SLOVENSKI STANDARD
oSIST prEN IEC 60358-1:2025

01-april-2025

Sklopni kondenzatorji in kondenzatorski delilniki - 1. del: Splošna pravila

Coupling capacitors and capacitor dividers - Part 1: General rules

Kopplungskondensatoren und kapazitive Teiler - Teil 1: Allgemeine Bestimmungen

Condensateurs de couplage et diviseurs capacitifs - Partie 1: Règles générales

Ta slovenski standard je istoveten z: **prEN IEC 60358-1:2025**

ICS:

31.060.70 Močnostni kondenzatorji Power capacitors

oSIST prEN IEC 60358-1:2025 **en**

33/718/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 60358-1 ED2**	
DATE OF CIRCULATION: **2025-02-07**	CLOSING DATE FOR VOTING: **2025-05-02**
SUPERSEDES DOCUMENTS: **33/711/CD, 33/714A/CC**	

IEC TC 33 : POWER CAPACITORS AND THEIR APPLICATIONS	
SECRETARIAT: Italy	SECRETARY: Mr Stefano Zunino
OF INTEREST TO THE FOLLOWING COMMITTEES:	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED:	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT 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.

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.

Recipients of this document are invited to submit, with their comments, notification of any relevant “In Some Countries” clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE:

Coupling capacitors and capacitor dividers - Part 1: General rules

PROPOSED STABILITY DATE: 2028

NOTE FROM TC/SC OFFICERS:

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

____

COUPLING CAPACITORS AND CAPACITOR DIVIDERS –

Part 1: General rules

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 60358-1 has been prepared by IEC Technical Committee 33: Power capacitors and their applications.

This standard cancels and replaces the first edition of IEC 60358-1:2012, and constitutes a technical revision.

This second edition of IEC 60358-1 includes the following significant technical changes with respect to the first edition:

– new terms and definitions are presented in clause 3.
– new definitions in clause 4, clause 5
– gas-insulated capacitors and capacitor dividers are integrated in clause 6.
– new tests in routine, type, special and design test sections are introduced, see clause 7
– new clause 8, clause 9 and clause 10
– new Annex D, Annex E, Annex F, Annex G and Annex H

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

FDIS	Report on voting
33/xxx/FDIS	33/xxx/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.

The language used for the development of this International Standard is English

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The updated list of standards issued by IEC TC 33 is available at the website: https://www.iec.ch

IEC 60358-1, Coupling capacitors and capacitor dividers – Part 1: General rules

IEC 60358-2, Coupling capacitors and capacitor dividers – Part 2: AC or DC single-phase coupling capacitor connected between line and ground for power line carrier-frequency (PLC) application

IEC 60358-3, Coupling capacitors and capacitor dividers – Part 3: AC or DC single-phase coupling capacitor for harmonic-filters applications

IEC 60358-4, Coupling capacitors and capacitor dividers – Part 4: DC or AC single-phase capacitor dividers

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 document is the first revision of the standard IEC 60358-1, defining general rules for coupling capacitors and capacitor dividers.

The main modifications of this revision are listed below:

- terms and definitions:
  - new terms and definitions are presented in clause 3;
- normal and special environmental conditions:
  - new definitions in clause 4 are introduced;
- ratings:
  - addition of HV insulation levels above 800 kV;
  - new definition on rated voltage U_r for AC and DC applications;
  - clause 5, new definitions for DC application are integrated;
  - new standard values of rated voltages are defined;
- design and construction:
  - clarification of the altitude correction for external insulation and dielectric tests;
  - external insulation requirements for DC application;
  - gas-insulated capacitors and capacitor dividers are integrated in clause 6;
  - new test with its requirements on capacitor element ageing is defined;
- type tests:
  - temperature rise test: more accurate definition of the test duration;
  - lightning impulse test: new test procedure (15 impulses) for U_m ≥ 300 kV;
  - mechanical test: moved from special test to type test;
  - new enclosure tightness test for gas-insulated capacitors and dividers;
- routine tests:
  - tightness tests for gas-insulated equipment;
  - gas dew point measurements;
  - new flowchart of routine tests presented in Figure 3;
- special tests:
  - determination of temperature coefficient of the capacitor element;
  - new enclosure tightness test on low and hot temperature;
  - information about internal arc tests;
  - information about multiple chopped impulse tests;
  - new test on impedance measurements depending on frequency;
  - new test on thermal stability;
  - new test on corrosion;
  - new flowchart of type tests presented in Figure 4;
- design tests (new clause):
  - ageing tests of capacitor elements;
- commissioning tests (new clause):
  - new installation inspection;
  - gas dew point test moved from special test to commissioning tests;

- rules for transport, storage, erection, operation and maintenance:
  - new mandatory rules for user and manufacturer;
  - new conditions for transportation and storage;
- new annexes:
  - Annex D (informative): provide information about superimposed impulse voltages;
  - Annex E (informative): provide information on test setups for superimposed impulse voltage tests;
  - Annex F (informative): is introduced on high-frequency characteristic measurements;
  - Annex G (informative): provide information about composite AC/DC voltages;
  - Annex H (informative): present a summary of all voltages used in DC application;

COUPLING CAPACITORS AND CAPACITOR DIVIDERS –

Part 1: General rules

1 Scope

This part of IEC 60358 applies to:

- Capacitors and capacitor dividers, with rated voltage > 1 000 V, connected line to ground with the low voltage terminal either permanently earthed or connected to devices, for applications listed hereunder and other similar uses.

This standard serves as basic standard for the coupling capacitors and capacitor dividers. The different parts of this standard will present the supplementary specifications and tests, for example IEC 60358-2, IEC 60358-3 or IEC 60358-4.

NOTE Diagrams of coupling capacitor and capacitor divider to which this standard applies are given in Figures A.1 and A.2.

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 60038, *IEC standard voltages*

IEC 60050-321:1986, *International Electrotechnical Vocabulary – Chapter 321: Instrument transformers*

IEC 60050-436:1990, *International Electrotechnical Vocabulary – Chapter 436: Power capacitors*

IEC 60050-601:1985, *International Electrotechnical Vocabulary – Chapter 601: Generation, transmission and distribution of electricity – General*

IEC 60050-604:1987, *International Electrotechnical Vocabulary – Chapter 604: Generation, transmission and distribution of electricity – Operation*

IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068-2-17, *Basic environmental testing procedures – Part 2-17: Tests – Test Q: Sealing*

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

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

IEC 60071-11, *Insulation co-ordination – Part 11: Definitions, principles and rules for HVDC system*

IEC 60085, *Electrical insulation – Thermal evaluation and designation*

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

IEC 60296, *Fluids for electrotechnical applications – Mineral insulating oils for electrical equipment*

IEC 60376, *Specification of technical grade sulphur hexafluoride (SF6) and complementary gases to be used in its mixtures for use in electrical equipment*

IEC 60480, *Specifications for the re-use of sulphur hexafluoride (SF6) and its mixtures in electrical equipment*

IEC 60721 (all parts), *Classification of environmental conditions*

IEC guide 109-2003, *Environmental aspects –Inclusion in electrotechnical product standards*

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 TS 60815-3:2008, Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 3: Polymer insulators for a.c. systems

IEC 60867, *Insulating liquids – Specifications for unused liquids based on synthetic aromatic hydrocarbons*

IEC 61099, *Insulating liquids – Specifications for unused synthetic organic esters for electrical purposes*

IEC 61462, *Composite hollow insulators – Pressurized and unpressurized insulators for use in electrical equipment with rated voltage greater than 1 000 V – Definitions, test methods and acceptance criteria and design recommendations*

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

IEC 62271-4:2022, *High-voltage switchgear and controlgear – Part 4: Handling procedures for gases for insulation and/or switching*

IEC 62770, *Fluids for electrotechnical applications – Unused natural esters for transformers and similar electrical equipment*

IEC 63012, *Insulating liquids – Unused modified or blended esters for electrotechnical applications*

ISO 4628-3, *Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 3: Assessment of degree of rusting*

ISO 22479, *Corrosion of metals and alloys – Sulfur dioxide test in a humid atmosphere (fixed gas method)*

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*

3 Terms, definitions, symbols and abbreviated terms

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

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

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

NOTE Some of these terms and definitions are identical with or are similar to those of IEC 60050-321:1986, IEC 60050-436:1990, IEC 60050-601:1985 and IEC 60050-604:1987. These are indicated by the relevant reference in brackets.

3.1 General

3.1.1
rated frequency of equipment
f_r
frequency for which the coupling capacitor has been designed

3.1.2
rated voltage
U_r
AC: based on the maximum voltage U_m including superimposed harmonic and sub-harmonic voltages between phase to ground

DC: the highest value of line to ground voltage, including harmonics and commutation overshoots, for which the equipment is designed and may be used in respect of its insulation

3.1.3
highest voltage for equipment
U_m
AC: the highest r.m.s. value of phase-to-phase voltage for which the equipment is designed and may be used in respect of its insulation

[SOURCE: IEC 60050-614:2016, 614-03-01, modified – Symbol added, "(rms value)" deleted, "service" replaced with "operating" and "greatest" replaced with "highest"]

3.1.4
Creepage distance voltage
U_{cd}
voltage which is needed to calculate the creepage distance based on IEC/TS 60815-4

3.1.5
DC system voltage
U_{DC}
highest mean or average operating voltage to earth, excluding harmonics and commutation overshoots

[SOURCE: IEC 60071-5]

3.1.6
Maximum DC-system voltage
U_{DCmax}
maximum DC-system voltage is almost a pure DC voltage with a magnitude dependent on voltage control and measuring tolerance excluding harmonics and commutation overshoots

3.1.7
Rated lightning impulse withstand voltage
U_{LIWV}
highest peak value of the lightning impulse voltage which does not cause breakdown of insulation under specified conditions

[SOURCE: IEC60050-442:2002, 442-09-18 – modified]

3.1.8
Rated switching impulse withstand voltage
U_{SIWV}
highest peak value of the switching impulse voltage which does not cause breakdown of insulation under specified conditions

[SOURCE: IEC60050-442:2002, 442-09-18 – modified]