Irish Standard
I.S. EN 62305-2:2012

Protection against lightning -- Part 2: Risk management (IEC 62305-2:2010 (MOD))

I.S. EN 62305-2:2012

Incorporating amendments/corrigenda issued since publication:

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I.S. EN 62305-2:2012

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EN 62305-2

May 2012

ICS 29.020; 91.120.40

Supersedes EN 62305-2:2006 + corr. Nov.2006

English version

Protection against lightning - Part 2: Risk management

(IEC 62305-2:2010, modified)

Protection contre la foudre -
Partie 2: Evaluation des risques
(CEI 62305-2:2010, modifiée)

Blitzschutz -
Teil 2: Risiko-Management
(IEC 62305-2:2010, modifiziert)

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CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 62305-2:2012 E

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Foreword

This document (EN 62305-2:2012) consists of the text of IEC 62305-2:2010 prepared by IEC/TC 81, "Lightning protection", together with the common modifications prepared by CLC/TC 81X, "Lightning protection".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-03-19
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2014-01-13

This document supersedes EN 62305-2:2006 + corrigendum November 2006.

EN 62305-2:2012 includes the following significant technical changes with respect to EN 62305-2:2006:

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};
4) extended damage to surroundings structures or to the environment is considered;
5) improved formulas 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.

Notes and tables, which are additional to those in IEC 62305-2:2010 are prefixed “Z”.

In this document, the common modifications to IEC 62305-2:2010 are indicated by a vertical line in the left margin of the text.

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

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 EN 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 EN 62305 series. Reference should be made to EN 61000-4-5 [2]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.

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.

1) Figures in square brackets refer to the bibliography.

1 Scope

This part of EN 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 62305-1:2011, *Protection against lightning – Part 1: General principles* (IEC 62305-1:2010, mod.)

EN 62305-3:2011, *Protection against lightning – Part 3: Physical damage to structures and life hazard* (IEC 62305-3:2010, mod.)

EN 62305-4:2011, *Protection against lightning – Part 4: Electrical and electronic systems within structures* (IEC 62305-4:2010, mod.)

3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the following terms, definitions, symbols and abbreviations, some of which have already been cited in Part 1 but are repeated here for ease of reading, as well as those given in other parts of EN 62305, apply.

3.1 Terms and definitions

3.1.1
structure to be protected
structure for which protection is required against the effects of lightning in accordance with this standard

Note 1 to entry: A structure to be protected may be part of a larger structure.

3.1.2
structures with risk of explosion
structures containing solid explosives materials or hazardous zones as determined in accordance with EN 60079-10-1[3] and EN 60079-10-2[4]

3.1.3
structures dangerous to the environment
structures which may cause biological, chemical or radioactive emission as a consequence of lightning (such as chemical, petrochemical, nuclear plants, etc.)

3.1.4
urban environment
area with a high density of buildings or densely populated communities with tall buildings

Note 1 to entry: 'Town centre' is an example of an urban environment.

3.1.5
suburban environment
area with a medium density of buildings

CONTENTS

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

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

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PROTECTION AGAINST LIGHTNING –

Part 2: Risk management

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