Insulators for overhead lines - Composite line post insulators for A.C. systems with a nominal voltage greater than 1 000 V - Definitions, test methods and acceptance criteria

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 61952:2008 sisaldab Euroopa standardi EN 61952:2008 ingliskeelset teksti.	This Estonian standard EVS-EN 61952:2008 consists of the English text of the European standard EN 61952:2008.
Standard on kinnitatud Eesti Standardikeskuse 24.11.2008 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 24.11.2008 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 15.10.2008.	Date of Availability of the European standard text 15.10.2008.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 29.080.10, 29.240.20

Võtmesõnad:

EUROPEAN STANDARD

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English version

Insulators for overhead lines - Composite line post insulators for A.C. systems with a nominal voltage greater than 1 000 V - Definitions, test methods and acceptance criteria

(IEC 61952:2008)

Isolateurs pour lignes aériennes - Isolateurs composites rigides à socle pour systèmes à courant alternatif de tension nominale supérieure à 1 000 V - Définitions, méthodes d'essai et critères d'acceptation (CEI 61952:2008)

Isolatoren für Freileitungen - Verbund-Freileitungsstützer für Wechselstromsysteme mit einer Nennspannung über 1 000 V - Begriffe, Prüfverfahren und Annahmekriterien (IEC 61952:2008)

This European Standard was approved by CENELEC on 2008-09-01. 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, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the 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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Foreword

The text of document 36B/273/FDIS, future edition 2 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 2008-09-01.

This standard supersedes EN 61952:2003.

EN 61952:2008 includes the following significant technical changes with respect to EN 61952:2003:

– removal of tests procedures now given in EN 62217,

– inclusion of clauses on tolerances, environmental conditions, transport, storage and installation,

– changes in the parameters determining the need to repeat design and type tests,

– clarification of the mounting arrangements for electrical type tests,

– modification of the specification of load application in bending tests to simplify testing,

– additional requirements for the visual examination,

– removal of the annex explaining the concept of classes for design tests.

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)	2009-06-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2011-09-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61952:2008 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60507	NOTE	Harmonized as EN 60507:1993 (not modified).
IEC 61462	NOTE	Harmonized as EN 61462:2007 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

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 60383-1	- [1)]	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 [2)] 1999
IEC 60383-2	- [1)]	Insulators for overhead lines with a nominal voltage above 1 kV - Part 2: Insulator strings and insulator sets for a.c. systems - Definitions, test methods and acceptance criteria	EN 60383-2	1995 [2)]
IEC 62217	- [1)]	Polymeric insulators for indoor and outdoor use with a nominal voltage > 1 000 V - General definitions, test methods and acceptance criteria	EN 62217 + corr. December	2006 [2)] 2006
ISO 3452	- [1)]	Non-destructive testing - Penetrant inspection - General principles	-	-

[1)] Undated reference.

[2)] Valid edition at date of issue.

CONTENTS

INTRODUCTION

Composite line post insulators consist of a cylindrical solid insulating core, bearing the mechanical load, protected by a polymeric 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 on insulators which satisfy the same design conditions. All the design tests defined in IEC 62217 are applied for composite line post insulators; additional specific mechanical tests are given in this standard. As far as practical, the influence of time on the electrical and mechanical properties of the components (core material, housing, interfaces, etc.) and of the complete composite insulators has been considered in specifying the design tests to ensure a satisfactory life-time under normally known stress conditions of transmission lines.

Composite insulators are used in both a.c. and d.c. applications. In spite of this fact a specific tracking and erosion test procedure for d.c. applications as a design test has not yet been defined and accepted. The 1 000 h a.c. tracking and erosion test of IEC 62217 is used to establish a minimum requirement for the tracking resistance of the housing material.

The approach for mechanical testing under bending loads used in this standard is based on the work of CIGRE [1][1]. 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. Further information is available from CIGRE [2].

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 [3], 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.

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1 Figures in square brackets refer to the bibliography.

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 by agreement between the user and manufacturer. IEC 61467 [4] 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 [5] 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.

The application of this standard to hybrid line post insulators (e.g. those having a core made of a material other than resin impregnated fibres) has not been fully studied. For example, in general the load-time mechanical tests and tests for core material are not applicable to porcelain cores. It is therefore recommended that this standard be considered as a provisional standard for hybrid line post insulators, using an agreed selection of tests from this standard and from IEC 60383-1.

Wherever possible, IEC Guide 111 [6] has been followed for the drafting of this standard.

INSULATORS FOR OVERHEAD LINES – COMPOSITE LINE POST INSULATORS FOR A.C. SYSTEMS WITH A NOMINAL VOLTAGE GREATER THAN 1 000 V – DEFINITIONS, TEST METHODS AND ACCEPTANCE CRITERIA

1 Scope

This International Standard applies to composite line post insulators consisting of a load-bearing cylindrical insulating solid core consisting of fibres – usually glass – in a resin-based matrix, a housing (outside the insulating core) made of polymeric material 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,

– to prescribe test methods,

– to 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 60383-1, *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, *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 62217, Polymeric *insulators for indoor and outdoor use with a nominal voltage above 1 000 V – General definitions, test methods and acceptance criteria*

ISO 3452, *Non-destructive testing – Penetrant inspection – General principles*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE Certain terms from IEC 62217 are reproduced here for ease of reference. Additional definitions applicable to insulators can be found in IEC 60050(471) [7]).