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Fixed electric double-layer capacitors for use in electric and electronic equipment - Part 1: Generic specification



## EESTI STANDARDI EESSÕNA

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EUROPEAN STANDARD

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**Fixed electric double-layer capacitors for use in electric and  
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Condensateurs électriques fixes à double couche utilisés  
dans les équipements électriques et électroniques - Partie  
1: Spécification générique  
(IEC 62391-1:2022)

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in elektrischen und elektronischen Geräten - Teil 1:  
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(IEC 62391-1:2022)

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## European foreword

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- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-08-24
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# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**Fixed electric double-layer capacitors for use in electric and electronic equipment –**

**Part 1: Generic specification**

**Condensateurs électriques fixes à double couche utilisés dans les équipements électriques et électroniques –**

**Partie 1: Spécification générique**



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# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Fixed electric double-layer capacitors for use in electric and electronic equipment –  
Part 1: Generic specification**

**Condensateurs électriques fixes à double couche utilisés dans les équipements électriques et électroniques –  
Partie 1: Spécification générique**

INTERNATIONAL  
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIXED ELECTRIC DOUBLE-LAYER CAPACITORS  
FOR USE IN ELECTRIC AND ELECTRONIC EQUIPMENT –****Part 1: Generic specification**

## FOREWORD

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IEC 62391-1 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment. It is an International Standard.

This third edition cancels and replaces the second edition published in 2015. 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) Calculation formula of charging/discharging efficiency in Annex D were divided into two cases: "Calculation assuming full charge and discharge" and "Calculation assuming incomplete charging and discharging due to internal resistance".

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

| Draft        | Report on voting |
|--------------|------------------|
| 40/2966/FDIS | 40/2976/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.

A list of all parts in the IEC 62391 series, published under the general title *Fixed electric double-layer capacitors for use in electric and electronic equipment*, can be found on the IEC website.

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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

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](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.

**IMPORTANT – The "colour inside" logo on the cover page of this document 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.**

# FIXED ELECTRIC DOUBLE-LAYER CAPACITORS FOR USE IN ELECTRIC AND ELECTRONIC EQUIPMENT –

## Part 1: Generic specification

### 1 Scope

This part of IEC 62391 applies to fixed electric double-layer capacitors (hereafter referred to as capacitors) mainly used in DC circuits of electric and electronic equipment.

This part of IEC 62391 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.

IEC 60062, *Marking codes for resistors and capacitors*

IEC 60063, *Preferred number series 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 – 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 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

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 of with leads*

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

IEC 60068-2-45:1980, *Environmental testing – Part 2-45: Tests – Test XA and guidance: Immersion in cleaning solvents*  
IEC 60068-2-45:1980/AMD1:1993)

IEC 60068-2-58, *Environmental testing – Part 2-58: Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)*

IEC 60068-2-69, *Environmental testing – Part 2-69: Tests – 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 – Test Cab: Damp heat, steady state*

IEC 60294, *Measurement of the dimensions of a cylindrical component with axial terminations*

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

IEC 60717, *Method for the determination of the space required by capacitors and resistors with unidirectional terminations*

IEC 61193-2, *Quality assessment systems – Part 2: Selection and use of sampling plans for inspection of electronic components and packages*

### 3 Terms and definitions

For the purposes of this document and the subordinate specifications, 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

##### **active flammability**

flammability (self-ignition) caused by internal heating of the component

Note 1 to entry: Active flammability can be caused by sparking due to insufficient internal contact for example.

#### 3.2

##### **category of passive flammability**

category given by the maximum burning time after a specified time of flame application

#### 3.3

##### **category temperature range**

range of ambient temperatures for which the capacitor has been designed to operate continuously

Note 1 to entry: This is given by the lower category temperature and the upper category temperature.

#### 3.4

##### **category voltage**

$U_C$

maximum voltage which may be applied continuously to a capacitor at its upper category temperature

Note 1 to entry: This term is not used in the document and is given for information only.

#### 3.5

##### **class**

classification of the capacitor by the capacitance value and the internal resistance value depending upon the application

#### 3.6

##### **DC capacitor**

capacitor designed essentially for application with direct voltage