SLOVENSKI STANDARD
SIST EN 61663-2:2002

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Lightning protection - Telecommunication lines -- Part 2: Lines using metallic conductors

Lightning protection - Telecommunication lines -- Part 2: Lines using metallic conductors

Blitzschutz - Telekommunikationsleitungen -- Teil 2: Leitungen mit metallischen Leitern

Protection contre la foudre - Lignes de télécommunication -- Partie 2: Lignes utilisant des conducteurs métalliques

Ta slovenski standard je istoveten z: **EN 61663-2:2001**

ICS:

33.040.50	Vodi, zveze in tokokrogi	Lines, connections and circuits
91.120.40	Zaģ¦ ita pred strelo	Lightning protection

SIST EN 61663-2:2002 **en**

EUROPEAN STANDARD **EN 61663-2**

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ICS 29.020; 33.040; 91.120.40

English version

Lightning protection - Telecommunication lines Part 2: Lines using metallic conductors (IEC 61663-2:2001)

Protection contre la foudre -
Lignes de télécommunication
Partie 2: Lignes utilisant des conducteurs métalliques
(CEI 61663-2:2001)

Blitzschutz -
Telekommunikationsleitungen
Teil 2: Leitungen mit metallischen Leitern
(IEC 61663-2:2001)

This European Standard was approved by CENELEC on 2001-05-01. 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

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Foreword

The text of document 81/164/FDIS, future edition 1 of IEC 61663-2, prepared by IEC TC 81, Lightning protection, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61663-2 on 2001-05-01.

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) 2002-02-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2002-05-01

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 and ZA are normative and annexes D, E, F, G and H are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61663-2:2001 was approved by CENELEC as a European Standard without any modification.

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 60364-4-443 (mod)	1995	Electrical installations of buildings Part 4: Protection for safety Chapter 44: Protection against overvoltages - Section 443: Protection against overvoltages of atmospheric origin or due to switching	HD 384.4.443 S1	2000
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	-	-
IEC 61662	1995	Assessment of the risk of damage due to lightning	-	-
IEC 61663-1 + corr. October	1999 1999	Lightning protection - Telecommunication lines Part 1: Fibre optic installations	EN 61663-1	1999
ITU-T Recommendation K.12	1995	Characteristics of gas discharge tubes for the protection of telecommunications installations	-	-
ITU-T Recommendation K.20	1996	Resistibility of telecommunication switching equipment to overvoltages and overcurrents	-	-
ITU-T Recommendation K.21	1996	Resistibility of subscriber's terminal to overvoltages and overcurrents	-	-
ITU-T Recommendation K.22	1995	Overvoltage resistibility of equipment connected to an ISDN T/S bus	-	-

Publication	Year	Title	EN/HD	Year
ITU-T Recommendation K.27	1996	Bonding configurations and earthing inside a telecommunication building	-	-
ITU-T Recommendation K.28	1993	Characteristics of semiconductor arrester assemblies for the protection of telecommunications installations	-	-
ITU-T Recommendation K.31	1993	Bonding configurations and earthing of telecommunication installations inside a subscriber's building	-	-
-	-	Application of equipotential bonding and earthing in buildings with information technology equipment	EN 50310	2000

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Protection contre la foudre – Lignes de télécommunication –

Partie 2: Lignes utilisant des conducteurs métalliques

Lightning protection – Telecommunication lines –

Part 2: Lines using metallic conductors

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LIGHTNING PROTECTION – TELECOMMUNICATION LINES –

Part 2: Lines using metallic conductors

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 61663-2 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
81/164/FDIS	81/169/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, B and C form an integral part of this standard.

Annexes D, E, F, G and H are for information only.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

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

INTRODUCTION

Lightning protection of telecommunication lines using metallic conductors concerns protection against overvoltages and overcurrents on such lines due to lightning. Overvoltages and overcurrents are characterized by parameters such as peak value, front time, time to half-value and specific energy. Parameters of expected overvoltages and overcurrents consist of highly varying values, statistically distributed, which also depend on several factors, for example, location and line characteristics.

Therefore a lightning protection method for telecommunication lines, in accordance with this standard, cannot guarantee absolute protection to the line and connected equipment; however, application of this standard will significantly reduce the risk of damage caused by lightning to the line and connected equipment.

The procedure for the application of this standard is given in annex A.

LIGHTNING PROTECTION – TELECOMMUNICATION LINES –

Part 2: Lines using metallic conductors

1 Scope and object

This part of IEC 61663 deals with protection against lightning of outdoor telecommunication lines using metallic conductors (for example, access networks, lines between buildings).

These lines concern:

– telecommunication lines connecting a switch with a network termination (NT1);

– telecommunication or signal lines connecting equipment located in different buildings, e.g. ISDN lines or signal lines between computers.

NOTE In this standard, such lines are called "telecommunication lines".

The object of this standard is to protect telecommunication lines and connected equipment against the direct and indirect influence of lightning by limiting the risk of damage due to overvoltages and overcurrents, liable to occur in these lines, to values which are lower than or equal to the tolerable risk of damage. For more details, see annex A.

The type of building can also have an effect on the risk assessment of lightning damage to telecommunication lines, as well as the physical layout of the equipment installation. However, these and other similar aspects are covered by appropriate specific standards and are beyond the scope of this standard.

Fibre optical cable with metallic pairs in the cable core must be protected, following the requirements of this standard, together with those requirements defined in IEC 61663-1.

2 Normative references

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 ISO and IEC maintain registers of currently valid International Standards.

IEC 60364-4-443:1995, *Electrical installations of buildings – Part 4: Protection for safety – Chapter 44: Protection against overvoltages – Section 443: Protection against overvoltages of atmospheric origin or due to switching*

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*

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

IEC 61663-1:1999, *Lightning protection – Telecommunication lines – Part 1: Fibre optics installations*

ITU-T Recommendation K.12:1995, *Characteristics of gas discharge tubes for the protection of telecommunications installations*

ITU-T Recommendation K.20:1996, *Resistibility of telecommunication switching equipment to overvoltages and overcurrents*

ITU-T Recommendation K.21:1996, *Resistibility of subscriber's terminal to overvoltages and overcurrents*

ITU-T Recommendation K.22:1995, *Overvoltage resistibility of equipment connected to an ISDN T/S bus*

ITU-T Recommendation K.27:1996, *Bonding configurations and earthing inside a telecommunication building*

ITU-T Recommendation K.28:1993, *Characteristics of semiconductor arrester assemblies for the protection of telecommunications installations*

ITU-T Recommendation K.31:1993, *Bonding configurations and earthing of telecommunication installations inside a subscriber's building*

EN 50310:1998, *Application of equipotential bonding and earthing at premises with information technology equipment*

3 Definitions

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

3.1
expected loss per damage δ
relative amount of expected service loss per damage δ caused by lightning to telecommunication line

3.2
expected loss per damage caused by direct lightning to aerial line δ_a
relative amount of expected service loss per damage δ_a caused by direct lightning to aerial telecommunication line

3.3
expected loss per damage caused by direct lightning to buried line δ_b
relative amount of expected service loss per damage δ_b caused by direct lightning to buried telecommunication line

3.4
expected loss per damage caused by indirect lightning to telecommunication line δ_{pi}
relative amount of expected service loss per damage δ_{pi} caused by indirect lightning to telecommunication line

3.5
expected loss per damage caused by direct lightning to exposed structure δ_{ps}
relative amount of expected service loss per damage δ_{ps} caused by direct lightning to exposed structure where telecommunication line enters

3.6
equipotential bonding bar EBB
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 3.19 of IEC 61663-1)

3.7
tolerable frequency of damage F_a
maximum value of expected average annual frequency of damage to a telecommunication line due to direct and indirect lightning flashes not requiring additional protective means

3.8
frequency of damage F_p
average annual occurrences of expected damage to the telecommunication line due to lightning

NOTE The inverse of F_p yields the mean time between occurrences of damage in years.

3.9
frequency of damage caused by direct lightning to aerial line F_{pa}
average annual occurrences of expected damage to aerial telecommunication line caused by direct lightning

3.10
frequency of damage caused by direct lightning to buried line F_{pb}
average annual occurrences of expected damage to buried telecommunication line caused by direct lightning

3.11
frequency of damage caused by indirect lightning to telecommunication line F_{pi}
average annual occurrences of expected damage to telecommunication line caused by indirect lightning

3.12
frequency of damage caused by direct lightning to exposed structure F_{ps}
average annual occurrences of expected damage caused by direct lightning to exposed structure where telecommunication line enters

3.13
direct lightning current *I*
peak value of the lightning current striking the structure, which causes a sheath breakdown, current I_s or a failure wire current I_c in shielded or unshielded cable, respectively

3.14
failure current I_a
minimum peak value of the lightning current giving rise to a direct arc to or from the cable and causing damage

3.15
failure wire current I_c
current flowing in the metallic wire of the telecommunication cable which causes damage to the cable

3.16
sheath breakdown current I_s
current flowing in the metallic sheath of the telecommunication cable which causes breakdown voltage between metallic conductors inside the cable core and the metallic sheath

3.17
damage correction factor K_d
factor which allows a conservative evaluation of the frequency of damage

NOTE The derivation of factor K_d is explained in annex E of IEC 61663-1.

3.18
environmental factor K_e
factor which takes into account protective and shielding properties of the area where the line section is installed to the direct and indirect lightning effects on the line section itself

3.19
installation factor K_i
factor which takes into account the installation conditions, i.e. above (aerial) or below (buried) ground, of line section

3.20
protection factor K_p
factor taking into account the effect of protection means

3.21
shielding factor K_{si}
factor which characterizes the cable-shielding characteristics of each line section

3.22
conventional line-section length L_{ci}
product between the environmental factor K_{ei} of the area where the i^th^ line section is installed, the shielding factor K_{si}, the installation factor K_{ii} and the length L_i of the i^{th} line section

$$L_{ci} = K_{ei} \times K_{si} \times K_{ii} \times L_i$$