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INTERNATIONAL STANDARD



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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD.....	6
INTRODUCTION	8
1 Scope.....	10
2 Normative references.....	10
3 Terms, definitions, symbols and abbreviations.....	10
3.1 Terms and definitions	10
3.2 Symbols and abbreviations	16
4 Explanation of terms	19
4.1 Damage and loss	19
4.1.1 Source of damage.....	19
4.1.2 Types of damage	19
4.1.3 Types of loss	19
4.2 Risk and risk components	20
4.2.1 Risk.....	20
4.2.2 Risk components for a structure due to flashes to the structure.....	21
4.2.3 Risk component for a structure due to flashes near the structure.....	21
4.2.4 Risk components for a structure due to flashes to a line connected to the structure	21
4.2.5 Risk component for a structure due to flashes near a line connected to the structure	21
4.3 Composition of risk components	22
5 Risk management.....	23
5.1 Basic procedure.....	23
5.2 Structure to be considered for risk assessment	23
5.3 Tolerable risk R_T	24
5.4 Specific procedure to evaluate the need of protection	24
5.5 Procedure to evaluate the cost effectiveness of protection	25
5.6 Protection measures.....	28
5.7 Selection of protection measures	28
6 Assessment of risk components	28
6.1 Basic equation.....	28
6.2 Assessment of risk components due to flashes to the structure (S1).....	29
6.3 Assessment of the risk component due to flashes near the structure (S2)	29
6.4 Assessment of risk components due to flashes to a line connected to the structure (S3)	29
6.5 Assessment of risk component due to flashes near a line connected to the structure (S4)	30
6.6 Summary of risk components	31
6.7 Partitioning of a structure in zones Z_S	31
6.8 Partitioning of a line into sections S_L	32
6.9 Assessment of risk components in a structure with zones Z_S	32
6.9.1 General criteria	32
6.9.2 Single zone structure.....	32
6.9.3 Multi-zone structure.....	32
6.10 Cost-benefit analysis for economic loss (L4)	33
Annex A (informative) Assessment of annual number N of dangerous events.....	34
Annex B (informative) Assessment of probability P_X of damage.....	42

Annex C (informative) Assessment of amount of loss L_X	50
Annex D (informative) Evaluation of costs of loss.....	57
Annex E (informative) Case study	58
Bibliography.....	84
Figure 1 – Procedure for deciding the need of protection and for selecting protection measures	26
Figure 2 – Procedure for evaluating the cost-effectiveness of protection measures	27
Figure A.1 – Collection area A_D of an isolated structure	35
Figure A.2 – Complex shaped structure	36
Figure A.3 – Different methods to determine the collection area for the given structure.....	37
Figure A.4 – Structure to be considered for evaluation of collection area A_D	38
Figure A.5 – Collection areas (A_D, A_M, A_I, A_L)	41
Figure E.1 – Country house	58
Figure E.2 – Office building	63
Figure E.3 – Hospital	69
Figure E.4 – Apartment block.....	80
Table 1 – Sources of damage, types of damage and types of loss according to the point of strike.....	20
Table 2 – Risk components to be considered for each type of loss in a structure.....	22
Table 3 – Factors influencing the risk components.....	23
Table 4 – Typical values of tolerable risk R_T	24
Table 5 – Parameters relevant to the assessment of risk components.....	30
Table 6 – Risk components for different types of damage and source of damage	31
Table A.1 – Structure location factor C_D	39
Table A.2 – Line installation factor C_I	40
Table A.3 – Line type factor C_T	40
Table A.4 – Line environmental factor C_E	40
Table B.1 – Values of probability P_{TA} that a flash to a structure will cause shock to living beings due to dangerous touch and step voltages	42
Table B.2 – Values of probability P_B depending on the protection measures to reduce physical damage	43
Table B.3 – Value of the probability P_{SPD} as a function of LPL for which SPDs are designed	44
Table B.4 – Values of factors C_{LD} and C_{LI} depending on shielding, grounding and isolation conditions.....	44
Table B.5 – Value of factor K_{S3} depending on internal wiring.....	46
Table B.6 – Values of probability P_{TU} that a flash to an entering line will cause shock to living beings due to dangerous touch voltages	47
Table B.7 – Value of the probability P_{EB} as a function of LPL for which SPDs are designed	47
Table B.8 – 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	47
Table B.9 – Values of the probability P_{LI} depending on the line type and the impulse withstand voltage U_W of the equipment.....	49

Table C.1 – Type of loss L1: Loss values for each zone	51
Table C.2 – Type of loss L1: Typical mean values of L_T , L_F and L_O	51
Table C.3 – Reduction factor r_t as a function of the type of surface of soil or floor	52
Table C.4 – Reduction factor r_p as a function of provisions taken to reduce the consequences of fire.....	52
Table C.5 – Reduction factor r_f as a function of risk of fire or explosion of structure	53
Table C.6 – Factor h_z increasing the relative amount of loss in presence of a special hazard.....	53
Table C.7 – Type of loss L2: Loss values for each zone	54
Table C.8 – Type of loss L2: Typical mean values of L_F and L_O	54
Table C.9 – Type of loss L3: Loss values for each zone	54
Table C.10 – Type of loss L3: Typical mean value of L_F	55
Table C.11 – Type of loss L4: Loss values for each zone.....	55
Table C.12 – Type of loss L4: Typical mean values of L_T , L_F and L_O	56
Table E.1 – Country house: Environment and structure characteristics.....	59
Table E.2 – Country house: Power line	59
Table E.3 – Country house: Telecom line (TLC).....	59
Table E.4 – Country house: Factors valid for zone Z_2 (inside the building).....	60
Table E.5 – Country house: Collection areas of structure and lines.....	61
Table E.6 – Country house: Expected annual number of dangerous events	61
Table E.7 – Country house: Risk R_1 for the unprotected structure (values $\times 10^{-5}$).....	62
Table E.8 – Country house: Risk components relevant to risk R_1 for protected structure	62
Table E.9 – Office building: Environment and structure characteristics.....	63
Table E.10 – Office building: Power line.....	64
Table E.11 – Office building: Telecom line	64
Table E.12 – Office building: Distribution of persons into zones.....	65
Table E.13 – Office building: Factors valid for zone Z_1 (entrance area outside).....	65
Table E.14 – Office building: Factors valid for zone Z_2 (garden outside).....	66
Table E.15 – Office building: Factors valid for zone Z_3 (archive).....	66
Table E.16 – Office building: Factors valid for zone Z_4 (offices).....	66
Table E.17 – Office building: Factors valid for zone Z_5 (computer centre).....	67
Table E.18 – Office building: Collection areas of structure and lines	67
Table E.19 – Office building: Expected annual number of dangerous events.....	68
Table E.20 – Office building: Risk R_1 for the unprotected structure (values $\times 10^{-5}$).....	68
Table E.21 – Office building: Risk R_1 for the protected structure (values $\times 10^{-5}$).....	69
Table E.22 – Hospital: Environment and global structure characteristics	70
Table E.23 – Hospital: Power line.....	70
Table E.24 – Hospital: Telecom line	70
Table E.25 – Hospital: Distribution of persons and of economic values into zones.....	71
Table E.26 – Hospital: Factors valid for zone Z_1 (outside the building).....	72
Table E.27 – Hospital: Factors valid for zone Z_2 (rooms block).....	72
Table E.28 – Hospital: Factors valid for zone Z_3 (operating block)	73
Table E.29 – Hospital: Factors valid for zone Z_4 (intensive care unit).....	74
Table E.30 – Hospital: Collection areas of structure and lines	74

Table E.31 – Hospital: Expected annual number of dangerous events.....	75
Table E.32 – Hospital: Risk R_1 – Values of probability P for the unprotected structure.....	75
Table E.33 – Hospital: Risk R_1 for the unprotected structure (values $\times 10^{-5}$)	75
Table E.34 – Hospital: Risk R_1 for the protected structure according to solution a) (values $\times 10^{-5}$)	77
Table E.35 – Hospital: Risk R_1 for the protected structure according to solution b) (values $\times 10^{-5}$)	77
Table E.36 – Hospital: Risk R_1 for the protected structure according to solution c) (values $\times 10^{-5}$)	78
Table E.37 – Hospital: Cost of loss C_L (unprotected) and C_{RL} (protected)	78
Table E.38 – Hospital: Rates relevant to the protection measures.....	79
Table E.39 – Hospital: Cost C_P and C_{PM} of protection measures (values in \$)	79
Table E.40 – Hospital: Annual saving of money (values in \$).....	79
Table E.41 – Apartment block: Environment and global structure characteristics.....	80
Table E.42 – Apartment block: Power line	80
Table E.43 – Apartment block: Telecom line.....	81
Table E.44 – Apartment block: Factors valid for zone Z_2 (inside the building)	82
Table E.45 – Apartment block: Risk R_1 for the apartment block depending on protection measures	83

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

This second edition cancels and replaces the first edition, published in 2006, and constitutes a technical revision.

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

- 1) Risk assessment for services connected to structures is excluded from the scope.
- 2) Injuries of living beings caused by electric shock inside the structure are considered.
- 3) Tolerable risk of loss of cultural heritage is lowered from 10^{-3} to 10^{-4} . The value of tolerable risk of loss of economic value ($R_T = 10^{-3}$) is introduced, to be used when data for cost/benefit analysis are not available.
- 4) Extended damage to surroundings structures or to the environment is considered.
- 5) Improved equations are provided for evaluation of

- collection areas relevant to flashes nearby a structure,
- collection areas relevant to flashes to and nearby a line,
- probabilities that a flash can cause damage,
- loss factors even in structures with risk of explosion,
- risk relevant to a zone of a structure,
- cost of loss.

6) Tables are provided to select the relative amount of loss in all cases.

7) Impulse withstand voltage level of equipments was extended down to 1 kV.

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

FDIS	Report on voting
81/371/FDIS	81/381/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 2.

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

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

A bilingual version of this standard may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication 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 may be hazardous to structures and to lines.

The hazard to a structure 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 may be extended to the surroundings of the structure or may involve its environment.

To reduce the loss due to lightning, protection measures may be required. Whether they are needed, and to what extent, should be determined by risk assessment.

The risk, defined in this part of IEC 62305 as the probable average annual loss in a structure due to lightning flashes, depends on:

- the annual number of lightning flashes influencing the structure;
- the probability of damage by one of the influencing lightning flashes;
- the mean amount of consequential loss.

Lightning flashes influencing the structure may be divided into

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

Flashes to the structure or a connected line may cause physical damage and life hazards. Flashes near the structure or line as well as flashes to the structure or line may 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 may also generate switching type overvoltages in the installations.

NOTE Malfunctioning of electrical and electronic systems is not covered by the IEC 62305 series. Reference should be made to IEC 61000-4-5 ^[1].

The number of lightning flashes influencing the structure depends on the dimensions and the characteristics of the structure and of the connected lines, on the environmental characteristics of the structure and the lines, as well as on lightning ground flash density in the region where the structure and the lines are located.

The probability of lightning damage depends on the structure, the connected lines, and the lightning current characteristics, as well as on the type and efficiency of applied protection measures.

The annual mean amount of the consequential loss depends on the extent of damage and the consequential effects which may occur as result of a lightning flash.

The effect of protection measures results from the features of each protection measure and may reduce the damage probabilities or the amount of consequential loss.

¹ Figures in square brackets refer to the bibliography.

The decision to provide lightning protection may be taken regardless of the outcome of risk assessment where there is a desire that there be no avoidable risk.

PROTECTION AGAINST LIGHTNING –

Part 2: Risk management

1 Scope

This part of IEC 62305 is applicable to risk assessment for 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 allows the selection of appropriate protection measures to be adopted to reduce the risk to or below the tolerable limit.

2 Normative references

The following referenced documents are indispensable for the application 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 62305-1:2010, *Protection against lightning – Part 1: General principles*

IEC 62305-3:2010, *Protection against lightning – Part 3: Physical damage to structures and life hazard*

IEC 62305-4:2010, *Protection against lightning – Part 4: Electrical and electronic systems within structures*