



SLOVENSKI STANDARD
SIST EN 61663-1:2000
01-junij-2000

Lightning protection - Telecommunication lines - Part 1: Fibre optic installations

Lightning protection - Telecommunication lines -- Part 1: Fibre optic installations

Blitzschutz - Telekommunikationsleitungen -- Teil 1: Lichtwellenleiteranlagen

Protection contre la foudre - Lignes de télécommunication -- Partie 1: Installations à fibres optiques

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Ta slovenski standard je istoveten z: EN 61663-1:1999

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ICS:

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91.120.40	Zaščita pred strelo	Lightning protection

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NORME EUROPÉENNE
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English version

Lightning protection - Telecommunication lines
Part 1: Fibre optic installations
(IEC 61663-1:1999 + corrigendum 1999)

Protection contre la foudre
Lignes de télécommunication
Partie 1: Installations à fibres optiques
(CEI 61663-1:1999 +
corrigendum 1999)

Blitzschutz
Telekommunikationsleitungen
Teil 1: Lichtwellenleiteranlagen
(IEC 61663-1:1999 +
Corrigendum 1999)

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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 81/136/FDIS, future edition 1 of IEC 61663-1, prepared by IEC TC 81, Lightning protection, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61663-1 on 1999-10-01.

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) 2000-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2002-10-01

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, C, D, G and ZA are normative and annexes E, F, H and I are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61663-1:1999 and its corrigendum October 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 61662	1995	Assessment of the risk of damage due to lightning	-	-
IEC 61024-1 (mod)	1990	Protection of structures against lightning Part 1: General principles	ENV 61024-1	1995
IEC 61024-1-1	1993	Protection of structures against lightning Part 1: General principles Section 1: Guide A: Selection of protection levels for lightning protection systems	-	-
IEC 61312-1	1995	Protection against lightning electromagnetic impulse Part 1: General principles	-	-
ITU Lightning Handbook		The protection of telecommunication lines and equipment against lightning discharges, ITU, 1974, 1978 and 1995	-	-

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**Protection contre la foudre –
Lignes de télécommunication –**

**Partie 1:
Installations à fibres optiques**

iTeh STANDARD PREVIEW

**Lightning protection –
Telecommunication lines –**

SIST EN 61663-1:2000

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**Part 1:
Fibre optic installations**

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LIGHTNING PROTECTION – TELECOMMUNICATION LINES –

Part 1: Fibre optic installations

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.
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- 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.
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- 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 61663-1 has been prepared by IEC technical committee 81: Lightning protection.

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

FDIS	Report on voting
81/136/FDIS	81/142/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, B, C, D and G form an integral part of this standard.

Annexes E, F, H and I are for information only.

LIGHTNING PROTECTION – TELECOMMUNICATION LINES –

Part 1: Fibre optic installations

1 Scope and object

This part of IEC 61663 concerns the lightning protection of telecommunication lines in fibre optic installations.

Its object is to limit the number of possible primary failures occurring in the optical fibre cable in a specified installation to within values which are lower than or equal to the limit value, defined as the tolerable frequency of primary failures.

Consequently this standard points out the method for calculating the possible number of primary failures; choosing the feasible protective measures and indicating the tolerable frequency of primary failures.

Secondary failures are not considered in this standard.

The tests described in annex G of this standard are convenient only for the risk evaluation associated with lightning in fibre optic installations. Tests for the qualification of a cable design are outside the scope of this standard.

2 Normative references

[SIST EN 61663-1:2000](https://standards.iteh.ai/catalog/standards/sist/cb48203a-29ee-4548-a18e-)

<https://standards.iteh.ai/catalog/standards/sist/cb48203a-29ee-4548-a18e->

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61663. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61663 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 61662:1995, *Assessment of the risk of damage due to lightning*

IEC 61024-1:1990, *Protection of structure against lightning – Part 1: General principles*

IEC 61024-1-1:1993, *Protection of structures against lightning – Part 1: General principles – Section 1: Guide A: Selection of protection levels for lightning protection systems*

IEC 61312-1:1995, *Protection against lightning electromagnetic impulse – Part 1: General principles*

ITU Lightning Handbook: *The protection of telecommunication lines and equipment against lightning discharges*, ITU, 1974, 1978 and 1995

3 Definitions

For the purpose of this part of IEC 61663, the following definitions apply.

3.1

primary failures

primary failures on the optical fibre cable are those which cause the interruption of service due to breakage of one or more optical fibres, an unacceptable increase in attenuation of the optical fibre, or an interruption in the remote power supply in the equipment if powered by metallic conductors inside the optical cable.

Primary failures are also those that damage the cable, such as destruction of the protective covering, moisture barrier, interconnecting elements and protective jelly, which, due to other mechanisms acting on the damage, lead to an unacceptable increase in attenuation of the optical fibre

3.2

secondary failures

secondary failures on the optical fibre cable are those that damage the cable, such as the puncturing of the plastic protective covering (pinholing), but do not cause primary failures

3.3

frequency of primary failures (F_p)

average annual number of expected primary failures in an optical fibre installation due to direct lightning flashes. The inverse of the F_p due to lightning will yield the mean time between primary failure in years

3.4

risk of primary failures (R_d)

probable average annual loss of function in the optical fibre installation due to direct lightning flashes

3.5

tolerable frequency of primary failures (F_a)

maximum value of expected average annual frequency of primary failures in an optical fibre installation due to direct lightning flashes not requiring additional protective means due to direct lightning flashes

3.6

tolerable risk of primary failures (R_a)

maximum level of the risk of primary failures, R_d , due to direct lightning flashes, not requiring additional protective means

3.7

direct lightning flash

lightning flash to aerial cable or to the ground surface within the equivalent arcing distance, D , from buried cable

3.8

direct lightning flash frequency (N_d)

expected average annual number of direct lightning flashes to an optical fibre installation

3.9**equivalent arcing distance (D)**

average distance from buried cable at which a lightning flash can arc to the cable

3.10**failure current (I_a)**

minimum peak value of the lightning current giving rise to a direct arc on the cable and causing primary failures

3.11**sheath breakdown current (I_s)**

current flowing in the metallic sheath which causes breakdown voltages between metallic elements inside the cable core and the metallic sheath, thus leading to primary failures

3.12**connection current (I_c)**

minimum current value causing primary failures (see 3.1), evaluated with the test for surge current resistibility of the interconnecting elements (see G.3)

3.13**interconnecting elements**

metallic elements connecting metallic parts of optical fibre cable at joints and cable ends

3.14**test current (I_t)**

current causing primary failures which is evaluated with the test for surge current resistibility shown in G.3 for interconnecting elements and in G.4 or G.5 for buried or aerial cables respectively

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3.15**impulse current (I_p)**

current to be used in the test for surge current resistibility of optical fibre cables. The test generator of this current is under consideration [2]*

NOTE – Test currents used in certain countries include the following:

- double exponential waveform current with a rise time of 10 μ s and a time to half value of 350 μ s (10/350 μ s waveform);
- damped oscillatory current with a maximum time-to-peak value of 15 μ s and a maximum frequency of 30 kHz. The time to half value of its waveform envelope shall be 40 μ s to 70 μ s. These values apply to the waveforms measured with the test sample in place.

3.16**breakdown voltage (U_b)**

impulse breakdown voltage between metallic elements inside the cable core and the metallic sheath of the optical cable

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

3.17**damage correction factor (K_d)**

factor which allows a conservative evaluation of the frequency of primary failures

NOTE – The derivation of factor K_d is explained in annex E.

3.18**surge protective device (SPD)**

device that is intended to limit transient overvoltages and divert surge currents. It contains at least one non-linear component

3.19**equipotential bonding bar (EBB)**

an electrically conductive bar whose electric potential is used as common reference, and to which metal installation, extraneous conductive parts, electrical power and telecommunication lines and other cables can be bonded (see IEC 61024-1)

3.20**direct lightning current to aerial cables (J)**

the minimum lightning current which strikes an aerial cable causing a flashover to ground

3.21**exposed structure**

a structure, e.g. telecommunication tower, high building, which needs to be protected against direct lightning strokes, as required by IEC 61024-1-1

3.22**thunderstorm days (T_d)**

number of thunderstorm days per year obtained from isokeraunic maps (see IEC 61024-1-1)

3.23**ground flash density (N_g)**

average ground flash density expressed in flashes per square kilometre per year, concerning the region where the structure or the optical fibre cable is located

3.24**lightning collection area**

an area of ground surface which has the same annual frequency of direct lightning as the structure or the line

3.25**stroke diversion factor**

for an isolated structure or line, the lightning collection area is the area enclosed within the border line obtained from the interception between the ground surface and a straight line with 1/3 slope which passes from the upper parts of the structure or line (touching it there) and rotating around it. The number 3, which is the reverse of the slope number, is the stroke diversion factor (see IEC 61024-1-1)

3.26**telecommunication line or network**

a transmission medium intended for communication between equipment that may be located in separate buildings