ICS 29.120.50, 29.240.10 SLOVENSKÁ TECHNICKÁ NORMA Február 2015

| STN | **Zvodiče prepätia. Časť 4: Beziskriskové zvodiče prepätia na báze oxidov kovov pre sústavy so striedavým napätím.** | **STN EN 60099-4**<br><br>35 4870 |
|---|---|---|

Surge arresters - Part 4: Metal-oxide surge arresters without gaps for a.c. systems

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 01/15

Obsahuje: EN 60099-4:2014, IEC 60099-4:2014

Oznámením tejto normy sa od 04.08.2017 ruší
STN EN 60099-4 (35 4870) z februára 2005

**120110**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 60099-4

September 2014

ICS 29.240.10; 29.120.50

Supersedes EN 60099-4:2004

English Version

# Surge arresters - Part 4: Metal-oxide surge arresters without gaps for a.c. systems (IEC 60099-4:2014)

Parafoudres - Partie 4: Parafoudres à oxyde métallique sans éclateur pour réseaux à courant alternatif (CEI 60099-4:2014)

Überspannungsableiter - Teil 4: Metalloxidableiter ohne Funkenstrecken für Wechselspannungsnetze (IEC 60099-4:2014)

This European Standard was approved by CENELEC on 2014-08-04. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.


European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**



Ref. No. EN 60099-4:2014 E

## Foreword

The text of document 37/416/FDIS, future edition 3 of IEC 60099-4, prepared by IEC/TC 37 "Surge arresters" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60099-4:2014.

The following dates are fixed:

| | | |
|---|---|---|
| – latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2015-05-04 |
| – latest date by which the national standards conflicting with the document have to be withdrawn | (dow) | 2017-08-04 |

This document supersedes EN 60099-4:2004.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

## Endorsement notice

The text of the International Standard IEC 60099-4:2014 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 60068-2-17 | NOTE | Harmonized as EN 60068-2-17. |
| IEC 60099-1 | NOTE | Harmonized as EN 60099-1. |
| IEC 60099-5:2013 | NOTE | Harmonized as EN 60099-5:2013 (not modified). |
| IEC 60721-3-2 | NOTE | Harmonized as EN 60721-3-2. |
| IEC 62271-202:2006 | NOTE | Harmonized as EN 62271-202:2007 (not modified). |
| ISO 3274 | NOTE | Harmonized as EN ISO 3274. |

# Annex ZA
(normative)

## Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60060-1 | - | High-voltage test techniques - Part 1: General definitions and test requirements | EN 60060-1 | - |
| IEC 60060-2 | - | High-voltage test techniques - Part 2: Measuring systems | EN 60060-2 | - |
| IEC 60068-2-11 | 1981 | Environmental testing - Part 2: Tests - Test Ka: Salt mist | EN 60068-2-11 | 1999 |
| IEC 60068-2-14 | - | Environmental testing - Part 2-14: Tests - Test N: Change of temperature | EN 60068-2-14 | - |
| IEC 60071-1 | - | Insulation co-ordination - Part 1: Definitions, principles and rules | EN 60071-1 | - |
| IEC 60071-2 | 1996 | Insulation co-ordination - Part 2: Application guide | EN 60071-2 | 1997 |
| IEC 60270 | - | High-voltage test techniques - Partial discharge measurements | EN 60270 | - |
| IEC 60507 | 2013 | Artificial pollution tests on high-voltage ceramic and glass insulators to be used on a.c. systems | EN 60507 | 2014 |
| IEC 62217 | - | Polymeric HV insulators for indoor and outdoor use - General definitions, test methods and acceptance criteria | EN 62217 | - |
| IEC 62271-1 | 2007 | High-voltage switchgear and controlgear - Part 1: Common specifications | EN 62271-1 | 2008 |
| IEC 62271-200 | 2011 | High-voltage switchgear and controlgear - Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV | EN 62271-200 | 2012 |
| IEC 62271-203 | 2011 | High-voltage switchgear and controlgear - Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV | EN 62271-203 | 2012 |

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC/TS 60815-1 | 2008 | Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 1: Definitions, information and general principles | - | - |
| IEC/TS 60815-2 | 2008 | Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 2: Ceramic and glass insulators for a.c. systems | - | - |
| ISO 4287 | - | Geometrical Product Specifications (GPS) - Surface texture: Profile method - Terms, definitions and surface texture parameters | EN ISO 4287 | - |
| ISO 4892-1 | - | Plastics - Methods of exposure to laboratory light sources - Part 1: General guidance | EN ISO 4892-1 | - |
| ISO 4892-2 | - | Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps | EN ISO 4892-2 | - |
| ISO 4892-3 | - | Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps | EN ISO 4892-3 | - |
| CISPR/TR 18-2 | - | Radio interference characteristics of overhead power lines and high-voltage equipment - Part 2: Methods of measurement and procedure for determining limits | - | - |

IEC 60099-4

Edition 3.0 2014-06

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

colour inside

## Surge arresters –
## Part 4: Metal-oxide surge arresters without gaps for a.c. systems

## Parafoudres –
## Partie 4: Parafoudres à oxyde métallique sans éclateur pour réseaux à courant alternatif

IEC 60099-4:2014-06(en-fr)

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# CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

# SURGE ARRESTERS –

# Part 4: Metal-oxide surge arresters without gaps for a.c. systems

## 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 60099-4 has been prepared by IEC technical committee 37: Surge arresters.

This third edition cancels and replaces the second edition published in 2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- A new concept of arrester classification and energy withstand testing was introduced: the line discharge classification was replaced by a classification based on repetitive charge transfer rating ($Q_{rs}$), as well as on thermal energy rating ($W_{th}$) and thermal charge transfer rating ($Q_{th}$), respectively. Requirements depend on the intended arrester application, being either a distribution class arrester (of $I_n$ = 2,5 kA; 5 kA or 10 kA) or a station class arrester (of $I_n$ = 10 kA or 20 kA). The new concept clearly differentiates between impulse and thermal energy handling capability, which is reflected in the requirements as well as in the related test procedures.
- Requirements and tests for UHV arresters (for highest system voltages $U_s$ > 800 kV) were introduced.
- Power-frequency voltage versus time tests – with and without prior duty – were introduced as type tests.
- Requirements and tests on disconnectors were added.
- "Test series B: 5 000 h" was removed from the weather ageing test, thus following the new approach of IEC 62217.
- Former Annexes C, D, E, H, I and J were removed. New Annexes for determining the start temperature for tests on thermal stability, for determining the axial temperature distribution along tall arresters, for providing an example of how to determine energy requirements for the operating duty test and for comparing the new classification system with the former line discharge class system were introduced.
- Definitions for new terms have been added.
- All former items “under consideration” were resolved or removed.

Clauses 10 to 13 contain particular requirements for polymer-housed surge arresters, gas-insulated metal enclosed arresters (GIS-arresters), separable and dead-front arresters, and liquid-immersed arresters, respectively. These are indicated in the form of replacements, additions or amendments to the original clauses or subclauses concerned.

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

| FDIS | Report on voting |
|---|---|
| 37/416/FDIS | 37/421/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.

A list of all parts in the IEC 60099 series, published under the general title *Surge arresters*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

# INTRODUCTION

This part of IEC 60099 presents the minimum criteria for the requirements and testing of gapless metal-oxide surge arresters that are applied to a.c. power systems with $U_s$ above 1 kV.

# SURGE ARRESTERS –

# Part 4: Metal-oxide surge arresters without gaps for a.c. systems

## 1 Scope

This part of IEC 60099 applies to non-linear metal-oxide resistor type surge arresters without spark gaps designed to limit voltage surges on a.c. power circuits with $U_s$ above 1 kV.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60060-2, *High-voltage test techniques – Part 2: Measuring systems*

IEC 60068-2-11:1981, *Environmental testing – Part 2-11: Tests – Test kA: Salt mist*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60071-1, *Insulation co-ordination – Part 1: Definitions, principles and rules*

IEC 60071-2:1996, *Insulation co-ordination – Part 2: Application guide*

IEC 60270, *High-voltage test techniques – Partial discharge measurements*

IEC 60507:2013, *Artificial pollution tests on high-voltage insulators to be used on a.c. systems*

IEC TS 60815-1:2008, *Selection and dimensioning of high voltage insulators intended for use in polluted conditions – Part 1: Definitions, information and general principles*

IEC TS 60815-2:2008, *Selection and dimensioning of high voltage insulators intended for use in polluted conditions – Part 2: Ceramic and glass insulators for a.c. systems*

IEC 62217, *Polymeric insulators for indoor and outdoor use – General definitions, test methods and acceptance criteria*

IEC 62271-1:2007, *High-voltage switchgear and controlgear – Part 1: Common specifications*

IEC 62271-200:2011, *High-voltage switchgear and controlgear – Part 200: A.C. metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

IEC 62271-203:2011, *High-voltage switchgear and controlgear – Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV*

ISO 4287, *Geometrical Product Specifications (GPS) – Surface texture: Profile method – Terms, definitions and surface texture parameters*

ISO 4892-1, *Plastics – Methods of exposure to laboratory light sources - Part 1: General guidance*

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CISPR/TR 18-2, *Radio interference characteristics of overhead power lines and high-voltage equipment – Part 2: Methods of measurement and procedure for determining limits*