

Insulation co-ordination —

Part 1: Definitions, principles and rules

The European Standard EN 60071-1:1995 has the status of a British Standard

ICS 29.080.00; 01.040.29

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee GEL/28, Insulation co-ordination, upon which the following bodies were represented:

- Association of Consulting Engineers
- British Cable Makers Confederation
- Electrical and Electronic Insulation Association (BEAMA Ltd.)
- Electricity Association
- Transmission and Distribution Association (BEAMA Ltd.)

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 March 1996

© BSI 06-1999

The following BSI references relate to the work on this standard:
Committee reference GEL/28
Draft for comment 90/26439 DC

ISBN 0 580 24965 4

Amendments issued since publication

Amd. No.	Date	Comments

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 60071-1	5
List of references	Inside back cover

National foreword

This British Standard has been prepared by Technical Committee GEL/28 and is the English language version of EN 60071-1:1995 *Insulation co-ordination — Part 1: Definitions, principles and rules*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 71-1:1993 published by the International Electrotechnical Commission (IEC).

This British Standard supersedes BS 5622-1:1979, which is withdrawn.

Cross-references

Publication referred to	Corresponding British Standard
HD 472 S1:1989	BS 7697:1993 <i>Nominal voltages for low voltage public electricity supply systems</i>
HD 588.1 S1:1991 (IEC 60-1:1989)	BS 923 <i>Guide on high-voltage testing techniques</i> Part 1:1990 <i>General</i>

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 20, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

ICS 29.080.00:01.040.29

Descriptors: Electric power networks, alternating voltage, high voltage, overvoltage, electrical insulation, co-ordination, definitions, classifications, specifications, electrical tests, insulated level

English version

Insulation co-ordination Part 1: Definitions, principles and rules

(IEC 71-1:1993)

Coordination de l'isolement
Partie 1: Définitions, principes et règles
(CEI 71-1:1993)

Isolationskoordination
Teil 1: Begriffe, Grundsätze und
Anforderungen
(IEC 71-1:1993)

This European Standard was approved by CENELEC on 1995-05-15. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

© 1995 Copyright reserved to CENELEC members

Foreword

The text of the International Standard IEC 71-1:1993, prepared by IEC TC 28, Insulation co-ordination, was submitted to the formal vote and was approved by CENELEC as EN 60071-1 on 1995-05-15 without any modification.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1996-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-03-01

Annexes designated “normative” are part of the body of the standard. Annexes designated “informative” are given for information only. In this standard, Annex ZA is normative and Annex A is informative. Annex ZA has been added by CENELEC.

Contents

	Page
Foreword	2
1 Scope	5
2 Normative references	5
3 Definitions	5
3.1 Insulation co-ordination	5
3.2 External insulation	5
3.3 Internal insulation	5
3.4 Self-restoring insulation	5
3.5 Non-self-restoring insulation	5
3.6 Insulation configuration terminal	5
3.7 Insulation configuration	6
3.8 Nominal voltage of a system	6
3.9 Highest voltage of a system	6
3.10 Highest voltage for equipment (U_m)	6
3.11 Isolated neutral system	6
3.12 Solidly earthed neutral system	6
3.13 Impedance earthed (neutral) system	6
3.14 Resonant earthed (neutral) system	6
3.15 Earth fault factor	6
3.16 Overvoltage	6
3.17 Classification of voltages and overvoltages	7
3.18 Standard voltage shapes	7
3.19 Representative overvoltages (U_{rp})	7
3.20 Overvoltage limiting device	7
3.21 Lightning (or switching) impulse protective level	7
3.22 Performance criterion	7
3.23 Withstand voltage	8
3.24 Co-ordination withstand voltage (U_{cw})	8
3.25 Co-ordination factor (K_c)	8
3.26 Standard reference atmospheric conditions	8
3.27 Required withstand voltage (U_{rw})	8
3.28 Atmospheric correction factor (K_a)	8
3.29 Safety factor (K_s)	8
3.30 Standard withstand voltage (U_w)	8
3.31 Test conversion factor (K_t)	8
3.32 Rated insulation level	8
3.33 Standard insulation level	8
3.34 Standard withstand voltage tests	8
4 Procedure for insulation co-ordination	9
4.1 General outline of the procedure	9
4.2 Determination of the representative overvoltages (U_{rp})	9

	Page
4.3 Determination of the co-ordination withstand voltages (U_{cw})	9
4.4 Determination of the required withstand voltages (U_{rw})	10
4.5 Selection of the rated insulation level	10
4.6 List of standard short-duration power frequency withstand voltages	10
4.7 List of standard impulse withstand voltages	10
4.8 Ranges for highest voltage for equipment	10
4.9 Selection of the standard insulation levels	10
5 Requirements for standard withstand voltage tests	11
5.1 General requirements	11
5.2 Standard short-duration power-frequency withstand voltage tests	12
5.3 Standard impulse withstand voltage tests	12
5.4 Alternative test situation	12
5.5 Phase-to-phase and longitudinal insulation standard withstand voltage tests for equipment in range I	13
5.6 Phase-to-phase and longitudinal insulation standard withstand voltage tests for equipment in range II	13
Annex A (informative)	19
Annex ZA (normative) Normative references to international publications with their corresponding European publications	20
Figure 1 — Flow chart for the determination of rated or standard insulation level	15
Table 1 — Classes and shapes of stressing voltages and overvoltages	16
Table 2 — Standard insulation levels for range I ($1 \text{ kV} < U_m \leq 245 \text{ kV}$)	17
Table 3 — Standard insulation levels for range II ($U_m > 245 \text{ kV}$)	18
Table A.1 — Values of rated insulation levels for $1 \text{ kV} < U_m \leq 245 \text{ kV}$ for highest voltages for equipment U_m not standardized by IEC based on current practice in some countries	19

