

STN	Ochrana pred bleskom Časť 2: Manažérstvo rizika	STN EN IEC 62305-2 34 1390
------------	--	--

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
STN EN 62305-2 (34 1390) z mája 2013

139844



EUROPEAN STANDARD

EN IEC 62305-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

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)

This European Standard was approved by CENELEC on 2024-10-17. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.



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

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- latest date by which the national standards conflicting with the (dow) 2027-10-31 document have to be withdrawn

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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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



**Protection against lightning –
Part 2: Risk management**

**Protection contre la foudre –
Partie 2: Évaluation des risques**





THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2024 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications, symboles graphiques et le glossaire. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 500 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 25 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

CONTENTS

FOREWORD.....	8
INTRODUCTION.....	11
1 Scope.....	13
2 Normative references	13
3 Terms and definitions	13
4 Symbols and abbreviated terms.....	21
5 Damage and loss.....	25
5.1 Source of damage.....	25
5.2 Cause of damage.....	25
5.3 Type of loss	25
6 Risk and risk components.....	26
6.1 Risk	26
6.2 Risk components	27
6.2.1 Risk components for a structure due to source S1	27
6.2.2 Risk component for a structure due to source S2.....	28
6.2.3 Risk components for a structure due to source S3	28
6.2.4 Risk component for a structure due to source S4.....	28
6.2.5 Factors affecting risk components for a structure	28
6.3 Composition of risk components	29
6.3.1 Composition of risk components according to source of damage	29
6.3.2 Composition of risk components according to type of loss	30
7 Risk assessment	31
7.1 Basic procedure.....	31
7.2 Structure to be considered for risk assessment.....	31
7.3 Procedure to evaluate the need of protection for risk R	31
8 Assessment of risk components.....	33
8.1 Basic equation	33
8.2 Assessment of risk components due to different sources of damage	34
8.3 Partitioning of a structure in risk zones Z_S	36
8.4 Partitioning of a line into sections S_L	37
8.5 Assessment of risk components in a zone of a structure with risk zones Z_S	38
8.5.1 General criteria.....	38
8.5.2 Single-zoned structure.....	38
8.5.3 Multi-zoned structure	38
9 Frequency of damage and its components.....	39
9.1 Frequency of damage	39
9.2 Assessment of partial frequency of damage	39
9.3 Procedure to evaluate the need of protection for frequency of damage F	40
9.4 Assessment of partial frequency of damage in zones	42
9.4.1 General criteria.....	42
9.4.2 Single-zoned structure.....	42
9.4.3 Multi-zoned structure	42
Annex A (informative) Assessment of annual number N of dangerous events.....	43
A.1 General.....	43

A.2	Assessment of the average annual number of dangerous events N_D due to flashes to a structure and N_{DJ} to an adjacent structure.....	44
A.2.1	Determination of the collection area A_D	44
A.2.2	Structure as a part of a building.....	46
A.2.3	Relative location of the structure.....	48
A.2.4	Number of dangerous events N_D for the structure.....	48
A.2.5	Number of dangerous events N_{DJ} for an adjacent structure.....	49
A.3	Assessment of the average annual number of dangerous events N_M due to flashes near a structure.....	49
A.4	Assessment of the average annual number of dangerous events N_L due to flashes to a line.....	50
A.5	Assessment of average annual number of dangerous events N_I due to flashes near a line.....	51
A.6	Representation of the equivalent collection areas.....	52
Annex B (informative)	Assessment of probability P_X of damage.....	53
B.1	General.....	53
B.2	Probability P_{AT} that a flash to a structure will cause dangerous touch and step voltages.....	54
B.3	Probability P_{AD} that a flash will cause damage to an exposed person on the structure.....	55
B.4	Probability P_B that a flash to a structure will cause physical damage by fire or explosion.....	57
B.5	Probability P_C that a flash to a structure will cause failure of internal systems.....	59
B.6	Probability P_M that a flash near a structure will cause failure of internal systems.....	63
B.7	Probability P_U that a flash to a line will cause damage due to touch voltage.....	65
B.8	Probability P_V that a flash to a line will cause physical damage by fire or explosion.....	67
B.9	Probability P_W that a flash to a line will cause failure of internal systems.....	68
B.10	Probability P_Z that a lightning flash near an incoming line will cause failure of internal systems.....	69
B.11	Probability P_P that a person will be in a dangerous place.....	69
B.12	Probability P_e that an equipment will be exposed to a damaging event.....	70
Annex C (informative)	Assessment of loss L_X	71
C.1	General.....	71
C.2	Mean relative loss per dangerous event.....	71
Annex D (informative)	P_{SPD} evaluation.....	74
D.1	General.....	74
D.2	P_Q values.....	75
D.2.1	Probability values of both the negative and positive first strokes.....	75
D.2.2	Source of damage S1.....	75
D.2.3	Source of damage S3.....	76
D.2.4	Sources of damage S2 and S4.....	77
D.3	SPD protection level.....	77
D.3.1	General.....	77

D.3.2	Source of damage S1	77
D.3.3	Source of damage S3	81
D.3.4	Energy coordinated SPDs: One voltage switching SPD and one voltage limiting SPD downstream	85
D.4	Source of damage S4	88
D.4.1	One voltage limiting SPD	88
D.4.2	One voltage switching SPD	88
D.5	Source of damage S2	89
Annex E (informative) Detailed investigation of additional losses L_E related to surroundings		90
E.1	General	90
E.2	Calculation of risk components	90
Annex F (informative) Case studies		94
F.1	General	94
F.2	House	94
F.2.1	Relevant data and characteristics	94
F.2.2	Calculation of expected annual number of dangerous events	96
F.2.3	Risk management	97
F.2.4	Definition of risk zones in the house	97
F.2.5	Risk assessment	99
F.2.6	Risk – Selection of protection measures	99
F.2.7	Conclusions	100
F.3	Office building	100
F.3.1	Relevant data and characteristics	100
F.3.2	Calculation of expected annual number of dangerous events	101
F.3.3	Risk management	102
F.3.4	Definition of zones in the office building	103
F.3.5	Risk assessment	107
F.3.6	Frequency of damage assessment	108
F.3.7	Risk – Selection of protection measures	108
F.3.8	Frequency of damage – Selection of protection measures	109
F.3.9	Conclusions	110
F.4	Hospital	110
F.4.1	Relevant data and characteristics	110
F.4.2	Calculation of expected annual number of dangerous events	111
F.4.3	Risk management	112
F.4.4	Definition of zones in the hospital	112
F.4.5	Risk assessment	117
F.4.6	Frequency of damage assessment	118
F.4.7	Risk – Selection of protection measures	118
F.4.8	Frequency of damage – Selection of protection measures	120
F.4.9	Conclusions	120
Bibliography		121
Figure 1 – Procedure for deciding the need for protection and for the selection of protection measures to reduce $R \leq R_T$		33
Figure 2 – Example of zone partitioning		37
Figure 3 – Procedure for determining the need for protection and for the selection of protection measures		41

Figure A.1 – Collection area A_D of an isolated structure	44
Figure A.2 – Complex-shaped structure	45
Figure A.3 – Different methods to determine the collection area for a given structure	46
Figure A.4 – Structure to be considered for evaluation of collection area A_D	47
Figure A.5 – Equivalent collection areas A_D , A_{DJ} , A_M , A_L and A_I	52
Figure D.1 – Charge probability of both negative and positive first strokes	76
Figure D.2 – Probability P_{Up} as a function of the SPD residual voltage U_p' at 1 kA	78
Figure D.3 – Probability P_{Up} as a function of k_{1i}	79
Figure D.4 – Probability P_{Up} as a function of the SPD2 residual voltage U_p' at 1 kA	80
Figure D.5 – Probability P_{Up} as a function of the SPD2 residual voltage U_p' at 1 kA	81
Figure D.6 – Probability P_{Up} as a function of the residual voltage at 1 kA (U_p')	82
Figure D.7 – Probability P_{Up} as a function of different lengths of the internal circuit	83
Figure D.8 – Probability P_{Up} as a function of different lengths of the internal circuit	83
Figure D.9 – Probability P_{Up} as a function of the SPD2 residual voltage U_p' at 1 kA	85
Figure D.10 – Probability P_{Up} as a function of the internal loop area for $n' = 2$ and $w = 0,1$ m	86
Figure D.11 – Probability P_{Up} as a function of the internal loop area for $n' = 2$ and $w = 0,5$ m	87
Figure D.12 – Probability P_{Up} as a function of the internal loop area for $n' = 20$ and $w = 0,1$ m	87
Figure D.13 – Probability P_{Up} as a function of the SPD protection level U_p' at 1 kA for different internal loop areas	88
Figure D.14 – Probability P_{Up} as a function of different internal loop areas for two typical protection levels of GDTs	89
Table 1 – Sources of damage, causes of damage, types of loss and risk components according to the point of strike	27
Table 2 – Factors influencing the risk components	29
Table 3 – Risk components for different sources of damage and types of loss	35
Table 4 – Partial frequency of damage for each source of damage	40
Table A.1 – Structure location factors C_D and C_{DJ}	48
Table A.2 – Line installation factor C_I	50
Table A.3 – Line type factor C_T	51
Table A.4 – Environmental factor C_E	51
Table B.1 – Values of probability P_{am} that a flash to a structure will cause damage due to touch and step voltages according to different protection measures	55
Table B.2 – Reduction factor r_t as a function of the type of surface of soil or floor	55
Table B.3 – Values of probability P_{LPS} depending on the protection measures to protect the exposed areas of the structure against the direct flash and to reduce physical damage	56
Table B.4 – Values of probability P_S that a flash to a structure will cause dangerous sparking	57

Table B.5 – Reduction factor r_p as a function of provisions taken to reduce the consequences of fire.....	58
Table B.6 – Reduction factor r_f as a function of risk of fire or explosion of structure.....	58
Table B.7 – Typical values of P_{SPD} for SPDs on the low-voltage system, used to protect against sources of damage S1, S2, S3, S4.....	60
Table B.8 – Typical values of P_{SPD} for SPDs on the telecommunications system used to protect against sources of damage S1, S2, S3, S4.....	61
Table B.9 – Values of factors C_{LD} and C_{LI} depending on shielding, grounding and isolation conditions	62
Table B.10 – Value of factor K_{S3} depending on internal wiring	65
Table B.11 – Values of the probability P_{LD} depending on the resistance R_S of the cable screen and the impulse withstand voltage U_W of the equipment	66
Table B.12 – Values of the probability P_{LD} depending on the resistance R_S of the cable screen and the higher impulse withstand voltage U_W of the equipment	67
Table B.13 – Typical values of probability P_{EB} relevant to protection level LPL for which the SPD is designed to protect against source of damage S3.....	67
Table C.1 – Loss values for each zone	72
Table C.2 – Typical mean values of L_T , L_D , L_{F1} , L_{F2} , L_{O1} and L_{O2}	73
Table D.1 – P_{Up} values of the voltage limiting SPD for combination between a voltage limiting and a voltage switching SPD.....	79
Table D.2 – P_{Up} values of the voltage limiting SPD	84
Table E.1 – Risk components for different sources of damage and types of loss, valid for damage to the surroundings	91
Table E.2 – Type of loss L1: Proposed typical values for the related time of presence for people $t_{ZE}/8\ 760$ in different environments as limited by Table E.3.....	92
Table E.3 – Type of loss L1: Typical mean values of L_{F1E} and L_{O1E} outside the structure	93
Table E.4 – Type of loss L2: Typical mean values of L_{F2E} and L_{O2E} outside the structure	93
Table F.1 – House: environment and structure characteristics	95
Table F.2 – House: power line	95
Table F.3 – House: telecom line.....	96
Table F.4 – House: equivalent collection areas of structure and lines	96
Table F.5 – House: expected annual number of dangerous events.....	97
Table F.6 – House: time of presence of persons and risk components into risk zones.....	98
Table F.7 – House: values for zone Z_2 (inside the building)	98
Table F.8 – House: risk for the unprotected structure (values $\times 10^{-5}$).....	99
Table F.9 – House: risk components for protected structure (values $\times 10^{-5}$).....	100
Table F.10 – Office building: environment and structure characteristics	100
Table F.11 – Office building: power line	101
Table F.12 – Office building: telecom line	101
Table F.13 – Office building: collection areas of structure and lines	102
Table F.14 – Office building: expected annual number of dangerous events	102

Table F.15 – Office building: time of presence of persons and risk components in zones.....	103
Table F.16 – Office building: factors valid for zone Z ₁ (entrance area outside)	104
Table F.17 – Office building: factors valid for zone Z ₂ (roof)	104
Table F.18 – Office building: factors valid for zone Z ₃ (archive).....	105
Table F.19 – Office building: factors valid for zone Z ₄ (offices).....	106
Table F.20 – Office building: factors valid for zone Z ₅ (computer centre).....	107
Table F.21 – Office building: risk for the unprotected structure (values × 10 ⁻⁵)	108
Table F.22 – Office building: frequency of damage for the unprotected structure	108
Table F.23 – Risk components for protected structure (values × 10 ⁻⁵)	109
Table F.24 – Office building: frequency of damage for protected structure	109
Table F.25 – Hospital: environment and structure characteristics.....	110
Table F.26 – Hospital: power line.....	111
Table F.27 – Hospital: collection areas of structure and power line	111
Table F.28 – Hospital: expected annual number of dangerous events	112
Table F.29 – Hospital: time of presence of persons and risk components in zones.....	113
Table F.30 – Hospital: factors valid for zone Z ₁ (outside the building).....	113
Table F.31 – Hospital: factors valid for zone Z ₂ (roof).....	114
Table F.32 – Hospital: factors valid for zone Z ₃ (rooms)	115
Table F.33 – Hospital: factors valid for zone Z ₄ (operating block)	116
Table F.34 – Hospital: factors valid for zone Z ₅ (intensive care unit).....	117
Table F.35 – Hospital: risk for the unprotected structure (values × 10 ⁻⁵).....	118
Table F.36 – Hospital: frequency of damage for the unprotected structure	118
Table F.37 – Hospital: risk for the protected structure (values × 10 ⁻⁵).....	119
Table F.38 – Hospital: frequency of damage for the protected structure	120

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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.
- 2) The formal decisions or agreements of 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 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].

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*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN