

**Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests (IEC 60664-1:2020)**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 60664-1:2020 sisaldab Euroopa standardi EN IEC 60664-1:2020 ja selle paranduse AC:2020 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 60664-1:2020 consists of the English text of the European standard EN IEC 60664-1:2020 and its corrigendum AC:2020.
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Insulation coordination for equipment within low-voltage supply  
systems - Part 1: Principles, requirements and tests  
(IEC 60664-1:2020)

Coordination de l'isolement des matériels dans les réseaux  
d'énergie électrique à basse tension - Partie 1: Principes,  
exigences et essais  
(IEC 60664-1:2020)

Isolationskoordination für elektrische Betriebsmittel in  
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## European foreword

The text of document 109/183/FDIS, future edition 3 of IEC 60664-1, prepared by IEC/TC 109 "Insulation co-ordination for low-voltage equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60664-1:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-03-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-06-30

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IEC 60038:2009	NOTE	Harmonized as EN 60038:2011 (modified)
IEC 60216 (series)	NOTE	Harmonized as EN 60216 (series)
IEC 60068 (series)	NOTE	Harmonized as EN 60068 (series)
IEC 60068-1:2013	NOTE	Harmonized as EN 60068-1:2014 (not modified)
IEC 60085:2007	NOTE	Harmonized as EN 60085:2008 (not modified)
IEC 60112:2003	NOTE	Harmonized as EN 60112:2003 (not modified)
IEC 60364-4-44:2007	NOTE	Harmonized as HD 60364-4-442:2012 (modified)
IEC 60529	NOTE	Harmonized as EN 60529
IEC 60664-3:2016	NOTE	Harmonized as EN 60664-3:2017 (not modified)
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### **Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests**

**Coordination de l'isolement des matériels dans les réseaux d'énergie électrique  
à basse tension –  
Partie 1: Principes, exigences et essais**



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# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



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### **Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests**

### **Coordination de l'isolement des matériels dans les réseaux d'énergie électrique à basse tension – Partie 1: Principes, exigences et essais**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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International Standard IEC 60664-1 has been prepared by IEC technical committee 109: Insulation co-ordination for low-voltage equipment.

This third edition cancels and replaces the second edition published in 2007. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) update of the Scope, Clauses 0 and 0,
- b) new structure for Clauses 0 and 0,
- c) addition of 1 500 V DC into tables in Annex B and F,
- d) update of distances altitude correction in a new Table F.10,
- e) addition of Annex G with a flowchart for clearances,
- f) addition of Annex H with a flowchart for creepage distances.

It has the status of a basic safety publication in accordance with IEC Guide 104.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
109/183/FDIS	109/186/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60664 series, published under the general title *Insulation coordination for equipment within low-voltage supply systems*, can be found on the IEC website.

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# INSULATION COORDINATION FOR EQUIPMENT WITHIN LOW-VOLTAGE SUPPLY SYSTEMS –

## Part 1: Principles, requirements and tests

### 1 Scope

This part of IEC 60664 deals with **insulation coordination** for equipment having a **rated voltage** up to AC 1 000 V or DC 1 500 V connected to **low-voltage supply systems**.

This document applies to frequencies up to 30 kHz.

NOTE 1 Requirements for **insulation coordination** for equipment within **low-voltage supply systems** with rated frequencies above 30 kHz are given in IEC 60664-4.

NOTE 2 Higher voltages can exist in internal circuits of the equipment.

It applies to equipment for use up to 2 000 m above sea level and provides guidance for use at higher altitudes (See 5.2.3.4).

It provides requirements for technical committees to determine **clearances**, **creepage distances** and criteria for **solid insulation**. It includes methods of electrical testing with respect to **insulation coordination**.

The minimum **clearances** specified in this document do not apply where ionized gases are present. Special requirements for such situations can be specified at the discretion of the relevant technical committee.

This document does not deal with distances:

- through liquid insulation;
- through gases other than air;
- through compressed air.

This basic safety publication focusing on safety essential requirements is primarily intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications in the preparation of its publications.

However, in case of missing specified values for **clearances**, **creepage distances** and requirements for **solid insulation** in the relevant product standards, or even missing standards, this document applies.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60068-2-2, *Environmental testing – Part 2-2: Tests – Tests B: Dry heat*

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60270, *High-voltage test techniques – Partial discharge measurements*

IEC 61140:2016, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61180:2016, *High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment*

### 3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 3.1 Terms and definitions

##### 3.1.1

##### **low-voltage supply system**

all installations and plant provided for the purpose of generating, transmitting and distributing electricity

[SOURCE: IEC 60050-601:1985, 601-01-01, modified – The term "electric power system" has been replaced with "low-voltage supply system".]

##### 3.1.2

##### **mains supply**

AC or DC power distribution system (external to the equipment) that supplies operating power to the equipment

Note 1 to entry: **Mains supply** includes public or private utilities and, unless otherwise specified in this document, equivalent sources such as motor-driven generators and uninterruptible power supplies.

##### 3.1.3

##### **insulation coordination**

mutual correlation of insulation characteristics of electrical equipment taking into account the expected **micro-environment** and other influencing stresses

Note 1 to entry: Expected voltage stresses are characterized in terms of the characteristics defined in 3.1.7 to 3.1.16.

[SOURCE: IEC 60050-442:2014, 442-09-01, modified – "electrical" replaces "electric" and Note 1 to entry has been added.]

##### 3.1.4

##### **clearance**

shortest distance in air between two conductive parts

[SOURCE: IEC 60050-581:2008, 581-27-76]