



SLOVENSKI STANDARD SIST EN IEC 60384-1:2021

01-november-2021

Nadomešča:
SIST EN 60384-1:2016

**Nespremenljivi kondenzatorji za elektronsko opremo - 1. del: Splošna specifikacija
(IEC 60384-1:2021)**

Fixed capacitors for use in electronic equipment - Part 1: Generic specification (IEC 60384-1:2021)

Festkondensatoren zur Verwendung in Geräten der Elektronik, Teil 1:
Fachgrundspezifikation (IEC 60384-1:2021)

Condensateurs fixes utilisés dans les équipements électroniques - Partie 1: Spécification
générique (IEC 60384-1:2021)

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Ta slovenski standard je istoveten z: EN IEC 60384-1:2021

ICS:

31.060.10 Fiksni kondenzatorji Fixed capacitors

SIST EN IEC 60384-1:2021 en

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EUROPEAN STANDARD

EN IEC 60384-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2021

ICS 31.060.10

Supersedes EN 60384-1:2016 and all of its amendments
and corrigenda (if any)

English Version

Fixed capacitors for use in electronic equipment - Part 1: Generic specification (IEC 60384-1:2021)

Condensateurs fixes utilisés dans les équipements
électroniques - Partie 1: Spécification générique
(IEC 60384-1:2021)

Festkondensatoren zur Verwendung in Geräten der
Elektronik - Teil 1: Fachgrundspezifikation
(IEC 60384-1:2021)

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EN IEC 60384-1:2021 (E)**European foreword**

The text of document 40/2848/FDIS, future edition 6 of IEC 60384-1, 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 60384-1:2021.

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) 2022-05-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-08-20

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60027 (series)	NOTE Harmonized as EN 60027 (series)
IEC 60384-2	NOTE Harmonized as EN IEC 60384-2
IEC 60384-3	NOTE Harmonized as EN 60384-3
IEC 60384-3-1	NOTE Harmonized as EN 60384-3-1
IEC 60384-26	NOTE Harmonized as EN IEC 60384-26
IEC 60469:2013	NOTE Harmonized as EN 60469:2013 (not modified)
ISO 80000-1	NOTE Harmonized as EN ISO 80000-1
ISO 9000	NOTE Harmonized as EN ISO 9000

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 60062	-	Marking codes for resistors and capacitors	EN 60062	-
IEC 60063	-	Preferred number series for resistors and capacitors	EN 60063	-
IEC 60068-1	2013	Environmental testing - Part 1: General and guidance	EN 60068-1	2014
IEC 60068-2-1	-	Environmental testing - Part 2-1: Tests Test A: Cold	EN 60068-2-1	-
IEC 60068-2-2	2007	Environmental testing - Part 2-2: Tests Test B: Dry heat	EN 60068-2-2	2007
IEC 60068-2-6	-	Environmental testing - Part 2-6: Tests Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60068-2-13	-	Environmental testing - Part 2-13: Tests Test M: Low air pressure	EN IEC 60068-2-13	-
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-17	-	Basic environmental testing procedures Part 2-17: Tests - Test Q: Sealing	EN 60068-2-17	-
IEC 60068-2-20	-	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	-
IEC 60068-2-21	-	Environmental testing - Part 2-21: Tests -- Test U: Robustness of terminations and integral mounting devices	-	-
IEC 60068-2-27	-	Environmental testing - Part 2-27: Tests Test Ea and guidance: Shock	EN 60068-2-27	-
IEC 60068-2-30	-	Environmental testing - Part 2-30: Tests Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	-

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IEC 60068-2-45	1980	Basic environmental testing procedures -EN 60068-2-45 Part 2-45: Tests - Test XA and guidance: Immersion in cleaning solvents	1992
+ A1	1993		+ A1 1993
IEC 60068-2-58	-	Environmental testing - Part 2-58: Tests -EN 60068-2-58 Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)	-
IEC 60068-2-67	-	Environmental testing - Part 2-67: Tests -EN 60068-2-67 Test Cy: Damp heat, steady-state, accelerated test primarily intended for components	-
IEC 60068-2-69	-	Environmental testing - Part 2-69: Tests -EN 60068-2-69 Test Te/Tc: Solderability testing of electronic components and printed boards by the wetting balance (force measurement) method	-
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests -EN 60068-2-78 Test Cab: Damp heat, steady-state	-
IEC 60068-2-82	2019	Environmental testing - Part 2-82: Tests -EN IEC 60068-2-82 2019 Test Xw1: Whisker test methods for components and parts used in electronic assemblies	-
IEC 60294	-	Measurement of the dimensions of aEN 60294 cylindrical component with axial terminations	-
IEC 60695-11-5	-	Fire hazard testing - Part 11-5: TestEN 60695-11-5 flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	-
IEC 60717	-	Method for the determination of the spaceEN 60717 required by capacitors and resistors with unidirectional terminations	-
IEC 61193-2	-	Quality assessment systems - Part 2:EN 61193-2 Selection and use of sampling plans for inspection of electronic components and packages	-
IEC 61249-2-7	-	Materials for printed boards and otherEN 61249-2-7 interconnecting structures - Part 2-7: Reinforced base materials clad and unclad - Epoxide woven E-glass laminated sheet of defined flammability (vertical burning test), copper-clad	-
ISO 3	-	Preferred numbers - Series of preferred- numbers	-



IEC 60384-1

Edition 6.0 2021-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fixed capacitors for use in electronic equipment –
Part 1: Generic specification

Condensateurs fixes utilisés dans les équipements électroniques –
Partie 1: Spécification générique

INTERNATIONAL
ELECTROTECHNICAL
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INTERNATIONALE

ICS 31.060.10

ISBN 978-2-8322-9973-9

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –**Part 1: Generic specification**

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 60384-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment. It is an International Standard.

This sixth edition cancels and replaces the fifth edition published in 2016. This edition constitutes a technical revision.

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

- a) The document has been completely restructured to comply with the ISO/IEC Directives, Part 2; a new technical categorization of test methods has been introduced and the test methods have been reorganized according to these new categories; tables, figures and references have been revised accordingly.
- b) Annex X has been added for comparison with the previous edition.

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

FDIS	Report on voting
40/2848/FDIS	40/2859/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/standardsdev/publications.

A list of all parts in the IEC 60384 series, published under the general title *Fixed capacitors for use in electronic equipment*, 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,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

The specification system for fixed capacitors for use in electronic equipment is structured in a hierarchical system consisting of the following specification types. See Figure 1.

Generic specification

The generic specification covers all subjects mainly common to the family of fixed capacitors for use in electronic equipment, such as terminology, methods of measurement and tests. Where the individual subjects require the conditions or parameters for provisions specific to the particular subfamily or type of fixed capacitor, such are required to be given by one of the subordinate specifications.

For the scope of fixed capacitors, the numeric reference to the generic specification is IEC 60384-1.

Sectional specification

Sectional specifications cover all subjects additional to those given in the generic specification, which are specific to a defined subgroup of fixed capacitors. These subjects normally are preferred values for dimensions and characteristics, additional test methods and relevant provisions for test methods given in the generic specification, requirements for sampling and for the preparation of specimen, recommended test severities and preferred acceptance criteria. The sectional specification also outlines the structure and scope of the test schedules which are to be applied in all subordinate detail specifications.

For the scope of fixed capacitors, the numeric references to the sectional specifications reach from IEC 60384-2 for polyester film capacitors to currently IEC 60384-26 for aluminum electrolytic capacitors with conductive polymer solid electrolyte. The variety of sectional specifications may be adapted to the portfolio of different technologies of fixed capacitors.

Detail specification

Detail specifications give directly, or by referring to other specifications, all information necessary to completely describe a given type and range of fixed capacitors, including requirements of all values for dimensions and characteristics. They also give all information required for the quality assessment of the covered type and range of fixed capacitors within a suitable quality assessment system, including requirements for all applied test severities and acceptance criteria, and the completed test schedules.

Detail specifications can be either specifications within the IEC system, another specification system linked to IEC, or specified by the manufacturer or user.

For the scope of fixed capacitors, the numeric references to detail specifications are for example IEC 60384-3-101, if related to the sectional specification IEC 60384-3 and to the ancillary blank detail specification IEC 60384-3-1.

Blank detail specification

The hierarchical system of specifications is supplemented by one or more blank detail specifications to a sectional specification, which are used to ensure a uniform presentation of detail specifications.

The blank detail specifications provide the specification writer with a template on the layout to be adopted and on the information to be given and with guidance for the preparation of detail specifications in line with the requirements of the superior generic or sectional specifications.

Blank detail specifications are not considered as relevant specifications since they do not themselves describe any particular component.

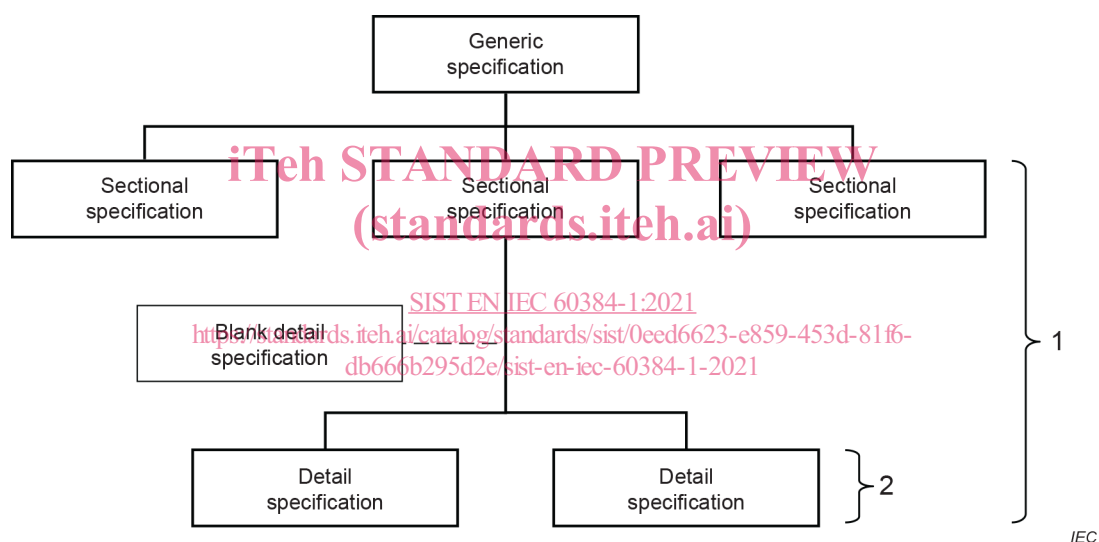
The presence of an established hierarchical specification system with blank detail specifications permits the preparation of detail specifications even outside of the relevant IEC technical committee.

For the scope of fixed capacitors, the numeric references to blank detail specifications are, for example, IEC 60384-3-1, if related to the sectional specification IEC 60384-3.

Relevant specification

In this system the term "relevant specification" addresses subordinate specifications containing specific requirements, where applicable.

Any generic or sectional specification may use abstract and universal references to subordinate specifications of either hierarchical level by use of the expression "relevant specification".



Key

- 1 Indicates the range of "Relevant specifications" to the superior generic specification, where applicable.
- 2 Indicates the range of "Relevant specifications" to the superior sectional specification, where applicable.

Figure 1 – Specification system for fixed capacitors

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 1: Generic specification

1 Scope

This part of IEC 60384 is a generic specification and is applicable to fixed capacitors for use in electronic equipment.

It establishes standard terms, inspection procedures and methods of test for use in sectional and detail specifications of electronic components for quality assessment or any other purpose.

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.

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IEC 60062, *Marking codes for resistors and capacitors*

IEC 60063, *Preferred number series for resistors and capacitors*

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

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

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

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

IEC 60068-2-13, *Environmental testing – Part 2-13: Tests – Test M: Low air pressure*

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

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

IEC 60068-2-20, *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, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

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