

# **SLOVENSKI STANDARD**

## **SIST EN 61325:1997**

**01-november-1997**

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**Insulators for overhead lines with a nominal voltage above 1000 V - Ceramic or glass insulator units for d.c. systems - Definitions, test methods and acceptance criteria (IEC 1325:1995)**

Insulators for overhead lines with a nominal voltage above 1 kV - Ceramic or glass insulator units for d.c. systems - Definitions, test methods and acceptance criteria

Isolatoren für Freileitungen mit einer Nennspannung über 1 kV - Keramik- oder Glasisolatoren für Gleichspannungssysteme - Begriffe, Prüfverfahren und Annahmekriterien

Isolateurs pour lignes aériennes de tension nominale supérieure à 1 kV - Eléments d'isolateurs en céramique ou en verre pour systèmes à courant continu - Définitions, méthodes d'essai et critères d'acceptation

**Ta slovenski standard je istoveten z: EN 61325:1995**

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**ICS:**

|           |             |   |
|-----------|-------------|---|
| 29.080.10 | Izolatorji  | Insulators                                |
| 29.240.20 | Daljinovodi | Power transmission and distribution lines |

**SIST EN 61325:1997**

**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 61325**

June 1995

ICS 29.080.10

Descriptors: Overhead lines, insulators, ceramic or glass, d.c. systems

English version

**Insulators for overhead lines with a nominal voltage above 1 000 V  
Ceramic or glass insulator units for d.c. systems  
Definitions, test methods and acceptance criteria  
(IEC 1325:1995)**

Isolateurs pour lignes aériennes de  
tension nominale supérieure à 1 000 V  
Eléments d'isolateurs en céramique  
ou en verre pour systèmes à courant  
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Définitions, méthodes d'essai et critères  
d'acceptation  
(CEI 1325:1995)

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einer Nennspannung über 1000 V  
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Gleichspannungssysteme  
Begriffe, Prüfverfahren und  
Annahmekriterien  
(IEC 1325:1995)

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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

### Foreword

The text of document 36B(CO)112, future edition 1 of IEC 1325, prepared by SC 36B, Insulators for overhead lines, of IEC TC 36, Insulators, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61325 on 1995-05-15.

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) 1996-02-15
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1996-02-15

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 annexes A and B are informative.  
Annex ZA has been added by CENELEC.

### Endorsement notice

The text of the International Standard IEC 1325:1995 was approved by CENELEC as a European Standard without any modification.

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## Annex ZA (normative)

Normative references to international publications  
with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

| <u>Publication</u> | <u>Year</u> | <u>Title</u>  | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|---|--------------|-------------|
| IEC 50(471)        | 1984        | International electrotechnical vocabulary<br>Chapter 471: Insulators  | -            | -           |
| IEC 60-1           | 1989        | High-voltage test techniques<br>Part 1: General definitions and test<br>requirements  | HD 588.1 S1  | 1991        |
| IEC 120            | 1984        | Dimensions of ball and socket couplings of<br>string insulator units  | HD 474 S1    | 1986        |
| IEC 305            | 1978        | Characteristics of string insulator units of<br>the cap and pin type  | -            | -           |
| IEC 372            | 1984        | Locking devices for ball and socket<br>couplings of string insulator units<br>Dimensions and tests  | -            | -           |
| IEC 383-1          | 1993        | Insulators for overhead lines with a nominal<br>voltage above 1000 V<br>Part 1: Ceramic or glass insulator units for<br>a.c. systems - Definitions, test methods<br>and acceptance criteria | -            | -           |
| IEC 433            | 1980        | Characteristics of string insulator units of<br>the long rod type   | -            | -           |
| IEC 471            | 1977        | Dimensions of clevis and tongue couplings<br>of string insulator units  | -            | -           |
| IEC 797            | 1984        | Residual strength of string insulator units of<br>glass or ceramic material for overhead lines<br>after mechanical damage of the dielectric   | -            | -           |
| IEC 1211           | 1994        | Insulators of ceramic material or glass for<br>overhead lines with a nominal voltage<br>greater than 1000 V<br>Puncture testing   | -            | -           |

| <u>Publication</u> | <u>Year</u> | <u>Title</u>   | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|--|--------------|-------------|
| IEC 1245           | 1993        | Artificial pollution tests on high-voltage insulators to be used on d.c. systems   | -            | -           |
| ISO 1459           | 1973        | Metallic coatings<br>Protection against corrosion by hot dip galvanizing - Guiding principles                            | -            | -           |
| ISO 1460           | 1992        | Metallic coatings<br>Hot dip galvanized coatings on ferrous metals - Gravimetric determination of the mass per unit area | -            | -           |
| ISO 1461           | 1973        | Metallic coatings<br>Hot dip galvanized coatings on fabricated ferrous products - Requirements                           | -            | -           |
| ISO 1463           | 1982        | Metallic and oxide coatings<br>Measurement of coating thickness<br>Microscopical method                                  | -            | -           |
| ISO 2064           | 1980        | Metallic and other non-organic coatings<br>Definitions and conventions concerning the measurement of thickness           | -            | -           |
| ISO 2178           | 1982        | Non-magnetic coatings on magnetic substrates<br>Measurement of coating thickness<br>Magnetic method                      | -            | -           |

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# NORME INTERNATIONALE INTERNATIONAL STANDARD

**CEI  
IEC  
1325**

Première édition  
First edition  
1995-03

## Isolateurs pour lignes aériennes de tension nominale supérieure à 1 000 V –

Eléments d'isolateurs en céramique ou en verre  
pour systèmes à courant continu –  
Définitions, méthodes d'essai et critères  
d'acceptation

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**Insulators for overhead lines with a nominal  
voltage above 1 000 V –**

Ceramic or glass insulator units  
for d.c. systems –  
Definitions, test methods and acceptance  
criteria

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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

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For price, see current catalogue

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INSULATORS FOR OVERHEAD LINES  
WITH A NOMINAL VOLTAGE ABOVE 1 000 V –**
**Ceramic or glass insulator units for d.c. systems –  
Definitions, test methods and acceptance criteria**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a world-wide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) 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.
- 3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

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International Standard IEC 1325 has been prepared by sub-committee 36B: Insulators for overhead lines, of IEC technical committee 36: Insulators.

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

| DIS        | Report on voting |
|------------|------------------|
| 36B(CO)112 | 36B/135/RVD      |

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

Annexes A and B are for information only.

## INSULATORS FOR OVERHEAD LINES WITH A NOMINAL VOLTAGE ABOVE 1 000 V –

### Ceramic or glass insulator units for d.c. systems – Definitions, test methods and acceptance criteria

#### Section 1: General

##### 1 Scope

This International Standard is applicable to string insulator units of ceramic material or glass for use on d.c. overhead power lines with a nominal voltage greater than 1 000 V.

It is not applicable to composite insulators.

The application of this standard to insulators for use in other situations under d.c. voltage will be left to the relevant technical committees.

This standard specifies:

- the characteristics of insulators;
- the conditions under which the specified values of these characteristics shall be verified;
- acceptance criteria.

It specifies basic characteristic tests in a manner similar to that of IEC 383-1. Certain additional tests have been found to be necessary to ensure satisfactory long-term performance of d.c. insulators. At present, these additional tests concern only cap and pin insulators.

In view of the lack of significant performance data regarding long rod insulators on d.c. lines, it is not possible at present to define or validate special d.c.-oriented tests for such insulators.

This standard does not include requirements, or special tests, dealing with the choice of insulators for specific operating conditions (e.g. ageing arising from specific operating conditions).

##### NOTES

1 This standard does not include radio interference tests, artificial pollution tests or tests on insulator sets. These subjects and some relevant test methods are dealt with in the following IEC Publications: IEC 383-2, IEC 437 and IEC 1245.

2 Many of the requirements and tests in this standard are relevant to insulators for use on d.c. traction lines, but other tests may be required. Reference can be made to IEC 383-1.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 50(471): 1984, *International Electrotechnical Vocabulary (IEV) – Chapter 471: Insulators*

IEC 60-1: 1989, *High-voltage test techniques – General definitions and test requirements*

IEC 120: 1984, *Dimensions of ball and socket couplings of string insulator units*

IEC 305: 1978, *Characteristics of string insulator units of the cap and pin type*

IEC 372: 1984, *Locking devices for ball and socket couplings of string insulator units – Dimensions and tests*

IEC 383-1: 1993, *Insulators for overhead lines with a nominal voltage above 1 000 V – Part 1: Ceramic or glass insulator units for a.c. systems – Definitions, test methods and acceptance criteria*

IEC 433: 1980, *Characteristics of string insulator units of the long rod type*

IEC 471: 1977, *Dimensions of clevis and tongue couplings of string insulator units*

IEC 797: 1984, *Residual strength of string insulator units of glass or ceramic material for overhead lines after mechanical damage to the dielectric*

IEC 1211: 1994, *Insulators of ceramic material or glass for overhead lines with a nominal voltage greater than 1 000 V – Puncture testing*

IEC 1245: 1993, *Artificial pollution tests on high-voltage insulators to be used on d.c. systems*

ISO 1459: 1973, *Metallic coatings – Protection against corrosion by hot dip galvanizing – Guiding principles*

ISO 1460: 1992, *Metallic coatings – Hot dip galvanized coatings on ferrous metals – Gravimetric determination of the mass per unit area*

ISO 1461: 1973, *Metallic coatings – Hot dip galvanized coatings on fabricated ferrous products – Requirements*

ISO 1463: 1982, *Metallic and oxide coatings – Measurement of coating thickness – Microscopical method*

ISO 2064: 1980, *Metallic and other non-organic coatings – Definitions and conventions concerning the measurement of thickness*

ISO 2178: 1982, *Non-magnetic coatings on magnetic substrates – Measurement of coating thickness – Magnetic method*

### 3 Definitions

For the purpose of this International Standard the following definitions apply.

The term "insulator" is used in this standard to refer to the object being tested.

The definitions given below are those which either do not appear in IEC 50(471) or differ from those given in IEC 50(471).

#### 3.1 *Insulator string*

One or more connected string insulator units intended to give flexible support to overhead line conductors and stressed mainly in tension.

#### 3.2 *Lot*

A group of insulators offered for acceptance from the same manufacturer, of the same design and manufactured under presumed similar conditions of production. One or more lots may be offered together for acceptance, the lot(s) offered may consist of the whole, or part, of the quantity ordered.

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#### 3.3 *Flashover*

A disruptive discharge external to the insulator, connecting those parts which normally have the operating voltage between them.

NOTE – The term "flashover" used in this standard includes a flashover across the insulator surface as well as disruptive discharge by sparkover through air adjacent to the insulator.

#### 3.4 *Dry lightning impulse withstand voltage*

The lightning impulse voltage which the insulator withstands dry, under the prescribed conditions of test.

#### 3.5 *50 % dry lightning impulse flashover voltage*

The value of the lightning impulse voltage which, under the prescribed conditions of test, has a 50 % probability of producing flashover on the insulator, dry. Represented by  $U_{50}$ .

#### 3.6 *Dry d.c. withstand voltage*

The d.c. voltage which the insulator withstands dry, under the prescribed conditions of test.

#### 3.7 *Electromechanical failing load*

The maximum load reached when a string insulator unit is tested under the prescribed conditions of test.

### 3.8 *Mechanical failing load*

The maximum load reached when a string insulator unit or a rigid insulator is tested under the prescribed conditions of test.

### 3.9 *Residual mechanical strength*

The maximum mechanical load which can be reached when an insulator unit, which has had its insulating part mechanically damaged in the prescribed manner, is tested under the prescribed conditions.

### 3.10 *SF<sub>6</sub> puncture withstand voltage*

The d.c. voltage which a string insulator unit withstands in SF<sub>6</sub> under the prescribed conditions of test.

### 3.11 *Ion migration*

The migration of ions in the dielectric of an insulator under d.c. voltage, which may or may not lead to a change in the electrical or mechanical characteristics of the insulator.

### 3.12 *Expected charge Q<sub>50</sub>*

The total charge expected to flow through an insulator during 50 years under the reference ambient conditions and applied voltage. Q<sub>50</sub> depends on the electrical resistance characteristic of the insulator dielectric.

### 3.13 *Electrical body resistance* (standards.iteh.ai)

The d.c. resistance of an insulator unit measured in the zone between the cap and the pin.

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### 3.14 *Thermal runaway* <https://standards.iteh.ai/catalog/standards/sist/d4d04fc1-271e-472e-9ace-6ad45e594332/sist-en-61325-1997>

The phenomenon which occurs when the internal heat generated within a solid with a negative resistance/temperature coefficient is greater than the heat dissipated externally.

### 3.15 *Zinc sleeve*

A piece of zinc metal fused to an insulator pin shank to protect it from electrolytic corrosion by acting as a sacrificial electrode.

### 3.16 *Zinc collar*

A piece of zinc metal fused to the base of an insulator cap to protect it from electrolytic corrosion by acting as a sacrificial electrode.

### 3.17 *Impulse overvoltage puncture withstand voltage*

The peak value of the impulse voltage which the insulator withstands without puncture under the prescribed conditions of test.