

English version

**Low-voltage surge protective devices -
Part 12: Surge protective devices connected to low-voltage power
distribution systems -
Selection and application principles
(IEC 61643-12:2008, modified)**

Parafoudres basse tension -
Partie 12: Parafoudres connectés
aux réseaux de distribution basse tension -
Principes de choix et d'application
(CEI 61643-12:2008, modifiée)

Überspannungsschutzgeräte
für Niederspannung -
Teil 12: Überspannungsschutzgeräte
für den Einsatz
in Niederspannungsanlagen -
Auswahl und Anwendungsgrundsätze
(IEC 61643-12:2008, modifiziert)

This Technical Specification was approved by CENELEC on 2009-10-30.

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CENELEC

European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

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Foreword

This Technical Specification consists of the text of the International Standard IEC 61643-12:2008 prepared by SC 37A, Low-voltage surge protective devices, of IEC TC 37, Surge arresters, together with the common modifications prepared by the Technical Committee CENELEC TC 37A, Low voltage surge protective devices.

The text of the draft was circulated for voting in accordance with the Internal Regulations, Part 2, Subclause 11.3.3.3 and was accepted by CENELEC as CLC/TS 61643-12 on 2009-10-30.

This Technical Specification supersedes CLC/TS 61643-12:2006.

The following date was fixed:

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This Technical Specification is to be used in conjunction with EN 61643-11:2002.

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0 Introduction

0.1 General

This Technical Specification is to be used with EN 61643-11:2002.

Surge protective devices (SPDs) are used to protect, under specified conditions, electrical systems and equipment against various overvoltages and impulse currents, such as lightning and switching surges.

SPDs shall be selected in accordance with their environmental conditions and the acceptable failure rate of the equipment and the SPDs.

This Technical Specification provides information :

- to the user about characteristics useful for the selection of an SPD.
- to evaluate, with reference to EN 62305-1 to EN 62305-4 and HD 384/60364 series, the need for using SPDs in low-voltage systems.
- on selection and co-ordination of SPDs, while taking into account the entire environment in which they are applied. Some examples are: equipment to be protected and system characteristics, insulation levels, overvoltages, method of installation, location of SPDs, co-ordination of SPDs, failure mode of SPDs and equipment failure consequences.
- and provides guidance to perform a risk analysis.

The HD 384/60364 series of harmonised documents provides direct information for contractors on the installation of SPDs.

For the purpose of having a usable and complete working document, parts from existing documents have been duplicated where necessary. Such parts are explicitly mentioned in the text and attention is drawn to the reader that these parts may change in future.

0.2 Keys to understanding the structure of this Technical Specification

The list below summarizes the structure of this Technical Specification and provides a summary of the information covered in each clause and annex. The main clauses provide basic information on the factors used for SPD selection. Readers who wish to obtain more detail on the information provided in Clauses 4 to 7 should refer to the relevant annexes.

Clause 1 describes the scope of this Technical Specification.

Clause 2 lists the normative references where additional information may be found.

Clause 3 provides definitions useful for the comprehension of this Technical Specification.

Clause 4 addresses the parameters of systems and equipment relevant to SPDs. In addition to the stresses created by lightning, those created by the network itself as temporary overvoltages and switching surges are described.

Clause 5 lists the electrical parameters used in the selection of an SPD and gives some explanation regarding these parameters. These are related to the data given in EN 61643-11.

Clause 6 is the core of this Technical Specification. It relates the stresses coming from the network (as discussed in Clause 4) to the characteristics of the SPD (as discussed in Clause 5). It outlines how the protection given by SPDs may be affected by its installation. The different steps for the selection of an SPD are presented including the problems of co-ordination when more than one SPD is used in an installation (details about co-ordination may be found in Annex F).

Clause 7 is an introduction to the risk analysis (considerations of when the use of SPDs is beneficial).

Clause 8 deals with co-ordination between signalling and power lines (under consideration).

Annex A gives examples of various SPD technologies.

Annex B deals with explanations of testing procedures used in EN 61643-11.

Annex C deals with the calculation of the sharing of lightning current between different earthing systems.

Annex D provides specific examples on the use of this Technical Specification.

Annex E provides specific examples of the use of the risk analysis.

Annex F deals with consideration when Type 1 SPDs are to be applied.

Annex G discusses differences between immunity level and insulation withstand of equipments.

Annex H provides practical examples of SPD installation as used in some countries.

Annex I deals with surge withstand of fuses.

Annex J provides SPD coordination tests principles.

Annex K provides simple calculation of I_{imp} for Type 1 SPDs in case of a building protected by a LPS.

1 Scope

This Technical Specification describes the principles for selection, operation, location and co-ordination of SPDs to be connected to 50 Hz to 60 Hz a.c. power circuits and equipment rated up to 1 000 V r.m.s..

NOTE 1 This Technical Specification deals only with SPDs and not with SPDs components integrated inside equipment.

NOTE 2 Additional requirements may be necessary for special applications such as electrical traction, etc.

NOTE 3 It should be remembered that IEC 60364 series and EN 62305-4 are also applicable.

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.

HD 384/60364 series, *Electrical installations of buildings/Low-voltage electrical installations* (IEC 60364 series, mod.)

HD 60364-4-41, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock* (IEC 60364-4-41, mod.)

HD 60364-4-443:2006, *Electrical installations of buildings – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances – Clause 443: Protection against overvoltages of atmospheric origin or due to switching* (IEC 60364-4-44:2001/A1:2003, mod.)

HD 60364-5-534:2008, *Low-voltage electrical installations – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control – Clause 534: Devices for protection against overvoltages* (IEC 60364-5-53:2001/A1:2002 (Clause 534), mod.)

EN 60529, *Degrees of protection provided by enclosures (IP Code)* (IEC 60529)

EN 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests* (IEC 60664-1)

EN 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test* (IEC 61000-4-5)

EN 61008-1, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) – Part 1: General rules* (IEC 61008-1, mod.)

EN 61009-1, *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) – Part 1: General rules* (IEC 61009-1, mod.)

EN 61643-11:2002 + A11:2007, *Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems – Requirements and tests* (IEC 61643-1:1998, mod. + corrigendum Dec. 1998, mod.)

EN 62305-1:2006, *Protection against lightning – Part 1: General principles* (IEC 62305-1:2006)

EN 62305-2, *Protection against lightning – Part 2: Risk management* (IEC 62305-2)

EN 62305-3, *Protection against lightning – Part 3: Physical damage to structures and life hazard* (IEC 62305-3, mod.)

EN 62305-4, *Protection against lightning – Part 4: Electrical and electronic systems within structures* (IEC 62305-4)