SLOVENSKI STANDARD
oSIST prEN IEC 60282-4:2018

01-december-2018

Dodatne zahteve za preskušanje visokonapetostnih izklopnih varovalk s polimernimi izolatorji

Additional testing requirements for high-voltage expulsion fuses utilizing polymeric insulators

Ta slovenski standard je istoveten z: **prEN IEC 60282-4:2018**

ICS:

29.120.50	Varovalke in druga medtokovna zaščita	Fuses and other overcurrent protection devices

oSIST prEN IEC 60282-4:2018 **en,fr,de**

32A/342/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 60282-4 ED1**	
DATE OF CIRCULATION: **2018-10-26**	CLOSING DATE FOR VOTING: **2019-01-18**
SUPERSEDES DOCUMENTS: **32A/333/CD,32A/337/CC**	

IEC SC 32A : HIGH-VOLTAGE FUSES

SECRETARIAT: France	SECRETARY: Mr Raphaël Buisson
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 36	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Additional testing requirements for high-voltage expulsion fuses utilizing polymeric insulators

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

CONTENTS

FOREWORD 3
INTRODUCTION 5
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 Type tests 7
4.1 General requirements 7
4.2 Mechanical tests 7
4.2.1 Mechanical stressing at temperature extremes 7
4.2.2 Long term deformation/creep testing 10
4.3 Environmental tests 10
4.3.1 General 10
4.3.2 Accelerated weathering test 10
4.3.3 Tracking and erosion test 11
4.3.4 Flammability test 13
4.4 Tests on interfaces and connections of end fittings 13
4.4.1 General 13
4.4.2 Water immersion pre-stressing procedure 13
4.4.3 Verification Tests 13
4.5 Breaking tests with dye penetration 14
4.5.1 General 14
4.5.2 Description of tests to be made 14
4.6 Acceptance criteria 14
Bibliography 15

Figure 1 – Test sequence 8
Figure 2 – Dye penetration test arrangement 9
Figure 3 – Tracking wheel test arrangement 12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

ADDITIONAL TESTING REQUIREMENTS FOR HIGH-VOLTAGE EXPULSION FUSES UTILIZING POLYMERIC INSULATORS

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.

2) The formal decisions or agreements of 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 IEC National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60282-4 has been prepared by subcommittee SC32A: High-voltage fuses, of IEC technical committee TC32: Fuses.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
32A/XX/FDIS	32A/XX/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

Acknowledgments:
The Working Group thanks the Institute of Electrical and Electronics Engineers, Incorporated, (IEEE) for permission to reproduce information from its global Standards IEEE C37.41-2016. All such extracts are copyright of IEEE, Piscataway, New Jersey. All rights reserved. Further information on the IEEE is available from www.standards.ieee.org. IEEE has no responsibility for the placement and context in which the extracts

and contents are reproduced by the author, nor is IEEE in any way responsible for the other content or accuracy therein. Note that any comments or interpretations of the Material are those of the author, and do not represent the views of IEEE, its members or affiliates.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

INTRODUCTION

High-voltage expulsion fuses are tested to IEC 60282-2 which recognizes that fuse-bases may use polymer (non-ceramic) insulators. However, very little additional testing is specified for fuses using such insulators. In the case of polymer post insulators and suspension insulators, only artificial pollution tests are required according to IEC 61592 and IEC 61109, respectively. However, for fuses that use insulators not covered by these standards, such as certain fuse-cutouts, the additional testing required is to be by agreement between manufacturer and user. Fuses that need such “additional testing” are expulsion fuses that utilize polymer insulators in which a single mounting bracket is used, either at the centre of an insulator or connected to two insulators (a “cutout fuse-base”). As the market for expulsion fuses using polymer insulators has grown, manufacturers have introduced many tests in addition to artificial pollution tests, covering other aspects of a fuse’s performance. This standard formalises such testing and provides standardisation and consistency. It should be noted that the document focusses on product testing as opposed to material testing. In addition to drawing on test procedures covered by IEC 62217:2012, “Polymeric HV insulators for indoor and outdoor use - General definitions, test methods and acceptance criteria”, material from IEEE Std C37.41:2016 (primarily 18.1.2 “Long-term deformation/creep testing”) is also used, by permission from IEEE.

ADDITIONAL TESTING REQUIREMENTS FOR HIGH-VOLTAGE EXPULSION FUSES UTILIZING POLYMERIC INSULATORS

1 Scope

This part of IEC 60282 applies to expulsion fuses complying with IEC 60282-2 and specifies additional testing requirements for fuses employing a cutout fuse-base that utilizes polymeric insulators.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60060-1:2010, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60282-2:2008, *High-voltage fuses - Part 2: Expulsion fuses*

IEC 62217:2012, *Polymeric HV insulators for indoor and outdoor use - General definitions, test methods and acceptance criteria*

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

ISO 4892-2, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc sources*

ISO 868:2003, *Plastics and ebonite – Determination of indentation hardness by means of a durometer (Shore hardness)*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
polymeric Insulator
insulator whose insulating body consists of at least one organic based material

Note 1 to entry: Polymeric insulators are also known as non-ceramic insulators.

Note 2 to entry: Coupling devices may be attached to the ends of the insulating body.

[SOURCE: IEC 60050-471:2007, 471-01-13]

3.2
composite polymeric insulator
polymeric insulator consisting of at least two separate polymeric insulating parts, namely a core and a housing, equipped with end fittings

[SOURCE: IEC 60050-471:2007, 471-01-02, modified to include the term “polymeric"]

3.3
core (of a composite polymeric insulator)
central insulating part of a composite polymeric insulator that provides the primary mechanical/strength characteristics of the insulator

[SOURCE: IEC 60050-471:2007, 471-01-03 modified: addition of “composite polymeric”; addition of “primary”, “strength” and “of the insulator”; note deleted]

3.4
housing (of a composite polymeric insulator)
external insulating part(s) of a composite insulator that provides the necessary leakage distance, other dielectric characteristics of the insulator, and protects the core from the environment

[SOURCE: IEC 60050-471:2007, 471-01-09, modified]

3.5
insulator body
insulating assembly that contains the insulator and permanent fittings

3.6
insulator trunk
central insulating part of an insulator from which the sheds project

Note 1 to entry: Also known as shank on smaller insulators.

[SOURCE: IEC 60050-471:2007, 471-01-11]

3.7
Shed (of an insulator)
insulating part, projecting from the insulator trunk, intended to increase the creepage distance

Note 1 to entry: The shed can be with or without ribs.

[SOURCE: IEC 60050-471:2007, 471-01-15]

3.8
cutout fuse-base
fuse-base that uses an insulator or insulators having a single point mounting bracket, generally located centrally between the terminals that are mounted at the outer ends of the insulator(s)

3.9
Resin insulator
polymeric insulator whose insulating body is made from only one insulating part and which is equipped with end fittings

polymeric insulator whose insulating body consists of a solid shank and sheds protruding from the shank made from only one organic based housing material (e.g. cycloaliphatic epoxy)

4 Type tests

4.1 General requirements

Fuses according to this standard shall comply with the requirements of IEC 60282-2, except for those that are specifically replaced with requirements specified in this standard for the following type tests.

4.2 Mechanical tests

4.2.1 Mechanical stressing at temperature extremes

4.2.1.1 General

When conducting this test with a fuse using a polymeric insulator(s), it is not necessary to also perform the mechanical tests outlined in 8.8.1 of IEC 60282-2:2008. The testing covered in 4.2.1 only applies to disconnecting devices that can be opened and closed manually.