SLOVENSKI STANDARD
SIST EN 60507:1997

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Artificial pollution tests on high-voltage insulators to be used on a.c. systems (IEC 507:1991)

Artificial pollution tests on high-voltage insulators to be used on a.c. systems

Fremschichtprüfungen an Hochspannungs-Isolatoren zur Anwendung in Wechselspannungssystemen

Essais sous pollution artificielle des isolateurs pour haute tension destinés aux réseaux à courant alternatif

Ta slovenski standard je istoveten z: EN 60507:1993

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29.080.10 Izolatorji Insulators

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ENGLISH VERSION

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This European Standard was approved by CENELEC on 1992-12-09. 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 CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 507:1991 could be accepted without textual changes, has shown that no common modifications were necessary for the acceptance as European Standard.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as EN 60507 on 9 December 1992.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1993-12-01
- latest date of withdrawal of conflicting national standards	(dow)	1993-12-01

For products which have complied with the relevant national standard before 1993-12-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1998-12-01.

Annexes designated "normative" are part of the body of the standard. In this standard, annex ZA is normative.

ENDORSEMENT NOTICE

The text of the International Standard IEC 507:1991 was approved by CENELEC as a European Standard without any modification.

ANNEX ZA (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 Publication	Date	Title	EN/HD	Date
60-1	1989	High-voltage test techniques Part 1: General definitions and test requirements (+ Corrigendum March 1990)	HD 588.1 S1	1991
71-1	1976	Insulation co-ordination Part 1: Terms, definitions, principles and rules	-	-

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Essais sous pollution artificielle des isolateurs pour haute tension destinés aux réseaux à courant alternatif

Artificial pollution tests on high-voltage insulators to be used on a.c. systems

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ARTIFICIAL POLLUTION TESTS ON HIGH-VOLTAGE INSULATORS TO BE USED ON A.C. SYSTEMS

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.

This standard has been prepared by IEC Technical Committee No. 36: Insulators.

This second edition of IEC 507 replaces the first edition issued in 1975 which had the status of a technical report.

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

Six Months' Rule	Report on Voting
36(CO)72	36(CO)75

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. 60-1 (1989): High-voltage test techniques. Part 1: General definitions and test requirements.

60-2 (1973): Part 2: Test procedures.

71-1 (1976): Insulation co-ordination. Part 1: Terms, definitions, principles and rules.

ARTIFICIAL POLLUTION TESTS ON HIGH-VOLTAGE INSULATORS TO BE USED ON A.C. SYSTEMS

SECTION ONE - GENERAL

1 Scope

This standard is applicable for the determination of the power frequency withstand characteristics of ceramic and glass insulators to be used outdoors and exposed to polluted atmospheres, on a.c. systems with the highest voltage of the system ranging from 1 000 V up to 765 kV.

These tests are not directly applicable to greased insulators or to special types of insulators (insulators with conductive glaze or covered with any organic insulating material).

2 Object

The object of this standard is to prescribe procedures for artificial pollution tests applicable to insulators for overhead lines, substations and traction lines, and to bushings.

3 Definitions

For the purpose of this standard, the following definitions apply.

3.1 *Test voltage*

The r.m.s. value of the voltage with which the insulator is continuously energized throughout the test.

3.2 *Short-circuit current (I_{sc}) of the testing plant*

The r.m.s. value of the current delivered by the testing plant when the test object is short-circuited at the test voltage.

3.3 *Specific creepage distance (L_s) of an insulator*

The overall creepage distance L of an insulator divided by the product of the test voltage and $\sqrt{3}$; it is generally expressed in mm/kV.

3.4 *Form factor of an insulator (F)*

The form factor is determined from the insulator dimensions. For graphical estimation of the form factor, the reciprocal value of the insulator circumference (l/p) is plotted versus the partial creepage distance l counted from the end of the insulator up to the point reckoned.

The form factor is given by the area under this curve and calculated according to the formula:

$$F = \int_0^L \frac{dl}{p(l)}$$

3.5 *Salinity (S_a)*

The concentration of the solution of salt in tap water, expressed by the amount of salt divided by the volume of solution; it is generally expressed in kg/m³.

3.6 *Pollution layer*

A conducting electrolytic layer on the insulator surface, composed of salt plus inert materials.

The conductance of the pollution layer on the insulator is measured in accordance with 16.1.

3.7 *Layer conductivity (K)*

The conductance of the pollution layer multiplied by the form factor; it is generally expressed in µS.

3.8 *Salt deposit density (SDD)*

The amount of salt in the deposit on a given surface of the insulator (metal parts and assembling materials are not to be included in this surface), divided by the area of this surface (see 16.2); it is generally expressed in mg/cm².

3.9 *Degree of pollution*

The value of the quantity (salinity, layer conductivity, salt deposit density) which characterizes the artificial pollution applied to the tested insulator.

3.10 *Reference salinity*

The value of the salinity used to characterize a test.

3.11 *Reference layer conductivity*

The value of the layer conductivity used to characterize a test: it is defined as the maximum value of the conductivity of the wetted layer of an insulator energized only for performing the conductance measurements.

3.12 *Reference salt deposit density*

The value of the salt deposit density used to characterize a test: It is defined as the average of the salt deposit density values measured on a few insulators (or on parts of them), which are chosen for this purpose from among the contaminated ones prior to their submission to any test.

3.13 *Specified withstand degree of pollution*

The reference degree of pollution at which an insulator shall withstand the specified test voltage in at least three tests out of four, under the conditions described in the relevant clauses 11 or 19.

3.14 *Maximum withstand degree of pollution*

The highest degree of pollution at which at least three withstand tests out of four can be obtained at the specified test voltage, under the conditions described in the relevant clauses 11 or 19.

3.15 *Specified withstand voltage*

The test voltage at which an insulator shall withstand the specified degree of pollution in at least three tests out of four, under the conditions described in the relevant clauses 11 or 19.

3.16 *Maximum withstand voltage*

The highest test voltage at which at least three withstand tests out of four can be obtained at the specified degree of pollution, under the conditions described in the relevant clauses 11 or 19.

SECTION TWO - GENERAL TEST REQUIREMENTS

4 Test methods

The two following categories of pollution test methods are recommended for standard tests:

– the salt fog method (section three) in which the insulator is subjected to a defined ambient pollution;

– the solid layer method (section four) in which a fairly uniform layer of a defined solid pollution is deposited on the insulator surface.

NOTE - In these test methods the voltage is held constant for a period of at least several minutes. Variants in which the voltage is raised continuously to flashover are not standardized but may be used for special purposes.

5 Arrangement of insulator for test

5.1 *Test configuration*

The insulator shall be erected in the test chamber, complete with the metal fittings which are invariably associated with it. The vertical position is in general suggested for comparison of different insulator types. Tests in other positions (inclined, horizontal) duplicating actual service conditions may be carried out when agreed between the manufacturer and the purchaser. When there are special reasons not to test insulators in the vertical position (e.g. wall bushings and circuit-breaker longitudinal insulation), only the service position shall be considered.

The minimum clearances between any part of the insulator and any earthed object other than the structure which supports the insulator and the columns of the nozzles, when used, shall be not less than 0,5 m per 100 kV of the test voltage and in any case not less than 1,5 m.

The configurations of the supporting structure and the energized metal parts, at least within their minimum clearance from the insulator, shall reproduce those expected in service. The arrangement of the nozzles and their construction are described in clause 8.