

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Protection against lightning –
Part 4: Electrical and electronic systems within structures

Protection contre la foudre –
Partie 4: Réseaux de puissance et de communication dans les structures

STANDARD PREVIEW
(standards.iteh.ai)

IEC 62305-4:2010

<https://standards.iteh.ai/catalog/standards/sist/1181c56d-24fa-4c02-a90a-f284e14892bd/iec-62305-4-2010>





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
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

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It also gives information on projects, replaced and withdrawn publications.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

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

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

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

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

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

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

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

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Protection against lightning –
Part 4: Electrical and electronic systems within structures
(standards.iteh.ai)

Protection contre la foudre –
Partie 4: Réseaux de puissance et de communication dans les structures
IEC 62305-4:2010
f284e14892bd/iec-62305-4-2010

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.020; 91.120.40

ISBN 978-2-83220-130-5

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.....	9
2 Normative references	9
3 Terms and definitions	10
4 Design and installation of SPM	13
4.1 General.....	13
4.2 Design of SPM	16
4.3 Lightning protection zones (LPZ).....	17
4.4 Basic SPM	20
5 Earthing and bonding	21
5.1 General.....	21
5.2 Earth-termination system.....	22
5.3 Bonding network.....	24
5.4 Bonding bars	28
5.5 Bonding at the boundary of an LPZ	29
5.6 Material and dimensions of bonding components.....	29
6 Magnetic shielding and line routing.....	30
6.1 General	30
6.2 Spatial shielding.....	30
6.3 Shielding of internal lines	30
6.4 Routing of internal lines	30
6.5 Shielding of external lines	31
6.6 Material and dimensions of magnetic shields.....	31
7 Coordinated SPD system.....	31
8 Isolating interfaces	32
9 SPM management	32
9.1 General.....	32
9.2 SPM management plan	32
9.3 Inspection of SPM	33
9.3.1 General	33
9.3.2 Inspection procedure	34
9.3.3 Inspection documentation.....	34
9.4 Maintenance.....	35
Annex A (informative) Basis of electromagnetic environment evaluation in an LPZ	36
Annex B (informative) Implementation of SPM for an existing structure.....	60
Annex C (informative) Selection and installation of a coordinated SPD system	76
Annex D (informative) Factors to be considered in the selection of SPDs.....	82
Bibliography.....	87
Figure 1 – General principle for the division into different LPZ	13
Figure 2 – Examples of possible SPM (LEMP protection measures).....	15
Figure 3 – Examples for interconnected LPZ.....	19
Figure 4 – Examples for extended lightning protection zones	20

Figure 5 – Example of a three-dimensional earthing system consisting of the bonding network interconnected with the earth-termination system	22
Figure 6 – Meshed earth-termination system of a plant	23
Figure 7 – Utilization of reinforcing rods of a structure for equipotential bonding	25
Figure 8 – Equipotential bonding in a structure with steel reinforcement	26
Figure 9 – Integration of conductive parts of internal systems into the bonding network	27
Figure 10 – Combinations of integration methods of conductive parts of internal systems into the bonding network	28
Figure A.1 – LEMP situation due to lightning strike	37
Figure A.2 – Simulation of the rise of magnetic field by damped oscillations	40
Figure A.3 – Large volume shield built by metal reinforcement and metal frames	41
Figure A.4 – Volume for electrical and electronic systems inside an inner LPZ n	42
Figure A.5 – Reducing induction effects by line routing and shielding measures	43
Figure A.6 – Example of SPM for an office building	45
Figure A.7 – Evaluation of the magnetic field values in case of a direct lightning strike	46
Figure A.8 – Evaluation of the magnetic field values in case of a nearby lightning strike	48
Figure A.9 – Distance s_a depending on rolling sphere radius and structure dimensions	51
Figure A.10 – Types of grid-like large volume shields	52
Figure A.11 – Magnetic field strength $H_{1/MAX}$ inside a grid-like shield type 1	53
Figure A.12 – Magnetic field strength $H_{1/MAX}$ inside a grid-like shield type 1 according to mesh width	54
Figure A.13 – Low-level test to evaluate the magnetic field inside a shielded structure	55
Figure A.14 – Voltages and currents induced into a loop formed by lines	56
Figure B.1 – SPM design steps for an existing structure	63
Figure B.2 – Possibilities to establish LPZ in existing structures	67
Figure B.3 – Reduction of loop area using shielded cables close to a metal plate	69
Figure B.4 – Example of a metal plate for additional shielding	70
Figure B.5 – Protection of aerials and other external equipment	71
Figure B.6 – Inherent shielding provided by bonded ladders and pipes	72
Figure B.7 – Ideal positions for lines on a mast (cross-section of steel lattice mast)	72
Figure B.8 – Upgrading of the SPM in existing structures	74
Figure C.1 – Surge voltage between live conductor and bonding bar	79
Figure D.1 – Installation example of test class I, class II and class III SPDs	83
Figure D.2 – Basic example for different sources of damage to a structure and lightning current distribution within a system	84
Figure D.3 – Basic example of balanced current distribution	85
Table 1 – Minimum cross-sections for bonding components	30
Table 2 – SPM management plan for new buildings and for extensive changes in construction or use of buildings	33
Table A.1 – Parameters relevant to source of harm and equipment	38
Table A.2 – Examples for $I_{0MAX} = 100$ kA and $w_m = 2$ m	48
Table A.3 – Magnetic attenuation of grid-like spatial shields for a plane wave	49
Table A.4 – Rolling sphere radius corresponding to maximum lightning current	51

Table A.5 – Examples for $I_{0/MAX} = 100$ kA and $w_m = 2$ m corresponding to $SF = 12,6$ dB	51
Table B.1 – Structural characteristics and surroundings	60
Table B.2 – Installation characteristics	61
Table B.3 – Equipment characteristics	61
Table B.4 – Other questions to be considered for the protection concept	61
Table D.1 – Preferred values of I_{imp}	82

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[IEC 62305-4:2010](https://standards.iteh.ai/catalog/standards/sist/1181c58d-24fa-4c02-a90a-f284e14892bd/iec-62305-4-2010)

<https://standards.iteh.ai/catalog/standards/sist/1181c58d-24fa-4c02-a90a-f284e14892bd/iec-62305-4-2010>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PROTECTION AGAINST LIGHTNING –

Part 4: Electrical and electronic systems within structures

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 62305-4 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) Isolating interfaces capable of reducing conducted surges on lines entering the structure are introduced.
- 2) Minimum cross-sections for bonding components are slightly modified.
- 3) First negative impulse current is introduced for calculation purposes as electromagnetic source of harm to the internal systems.
- 4) Selection of SPD with regard to voltage protection level is improved to take into account oscillation and induction phenomena in the circuit downstream of SPD.
- 5) Annex C dealing with SPD coordination is withdrawn and referred back to SC 37A.

- 6) A new informative Annex D is introduced giving information on factors to be considered in the selection of SPDs.

This bilingual version (2012-06) 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
81/373/FDIS	81/383/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, as closely as possible, 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.

<http://standards.iteh.ai/>
<http://standards.iteh.ai/catalog/standards/sist/1181c58d-24fa-4c02-a90a-f284e14892bd/iec-62305-4-2010>
 IEC 62305-4:2010

INTRODUCTION

Lightning as a source of harm is a very high energy phenomenon. Lightning flashes release many hundreds of mega-joules of energy. When compared with the milli-joules of energy that may be sufficient to cause damage to sensitive electronic equipment in electrical and electronic systems within a structure, it is clear that additional protection measures will be necessary to protect some of this equipment.

The need for this International Standard has arisen due to the increasing cost of failures of electrical and electronic systems, caused by electromagnetic effects of lightning. Of particular importance are electronic systems used in data processing and storage as well as process control and safety for plants of considerable capital cost, size and complexity (for which plant outages are very undesirable for cost and safety reasons).

Lightning can cause different types of damage in a structure, as defined in IEC 62305-1:

- D1 injury to living beings by electric shock;
- D2 physical damage (fire, explosion, mechanical destruction, chemical release) due to lightning current effects, including sparking;
- D3 failure of internal systems due to LEMP.

IEC 62305-3 deals with the protection measures to reduce the risk of physical damage and life hazard, but does not cover the protection of electrical and electronic systems.

This Part 4 of IEC 62305 therefore provides information on protection measures to reduce the risk of permanent failures of electrical and electronic systems within structures.

Permanent failure of electrical and electronic systems can be caused by the lightning electromagnetic impulse (LEMP) via:

- a) conducted and induced surges transmitted to equipment via connecting wiring;
- b) the effects of radiated electromagnetic fields directly into equipment itself.

Surges to the structure can originate from sources external to the structure or from within the structure itself:

- surges which originate externally from the structure are created by lightning flashes striking incoming lines or the nearby ground, and are transmitted to electrical and electronic systems within the structure via these lines;
- surges which originate internally within the structure are created by lightning flashes striking the structure itself or the nearby ground.

NOTE 1 Surges can also originate internally within the structure, from switching effects, e.g. switching of inductive loads.

The coupling can arise from different mechanisms:

- resistive coupling (e.g. the earth impedance of the earth-termination system or the cable shield resistance);
- magnetic field coupling (e.g. caused by wiring loops in the electrical and electronic system or by inductance of bonding conductors);
- electric field coupling (e.g. caused by rod antenna reception).

NOTE 2 The effects of electric field coupling are generally very small when compared to the magnetic field coupling and can be disregarded.

Radiated electromagnetic fields can be generated via

- the direct lightning current flowing in the lightning channel,
- the partial lightning current flowing in conductors (e.g. in the down-conductors of an external LPS in accordance with IEC 62305-3 or in an external spatial shield in accordance with this standard).

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[IEC 62305-4:2010](https://standards.iteh.ai/catalog/standards/sist/1181c58d-24fa-4c02-a90a-f284e14892bd/iec-62305-4-2010)

<https://standards.iteh.ai/catalog/standards/sist/1181c58d-24fa-4c02-a90a-f284e14892bd/iec-62305-4-2010>

PROTECTION AGAINST LIGHTNING –

Part 4: Electrical and electronic systems within structures

1 Scope

This part of IEC 62305 provides information for the design, installation, inspection, maintenance and testing of electrical and electronic system protection (SPM) to reduce the risk of permanent failures due to lightning electromagnetic impulse (LEMP) within a structure.

This standard does not cover protection against electromagnetic interference due to lightning, which may cause malfunctioning of internal systems. However, the information reported in Annex A can also be used to evaluate such disturbances. Protection measures against electromagnetic interference are covered in IEC 60364-4-44 ^[1] 1 and in the IEC 61000 series ^[2].

This standard provides guidelines for cooperation between the designer of the electrical and electronic system, and the designer of the protection measures, in an attempt to achieve optimum protection effectiveness.

This standard does not deal with detailed design of the electrical and electronic systems themselves.

ITeCh STANDARD PREVIEW
(standards.iteh.ai)

2 Normative references

[https://standards.iteh.ai/catalog/standards/sist/1181c58d-24fa-4c02-a90a-](https://standards.iteh.ai/catalog/standards/sist/1181c58d-24fa-4c02-a90a-91e91c91e91c)

[91e91c91e91c](https://standards.iteh.ai/catalog/standards/sist/1181c58d-24fa-4c02-a90a-91e91c91e91c)

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 60364-5-53:2001, *Electrical installations of buildings – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 61000-4-5:2005, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-9:1993, *Electromagnetic compatibility (EMC) – Part 4-9: Testing and measurement techniques – Pulse magnetic field immunity test – Basic EMC Publication*

IEC 61000-4-10:1993, *Electromagnetic compatibility (EMC) – Part 4-10: Testing and measurement techniques – Damped oscillatory magnetic field immunity test – Basic EMC Publication*

IEC 61643-1:2005, *Low-voltage surge protective devices – Part 1: Surge protective devices connected to low-voltage power distribution systems – Requirements and tests*

IEC 61643-12:2008, *Low-voltage surge protective devices – Part 12: Surge protective devices connected to low-voltage power distribution systems – Selection and application principles*

¹ Figures in square brackets refer to the bibliography.

IEC 61643-21, *Low voltage surge protective devices – Part 21: Surge protective devices connected to telecommunications and signalling networks – Performance requirements and testing methods*

IEC 61643-22, *Low voltage surge protective devices – Part 22: Surge protective devices connected to telecommunications and signalling networks – Selection and application principles*

IEC 62305-1:2010, *Protection against lightning – Part 1: General principles*

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*

3 Terms and definitions

For the purposes of this document, the following terms and definitions, as well as those given in other parts of IEC 62305, apply.

3.1

electrical system

system incorporating low voltage power supply components

3.2

electronic system

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

3.3

internal systems

electrical and electronic systems within a structure

3.4

lightning protection

LP

complete system for the protection of structures and/or electrical and electronic systems in those structures from the effects of lightning, consisting of an LPS and SPM

3.5

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.

3.6

lightning electromagnetic impulse

LEMP

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

3.7

surge

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

3.8 rated impulse withstand voltage level

U_W

impulse withstand voltage assigned by the manufacturer to the equipment or to a part of it, characterizing the specified withstand capability of its insulation against overvoltages

NOTE For the purposes of this part of IEC 62305, only withstand voltage between live conductors and earth is considered.

3.9 lightning protection level

LPL

number related to a set of lightning current parameters 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.

3.10 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).

3.11 LEMP protection measures

SPM

measures taken to protect internal systems against the effects of LEMP

NOTE This is part of overall lightning protection. IEC 62305-4:2010

<https://standards.iteh.ai/catalog/standards/sist/1181c58d-24fa-4c02-a90a-f284e14892bd/iec-62305-4-2010>

3.12 grid-like spatial shield

magnetic shield characterized by openings

NOTE For a building or a room, it is preferably built by interconnected natural metal components of the structure (e.g. rods of reinforcement in concrete, metal frames and metal supports).

3.13 earth-termination system

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

3.14 bonding network

interconnecting network of all conductive parts of the structure and of internal systems (live conductors excluded) to the earth-termination system

3.15 earthing system

complete system combining the earth-termination system and the bonding network

3.16 surge protective device

SPD

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

3.17

SPD tested with I_{imp}

SPDs which withstand the partial lightning current with a typical waveform 10/350 μ s and require a corresponding impulse test current I_{imp}

NOTE For power lines, a suitable test current I_{imp} is defined in the Class I test procedure of IEC 61643-1:2005.

3.18

SPD tested with I_n

SPDs which withstand induced surge currents with a typical waveform 8/20 μ s and require a corresponding impulse test current I_n

NOTE For power lines a suitable test current I_n is defined in the Class II test procedure of IEC 61643-1:2005.

3.19

SPD tested with a combination wave

SPDs that withstand induced surge currents with a typical waveform 8/20 μ s and require a corresponding impulse test current I_{SC}

NOTE For power lines a suitable combination wave test is defined in the Class III test procedure of IEC 61643-1:2005 defining the open circuit voltage U_{OC} 1,2/50 μ s and the short-circuit current I_{SC} 8/20 μ s of a 2 Ω combination wave generator.

3.20

voltage-switching type SPD

SPD that has a high impedance when no surge is present, but can have a sudden change in impedance to a low value in response to a voltage surge

NOTE 1 Common examples of components used as voltage switching devices include spark gaps, gas discharge tubes (GDT), thyristors (silicon controlled rectifiers) and triacs. These SPDs are sometimes called "crowbar type".

NOTE 2 A voltage-switching device has a discontinuous voltage/current characteristic.

3.21

voltage-limiting type SPD

SPD that has a high impedance when no surge is present, but will reduce it continuously with increased surge current and voltage

NOTE 1 Common examples of components used as non-linear devices are varistors and suppressor diodes. These SPDs are sometimes called "clamping type".

NOTE 2 A voltage-limiting device has a continuous voltage/current characteristic.

3.22

combination type SPD

SPD that incorporates both voltage-switching and voltage-limiting type components and that may exhibit voltage-switching, voltage-limiting or both voltage-switching and voltage-limiting behaviour, depending upon the characteristics of the applied voltage

3.23

coordinated SPD system

SPDs properly selected, coordinated and installed to form a system intended to reduce failures of electrical and electronic systems

3.24

isolating interfaces

devices which are capable of reducing conducted surges on lines entering the LPZ

NOTE 1 These include isolation transformers with earthed screen between windings, metal-free fibre optic cables and opto-isolators.

NOTE 2 Insulation withstand characteristics of these devices are suitable for this application intrinsically or via SPD.

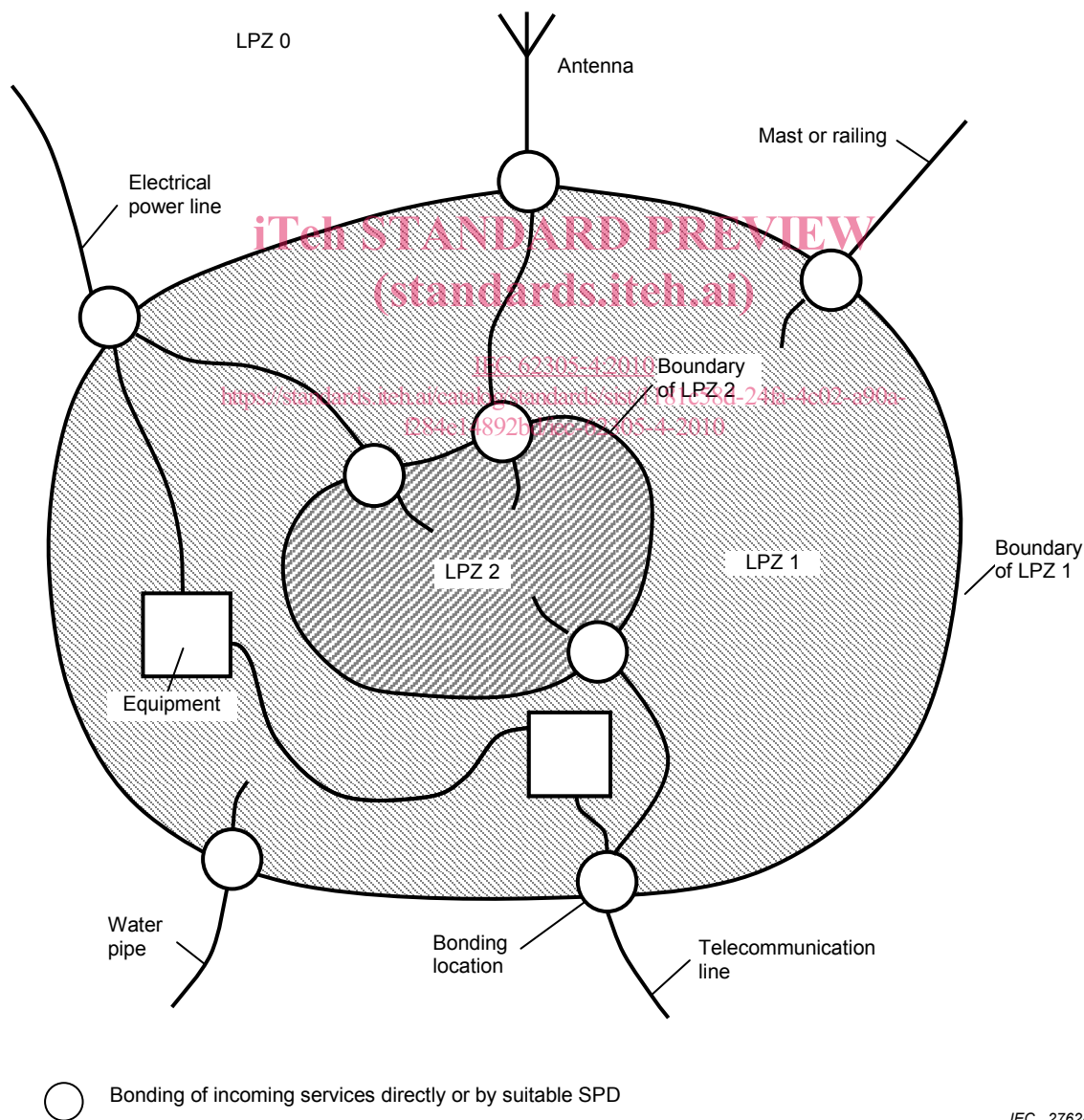
4 Design and installation of SPM

4.1 General

Electrical and electronic systems are subject to damage from a lightning electromagnetic impulse (LEMP). Therefore SPM need to be provided to avoid failure of internal systems.

The design of SPM should be carried out by experts in lightning and surge protection who possess a broad knowledge of EMC and installation practices.

Protection against LEMP is based on the lightning protection zone (LPZ) concept: the zone containing systems to be protected shall be divided into LPZs. These zones are theoretically assigned part of space (or of an internal system) where the LEMP severity is compatible with the withstand level of the internal systems enclosed (see Figure 1). Successive zones are characterized by significant changes in the LEMP severity. The boundary of an LPZ is defined by the protection measures employed (see Figure 2).



IEC 2762/10

NOTE This figure shows an example of dividing a structure into inner LPZs. All metal services entering the structure are bonded via bonding bars at the boundary of LPZ 1. In addition, the conductive services entering LPZ 2 (e.g. computer room) are bonded via bonding bars at the boundary of LPZ 2.

Figure 1 – General principle for the division into different LPZ