

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

Protection against lightning –  
Part 1: General principles

Protection contre la foudre –  
Partie 1: Principes généraux

STANDARD PREVIEW  
(standards.iteh.ai)

[IEC 62305-1:2010](https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010)

<https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010>



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2010 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 la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

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

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://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 corrigenda or an amendment might have been published.

#### Useful links:

IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

The advanced search enables you 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](http://webstore.iec.ch/justpublished)

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

Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - [webstore.iec.ch/csc](http://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: [csc@iec.ch](mailto:csc@iec.ch).

### A propos de la CEI

La Commission Electrotechnique Internationale (CEI) 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 CEI

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

#### Liens utiles:

Recherche de publications CEI - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

La recherche avancée vous permet de trouver des publications CEI 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.

Just Published CEI - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

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

Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (VEI) en ligne.

Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [csc@iec.ch](mailto:csc@iec.ch).

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

Protection against lightning –  
Part 1: General principles

Protection contre la foudre –  
Partie 1: Principes généraux

STANDARD PREVIEW  
(standards.iteh.ai)

[IEC 62305-1:2010](#)

<https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010>

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 29.020; 91.120.40

ISBN 978-2-83220-604-1

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references.....	8
3 Terms and definitions.....	8
4 Lightning current parameters.....	14
5 Damage due to lightning.....	14
5.1 Damage to a structure.....	14
5.1.1 Effects of lightning on a structure.....	14
5.1.2 Sources and types of damage to a structure.....	16
5.2 Types of loss.....	16
6 Need and economic justification for lightning protection.....	18
6.1 Need for lightning protection.....	18
6.2 Economic justification of lightning protection.....	19
7 Protection measures.....	19
7.1 General.....	19
7.2 Protection measures to reduce injury of living beings by electric shock.....	19
7.3 Protection measures to reduce physical damage.....	20
7.4 Protection measures to reduce failure of electrical and electronic systems.....	20
7.5 Protection measures selection.....	20
8 Basic criteria for protection of structures.....	21
8.1 General.....	21
8.2 Lightning protection levels (LPL).....	21
8.3 Lightning protection zones (LPZ).....	23
8.4 Protection of structures.....	25
8.4.1 Protection to reduce physical damage and life hazard.....	25
8.4.2 Protection to reduce the failure of internal systems.....	26
Annex A (informative) Parameters of lightning current.....	27
Annex B (informative) Time functions of the lightning current for analysis purposes.....	38
Annex C (informative) Simulation of the lightning current for test purposes.....	44
Annex D (informative) Test parameters simulating the effects of lightning on LPS components.....	48
Annex E (informative) Surges due to lightning at different installation points.....	62
Bibliography.....	67
Figure 1 – Connection between the various parts of IEC 62305.....	7
Figure 2 – Types of loss and corresponding risks resulting from different types of damage.....	18
Figure 3 – LPZ defined by an LPS (IEC 62305-3).....	24
Figure 4 – LPZ defined by an SPM (IEC 62305-4).....	25
Figure A.1 – Definitions of impulse current parameters (typically $T_2 < 2$ ms).....	27
Figure A.2 – Definitions of long duration stroke parameters (typically $2$ ms $< T_{LONG} < 1$ s).....	28
Figure A.3 – Possible components of downward flashes (typical in flat territory and to lower structures).....	28

Figure A.4 – Possible components of upward flashes (typical to exposed and/or higher structures) .....	29
Figure A.5 – Cumulative frequency distribution of lightning current parameters (lines through 95 % and 5 % value).....	34
Figure B.1 – Shape of the current rise of the first positive impulse .....	39
Figure B.2 – Shape of the current tail of the first positive impulse .....	40
Figure B.3 – Shape of the current rise of the first negative impulse .....	40
Figure B.4 – Shape of the current tail of the first negative impulse .....	41
Figure B.5 – Shape of the current rise of the subsequent negative impulses .....	42
Figure B.6 – Shape of the current tail of the subsequent negative impulses .....	42
Figure B.7 – Amplitude density of the lightning current according to LPL I .....	43
Figure C.1 – Example test generator for the simulation of the specific energy of the first positive impulse and the charge of the long stroke .....	45
Figure C.2 – Definition of the current steepness in accordance with Table C.3 .....	46
Figure C.3 – Example test generator for the simulation of the front steepness of the first positive impulse for large test items .....	47
Figure C.4 – Example test generator for the simulation of the front steepness of the subsequent negative impulses for large test items .....	47
Figure D.1 – General arrangement of two conductors for the calculation of electrodynamic force .....	54
Figure D.2 – Typical conductor arrangement in an LPS .....	55
Figure D.3 – Diagram of the stresses $F$ for the configuration of Figure D.2 .....	55
Figure D.4 – Force per unit length $F'$ along the horizontal conductor of Figure D.2 .....	55
<a href="https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-62305-1-2010">https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-62305-1-2010</a>	
Table 1 – Effects of lightning on typical structures .....	15
Table 2 – Damage and loss relevant to a structure according to different points of strike of lightning .....	17
Table 3 – Maximum values of lightning parameters according to LPL .....	22
Table 4 – Minimum values of lightning parameters and related rolling sphere radius corresponding to LPL .....	22
Table 5 – Probabilities for the limits of the lightning current parameters .....	23
Table A.1 – Tabulated values of lightning current parameters taken from CIGRE (Electra No. 41 or No. 69) [3], [4] .....	31
Table A.2 – Logarithmic normal distribution of lightning current parameters – Mean $\mu$ and dispersion $\sigma_{\log}$ calculated from 95 % and 5 % values from CIGRE (Electra No. 41 or No. 69) [3], [4] .....	32
Table A.3 – Values of probability $P$ as function of the lightning current $I$ .....	33
Table B.1 – Parameters for Equation (B.1) .....	38
Table C.1 – Test parameters of the first positive impulse .....	45
Table C.2 – Test parameters of the long stroke .....	45
Table C.3 – Test parameters of the impulses .....	46
Table D.1 – Summary of the lightning threat parameters to be considered in the calculation of the test values for the different LPS components and for the different LPL .....	49
Table D.2 – Physical characteristics of typical materials used in LPS components .....	52
Table D.3 – Temperature rise for conductors of different sections as a function of $W/R$ .....	52
Table E.1 – Conventional earthing impedance values $Z$ and $Z_1$ according to the resistivity of the soil .....	63

Table E.2 – Expected surge overcurrents due to lightning flashes on low-voltage systems .....	64
Table E.3 – Expected surge overcurrents due to lightning flashes on telecommunication systems .....	65

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[IEC 62305-1:2010](https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010)

<https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## PROTECTION AGAINST LIGHTNING –

## Part 1: General principles

## 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) 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 62305-1 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) It no longer covers protection of services connected to structures.
- 2) Isolated interfaces are introduced as protection measures to reduce failure of electric and electronic systems.
- 3) First negative impulse current is introduced as a new lightning parameter for calculation purposes.
- 4) Expected surge overcurrents due to lightning flashes have been more accurately specified for low voltage power systems and for telecommunication systems.

This bilingual version (2013-01) corresponds to the monolingual English version, published in 2010-12.

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

FDIS	Report on voting
81/370/FDIS	81/380/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.

The French version of this standard has not been voted upon.

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.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[IEC 62305-1:2010](https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010)

<https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010>



## INTRODUCTION

There are no devices or methods capable of modifying the natural weather phenomena to the extent that they can prevent lightning discharges. Lightning flashes to, or nearby, structures (or lines connected to the structures) are hazardous to people, to the structures themselves, their contents and installations as well as to lines. This is why the application of lightning protection measures is essential.

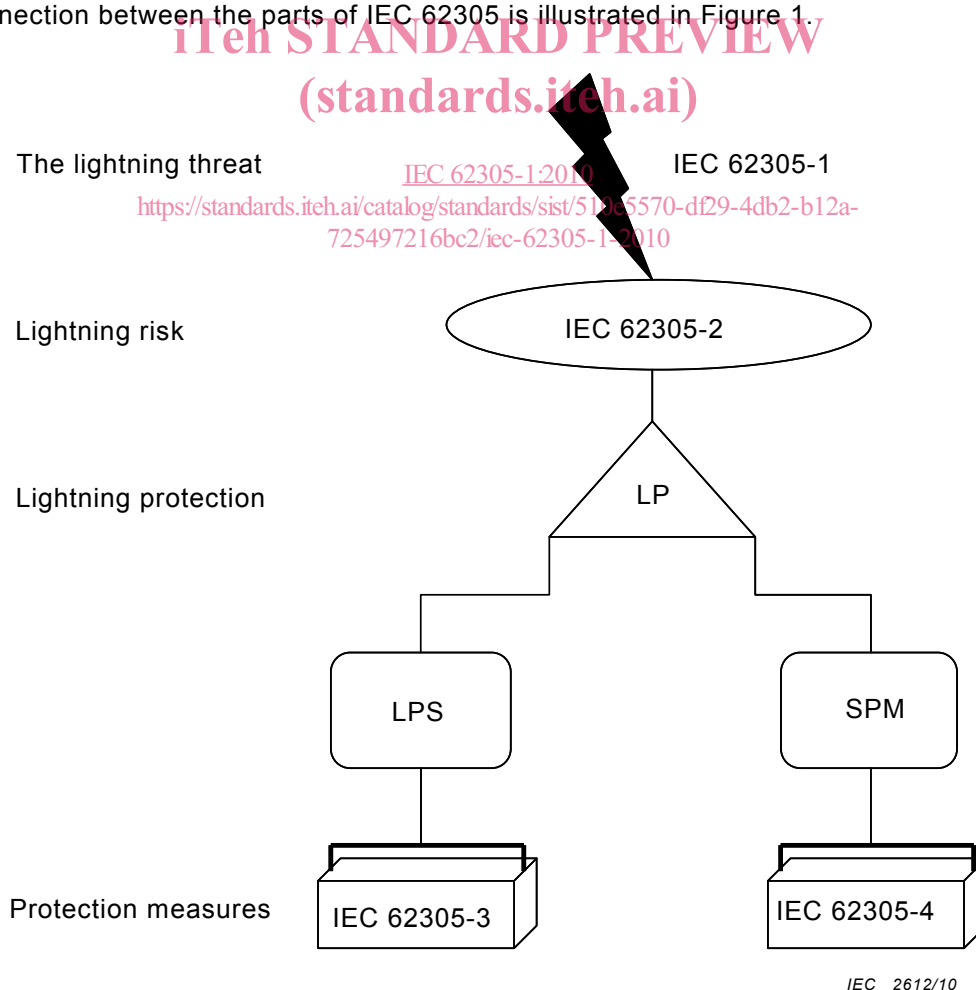
The need for protection, the economic benefits of installing protection measures and the selection of adequate protection measures should be determined in terms of risk management. Risk management is the subject of IEC 62305-2.

Protection measures considered in IEC 62305 are proved to be effective in risk reduction.

All measures for protection against lightning form the overall lightning protection. For practical reasons the criteria for design, installation and maintenance of lightning protection measures are considered in two separate groups:

- the first group concerning protection measures to reduce physical damage and life hazard in a structure is given in IEC 62305-3;
- the second group concerning protection measures to reduce failures of electrical and electronic systems in a structure is given in IEC 62305-4.

The connection between the parts of IEC 62305 is illustrated in Figure 1.



**Figure 1 – Connection between the various parts of IEC 62305**

# PROTECTION AGAINST LIGHTNING –

## Part 1: General principles

### 1 Scope

This part of IEC 62305 provides general principles to be followed for protection of structures against lightning, including their installations and contents, as well as persons.

The following cases are outside the scope of this standard:

- railway systems;
- vehicles, ships, aircraft, offshore installations;
- underground high pressure pipelines;
- pipe, power and telecommunication lines placed outside the structure.

NOTE These systems usually fall under special regulations produced by various specialized authorities.

### 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*  
<https://standards.iteh.ai/en/standard/iec/5.0.5570-489-4db2-b12-725497216bc2/iec-62305-1-2010>

IEC 62305-2:2010, *Protection against lightning – Part 2: Risk management*

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*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1

##### **lightning flash to earth**

electrical discharge of atmospheric origin between cloud and earth consisting of one or more strokes

#### 3.2

##### **downward flash**

lightning flash initiated by a downward leader from cloud to earth

NOTE A downward flash consists of a first impulse, which can be followed by subsequent impulses. One or more impulses may be followed by a long stroke.

#### 3.3

##### **upward flash**

lightning flash initiated by an upward leader from an earthed structure to cloud

NOTE An upward flash consists of a first long stroke with or without multiple superimposed impulses. One or more impulses may be followed by a long stroke.

### 3.4

#### lightning stroke

single electrical discharge in a lightning flash to earth

### 3.5

#### short stroke

part of the lightning flash which corresponds to an impulse current

NOTE This current has a time  $T_2$  to the half peak value on the tail typically less than 2 ms (see Figure A.1).

### 3.6

#### long stroke

part of the lightning flash which corresponds to a continuing current

NOTE The duration time  $T_{LONG}$  (time from the 10 % value on the front to the 10 % value on the tail) of this continuing current is typically more than 2 ms and less than 1 s (see Figure A.2).

### 3.7

#### multiple strokes

lightning flash consisting on average of 3-4 strokes, with typical time interval between them of about 50 ms

NOTE Events having up to a few dozen strokes with intervals between them ranging from 10 ms to 250 ms have been reported.

### 3.8

#### point of strike

point where a lightning flash strikes the earth, or protruding structure (e.g. structure, LPS, line, tree, etc.)

<https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010>

NOTE A lightning flash may have more than one point of strike.

### 3.9

#### lightning current

$i$

current flowing at the point of strike

### 3.10

#### current peak value

$I$

maximum value of the lightning current

### 3.11

#### average steepness of the front of impulse current

average rate of change of current within a time interval  $\Delta t = t_2 - t_1$

NOTE It is expressed by the difference  $\Delta i = i(t_2) - i(t_1)$  of the values of the current at the start and at the end of this interval, divided by the time interval  $\Delta t = t_2 - t_1$  (see Figure A.1).

### 3.12

#### front time of impulse current

$T_1$

virtual parameter defined as 1,25 times the time interval between the instants when the 10 % and 90 % of the peak value are reached (see Figure A.1)

### 3.13 virtual origin of impulse current

$O_1$

point of intersection with time axis of a straight line drawn through the 10 % and the 90 % reference points on the stroke current front (see Figure A.1); it precedes by 0,1  $T_1$  that instant at which the current attains 10 % of its peak value

### 3.14 time to half value on the tail of impulse current

$T_2$

virtual parameter defined as the time interval between the virtual origin  $O_1$  and the instant at which the current has decreased to half the peak value on the tail (see Figure A.1)

### 3.15 flash duration

$T$

time for which the lightning current flows at the point of strike

### 3.16 duration of long stroke current

$T_{LONG}$

time duration during which the current in a long stroke is between 10 % of the peak value during the increase of the continuing current and 10 % of the peak value during the decrease of the continuing current (see Figure A.2)

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

### 3.17 flash charge

$Q_{FLASH}$

value resulting from the time integral of the lightning current for the entire lightning flash duration

<https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010>

### 3.18 impulse charge

$Q_{SHORT}$

value resulting from the time integral of the lightning current in an impulse

### 3.19 long stroke charge

$Q_{LONG}$

value resulting from the time integral of the lightning current in a long stroke

### 3.20 specific energy

$W/R$

value resulting from the time integral of the square of the lightning current for the entire flash duration

NOTE It represents the energy dissipated by the lightning current in a unit resistance.

### 3.21 specific energy of impulse current

value resulting from the time integral of the square of the lightning current for the duration of the impulse

NOTE The specific energy in a long stroke current is negligible.

**3.22  
structure to be protected**

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

NOTE A structure to be protected may be part of a larger structure.

**3.23  
line**

power line or telecommunication line connected to the structure to be protected

**3.24  
telecommunication lines**

lines intended for communication between equipment that may be located in separate structures, such as a phone line and a data line

**3.25  
power lines**

distribution lines feeding electrical energy into a structure to power electrical and electronic equipment located there, such as low voltage (LV) or high voltage (HV) electric mains

**3.26  
lightning flash to a structure**

lightning flash striking a structure to be protected

**3.27  
lightning flash near a structure**

lightning flash striking close enough to a structure to be protected that it may cause dangerous overvoltages

[IEC 62305-1:2010](https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010)

<https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010>

**3.28  
electrical system**

system incorporating low voltage power supply components

**3.29  
electronic system**

system incorporating sensitive electronic components such as telecommunication equipment, computer, control and instrumentation systems, radio systems, power electronic installations

**3.30  
internal systems**

electrical and electronic systems within a structure

**3.31  
physical damage**

damage to a structure (or to its contents) due to mechanical, thermal, chemical and explosive effects of lightning

**3.32  
injury of living beings**

permanent injuries, including loss of life, to people or to animals by electric shock due to touch and step voltages caused by lightning

NOTE Although living beings may be injured in other ways, in this standard the term 'injury to living beings' is limited to the threat due to electrical shock (type of damage D1).

### 3.33

#### **failure of electrical and electronic systems**

permanent damage of electrical and electronic systems due to LEMP

### 3.34

#### **lightning electromagnetic impulse**

LEMP

all electromagnetic effects of lightning current via resistive, inductive and capacitive coupling that create surges and radiated electromagnetic fields

### 3.35

#### **surge**

transient created by LEMP that appears as an overvoltage and/or an overcurrent

### 3.36

#### **lightning protection zone**

LPZ

zone where the lightning electromagnetic environment is defined

NOTE The zone boundaries of an LPZ are not necessarily physical boundaries (e.g. walls, floor and ceiling).

### 3.37

#### **risk**

$R$

value of probable average annual loss (humans or goods) due to lightning, relative to the total value (humans or goods) of the structure to be protected

### 3.38

#### **tolerable risk**

$R_T$

maximum value of the risk which can be tolerated for the structure to be protected

### 3.39

#### **lightning protection level**

LPL

number related to a set of lightning current parameters values relevant to the probability that the associated maximum and minimum design values will not be exceeded in naturally occurring lightning

NOTE Lightning protection level is used to design protection measures according to the relevant set of lightning current parameters.

### 3.40

#### **protection measures**

measures to be adopted for the structure to be protected in order to reduce the risk

### 3.41

#### **lightning protection**

LP

complete system for protection of structures against lightning, including their internal systems and contents, as well as persons, in general consisting of an LPS and SPM

### 3.42

#### **lightning protection system**

LPS

complete system used to reduce physical damage due to lightning flashes to a structure

NOTE It consists of both external and internal lightning protection systems.

**3.43****external lightning protection system**

part of the LPS consisting of an air-termination system, a down-conductor system and an earth-termination system

**3.44****internal lightning protection system**

part of the LPS consisting of lightning equipotential bonding and/or electrical insulation of external LPS

**3.45****air-termination system**

part of an external LPS using metallic elements such as rods, mesh conductors or catenary wires intended to intercept lightning flashes

**3.46****down-conductor system**

part of an external LPS intended to conduct lightning current from the air-termination system to the earth-termination system

**3.47****earth-termination system**

part of an external LPS which is intended to conduct and disperse lightning current into the earth

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

**3.48****external conductive parts**

extended metal items entering or leaving the structure to be protected such as pipe works, cable metallic elements, metal ducts, etc. which may carry a part of the lightning current

<https://standards.iteh.ai/catalog/standards/sist/510e5570-df29-4db2-b12a-725497216bc2/iec-62305-1-2010>

**3.49****lightning equipotential bonding**

EB

bonding to LPS of separated metallic parts, by direct conductive connections or via surge protective devices, to reduce potential differences caused by lightning current

**3.50****conventional earthing impedance**

ratio of the peak values of the earth-termination voltage and the earth-termination current which, in general, do not occur simultaneously

**3.51****LEMP protection measures**

SPM

measures taken to protect internal systems against the effects of LEMP

NOTE This is part of overall lightning protection.

**3.52****magnetic shield**

closed, metallic, grid-like or continuous screen enveloping the structure to be protected, or part of it, used to reduce failures of electrical and electronic systems

**3.53****surge protective device**

SPD

device intended to limit transient overvoltages and divert surge currents; contains at least one non linear component