

SLOVENSKI STANDARD

SIST EN 61109:2008

01-december-2008

Izolatorji za nadzemne vode - Sestavljeni obesni in strižni izolatorji za izmenične sisteme z nazivno napetostjo nad 1 000 V - Definicije, preskusne metode in prevzemna merila (IEC 61109:2008)

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)

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

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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)

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61109

October 2008

ICS 29.080.10

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
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mit einer Nennspannung über 1 000 V -
Begriffe, Prüfverfahren
und Annahmekriterien
(IEC 61109:2008)

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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

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.

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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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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.

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IEC 61109

Edition 2.0 2008-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**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**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61109 has been prepared by subcommittee 36B: Insulators for overhead lines, of IEC technical committee 36: Insulators.

This second edition cancels and replaces the first edition, published in 1992 and amendment 1, published in 1995. This edition constitutes a technical revision.

The main technical changes with respect to the previous edition are listed below:

- removal of tests procedures now given in IEC 62217;
- inclusion of clauses on tolerances, environmental conditions, transport, storage and installation;
- inclusion of hybrid insulators in the scope (see Clause 8);
- clarification and modification of the parameters determining the need to repeat design and type tests;

- general improvement of the description of tests;
- modification of the specification of load application in bending tests to simplify testing;
- mechanical tests adapted to improved knowledge of failure mechanisms;
- additional requirements for visual examination;
- Annex A simplified and adapted to include the damage limit concept;
- addition of a new Annex C on non-standard loads.

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

FDIS	Report on voting
36B/274/FDIS	36B/276/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 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

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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 B2.03² 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.

¹ Figures in square brackets refer to the bibliography.

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