



SLOVENSKI STANDARD

SIST HD 578 S1:1997

01-november-1997

Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1000 V (IEC 273:1990)

Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1 kV

Kenngrößen von Innenraum- und Freiluft- Stützisolatoren für Systeme mit Nennspannungen über 1 kV

Caractéristiques des supports isolants d'intérieur et d'extérieur destinés à des installations de tension nominale supérieure à 1 kV

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Ta slovenski standard je istoveten z: **HD 578 S1:1992**

ICS:

29.080.10 Izolatorji Insulators

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HARMONIZATION DOCUMENT

HD 578 S1

DOCUMENT D'HARMONISATION

HARMONISIERUNGSDOKUMENT

July 1992

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Descriptors: Insulators, characteristics, systems, nominal voltages
greater than 1000 V

ENGLISH VERSION

Characteristics of indoor and outdoor post
insulators for systems with nominal voltages
greater than 1000 V
(IEC 273:1990)

Caractéristiques des supports
isolants d'intérieur et
d'extérieur destinés à des
installations de tension
nominale supérieure à 1000 V
(CEI 273:1990)

Kenngößen von
Innenraum- und
Freiluft-Stützisolatoren für
Systeme mit Nennspannungen
über 1000 V
(IEC 273:1990)

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This Harmonization Document was approved by CENELEC on 1991-09-23.
CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations
which stipulate the conditions for implementation of this Harmonization Document
on a national level.

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

This Harmonization Document exists in three official versions (English, French,
German).

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

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Ref. No. HD 578 S1:1992 E

FOREWORD

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 273:1990 could be accepted without textual changes, has shown that no common modifications were necessary for the acceptance as Harmonization Document.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as HD 578 S1 on 23 September 1991.

The following dates were fixed:

- latest date of announcement
of the HD at national level (doa) 1992-04-01
- latest date of publication of
a harmonized national standard (dop) 1992-10-01
- latest date of withdrawal of
conflicting national standards (dow) 1992-10-01

For products which have complied with the relevant national standard before 1992-10-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1997-10-01.

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Annexes designated "normative" are part of the body of the standard. In this standard, annexes ZA and ZB are normative.

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ENDORSEMENT NOTICE

The text of the International Standard IEC 273:1990 was approved by CENELEC as a Harmonization Document without any modification.

ANNEX ZA (normative)

Special national conditions

Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions. If it affects harmonization, it forms part of the European Standard or Harmonization Document.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

<u>Clause</u>	<u>Special national condition</u>
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1	Germany
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For maintenance purposes within a maximum transitional period of 10 years the isolator types given hereafter are permitted:

a) Out of
DIN 48 120 Part 1/10.67

Outdoor post insulator;
insulation class 110 N, F = 800 kp, F = 600 kp

type designation: post insulator DIN 48 120 - Z110N-800
- Y110N-800

b) Out of
DIN 48 136/05.68

Indoor post insulator;
insulation class 10S to 30N

type designation: post insulator DIN 48 136 - A10S
- B10S
- C10S

- A10N
- B10N
- C10N

- A20S
- B20S
- C20S

- A20N
- B20N
- C20N

- A30S
- B30S
- C30S

- A30N
- B30N
- C30N

ANNEX ZB (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD
WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

When the international publication has been modified by CENELEC common modifications, indicated by (mod), the relevant EN/HD applies.

IEC <u>Publication</u>	<u>Date</u>	<u>Title</u>	<u>EN/HD</u>	<u>Date</u>
71-1	1976	Insulation co-ordination Part 1: Terms, definitions, principles and rules	-	-
168	1979	Test on indoor and outdoor post insulators of ceramic material or glass for systems with nominal voltages greater than 1000 V	-	-
506	1975	Switching impulse tests on high-voltage insulators	-	-
660	1979	Tests on indoor post insulators of organic material for systems with nominal voltages greater than 1000 V up to but not including 300 kV	-	-
815	1986	Guide for the selection of insulators in respect of polluted conditions	-	-

**NORME
INTERNATIONALE
INTERNATIONAL
STANDARD**

**CEI
IEC
273**

Troisième édition
Third edition
1990-02

**Caractéristiques des supports isolants
d'intérieur et d'extérieur destinés à des
installations de tension nominale
supérieure à 1000 V**

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**(Characteristics of indoor and outdoor post
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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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SECTION THREE — CHARACTERISTICS OF STANDARD POST INSULATORS

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CHARACTERISTICS OF INDOOR AND
 OUTDOOR POST INSULATORS FOR SYSTEMS
 WITH NOMINAL VOLTAGES
 GREATER THAN 1 000 V**

FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by Sub-Committee 36C: Insulators for substations, of IEC Technical Committee No. 36: Insulators.

This third edition replaces the second edition (1979) of IEC Publication 273.

The reader of this new edition is informed that only Clauses 3 and 5, Table IV and notes to Table IV have been amended.

The text of this standard is based on the previous edition and on the following documents:

Six Months' Rule	Report on Voting
36C(CO)49	36C(CO)52

Full information on the voting for the approval of this standard can be found in the Voting Report indicated in the above table.

The following IEC publications are quoted in this standard:

- Publications Nos. 71-1 (1976): Insulation co-ordination, Part 1: Terms, definitions, principles and rules.
 168 (1979): Tests on indoor and outdoor post insulators of ceramic material or glass for systems with nominal voltages greater than 1 000 V.
 506 (1975): Switching impulse tests on high-voltage insulators.
 660 (1979): Tests on indoor post insulators of organic material for systems with nominal voltages greater than 1 000 V up to but not including 300 kV.
 815 (1986): Guide for the selection of insulators in respect of polluted conditions.

**CHARACTERISTICS OF INDOOR AND
OUTDOOR POST INSULATORS FOR SYSTEMS
WITH NOMINAL VOLTAGES
GREATER THAN 1 000 V**

SECTION ONE — GENERAL

1. Scope

This standard applies to post insulators and post insulator units of ceramic material or glass intended for indoor or outdoor service, and to post insulators of organic material intended for indoor service in electrical installations or equipment operating on alternating current systems with a nominal voltage greater than 1 000 V and a frequency not greater than 100 Hz. It may also be regarded as a provisional standard for insulators for use on direct current systems.

The insulators covered by this standard are primarily intended for use in isolators (disconnectors) or as bus-bar or fuse supports.

This standard covers five types of post insulators:

- a) indoor post insulators of ceramic material or glass and with internal metal fittings;
- b) indoor post insulators of organic material and with internal metal fittings;
- c) outdoor cylindrical post insulators of ceramic material or glass and with internal metal fittings;
- d) outdoor cylindrical post insulators of ceramic material or glass and with external metal fittings;
- e) outdoor pedestal post insulators of ceramic material or glass.

The term "cylindrical insulators" is intended to cover insulators of the truncated conical form also.

The five types of insulators are distinguished by their electrical, mechanical and dimensional characteristics. Figures 1, 2, 3, 4 and 5 illustrate typical examples of each type of insulator.

These drawings are only general illustrations and other shapes and constructions are permitted.

2. Object

This standard is intended to establish standard values of those electrical characteristics, mechanical characteristics and dimensions which are essential for the interchangeability of post insulators and post insulator units of the same type.

Notes 1. — General definitions and methods of test for insulators of ceramic material or glass are covered by IEC Publication 168.

General definitions and methods of test for insulators of organic material are covered by IEC Publication 660.

2. — The values of creepage distance as well as information on design aspects are provisional. These values are not directly related to the specified electrical characteristics.

The performance of insulation under contaminated conditions has been considered, with the object of determining the significant factors influencing performance. An application guide (IEC Publication 815) has been prepared recommending the range of suitable designs. The guide also indicates:

- definitions of the site severity
- different methods for determining the site severity
- corresponding creepage distance
- the significance and influence of different parameters characterising the insulator profiles
- the influence of the diameter
- the influence of the angle of the installation of the insulator
- alternative measures to be considered such as greasing or washing.

3. Electrical characteristics

Each post insulator is designated for a specified lightning impulse withstand voltage based on the standardized values given in IEC Publication 71-1. The minimum height to be chosen is determined by one of the electrical characteristics given in the table, i.e. dry lightning impulse withstand voltage, wet power frequency withstand voltage and wet switching impulse withstand voltage as applicable and according to the relevant insulation coordination requirements. The operating voltage is not specified because depending on service conditions, especially contamination, it cannot strictly be correlated with the height of the post insulator.

The composition of the post insulator, i.e. the number, the size and the positioning of insulator units is not specified. For a given height of a post insulator, however, the composition together with insulator profile and size and shape of metal parts can all affect the electrical performance of the post insulator especially the wet switching impulse withstand voltage value.

The rated switching impulse withstand voltage values are specified taking into account the above-mentioned facts as well as the high dispersion in wet switching impulse tests. However for many post insulator designs higher switching impulse withstand voltage values are obtainable.

The rated withstand voltage requirements given in tables are for tests carried out on single post insulators in accordance with IEC Publication 168. With regard to this test arrangement the test conditions are favourable and may result in higher withstand voltages than in service applications. This applies in particular to complete disconnectors for which the actual withstand values may differ appreciably from those given in the tables. In these cases an insulator with a greater standard height may be chosen or special stress control fittings may be used.

4. Mechanical characteristics

Post insulators are standardized in mechanical strength classes based on values of the specified failing load in the bending test.

These mechanical strength classes are as follows:

a) *Indoor post insulators of ceramic material or glass and with internal metal fittings*

Strength class 2	2 000 N
Strength class 4	4 000 N
Strength class 8	8 000 N
Strength class 16	16 000 N
Strength class 25	25 000 N

b) *Indoor post insulators of organic material and with internal metal fittings*

Strength class 2	2 000 N
Strength class 4	4 000 N
Strength class 6	6 000 N
Strength class 8	8 000 N
Strength class 10	10 000 N
Strength class 16	16 000 N
Strength class 25	25 000 N

c) *Outdoor cylindrical post insulators of ceramic material or glass and with internal metal fittings*

Strength class 2	2 000 N
Strength class 4	4 000 N
Strength class 8	8 000 N
Strength class 16	16 000 N
Strength class 31,5	31 500 N

d) *Outdoor cylindrical post insulators of ceramic material or glass and with external metal fittings*

Strength class 2	2 000 N
Strength class 4	4 000 N
Strength class 6	6 000 N
Strength class 8	8 000 N
Strength class 10	10 000 N
Strength class 12,5	12 500 N
Strength class 16	16 000 N
Strength class 20	20 000 N
Strength class 25	25 000 N
Strength class 31,5	31 500 N
Strength class 40	40 000 N

e) *Outdoor pedestal post insulators of ceramic material or glass*

Strength class A	3 000 N to 5 000 N
Strength class B	5 000 N to 7 500 N
Strength class C	7 500 N to 12 000 N
Strength class D	12 000 N to 18 000 N
Strength class E	18 000 N to 30 000 N

Note. — The dimensions of outdoor cylindrical post insulators according to d) above are only specified for strength classes 2 to 20. For strength classes 25, 31,5 and 40 these dimensions are left for future consideration.

The specified strength classes are based on the minimum failing load in the bending test with the post insulator mounted upright and the load applied horizontally at the top surface of the insulator. Where insulators are to be mounted underhung, the standard values of bending strength may not be applicable except for those insulators included in

Table III. Other positions of mounting (e.g. horizontal) may also affect the strength if the weight of the post insulator is not negligible. The appropriate strength rating for methods of mounting other than upright shall be subject to agreement between the manufacturer and the purchaser.

The bending strength at different points along the axis of a post insulator is defined in different ways depending on the type of insulator (see Tables I to VI and notes).

A failing load P_x may also be specified and will refer to a load applied at x mm above the top face of the insulator. The value of such loads shall be subject to agreement between the manufacturer and the purchaser. For indoor insulators, values of P_{50} ($x = 50$ mm) are specified in the tables.

Note. — These values have been determined from the formula $P_x = P_0 \frac{h}{h+x}$ where h is the overall height of the insulator.

Mechanical strengths in tension or compression are not specified.

Mechanical strength in torsion is specified only for outdoor post insulators according to *d)* and *e)* above.

For special applications, additional mechanical characteristics may be required. In such cases, the values of these mechanical characteristics shall be subject to agreement between the manufacturer and the purchaser.

For insulators of organic material according to *b)* above, the following also applies:

For circular cross-sections, the specified failing loads apply for any load direction perpendicular to the axis of the insulator. If this is not the case, the applicable load direction shall be the subject of agreement between the manufacturer and the purchaser.

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For non-circular cross-sections, the applicable load directions shall be specified.

Unless otherwise agreed, the specified failing loads apply at ambient temperature.

In Table II the difference in deflection between 20% and 50% of the failing load is given to permit the evaluation of the flexibility of post insulators of organic material.

5. Dimensional characteristics

The following dimensional characteristics are specified:

- overall height;
- maximum nominal diameter of the insulating part;
- fixing arrangements (see Clause 6);
- tolerances;
- minimum nominal creepage distance (for outdoor post insulators only).

The composition of the post insulator is not specified, see Clause 3.