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Fixed electric double-layer capacitors for use in electric and electronic equipment - Part 1: Generic specification (IEC 62391-1:2022)

Elektrische Doppelschichtkondensatoren zur Verwendung in elektrischen und elektronischen Geräten - Teil 1: Fachgrundspezifikation (IEC 62391-1:2022)

Condensateurs électriques fixes à double couche utilisé dans les équipements électriques et électroniques - Partie 1: Spécification générique (IEC 62391-1:2022)

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Fixed electric double-layer capacitors for use in electric and electronic equipment - Part 1: Generic specification (IEC 62391-1:2022)

Condensateurs électriques fixes à double couche utilisés dans les équipements électriques et électroniques - Partie 1: Spécification générique
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Elektrische Doppelschichtkondensatoren zur Verwendung in elektrischen und elektronischen Geräten - Teil 1: Fachgrundspezifikation
(IEC 62391-1:2022)

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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

EN IEC 62391-1:2022 (E)**European foreword**

The text of document 40/2966/FDIS, future edition 3 of IEC 62391-1, 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 62391-1:2022.

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) 2023-08-24
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-11-24

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The text of the International Standard IEC 62391-1:2022 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 60027 (series) NOTE Harmonized as EN 60027 (series)
- IEC 60068-2-47:2005 NOTE Harmonized as EN 60068-2-47:2005 (not modified)
- IEC 60301:2012 NOTE Harmonized as EN 60301:2012 (not modified)
- IEC 60384-1:2021 NOTE Harmonized as EN IEC 60384-1:2021 (not modified)
- IEC 60695-2-11 NOTE Harmonized as EN IEC 60695-2-11
- IEC 61881-3:2012 NOTE Harmonized as EN 61881-3:2012 (not modified)
- IEC 62391-1:2015 NOTE Harmonized as EN 62391-1:2016 (not modified)
- IEC 62391-2:2006 NOTE Harmonized as EN 62391-2:2006 (not modified)
- IEC 62391-2-1:2006 NOTE Harmonized as EN 62391-2-1:2006 (not modified)
- IEC 62576:2018 NOTE Harmonized as EN IEC 62576:2018 (not modified)
- ISO 80000-1:2009 NOTE Harmonized as EN ISO 80000-1:2013 (not modified)

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	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	-	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
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	EN IEC 60068-2-21 -	
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
+ A1	1993		+ A1	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)	EN 60068-2-58	-

EN IEC 62391-1:2022 (E)

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	EN 60068-2-69	-
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60294	-	Measurement of the dimensions of a cylindrical component with axial terminations	EN 60294	-
IEC 60695-11-5	-	Fire hazard testing - Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	-
IEC 60717	-	Method for the determination of the space required by capacitors and resistors with unidirectional terminations	EN 60717	-
IEC 61193-2	-	Quality assessment systems - Part 2: Selection and use of sampling plans for inspection of electronic components and packages	EN 61193-2	-

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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
ELECTROTECHNICAL
COMMISSION

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INTERNATIONALE

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CONTENTS

FOREWORD.....	7
1 Scope.....	9
2 Normative references	9
3 Terms and definitions	10
4 General requirements	15
4.1 Unit and symbols	15
4.2 Preferred values and class.....	15
4.2.1 General	15
4.2.2 Preferred values of nominal capacitance	15
4.2.3 Class	15
4.3 Marking.....	15
4.3.1 General	15
4.3.2 Coding.....	15
5 General provisions for tests and measurement procedures.....	16
5.1 General.....	16
5.2 Test and measurement requirements	16
5.2.1 Test conditions	16
5.2.2 Measurement conditions.....	16
5.2.3 Voltage treatment	16
5.2.4 Thermal treatment.....	16
5.3 Drying.....	16
5.4 Storage.....	17
5.4.1 Storage at high temperature	17
5.4.2 Storage at low temperature.....	17
6 Electrical tests and measurements	17
6.1 Measurement method 1 for capacitance and internal resistance (constant current discharge).....	17
6.1.1 Basic circuit for measuring.....	17
6.1.2 Measuring equipment	18
6.1.3 Measurement procedure	19
6.1.4 Calculation methods for capacitance	21
6.1.5 Calculation methods for internal resistance.....	22
6.1.6 Conditions to be prescribed in the detail specification.....	23
6.2 Measurement method 2 for capacitance and internal resistance.....	23
6.2.1 Constant resistance charging method for capacitance measurement	23
6.2.2 AC internal resistance measurement method	24
6.3 Leakage current.....	24
6.3.1 Measurement method	24
6.3.2 Items to be specified in the detail specification	26
6.4 Maintain voltage.....	26
6.4.1 Measurement method	26
6.4.2 Calculation of voltage maintenance rate	27
6.4.3 Conditions to be prescribed in the detail specification.....	27
7 Mechanical tests and measurements	27
7.1 Visual examination and check of dimensions	27
7.1.1 Visual examination	27

7.1.2	Dimensions (gauging).....	27
7.1.3	Dimensions (detail).....	28
7.2	Robustness of terminations.....	28
7.2.1	Test Ua1 – Tensile	28
7.2.2	Test Ub – Bending (half of the sample).....	28
7.2.3	Test Uc – Torsion (remaining sample)	28
7.2.4	Test Ud – Torque (for terminations with threaded studs or screws and for integral mounting devices).....	28
7.2.5	Visual examination	29
7.3	Vibration	29
7.3.1	Initial measurement	29
7.3.2	Test.....	29
7.3.3	Final measurement and requirements	29
8	Environmental and climatic tests	29
8.1	Rapid change of temperature.....	29
8.1.1	Initial measurement	29
8.1.2	Test.....	29
8.1.3	Final inspection, measurements and requirements.....	29
8.2	Damp heat, steady state	30
8.2.1	Initial measurement	30
8.2.2	Test.....	30
8.2.3	Final measurement	30
8.3	Endurance	30
8.3.1	Initial measurements	30
8.3.2	Test.....	30
8.3.3	Final measurement, inspection and requirements	30
8.4	Characteristics at high and low temperature.....	31
8.4.1	General	31
8.4.2	Test procedure	31
8.4.3	Dry heat	31
8.4.4	Cold.....	31
8.4.5	Final measurement and requirements	31
9	Tests related to component assembly.....	31
9.1	Resistance to soldering heat.....	31
9.1.1	Preconditioning and initial measurement.....	31
9.1.2	Test.....	31
9.1.3	Recovery	32
9.1.4	Final inspection, measurements and requirements.....	32
9.2	Solderability	32
9.2.1	General	32
9.2.2	Preconditioning.....	32
9.2.3	Capacitors with leads	32
9.2.4	Surface mount capacitors	33
9.3	Component solvent resistance	33
9.3.1	Initial measurements	33
9.3.2	Test.....	33
9.3.3	Requirements	33
9.4	Solvent resistance of marking	34
9.4.1	Test.....	34

9.4.2	Requirements	34
10	Tests related to safety	34
10.1	Passive flammability	34
10.1.1	Test procedure	34
10.1.2	Requirements	34
10.2	Pressure relief (if applicable)	35
10.2.1	Test	35
10.2.2	Requirements	35
11	Quality assessment procedures	35
Annex A (normative)	Classification according to capacitance and internal resistance	36
A.1	General	36
A.2	Classification by capacitance and internal resistance	36
Annex B (informative)	Measurement method of capacitance and low resistance by low frequency AC method (reference)	38
B.1	General	38
B.2	Measurement system	38
B.3	Calculation of capacitance	38
B.4	Measurement conditions	39
Annex C (informative)	Thermal equilibrium time of capacitors	40
C.1	General	40
C.2	Thermal equilibrium time of capacitors	40
Annex D (informative)	Charging/discharging efficiency and measurement current	42
D.1	General	42
D.2	Charging efficiency, discharging efficiency, and current	42
D.2.1	Calculation assuming full charge and discharge	42
D.2.2	Calculation assuming incomplete charging and discharging due to internal resistance	43
Annex E (informative)	Procedures for setting the measurement current of capacitor with uncertain nominal internal resistance	46
E.1	General	46
E.2	Current setting procedures for measurement of capacitor	46
E.3	Example of a current setting for determining capacitor characteristics	46
Annex F (informative)	Policy on uncertainty of measurement and inset limits	47
F.1	Objective	47
F.2	Calculation of measurement uncertainty	47
F.3	Policy	47
F.4	Calculation of inset and outset limits	47
F.5	Examples	48
F.5.1	General	48
F.5.2	Example 1: Resistor measurement	48
F.5.3	Example 2: Resistor measurement	48
F.5.4	Example 3: Transistor measurement (gain)	48
F.5.5	Example 4: Comparison between initial and final measurement results	48
Annex Q (normative)	Quality assessment procedures	49
Q.1	General	49
Q.1.1	Overview	49
Q.1.2	Applicability of qualification approval	49
Q.1.3	Applicability of capability approval	49

Q.1.4	Applicability of technology approval	50
Q.2	Primary stage of manufacture	50
Q.3	Subcontracting.....	50
Q.4	Structurally similar components	50
Q.5	Qualification approval procedures	50
Q.5.1	Eligibility for qualification approval.....	50
Q.5.2	Application for qualification approval	51
Q.5.3	Test procedure for qualification approval	51
Q.5.4	Granting of qualification approval	51
Q.5.5	Maintenance of qualification approval	51
Q.5.6	Quality conformance inspection	51
Q.6	Capability approval procedures	51
Q.6.1	General	51
Q.6.2	Eligibility for capability approval.....	52
Q.6.3	Application for capability approval	52
Q.6.4	Description of capability.....	52
Q.6.5	Demonstration and verification of capability	53
Q.6.6	Programme for capability approval.....	53
Q.6.7	Capability approval test report	54
Q.6.8	Abstract of description of capability	54
Q.6.9	Modifications likely to affect the capability approval.....	54
Q.6.10	Initial capability approval	54
Q.6.11	Granting of capability approval	55
Q.6.12	Maintenance of capability approval	55
Q.6.13	Extension of capability approval	56
Q.6.14	Quality conformance inspection	56
Q.7	Rework and repair.....	56
Q.7.1	Rework	56
Q.7.2	Repair	57
Q.8	Release for delivery	57
Q.8.1	General	57
Q.8.2	Release for delivery under qualification approval before the completion of group B tests	57
Q.9	Certified test records of released lots	57
Q.10	Delayed delivery	57
Q.11	Alternative test methods	57
Q.12	Manufacture outside the geographical limits of IECQ CBs	57
Q.13	Unchecked parameters	57
Q.14	Technology approval procedures	58
Q.14.1	General	58
Q.14.2	Eligibility for technology approval	58
Q.14.3	Application of technology approval	58
Q.14.4	Description of technology	58
Q.14.5	Demonstration and verification of the technology	58
Q.14.6	Granting of technology approval	58
Q.14.7	Maintenance of technology approval.....	58
Q.14.8	Quality conformance inspection	58
Q.14.9	Failure rate level determination.....	59
Q.14.10	Outgoing quality level	59

Annex X (informative) Cross-references to IEC 62391-1:2015.....	60
Bibliography.....	61
Figure 1 – Basic circuit for measuring	18
Figure 2 – Voltage–time characteristics between capacitor terminals in capacitance and internal resistance measurement.....	19
Figure 3 – Circuit for constant resistance charging method	23
Figure 4 – Circuit for AC resistance method.....	24
Figure 5 – Circuit for measuring leakage currents	25
Figure 6 – Diagram of current and voltage changes at the time of measuring the leakage current.....	26
Figure 7 – Maintain voltage test diagram	27
Figure A.1 – Conceptual rendering orientated by characteristics in each classification.....	37
Figure B.1 – Capacitance measurement system by the low frequency AC method	38
Figure C.1 – Thermal equilibrium times of capacitors (from 85 °C to 25 °C)	40
Figure C.2 – Thermal equilibrium times of capacitors (from –40 °C to 25 °C)	41
Figure C.3 – Capacitor core temperature change with respect to time.....	41
Figure Q.1 – General scheme for capability approval	52
Table 1 – Measurement conditions for measurement method 1A.....	20
Table 2 – Measurement conditions for measurement method 1B.....	21
Table 3 – Tensile force	28
Table 4 – Torque	29
Table 5 – Severities and requirements.....	35
Table A.1 – Electrical performance and measurement method by class	37
Table E.1 – Example of setting current for measurement of capacitor	46
Table X.1 – Cross-references to the previous edition	60

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. The main document types developed by IEC are described in greater detail at 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 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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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*