

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**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**





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Part 3: Physical damage to structures and life hazard**

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## PROTECTION AGAINST LIGHTNING –

## Part 3: Physical damage to structures and life hazard

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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  $\Delta T$  (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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://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.

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## 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.