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INTERNATIONAL STANDARD

colour inside

HORIZONTAL STANDARD

Insulation co-ordination –
Part 2: Application guidelines

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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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International Standard IEC 60071-2 has been prepared by IEC technical committee 28: Insulation co-ordination.

This fourth edition cancels and replaces the third edition published in 1996. This edition constitutes a technical revision.

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

a) the annex on clearance in air to assure a specified impulse withstand voltage installation is deleted because the annex in IEC 60071-1 is overlapped;
b) 4.2 and 4.3 on surge arresters are updated;
c) 4.3.5 on very-fast-front overvoltages is revised. Annex J on insulation co-ordination for very-fast-front overvoltages in UHV substations is added;
d) Annex H on atmospheric correction – altitude correction is added.
e) Annex I on evaluation method of non-standard lightning overvoltage shape is added.

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

FDIS	Report on voting
28/255/FDIS	28/256/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.

It has the status of a horizontal standard in accordance with IEC Guide 108.

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.

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INSULATION CO-ORDINATION –

Part 2: Application guidelines

~~1 General~~

1 Scope

This part of IEC 60071 constitutes ~~an~~ application guidelines and deals with the selection of insulation levels of equipment or installations for three-phase electrical systems. Its aim is to give guidance for the determination of the rated withstand voltages for ranges I and II of IEC 60071-1 and to justify the association of these rated values with the standardized highest voltages for equipment.

This association is for insulation co-ordination purposes only. The requirements for human safety are not covered by this document.

This document covers three-phase systems with nominal voltages above 1 kV. The values derived or proposed herein are generally applicable only to such systems. However, the concepts presented are also valid for two-phase or single-phase systems.

This document covers phase-to-earth, phase-to-phase and longitudinal insulation.

This document is not intended to deal with routine tests. These are to be specified by the relevant product committees.

The content of this document strictly follows the flow chart of the insulation co-ordination process presented in Figure 1 of IEC 60071-1:2006. Clauses 4 to 7 correspond to the squares in this flow chart and give detailed information on the concepts governing the insulation co-ordination process which leads to the establishment of the required withstand levels.

This document emphasizes the necessity of considering, at the very beginning, all origins, all classes and all types of voltage stresses in service irrespective of the range of highest voltage for equipment. Only at the end of the process, when the selection of the standard withstand voltages takes place, does the principle of covering a particular service voltage stress by a standard withstand voltage apply. Also, at this final step, this document refers to the correlation made in IEC 60071-1 between the standard insulation levels and the highest voltage for equipment.

The annexes contain examples and detailed information which explain or support the concepts described in the main text, and the basic analytical techniques used.

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 56: 1987, *High-voltage alternating-current circuit-breakers*~~

IEC 60060-1:~~1989~~ 2010, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60071-1:~~1993~~ 2006, *Insulation co-ordination – Part 1: Definitions, principles and rules*
IEC 60071-1:2006/AMD1:2010

~~IEC 99-1:1991, *Surge arresters – Part 1: Non-linear resistor type gapped surge arresters for a.c. systems*~~

~~IEC 99-4:1991, *Surge arresters – Part 4: Metal-oxide surge arresters without gaps for a.c. systems*~~

~~IEC 99-5:1996, *Surge arresters – Part 5: Selection and application recommendations – Section 1: General*~~

~~IEC 505:1975, *Guide for the evaluation and identification of insulation systems of electrical equipment*~~

~~IEC 507:1991, *Artificial pollution test on high-voltage insulators to be used on a.c. systems*~~

~~IEC 721-2-3:1987, *Classification of environmental conditions – Part 2: Environmental conditions appearing in nature – Air pressure*~~

~~IEC 815:1986, *Guide for the selection of insulators in respect of polluted conditions*~~

IEC 60505:2011, *Evaluation and qualification of electrical insulation systems*

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

ISO 2533:1975, *Standard Atmosphere*

3 Terms, definitions, abbreviated terms and symbols

3.1 Terms and definitions

No terms and definitions are listed in this document.

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

3.2 Abbreviated terms

MOSA	metal-oxide surge arrester
SFO	slow-front overvoltage
FFO	fast-front overvoltage
VFFO	very-fast-front overvoltage
LSA	line surge arrester
EGLA	externally gapped line arrester
NGLA	non-gapped line arrester
LIWV	lightning impulse withstand voltage
SIWV	switching impulse withstand voltage
SDWV	short-duration power-frequency withstand voltage
LIPL	lightning impulse protection level