optical path between a *transmit terminal device* and a *receive terminal device*

NOTE – This is equivalent to a *basic fibre optic subsystem* minus the *transmitter* and *receiver*.

3.21**fibre optic subsystem**

an assembly of interconnected *basic fibre optic subsystems*. The assembly is specified at defined interfaces within the fibre optic system

3.22**full-width at half-maximum (FWHM)**

the positive difference of the closest spaced *half-power wavelengths*, one above and one below the *peak wavelength* of an optical spectrum

NOTE 1 – Other spectral widths are *N-dB-down widths* and *root-mean-square widths*.

NOTE 2 – The FWHM equals the *N-dB-down width* where $N = 3$.

3.23**half-power wavelength**

a wavelength corresponding to a half peak power value of the optical spectrum

NOTE – Other spectral wavelengths are *central wavelengths*, *centroidal wavelengths*, and *peak wavelengths*.

3.24**harmonic distortion**

distortion in a system or transducer characterized by the presence at the output of spectral components which are harmonically related to the spectral components of the input signal [1]*

3.25**input power range**

for an optical fibre amplifier, the range of optical power levels such that, for any input signal power of the OFA which lies within this range, the corresponding output signal power lies in the specified output power range, where the OFA performance is ensured

3.26**input signal bandwidth, analogue**

the *bandwidth* at the electrical input to the *transmitter*

* Figures in square brackets refer to the bibliography given in annex B.