IEC 62305-3

Edition 3.0 2024-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Protection against lightning – Part 3: Physical damage to structures and life hazard

Protection contre la foudre – Partie 3: Dommages physiques sur les structures et risques humains

IEC 62305-3:2024-09(en-fr)

IEC Secretariat
3, rue de Varembé
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 It also gives information on projects, replaced and withdrawn publications.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.

IEC 62305-3

Edition 3.0 2024-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Protection against lightning – Part 3: Physical damage to structures and life hazard

Protection contre la foudre – Partie 3: Dommages physiques sur les structures et risques humains

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 29.020, 91.120.40

ISBN 978-2-8322-9059-0

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

PROTECTION AGAINST LIGHTNING –

Part 3: Physical damage to structures and life hazard

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 62305-3 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) Minimum thicknesses of metal sheets or metal pipes are given in Table 4 for air-termination systems where it is necessary to prevent hot-spot problems. Maximum temperature rises ΔT (K) and time duration t_{50} (s) for different thicknesses and long strokes are also given.
b) Cross-reference to the IEC 62561 series is made for the use of reliable, stable, safe and appropriate LPS components.

c) The application of two methods – general and simplified – for separation distance calculation is clarified.

d) Some changes to the requirements for continuity of steel reinforcement are made.

e) Annex C is revised to address comments from IEC subcommittee 31J.

f) Revision of positioning of air-termination conductors are modified according to the three accepted methods. A more precise description of the methods for positioning of the air-termination systems is made according to the complexity of structures to be protected. The main text has been simplified, Annex A has been deleted and all detailed information has been moved to Annex D.

g) Information on the protection of green roofs is introduced in Annex D.

h) Information on the protection of protruding parts on facades of tall buildings is introduced in Annex D;

i) a new definition of “electrically insulated LPS” has been introduced to distinguish it from an LPS both electrically and physically isolated from the structure, with a slight modification of the other LPS definitions.

The text of this International Standard is based on the following documents:

Draft	Report on voting
81/764/FDIS	81/767/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 Austria, Annex C shall not be applied and is replaced by the National standard ÖVE/ÖNORM EN 62305-3 Beiblatt 1:2013-11-01 Blitzschutz – Teil 3: Schutz von baulichen Anlagen und Personen – Beiblatt 1: Zusätzliche Informationen für bauliche Anlagen mit explosionsgefährdeten Bereichen. In Austria, Annex C shall be classified as "Informative".

In Germany, the need for lightning protection is determined by, and the class of required LPS shall be selected according to, a national annex to the third edition of IEC 62305-1 (including an option for a risk assessment following the third edition of IEC 62305-2).

In Germany, for a metallic or electrically-continuous connected reinforced concrete framework, in addition, DIN EN 62305-3 Beiblatt 1 shall be applied.

In Germany, 8.1 condition b) is not applied – see DIN EN 62305-3 Beiblatt 1. Instead, the alternate measures, as described in DIN EN 62305-3 Beiblatt 1, shall be applied.

In Germany, for 8.2, the alternate measures, as described in DIN EN 62305-3 Beiblatt 1, shall be applied.

In Japan, when using country-specific lightning protection components, the manufacturer and/or lightning protection designer shall explain that the component will withstand the electromagnetic effects of lightning currents and possible accidental stresses without damage.

In Italy, a separation distance is not required in structures with metallic or electrically-continuous connected reinforced concrete framework according to 5.3.5.

In Italy, in reinforced concrete structures, the reinforcement may be used for equipotential bonding. In this case, if a ring electrode is not yet installed and connected to the reinforcement steels, a ring conductor welded or bolted to the steel reinforcement will be installed, to which the bonding bars should be connected via welded conductors.

In the Netherlands, in some situations, special fasteners which are necessary and which are not available on the commercial market and are not tested according to IEC 62561-4 (because of a small number of required special fasteners), must comply with the lateral and axial test mentioned in IEC 62561-4. A written statement of passing these lateral and axial tests must be issued by the designer and/or the installer of the LPS and must be a part of the commissioning documents.

In South Africa, the class of required LPS shall be selected on the basis of a risk assessment of either the second edition of IEC 62305-2 or the third edition of IEC 62305-2 . This note applies also for D.4.1 and D.4.2.1.

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

This part of IEC 62305 deals with the protection, in and around a structure, against physical damage and injury to human beings due to touch and step voltages.

The main and most effective measure for protection of structures and its content against physical damage is considered to be a lightning protection system (LPS). It usually consists of both external and internal lightning protection measures.

An external LPS is intended to

a) intercept a lightning flash to the structure (with an air-termination system),

b) conduct the lightning current safely towards earth (using a down-conductor system),

c) disperse the lightning current into the earth (using an earth-termination system).

NOTE The purpose of the external LPS is to protect the structure from a direct lightning strike by providing the preferred attachment points, conducting and dispersing the lightning current. It will not significantly influence the attachment process between the structure and the lightning to increase or reduce the number of direct lightning strikes (S1) to the structure.

An internal LPS prevents dangerous sparking within the structure using either equipotential bonding or a separation distance (and hence isolation) between the external LPS (as defined in 3.2) and other electrically conducting elements internal to the structure.

Main protection measures against injury to human beings due to touch and step voltages are intended to:

1) reduce dangerous current flowing through bodies by either insulating exposed conductive parts, or by increasing the surface soil resistivity, or both,

2) reduce the occurrence of dangerous touch and step voltages by either physical restrictions or warning notices, or both.

The type and location of an LPS should be carefully considered in the initial design of a new structure, thereby enabling maximum advantage to be taken of the electrically conductive parts of the structure. By so doing, design and construction of an integrated installation is made easier, the overall aesthetic aspects can be improved, and the effectiveness of the LPS can be increased at minimum cost and effort.

Access to the ground and the proper use of foundation steelwork for the purpose of forming an effective earth termination may well be impossible once construction work on a site has commenced. Therefore, soil resistivity and the nature of the earth should be considered at the earliest possible stage of a project. This information is fundamental to the design of an earth-termination system and can influence the foundation design work for the structure.

Regular consultation between LPS designers and installers, architects and builders is essential in order to achieve the best result at minimum cost.

If lightning protection is to be added to an existing structure, every effort should be made to ensure that it conforms to the principles of this document. The design of the type and location of an LPS should take into account the features of the existing structure.

When safety is involved and significant changes are made to the structure or its use changes, consideration of updating the lightning protection installation to the present edition of this document is recommended.

National or local laws and regulations can provide guidance or minimum requirements on the application of this document. This includes specifying the class of a required LPS for specific applications without a risk assessment, the conditions of separation and bonding of other earth-termination systems, the additional information given in Annex C for LPSs in case of structures with a risk of explosion, and the mandatory requirements for inspection, testing and maintenance of LPSs given in Clause 7.

PROTECTION AGAINST LIGHTNING –

Part 3: Physical damage to structures and life hazard

1 Scope

This part of IEC 62305 provides the requirements for protection of a structure against physical damage by means of a lightning protection system (LPS), and for protection against injury to human beings due to touch and step voltages in the vicinity of an LPS (see IEC 62305-1).

This document is applicable to the:

a) design, installation, inspection and maintenance of an LPS for structures without limitation of their height,

b) establishment of measures for protection against injury to human beings primarily due to touch and step voltages.

NOTE 1 Specific requirements for an LPS in structures dangerous to their surroundings due to the risk of explosion are provided in Annex C.

NOTE 2 This document is not intended to provide protection against failures of electrical and electronic systems due to overvoltages. Specific requirements for such cases are provided in IEC 62305-4.

NOTE 3 Specific requirements for the protection against lightning of wind turbines are reported in IEC 61400-24 [1][1].

NOTE 4 Specific requirements for the protection against overvoltage of photovoltaic systems are reported in IEC 61643-32 [2] and in IEC 62305-4:2024, Annex F.

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 60079-10-1:2020, *Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres*

IEC 60079-10-2:2015, *Explosive atmospheres – Part 10-2: Classification of areas – Explosive dust atmospheres*

IEC 60079-14, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*

IEC 60364-5-53, *Low-voltage electrical installations – Part 5-53: Selection and erection of electrical equipment – Devices for protection for safety, isolation, switching, control and monitoring*

IEC 61643-11, *Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems – Requirements and test methods*

---

[1] Numbers in square brackets refer to the Bibliography.