Piksekaitse. Osa 4: Ehitiste elektri- ja elektroonikasüsteemid

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

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

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NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 62305-4:2011 sisaldab Euroopa standardi EN 62305-4:2011 ja selle paranduse AC:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 62305-4:2011 consists of the English text of the European standard EN 62305-4:2011 and its corrigendum AC:2016.
Standard on kinnitatud Eesti Standardikeskuse 31.03.2011 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 31.03.2011 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 25.02.2011, parandusele AC 04.11.2016.	Date of Availability of the European standard text is 25.02.2011, for corrigendum AC 04.11.2016.
Standard on kättesaadav Eesti standardiorganisatsioonist	The standard is available from Estonian standardisation organisation.

ICS 29.020, 91.120.40

ehitis, elektroonikasüsteemid, välgukaitse, välk

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

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)	2011-10-13
– 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.

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.

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).