



BSI Standards Publication

# Insulation coordination for equipment within low-voltage supply systems

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Part 1: Principles, requirements and tests

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## National foreword

This British Standard is the UK implementation of EN IEC 60664-1:2020. It is identical to IEC 60664-1:2020, incorporating corrigendum October 2020. It supersedes BS EN 60664-1:2007, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/109, Insulation co-ordination for low voltage equipment.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2020.

### Amendments/corrigenda issued since publication

Date	Text affected
31 December 2020	Implementation of IEC corrigendum October 2020: replacement of Figure G.1 (2 of 2)

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## EUROPÄISCHE NORM

July 2020

ICS 29.080.30

Supersedes EN 60664-1:2007 and all of its amendments and corrigenda (if any)

English Version

## 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 Niederspannungsanlagen - Teil 1: Grundsätze, Anforderungen und Prüfungen (IEC 60664-1:2020)

This European Standard was approved by CENELEC on 2020-06-30. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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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

This document supersedes EN 60664-1:2007 and all of its amendments and corrigenda (if any).

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

## Endorsement notice

The text of the International Standard IEC 60664-1:2020 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:

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)
IEC 60664-4:2005	NOTE	Harmonized as EN 60664-4:2006 (not modified)
IEC 61000-4-5:2014	NOTE	Harmonized as EN 61000-4-5:2014 (not modified)

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(normative)

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

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-2	-	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	-
IEC 60068-2-14	2009	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	2009
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60270	-	High-voltage test techniques - Partial discharge measurements	EN 60270	-
IEC 61140	2016	Protection against electric shock - Common aspects for installation and equipment	EN 61140	2016
IEC 61180	2016	High-voltage test techniques for low-voltage equipment - Definitions, test and procedure requirements, test equipment	EN 61180	2016

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## CONTENTS

FOREWORD .....	6
1 Scope .....	8
2 Normative references .....	8
3 Terms, definitions and abbreviated terms .....	9
3.1 Terms and definitions .....	9
3.2 Abbreviated terms .....	15
4 Basic technical characteristics for insulation coordination .....	15
4.1 General .....	15
4.2 Voltages .....	16
4.2.1 General aspects .....	16
4.2.2 Transient overvoltages .....	17
4.2.3 Temporary overvoltages .....	18
4.2.4 Recurring peak voltage .....	18
4.2.5 Steady-state working voltage .....	19
4.2.6 Steady-state peak voltage .....	19
4.3 Overvoltage categories .....	19
4.3.1 General .....	19
4.3.2 Equipment energized directly from the mains supply .....	19
4.3.3 Systems and equipment not energized directly from the mains supply .....	20
4.4 Frequency .....	20
4.4.1 General .....	20
4.4.2 Solid insulation .....	20
4.5 Pollution .....	20
4.5.1 General .....	20
4.5.2 Degrees of pollution in the micro-environment .....	21
4.5.3 Conditions of conductive pollution .....	21
4.6 Insulating material .....	21
4.6.1 Solid insulation .....	21
4.6.2 Stresses .....	22
4.6.3 Comparative tracking index (CTI) .....	23
4.7 Environmental aspects .....	24
4.7.1 General .....	24
4.7.2 Altitude .....	24
4.7.3 Temperature .....	24
4.7.4 Vibrations .....	24
4.7.5 Humidity .....	24
4.8 Duration of voltage stress .....	24
4.9 Electrical field distribution .....	25
5 Design for insulation coordination .....	25
5.1 General .....	25
5.1.1 Means of insulation coordination .....	25
5.1.2 Frequency above 30 kHz .....	25
5.1.3 Reduced distances due to coating or potting .....	25
5.1.4 Equipment which are not connected to public low-voltage systems .....	25
5.2 Dimensioning of clearances .....	25
5.2.1 General .....	25

This is a preview of "BS EN IEC 60664-1:20...". [Click here to purchase the full version from the ANSI store.](#)

5.2.2	Dimensioning criteria for clearances .....	26
5.2.3	Other factors involving clearances .....	26
5.2.4	Dimensioning of clearances of functional insulation .....	27
5.2.5	Dimensioning of clearances of basic insulation, supplementary insulation and reinforced insulation.....	27
5.3	Dimensioning of creepage distances .....	28
5.3.1	General .....	28
5.3.2	Dimensioning criteria of creepage distances .....	29
5.3.3	Other factors involving creepage distances.....	30
5.3.4	Dimensioning of creepage distances of functional insulation.....	31
5.3.5	Dimensioning of creepage distances of basic insulation, supplementary insulation and reinforced insulation.....	31
5.4	Requirements for design of solid insulation .....	32
5.4.1	General .....	32
5.4.2	Voltage stress.....	32
5.4.3	Withstand of voltage stresses .....	32
5.4.4	Withstand on environmental stresses.....	34
6	Tests and measurements.....	34
6.1	General.....	34
6.2	Verification of clearances .....	35
6.2.1	General .....	35
6.2.2	Test voltages .....	35
6.3	Verification of creepage distances .....	37
6.4	Verification of solid insulation .....	37
6.4.1	General .....	37
6.4.2	Selection of tests .....	38
6.4.3	Conditioning .....	39
6.4.4	Impulse voltage test.....	39
6.4.5	AC power frequency voltage test .....	40
6.4.6	Partial discharge test.....	40
6.4.7	DC voltage test.....	42
6.4.8	High-frequency voltage test .....	43
6.5	Performing dielectric tests on complete equipment.....	43
6.5.1	General .....	43
6.5.2	Parts to be tested .....	43
6.5.3	Preparation of equipment circuits.....	44
6.5.4	Test voltage values.....	44
6.5.5	Test criteria .....	44
6.6	Other tests .....	44
6.6.1	Test for purposes other than insulation coordination .....	44
6.6.2	Sampling and routine tests .....	44
6.6.3	Measurement accuracy of test parameters.....	44
6.7	Measurement of the attenuation of the transient overvoltages.....	45
6.8	Measurement of clearances and creepage distances .....	45
Annex A (informative)	Basic data on withstand characteristics of clearances .....	51
Annex B (informative)	Nominal voltages of mains supply for different modes of overvoltage control .....	56
Annex C (normative)	Partial discharge test methods .....	58
C.1	Test circuits .....	58



This is a preview of "BS EN IEC 60664-1:20...". [Click here to purchase the full version from the ANSI store.](#)

C.1.1	General .....	58
C.1.2	Test circuit for earthed test specimen (Figure C.1).....	58
C.1.3	Test circuit for unearthed test specimen (Figure C.2).....	59
C.1.4	Selection criteria.....	59
C.1.5	Measuring impedance.....	59
C.1.6	Coupling capacitor $C_k$ .....	59
C.1.7	Filter.....	59
C.2	Test parameters.....	59
C.2.1	General .....	59
C.2.2	Requirements for the test voltage .....	60
C.2.3	Climatic conditions .....	60
C.3	Requirements for measuring instruments .....	60
C.3.1	General .....	60
C.3.2	Classification of PD meters.....	60
C.3.3	Bandwidth of the test circuit.....	61
C.4	Calibration .....	61
C.4.1	Calibration of discharge magnitude before the noise level measurement .....	61
C.4.2	Verification of the noise level.....	62
C.4.3	Calibration for the PD test .....	63
C.4.4	Calibration pulse generator.....	63
Annex D (informative)	Additional information on partial discharge test methods .....	64
D.1	Measurement of partial discharge (PD), PD inception and extinction voltage.....	64
D.2	Description of PD test circuits (Figure D.1) .....	64
D.3	Precautions for reduction of noise.....	65
D.3.1	General .....	65
D.3.2	Sources in the non-energized test circuit .....	65
D.3.3	Sources in the energized test circuit .....	65
D.3.4	Measures for reduction of noise.....	65
D.4	Application of multiplying factors for test voltages .....	65
D.4.1	General .....	65
D.4.2	Example 1 (circuit connected to mains supply).....	66
D.4.3	Example 2 (internal circuit with maximum recurring peak voltage $U_{rp}$ ).....	66
Annex E (informative)	Comparison of creepage distances specified in Table F.5 and clearances in Table A.1 .....	67
Annex F (normative)	Tables .....	68
Annex G (informative)	Determination of clearance distances according to 5.2.....	77
Annex H (informative)	Determination of creepage distances according to 5.3.....	79
Bibliography	.....	81
Figure 1	– Recurring peak voltage .....	19
Figure 2	– Determination of the width ( $W$ ) and height ( $H$ ) of a rib .....	31
Figure 3	– Test voltages .....	42
Figure 4	– Across the groove .....	46
Figure 5	– Contour of the groove .....	47
Figure 6	– Contour of the groove with angle.....	47
Figure 7	– Contour of rib.....	47
Figure 8	– Uncemented joint with grooves less than $X$ .....	48

This is a preview of "BS EN IEC 60664-1:20...". [Click here to purchase the full version from the ANSI store.](#)

Figure 9 – Uncemented joint with grooves equal to or more than $X$ .....	48
Figure 10 – Uncemented joint with a groove on one side less than $X$ .....	49
Figure 11 – Creepage distance and clearance through an uncemented joint .....	49
Figure 12 – Creepage distance and clearance to a head of screw more than $X$ .....	49
Figure 13 – Creepage distance and clearance to a head of screw less than $X$ .....	50
Figure 14 – Creepage distance and clearance with conductive floating part .....	50
Figure A.1 – Withstand voltage at 2 000 m above sea level .....	53
Figure A.2 – Experimental data measured at approximately sea level and their low limits for inhomogeneous field .....	54
Figure A.3 – Experimental data measured at approximately sea level and their low limits for homogeneous field .....	55
Figure C.1 – Earthed test specimen .....	58
Figure C.2 – Unearthed test specimen .....	59
Figure C.3 – Calibration for earthed test specimen .....	62
Figure C.4 – Calibration for unearthed test specimen .....	62
Figure D.1 – Partial discharge test circuits .....	64
Figure E.1 – Comparison between creepage distances specified in Table F.5 and clearances in Table A.1 .....	67
Figure G.1 – Determination of clearance distances according to 5.2 (1 of 2) .....	77
Figure H.1 – Determination of creepage distances according to 5.3 (1 of 2) .....	79
Table 1 – Dimensioning of grooves .....	46
Table A.1 – Withstand voltages for an altitude of 2 000 m above sea level (1 of 2) .....	51
Table A.2 – Altitude correction factors for clearance correction .....	52
Table B.1 – Inherent control or equivalent protective control .....	56
Table B.2 – Cases where protective control is necessary and control is provided by surge protective device having a ratio of voltage protection level to rated voltage not smaller than that specified in IEC 61643 (all parts) .....	57
Table F.1 – Rated impulse withstand voltage for equipment energized directly from the mains supply .....	68
Table F.2 – Clearances to withstand transient overvoltages .....	69
Table F.3 – Single-phase three-wire or two-wire AC or DC systems .....	70
Table F.4 – Three-phase four-wire or three-wire AC systems .....	71
Table F.5 – Creepage distances to avoid failure due to tracking (1 of 2) .....	72
Table F.6 – Test voltages for verifying clearances only at different altitudes .....	74
Table F.7 – Severities for conditioning of solid insulation .....	74
Table F.8 – Dimensioning of clearances to withstand steady-state peak voltages, temporary overvoltages or recurring peak voltages <sup>b</sup> .....	75
Table F.9 – Additional information concerning the dimensioning of clearances to avoid partial discharge .....	75
Table F.10 – Altitude correction factors for clearance correction .....	76

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

#### Part 1: Principles, requirements and tests

#### FOREWORD

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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 2 and 3,
- b) new structure for Clauses 4 and 5,
- 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,

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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.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

In this document, the following print type is used:

– **Terms defined in Clause 3: in bold type.**

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

The contents of the corrigendum of October 2020 have been included in this copy.

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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*