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Passiva avstörningsfilter – Del 3: Filter för vilka provning avseende säkerhet är lämplig

*Passive filter units for electromagnetic interference suppression –
Part 3: Passive filter units for which safety tests are appropriate*

Som svensk standard gäller europastandarden EN IEC 60939-3:2024. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 60939-3:2024.

Nationellt förord

Europastandarden EN IEC 60939-3:2024

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60939-3, Second edition, 2024 - Passive filter units for electromagnetic interference suppression – Part 3: Passive filter units for which safety tests are appropriate**

utarbetad inom International Electrotechnical Commission, IEC.

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English Version

Passive filter units for electromagnetic interference suppression -
Part 3: Passive filter units for which safety tests are appropriate
(IEC 60939-3:2024)

Filtres passifs d'antiparasitage - Partie 3: Filtres passifs
pour lesquels des essais de sécurité sont appropriés
(IEC 60939-3:2024)

Passive Filter für die Unterdrückung von
elektromagnetischen Störungen - Teil 3: Filter, für die
Sicherheitsprüfungen vorgeschrieben sind
(IEC 60939-3:2024)

This European Standard was approved by CENELEC on 2024-03-18. 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.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 40/3102/FDIS, future edition 2 of IEC 60939-3, prepared by IEC/TC 40 "Capacitors and resistors for electronic equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60939-3:2024.

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) 2024-12-18
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2027-03-18

This document supersedes EN 60939-3:2015 and all of its amendments and corrigenda (if any).

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Endorsement notice

The text of the International Standard IEC 60939-3:2024 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 standard indicated:

IEC 60068-2-13 NOTE Approved as EN IEC 60068-2-13

IEC 60068-2-27 NOTE Approved as EN 60068-2-27

IEC 60085 NOTE Approved as EN 60085

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IEC 61112 NOTE Approved as EN 61112

IEC 61140 NOTE Approved as EN 61140

IEC 62109-1 NOTE Approved as EN 62109-1

ISO 80000-1 NOTE Approved as EN ISO 80000-1

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60060-1	2010	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	2010
IEC 60062	2016	Marking codes for resistors and capacitors	EN 60062	2016
IEC 60068-1	2013	Environmental testing - Part 1: General and guidance	EN 60068-1	2014
IEC 60068-2-1	2007	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	2007
IEC 60068-2-2	2007	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	2007
IEC 60068-2-6	2007	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	2008
IEC 60068-2-14	2023	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN IEC 60068-2-14	2023
IEC 60068-2-17	2023	Environmental testing - Part 2-17: Tests - Test Q: Sealing	EN IEC 60068-2-17	2023
IEC 60068-2-20	2021	Environmental testing - Part 2-20: Tests - Test Ta and Tb: Test methods for solderability and resistance to soldering heat of devices with leads	EN IEC 60068-2-20	2021
IEC 60068-2-21	2021	Environmental testing - Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices	EN IEC 60068-2-21	2021
IEC 60068-2-30	2005	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	2005
IEC 60068-2-45	1980	Basic environmental testing procedures - Part 2-45: Tests - Test XA and guidance: Immersion in cleaning solvents	EN 60068-2-45	1992
IEC 60068-2-78	2012	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	2013

EN IEC 60939-3:2024 (E)

IEC 60384-14	2023	Fixed capacitors for use in electronic equipment - Part 14: Sectional specification - Fixed capacitors for electromagnetic interference suppression and connection to the supply mains	EN IEC 60384-14	2023
IEC 60664-1	2020	Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests	EN IEC 60664-1	2020
IEC 60695-11-5	2016	Fire hazard testing - Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	2017
IEC 60695-11-10	2013	Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	2013
IEC 60938-1	2021	Fixed inductors for electromagnetic interference suppression - Part 1: Generic specification	EN IEC 60938-1	2021
IEC 60938-2	2021	Fixed inductors for electromagnetic interference suppression - Part 2: Sectional specification on power line chokes	EN IEC 60938-2	2021
IEC 60940	2015	Guidance information on the application of capacitors, resistors, inductors and complete filter units for electromagnetic interference suppression	EN 60940	2015
CISPR 17	2011	Methods of measurement of the suppression characteristics of passive EMC filtering devices	EN 55017	2011



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INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Passive filter units for electromagnetic interference suppression –
Part 3: Passive filter units for which safety tests are appropriate**

**Filtres passifs d'antiparasitage –
Partie 3: Filtres passifs pour lesquels des essais de sécurité sont appropriés**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PASSIVE FILTER UNITS FOR ELECTROMAGNETIC
INTERFERENCE SUPPRESSION –****Part 3: Passive filter units for which safety tests are appropriate****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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IEC 60939-3 has been prepared by of IEC technical committee 40: Capacitors and resistors for electronic equipment. It is an International Standard.

This second edition cancels and replaces the first edition published in 2015, Corrigendum 1:2016 and Corrigendum 2:2018. This edition constitutes a technical revision.

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

- a) Separated clauses for safety and performance tests;
- b) Added note for use of multiple X capacitors bridging basic insulation in 3 phase filters;
- c) Characteristics and conditions to substitute X and Y capacitors are now described in a separate Subclause 4.1;

- d) Creepage and clearance tables updated and in line with the latest editions of IEC 60938-2 and IEC 60664-1;
- e) Allowing voltage measurement for inductance measurements (7.3);
- f) Added requirements for marking depending on remaining energy after disconnection;
- g) Added content of CTL DSH 2044:2016 for temperature test of IEC filters;
- h) Added note about temperature rise required specimens for safety testing;
- i) Changed index of capacitors in Annex A to avoid confusion between index name and capacitor class;
- j) Moved tests from group 1A to 2. Now, samples in group 1A need to be submitted without potting;
- k) Revision of all parts of the document has taken place based on the ISO/IEC Directives, Part 2:2021, and harmonization with other similar kinds of documents. Annex X contains all cross-references of changes in clause/subclause numbers.

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

Draft	Report on voting
40/3102/FDIS	40/3118/RVD

Full information on the voting for its approval 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.

A list of all parts in the IEC 60939 series, published under the general title *Passive filter units for electromagnetic interference suppression*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn, or
- revised.

PASSIVE FILTER UNITS FOR ELECTROMAGNETIC INTERFERENCE SUPPRESSION –

Part 3: Passive filter units for which safety tests are appropriate

1 Scope

This part of IEC 60939 covers passive filters used to attenuate unwanted radio-frequency signals (such as noise or interference) generated from electromagnetic sources.

Both single and multi-channel filters within one enclosure or which are built on a printed circuit board forming a compact entity are included within the scope of this document.

Filters constructed of capacitive elements where the inductance is inherent in the construction of the filter are within the scope of this document. Similarly, filters constructed of inductive elements where the capacitance is inherent in the construction of the filter are also within the scope of this document. It is up to the manufacturer to state whether a given component is to be designed as a capacitor, an inductor or a filter. Filters can include also other components such as resistors and/or varistors or similar components.

This document applies to passive filter units for electromagnetic interference suppression for which safety tests are appropriate. This implies that filters specified according to this document will either be connected to mains supplies, when compliance with the mandatory tests of Table B.1 is necessary, or used in other circuit positions where the equipment specification specifies that some or all of these safety tests are required.

This document applies to passive filter units, which will be connected to an AC mains or other supply (DC or AC) with a nominal voltage not exceeding 1 000 V AC, with a nominal frequency not exceeding 400 Hz, or 1 500 V DC.

NOTE For AC use, IEC 60384-14 applies to capacitors which will be connected to AC mains with a nominal frequency not exceeding 100 Hz.

This document covers appliance filters (US) but does not cover facility filters, cord-connected filters or direct plug-in filters. These other filters will be covered by another sectional specification.

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 60062:2016, *Marking codes for resistors and capacitors*

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-6:2007, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14:2023, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-17:2023, *Environmental testing – Part 2-17: Tests – Test Q: Sealing*

IEC 60068-2-20:2021, *Environmental testing – Part 2-20: Tests – Test Ta and Tb: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60068-2-21:2021, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-45:1980, *Basic environmental testing procedures – Part 2-45: Tests – Test XA and guidance: Immersion in cleaning solvents*

IEC 60068-2-78:2012, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60384-14:2023, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

IEC 60695-11-5:2016, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60695-11-10:2013, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60938-1:2021, *Fixed inductors for electromagnetic interference suppression – Part 1: Generic specification*

IEC 60938-2:2021, *Fixed inductors for electromagnetic interference suppression – Part 2: Sectional specification on power line chokes*

IEC 60940:2015, *Guidance information on the application of capacitors, resistors, inductors and complete filter units for electromagnetic interference suppression*

CISPR 17:2011, *Methods of measurement of the suppression characteristics of passive EMC filtering devices*