Insulators for overhead lines - Composite suspension and tension insulators for a.c. systems with a nominal voltage greater than 1 000 V - Definitions, test methods and acceptance criteria

EESTI STANDARDIKESKUS
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NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 61109:2008 sisaldab Euroopa standardi EN 61109:2008 ingliskeelset teksti.	This Estonian standard EVS-EN 61109:2008 consists of the English text of the European standard EN 61109:2008.
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.

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Võtmesõnad:

EUROPEAN STANDARD

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English version

Insulators for overhead lines - Composite suspension and tension insulators for a.c. systems with a nominal voltage greater than 1 000 V - Definitions, test methods and acceptance criteria

(IEC 61109:2008)

Isolateurs pour lignes aériennes - Isolateurs composites de suspension et d'ancrage destinés aux systèmes à courant alternatif de tension nominale supérieure à 1 000 V - Définitions, méthodes d'essai et critères d'acceptation (CEI 61109:2008)

Isolatoren für Freileitungen - Verbund-Hänge- und -Abspannisolatoren für Wechselstromsysteme mit einer Nennspannung über 1 000 V - Begriffe, Prüfverfahren und Annahmekriterien (IEC 61109:2008)

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

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Foreword

The text of document 36B/274/FDIS, future edition 2 of IEC 61109, 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 61109 on 2008-09-01.

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)	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 61109:2008 was approved by CENELEC as a European Standard without any modification.

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 61466-1	- [1)]	Composite string insulator units for overhead lines with a nominal voltage greater than 1 kV - Part 1: Standard strength classes and end fittings	EN 61466-1	1997 [2)]
IEC 62217	2005	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 2006
ISO 3452	Series	Non-destructive testing - Penetrant inspection	EN ISO 3452	Series

[1)] Undated reference.

[2)] Valid edition at date of issue.

CONTENTS

INTRODUCTION

Composite insulators consist of an insulating core, bearing the mechanical load protected by a polymeric housing, the load being transmitted to the core by end fittings. Despite these common features, the materials used and the construction details employed by different manufacturers may be quite different.

Some tests have been grouped together as "Design tests", to be performed only once on insulators which satisfy the same design conditions. For all design tests of composite suspension and tension insulators, the appropriate common clauses defined in IEC 62217 are applied. 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. An explanation of the principles of the damage limit, load coordination and testing is presented in Annex A.

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 [1][1] gives details of a.c. power arc testing of insulator sets.

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 mechanism of brittle fracture has been investigated by CIGRE B2.03[2] and conclusions are published in [2, 3]. Brittle fracture is a result of stress corrosion induced by internal or external acid attack on the resin bonded glass fibre core. CIGRE D1.14 has developed a test procedure for core materials based on time-load tests on assembled cores exposed to acid, along with chemical analysis methods to verify the resistance against acid attack [4]. In parallel IEC TC36WG 12 is studying preventive and predictive measures.

Composite suspension/tension insulators are not normally intended for torsion or other non-tensile loads. Guidance on non-standard loads is given in Annex C.

Wherever possible, IEC Guide 111 [5] has been followed for the drafting of this standard.

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1 Figures in square brackets refer to the bibliography.

2 International Council on Large High Voltage Electric Systems: Working Group B2.03.

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

1 Scope and object

This International Standard applies to composite suspension/tension 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 insulators covered by this standard are intended for use as suspension/tension line insulators, but it should be noted that these insulators can occasionally be subjected to compression or bending, for example when used as phase-spacers.

This standard can be applied in part to hybrid composite insulators where the core is made of a homogeneous material (porcelain, resin), see Clause 8.

The object of this standard is to

– define the terms used,

– prescribe test methods,

– prescribe acceptance 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 61466-1, *Composite string insulator units for overhead lines with a nominal voltage greater than 1 000 V – Part 1: Standard strength classes and end fittings*

IEC 62217:2005, *Polymeric insulators for indoor and outdoor use with a nominal voltage > 1 000 V – General definitions, test methods and acceptance criteria*

ISO 3452 (all parts), *Non-destructive testing – Penetrant testing*