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Protection against lightning - Part 2: Risk management

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 01/25

Obsahuje: EN IEC 62305-2:2024, IEC 62305-2:2024

Oznámením tejto normy sa od 31.10.2027 ruší
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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62305-2

October 2024

ICS 29.020; 91.120.40

Supersedes EN 62305-2:2012

English Version

Protection against lightning - Part 2: Risk management (IEC 62305-2:2024)

Protection contre la foudre - Partie 2: Évaluation des risques
(IEC 62305-2:2024)

Blitzschutz - Teil 2: Risiko-Management
(IEC 62305-2:2024)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 62305-2:2024 E

European foreword

The text of document 81/769/FDIS, future edition 3 of IEC 62305-2, prepared by TC 81 "Lightning protection" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62305-2:2024.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2025-10-31
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2027-10-31

This document supersedes EN 62305-2:2012 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 62305-2:2024 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 standard indicated:

IEC 60364-4-44	NOTE	Approved as HD 60364-4-444
IEC 61000-4-5:2014	NOTE	Approved as EN 61000-4-5:2014 (not modified)
IEC 60079-10-1	NOTE	Approved as EN IEC 60079-10-1
IEC 60079-10-2	NOTE	Approved as EN 60079-10-2
IEC 60664-1:2020	NOTE	Approved as EN IEC 60664-1:2020 (not modified)
IEC 61643-11:2011	NOTE	Approved as EN 61643-11:2012 +A11:2018

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61643	series	Low-voltage surge protective devices -- Part 1: Surge protective devices connected to low-voltage power distribution systems - Requirements and tests	EN IEC 61643	series
IEC 62305-1	2024	Protection against lightning - Part 1: General principles	EN IEC 62305-1	2024
IEC 62305-3	2024	Protection against lightning - Part 3: Physical damage to structures and life hazard	EN IEC 62305-3	2024
IEC 62305-4	2024	Protection against lightning - Part 4: Electrical and electronic systems within structures	EN IEC 62305-4	2024
IEC 62793	-	Thunderstorm warning systems - Protection against lightning	EN IEC 62793	-
IEC 62858	-	Lightning density based on lightning location systems (LLS) - General principles	EN IEC 62858	-

IEC 62305-2

Edition 3.0 2024-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Protection against lightning – Part 2: Risk management

Protection contre la foudre – Partie 2: Évaluation des risques

IEC 62305-2:2024-09(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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PROTECTION AGAINST LIGHTNING –

Part 2: Risk management

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). 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. 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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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 62305-2 has been prepared by IEC technical committee 81: Lightning protection. It is an International Standard.

This third edition cancels and replaces the second edition, published in 2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) The concept of a single risk, to combine loss of human life and loss due to fire, has been introduced.
b) The concept of frequency of damage that can impair the availability of the internal systems within the structure has been introduced.

c) The lightning ground strike-point density N_{SG} has been introduced replacing the lightning flash density N_G in the evaluation of expected average annual number of dangerous events.

d) Reduction of a few risk components can be achieved by the use of preventive temporary measures activated by means of a thunderstorm warning system (TWS) compliant with IEC 62793. The risk of direct strike to people in open areas has been introduced, considering the reduction of that risk using a TWS.

The text of this International Standard is based on the following documents:

Draft	Report on voting
81/769/FDIS	81/772/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 62305 series, published under the general title *Protection against lightning*, can be found on the IEC website.

The following differing practices of a less permanent nature exist in the countries indicated below.

In Germany, the value of r_p = 1 applies for all cases. For the risk components R_B, R_C, R_M, R_V, R_W and R_Z P_{TWS} = 1 is assumed. For LF1 and LF2 the highest values given in Table C.2 should be used.

In Greece, the value of P_{TWS} = 1 for all cases is assumed.

In Italy, calculating both the risk of loss of human life, RL1 in Equation (7), and the risk of loss due to physical damages, RL2 in Equation (8), and comparing each risk with the tolerable risk is required. Protection is achieved when both risks, RL1 and RL2, are less than the tolerable value.

In the Netherlands and South Africa, Annex D and Annex E should not be applied for usual studies.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Lightning flashes to earth can be hazardous to structures and to lines supplying the structure.

These hazards can result in:

– damage to the structure and to its contents,
– failure of associated electrical and electronic systems,
– injury to living beings in or close to the structure.

Consequential effects of the damage and failures can be extended to the surroundings of the structure or can involve its environment. Moreover, regardless of the extent of loss, the availability of the structure and its internal systems can be unacceptably impaired if the frequency of damage is high.

To reduce the frequency of damage and the loss due to lightning, protection measures can be required. Whether they are necessary, and to what extent, should be determined by frequency of damage and risk assessment.

NOTE 1 The decision to provide lightning protection can be taken regardless of the outcome of frequency of damage or risk assessment where there is a desire that there be no avoidable damages.

NOTE 2 IEC 60364-4-44 [1][1] always requires the installation of a surge protective device (SPD) at the power line entrance in the structure when the consequence caused by overvoltages affects:

– care of human life, e.g. safety services, medical care facilities,
– public services and cultural heritage, e.g. loss of public services, IT centres, museums,
– commercial or industrial activity, e.g. hotels, banks, industries, commercial markets, farms.

The frequency of damage, defined in this document as the annual number of damages in a structure due to lightning flashes, depends on:

– the annual number of lightning flashes influencing the structure;
– the probability of damaging events by one of the influencing lightning flashes.

The risk, defined in this document as the probable average annual loss in a structure due to lightning flashes, depends on:

– the frequency of damage;
– the mean extent of consequential loss.

Lightning flashes influencing the structure can be divided into

– flashes terminating on the structure,
– flashes terminating near the structure, directly to connected lines (power, telecommunication lines) or near the lines.

Flashes to the structure or a connected line can cause physical damage and life hazards. Flashes near the structure or line as well as flashes to the structure or line can cause failure of electrical and electronic systems due to overvoltages resulting from resistive and inductive coupling of these systems with the lightning current.

Moreover, failures caused by lightning overvoltages in users' installations and in power supply lines can also generate voltage switching overvoltages in the installations.

NOTE 3 Malfunctioning of electrical and electronic systems is not covered by the IEC 62305 series. Reference is made to IEC 61000-4-5 [2].

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[1] Numbers in square brackets refer to the Bibliography.

The number of lightning flashes influencing the structure depends on the dimensions, the characteristics of the structure and the connected lines, on the environmental characteristics of the structure and the lines, as well as on lightning ground strike-point density in the region where the structure and the lines are located. Guidance on the assessment of the number of lightning flashes influencing the structure is given in Annex A.

The probability of damage depends on the structure, the resistibility of equipment located on the structure, the connected lines, and the lightning current characteristics, as well as on the type and efficiency of the protection measures applied. Guidance on the assessment of probability of damage is given in Annex B.

The annual mean extent of the consequential loss depends on the extent of damage and the consequential effects which can occur as a result of a lightning flash. Guidance on the assessment of consequential loss is given in Annex C.

The effect of protection measures results from the characteristics of each protection measure and can reduce the damage probabilities.

NOTE 4 It is assumed that protective provisions are realized in the necessary quality.

The protection measures are intended to comply with the IEC 62305 series, the IEC 61643 series and IEC 62793, as applicable.

NOTE 5 For complex structures (such as petrochemical plants, large industrial plants) the factors reported in the annexes of this document can require more detailed evaluation of the characteristics of the structure.

National or local regulations can provide guidance or minimum requirements on the application of this document. This includes fixing the values for the tolerable risk R_T and the tolerable frequency of damage F_T, and the calculation rules and parameter values given in Annex A, Annex B, Annex C and Annex E.

PROTECTION AGAINST LIGHTNING –

Part 2: Risk management

1 Scope

This part of IEC 62305 is applicable to the risk management of a structure due to lightning flashes to earth.

Its purpose is to provide a procedure for the evaluation of such a risk. Once an upper tolerable limit for the risk has been selected, this procedure provides a means for the selection of appropriate protection measures to be adopted to reduce the risk to or below the tolerable limit.

Risk management also includes the evaluation of frequency of damage of internal systems caused by surges due to lightning flashes to earth. Once an upper tolerable limit for the frequency of damage has been selected, this procedure provides a means for the selection of appropriate protection measures to be adopted to reduce the frequency of damage to or below the tolerable limit.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 61643 (all parts), *Low-voltage surge protective devices*

IEC 62305-1:2024 , *Protection against lightning – Part 1: General principles*

IEC 62305-3:2024, *Protection against lightning – Part 3: Physical damage to structures and life hazard*

IEC 62305-4:2024, *Protection against lightning – Part 4: Electrical and electronic systems within structures*

IEC 62793, *Thunderstorm warning systems – Protection against lightning*

IEC 62858, *Lightning density based on lightning location systems (LLS) – General principles*