IEC 62305-4

Edition 2.0 2010-12

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PROTECTION AGAINST LIGHTNING –

Part 4: Electrical and electronic systems within structures

FOREWORD

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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5) Annex C dealing with SPD coordination is withdrawn and referred back to SC 37A.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.

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).