SVENSK STANDARD SS-EN 62305-4

| Fastställd | Utgåva | Sida | Ansvarig kommitté |
|---|---|---|---|
| 2011-10-05 | 2 | 1 (1+88) | SEK TK 81 |




# Åskskydd –
# Del 4: Skydd av elektriska och elektroniska system i byggnader

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

Som svensk standard gäller europastandarden EN 62305-4:2011. Den svenska standarden innehåller den officiella engelska språkversionen av EN 62305-4:2011.

**Nationellt förord**

Europastandarden EN 62305-4:2011

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 62305-4, Second edition, 2010 - Protection against lightning - Part 4: Electrical and electronic systems within structures**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 62305-4, utgåva 1, 2006, gäller ej fr o m 2014-01-13.

ICS 29.020; 91.120.40

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
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Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 62305-4

February 2011

ICS 29.020; 91.120.40

Supersedes EN 62305-4:2006 + corr. Nov.2006

English version

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

(IEC 62305-4:2010, modified)

Protection contre la foudre - Partie 4: Réseaux de puissance et de communication dans les structures (CEI 62305-4:2010, modifiée)

Blitzschutz - Teil 4: Elektrische und elektronische Systeme in baulichen Anlagen (IEC 62305-4:2010, modifiziert)



CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**



Ref. No. EN 62305-4:2011 E

SEK Svensk Elstandard

## Foreword

The text of document 81/373/FDIS, future edition 2 of IEC 62305-4, prepared by IEC TC 81, Lightning protection, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62305-4 on 2011-01-13.

This European Standard supersedes EN 62305-4:2006 + corr. Nov.2006.

This EN 62305-4:2011 includes the following significant technical changes with respect to EN 62305-4:2006 + corr. Nov.2006:

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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

| | | |
|---|---|---|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2012-01-13 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2014-01-13 |

Annex ZA has been added by CENELEC.

ANM – (sv anm) Uppgifter om andra, felaktiga datum har tidigare cirkulerat i CENELEC.

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## Endorsement notice

The text of the International Standard IEC 62305-4:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

[2] IEC 61000 series NOTE Harmonized in EN 61000 series (partially modified).

[8] IEC 61643-11 NOTE Harmonized as EN 61643-11.

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## Annex ZA
(normative)

## Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| 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 | EN 60664-1 | 2007 |
| IEC 61000-4-5 | 2005 | Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test | EN 61000-4-5 | 2006 |
| IEC 61000-4-9 | 1993 | Electromagnetic compatibility (EMC) - Part 4-9: Testing and measurement techniques - Pulse magnetic field immunity test | EN 61000-4-9 | 1993 |
| IEC 61000-4-10 | 1993 | Electromagnetic compatibility (EMC) - Part 4-10: Testing and measurement techniques - Damped oscillatory magnetic field immunity test | EN 61000-4-10 | 1993 |
| 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 (mod) | 2008 | Low-voltage surge protective devices - Part 12: Surge protective devices connected to low-voltage power distribution systems - Selection and application principles | CLC/TS 61643-12 | 2009 |
| IEC 61643-21 | - | Low voltage surge protective devices - Part 21: Surge protective devices connected to telecommunications and signalling networks - Performance requirements and testing methods | EN 61643-21 | - |
| IEC 61643-22 (mod) | - | Low-voltage surge protective devices - Part 22: Surge protective devices connected to telecommunications and signalling networks - Selection and application principles | CLC/TS 61643-22 | - |
| IEC 62305-1 | 2010 | Protection against lightning - Part 1: General principles | EN 62305-1 | 2011 |
| IEC 62305-2 | 2010 | Protection against lightning - Part 2: Risk management | EN 62305-2 | 2011 |

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 62305-3 | 2010 | Protection against lightning - Part 3: Physical damage to structures and life hazard | EN 62305-3 | 2011 |

# CONTENTS

# 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).

# 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.

## 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 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*

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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*