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STN	**Koordinácia izolácie Časť 11: Definície, zásady a pravidlá systému jednosmerného prúdu vysokého napätia (HVDC)**	**STN EN IEC 60071-11** 33 0400

Insulation co-ordination - Part 11:Definitions, principles and rules for HVDC system

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 02/23

Táto STN čiastočne nahrádza STN EN 60071-5 z júna 2015.

Obsahuje: EN IEC 60071-11:2022, IEC 60071-11:2022

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60071-11

December 2022

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Supersedes EN 60071-5:2015 (partially)

English Version

Insulation co-ordination - Part 11:Definitions, principles and rules for HVDC system (IEC 60071-11:2022)

Coordination de l'isolement - Partie 11: Définitions, principes et règles relatifs au réseau CCHT (IEC 60071-11:2022)

Isolationskoordination - Teil 11: Begriffe, Grundsätze und Anforderungen für HVDC Systeme (IEC 60071-11:2022)

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

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

Ref. No. EN IEC 60071-11:2022 E

EN IEC 60071-11:2022 (E)

European foreword

The text of document 99/374/FDIS, future edition 1 of IEC 60071-11, prepared by IEC/TC 99 "Insulation co-ordination and system engineering of high voltage electrical power installations above 1,0 kV AC and 1,5 kV DC" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60071-11:2022.

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) 2023-09-13
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-12-13

This document, in conjunction with EN IEC 60071-12:2022, supersedes (partially) EN 60071-5:2015 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.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60071-11:2022 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 standard indicated:

IEC 60071-5:2014	NOTE	Harmonized as EN 60071-5:2015 (not modified)
IEC 60700-1:2015	NOTE	Harmonized as EN 60700-1:2015 (not modified)
IEC 60633	NOTE	Harmonized as EN IEC 60633
IEC 60099-5:2018	NOTE	Harmonized as EN IEC 60099-5:2018 (not modified)
IEC 60505:2011	NOTE	Harmonized as EN 60505:2011 (not modified)
IEC 60721-3-0:2020	NOTE	Harmonized as EN IEC 60721-3-0:2020 (not modified)
IEC/TR 60919-2:2008	NOTE	Harmonized as CLC/TR 60919-2:2010 (not modified)

Annex ZA
(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.

Publication	Year	Title	EN/HD	Year
IEC 60060-1	-	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	-
IEC 60071-1	2019	Insulation co-ordination - Part 1: Definitions, principles and rules	EN IEC 60071-1	2019
IEC 60071-2	2018	Insulation co-ordination - Part 2: Application guidelines	EN IEC 60071-2	2018
IEC 60099-4	2014	Surge arresters - Part 4: Metal-oxide surge arresters without gaps for a.c. systems	EN 60099-4	2014
IEC/TS 60815-1	2008	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 1: Definitions, information and general principles	-	-
IEC/TS 60815-2	2008	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 2: Ceramic and glass insulators for a.c. systems	-	-
IEC/TS 60815-3	2008	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 3: Polymer insulators for a.c. systems	-	-

IEC 60071-11

Edition 1.0 2022-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Insulation co-ordination – Part 11: Definitions, principles and rules for HVDC system

Coordination de l'isolement – Partie 11: Définitions, principes et règles relatifs au réseau CCHT

IEC 60071-11:2022-11(en-fr)

IEC 60071-11

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INSULATION CO-ORDINATION –

Part 11: Definitions, principles and rules for HVDC system

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC 60071-11 has been prepared by IEC technical committee 99: Insulation co-ordination and system engineering of high voltage electrical power installations above 1,0 kV AC and 1,5 kV DC. It is an International Standard.

This international standard replaces, in conjunction with IEC 60071-12, IEC 60071-5 published in 2014.

This edition includes the following significant technical changes with respect to IEC 60071-5:2014:

a) This standard applies to both LCC and VSC HVDC systems whereas IEC 60071-5 only dealt with LCC HVDC system;
b) Annex C (normative) gives the recommended specified withstand voltage (LI and SI);
c) Annex C (normative) gives the minimum air clearances;
d) Annex E shows the correlation of clauses between this standard and IEC 60071-5:2014.

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

Draft	Report on voting
99/374/FDIS	99/394/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 60071 series, published under the general title *Insulation co-ordination*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under 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.

INTRODUCTION

As the demand for electrical energy is growing, more and more HVDC projects have appeared, and the voltage up to ±1 100 kV so far. However, the nominal voltage, nominal current and insulation levels for HVDC system are not yet as standardized as the AC system.

In October 2016, IEC Technical Committee 28 (Insulation co-ordination) established AHG 8 (Ad hoc group 8) to make the roadmap for HVDC system insulation co-ordination standards.

After IEC TC 28 was merged into IEC TC 99 in 2017, JWG 13 (Joint working group 13) was built by IEC TC 99 and TC 115 and was responsible for making the series standards for HVDC system according to the approved roadmap, as follows:

a) Part 11: Definitions, principles and rules for HVDC system;

b) Part 12: Application guidelines for LCC HVDC converter stations;

c) Part 13: Application guidelines for VSC HVDC converter stations;

d) Part 14: Insulation co-ordination for AC/DC filters;

e) Part 15: Insulation co-ordination for DC transmission lines.

INSULATION CO-ORDINATION –

Part 11: Definitions, principles and rules for HVDC system

1 Scope

This part of IEC 60071 applies to high-voltage direct current (HVDC) systems. It specifies the principles on the procedures for the determination of the specified withstand voltages, creepage distance and air clearances for the equipment and the installations of these systems.

This document gives the insulation co-ordination principles related to line commutated converter (LCC) and voltage sourced converters (VSC) HVDC systems. The main principles of this document also apply to other special converter configurations of LCC, such as the capacitor commutated converter (CCC) as well as the controlled series compensated converter (CSCC), etc.

This document applies to insulation co-ordination of equipment connected between the converter AC bus (including the AC harmonic filters, the converter transformer, the circuit breakers) and the DC line side. The line and cable terminations in so far as they influence the insulation co-ordination of converter station equipment are also covered.

This document applies only for HVDC applications in power systems and not for industrial conversion equipment. Principles and guidance given are for insulation co-ordination purposes only. The requirements for human safety are not covered by this document.

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 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60071-1:2019, *Insulation co-ordination – Part 1: Definitions, principles and rules*

IEC 60071-2:2018, *Insulation co-ordination – Part 2: Application guidelines*

IEC 60099-4:2014, *Surge arresters – Part 4: Metal-oxide surge arresters without gaps for a.c. systems*

IEC TS 60815-1:2008, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 1: Definitions, information and general principles*

IEC TS 60815-2:2008, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 2: Ceramic and glass insulators for a.c. systems*

IEC TS 60815-3:2008, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 3: Polymer insulators for a.c. systems*