SLOVENSKI STANDARD
SIST EN 61952:2004

01-september-2004

Insulators for overhead lines - Composite line post insulators for alternative current with a nominal voltage > 1000 V (IEC 61952:2002)

Insulators for overhead lines - Composite line post insulators for alternative current with a nominal voltage > 1 000 V

Isolatoren für Freileitungen - Verbund-Freileitungsstützer für Wechselspannungsfreileitungen mit einer Nennspannung über 1 000 V

Isolateurs pour lignes aériennes - Isolateurs composites rigides à socle pour courant alternatif de tension nominale > 1 000 V

Ta slovenski standard je istoveten z: **EN 61952:2003**

ICS:

29.080.10	Izolatorji	Insulators
29.240.20	Daljnovodi	Power transmission and distribution lines

SIST EN 61952:2004 **en**

EUROPEAN STANDARD **EN 61952**

NORME EUROPÉENNE

EUROPÄISCHE NORM January 2003

ICS 29.080.10; 29.240.20

English version

Insulators for overhead lines - Composite line post insulators for alternative current with a nominal voltage > 1 000 V
(IEC 61952:2002)

Isolateurs pour lignes aériennes - Isolateurs composites rigides à socle pour courant alternatif de tension nominale > 1 000 V (CEI 61952:2002)

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This European Standard was approved by CENELEC on 2002-12-01. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, 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

Ref. No. EN 61952:2003 E

Foreword

The text of document 36B/208/FDIS, future edition 1 of IEC 61952, 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 61952 on 2002-12-01.

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)	2003-09-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2005-12-01

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

Endorsement notice

The text of the International Standard IEC 61952:2002 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60507	NOTE	Harmonized as EN 60507:1993 (not modified).

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.

Publication	Year	Title	EN/HD	Year
IEC 60060-1 + corr. March	1989 1990	High-voltage test techniques Part 1: General definitions and test requirements	HD 588.1 S1	1991
IEC 60383-1	1993	Insulators for overhead lines with a nominal voltage above 1 kV Part 1: Ceramic or glass insulator units for a.c. systems - Definitions, test methods and acceptance criteria	EN 60383-1 A11	1996 1999
IEC 60383-2	1993	Part 2: Insulator strings and insulator sets for a.c. systems - Definitions, test methods and acceptance criteria	EN 60383-2	1995
IEC 60695-11-10	1999	Fire hazard testing Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	1999
ISO 868	1985	Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness)	EN ISO 868	1997
ISO 3274 Cor 1	1996 1998	Geometrical Product Specifications (GPS) - Surface texture: Profile method - Nominal characteristics of contact (stylus) instruments	EN ISO 3274	1997
ISO 3452	Series	Non-destructive testing - Penetrant inspection	-	-
ISO 4287 Cor 1	1997 1998	Geometrical Product Specifications (GPS) - Surface texture: Profile method - Terms, definitions and surface texture parameters	EN ISO 4287	1998
ISO 4892-1	1999	Plastics - Methods of exposure to laboratory light sources Part 1: General guidance	EN ISO 4892-1	2000

Publication	Year	Title	EN/HD	Year
ISO 4892-2	1994	Part 2: Xenon arc sources	EN ISO 4892-2	1999
ISO 4892-3	1994	Part 3: Fluorescent UV lamps	EN ISO 4892-3	1999

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
61952

Première édition
First edition
2002-07

Isolateurs pour lignes aériennes – Isolateurs composites rigides à socle pour courant alternatif de tension nominale >1 000 V

Insulators for overhead lines – Composite line post insulators for alternative current with a nominal voltage >1 000 V

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CODE PRIX
PRICE CODE V

Pour prix, voir catalogue en vigueur
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

INSULATORS FOR OVERHEAD LINES – COMPOSITE LINE POST INSULATORS FOR ALTERNATIVE CURRENT WITH A NOMINAL VOLTAGE >1 000 V

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide 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 express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, 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.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61952 has been prepared by subcommittee 36B: Insulators for overhead lines, of IEC technical committee 36: Insulators.

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

FDIS	Report on voting
36B/208/FDIS	36B/209/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annexes A, B, and C are for information only.

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTRODUCTION

Composite line post insulators consist of a cylindrical solid insulating core, bearing the mechanical load, protected by an elastomer housing, the loads being transmitted to the core by metal fittings. Despite these common features, the materials used and the construction details employed by different manufacturers may be different.

Some tests have been grouped together as "design tests" to be performed only once for insulators of the same design. Design tests are performed in order to eliminate designs and materials not suitable for high-voltage applications. The influence of time on the electrical and mechanical properties of the complete composite line post insulator and its components (core material, housing material, interfaces, etc.) has been considered in specifying the design tests in order to ensure a satisfactory lifetime under normal service conditions.

The approach for mechanical testing under bending loads used in this standard is based on the work of CIGRE. This approach uses the concept of a damage limit which is the maximum stress which can be developed in the insulator before damage begins to occur. Annex A gives some notes on the mechanical loads and tests used in this standard.

Line post insulators are often used in braced structures whose geometry varies from line to line. A combined loading test to reproduce the complex loading cases in such structures is outside the scope of this standard and it would be very difficult to specify a general test which covers the majority of geometry and loading cases. In order to give some guidance, annex B explains how to calculate the moment in the insulators resulting from combined loads. This moment can then be equated to an equivalent bending load or stress for design purposes.

Compression load tests are not specified in this standard. The mechanical loads expected from service stress acting on line post insulators are mostly combined loads, These loads will cause some deflection on the insulator. Compression loads applied on pre-deflected insulators will lead to results largely dependent on the pre-deflection. Therefore a pure compression test has little meaning since the deflection prior to the cantilever load test cannot be specified.

Pollution tests, as specified in IEC 60507, are not included in this standard, their applicability to composite line post insulators not having been proven. Such pollution tests performed on insulators made of non-ceramic materials do not correlate with experience obtained from service. Specific pollution tests for non-ceramic insulators are under consideration.

The tracking and erosion test given in this standard is based on the test specified in IEC 61109. However, when this standard was drafted, it had been decided to study the possibility of preparing a general standard on tracking, erosion and ageing tests for all types of composite insulators. The prescriptions concerning the 1 000 h and alternative tests for severe environmental conditions are therefore given as a temporary measure until such time as the general standard is issued by the IEC.

For insulators intended for use in severe environmental conditions, a supplementary multi-stress ageing test may be considered (such as the 5 000 h ageing test in annex C of IEC 61109). However CIGRE and IEC are currently studying the representativity, repeatability and reproducibility of ageing tests and will issue guidance in the future. In the meantime, it is recommended that particular care be taken when specifying the type and parameters of such tests.

It has not been considered useful to specify a power arc test as a mandatory test. The test parameters are manifold and can have very different values depending on the configurations of the network and the supports and on the design of arc-protection devices. The heating effect of power arcs should be considered in the design of metal fittings. Critical damage to the metal fittings, resulting from the magnitude and duration of the short-circuit current can be avoided by properly designed arc-protection devices. This standard, however, does not exclude the possibility of a power arc test if agreed between the user and manufacturer. IEC 61467 gives details of a.c. power arc testing of insulator sets.

Radio interference and corona tests are not specified in this standard since the RIV and corona performance are not characteristics of the insulator alone.

Composite, hollow core, line post insulators are currently not dealt with in this standard. IEC 61462 gives details of tests on hollow core, composite insulators, many of which can be applied to such line post insulators.

Torsion loads are not dealt with in this standard since they are usually negligible in the configuration in which line post insulators are generally used. Specific applications where high torsion loads can occur are outside the scope of this standard.

INSULATORS FOR OVERHEAD LINES – COMPOSITE LINE POST INSULATORS FOR ALTERNATIVE CURRENT WITH A NOMINAL VOLTAGE >1 000 V

1 Scope and object

This International Standard applies to composite line post insulators consisting of a load-bearing, cylindrical, insulating solid core made up of fibres – usually glass – in a resin-based matrix, a housing (outside the insulating core) made of elastomer material (e.g. silicone or ethylene-propylene) and end fittings permanently attached to the insulating core.

Composite line post insulators covered by this standard are subjected to cantilever, tensile and compressive loads, when supporting the line conductors.

They are intended for use on a.c. overhead lines with a rated voltage greater than 1 000 V and a frequency not greater than 100 Hz.

The object of this standard is to

– define the terms used,
– prescribe test methods,
– prescribe acceptance or failure criteria.

This standard does not include requirements dealing with the choice of insulators for specific operating conditions.

2 Normative references

The following referenced documents are indispensable for the application 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 60060-1:1989, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60383-1:1993, *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 60383-2:1993, *Insulators for overhead lines with a nominal voltage above 1 000 V – Part 2: Insulator strings and insulator sets for a.c. systems – Definitions, test methods and acceptance criteria*

IEC 60695-11-10:1999, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

ISO 868:1985, *Plastics and ebonite – Determination of indentation hardness by means of a durometer (Shore hardness)*