



SLOVENSKI STANDARD
oSIST prEN IEC 62391-2:2024
01-junij-2024

**Fiksni električni dvoplastni kondenzatorji za elektronsko opremo – 2. del:
Področna specifikacija – Električni dvoplastni kondenzatorji za elektroenergetske
aplikacije**

Fixed electric double-layer capacitors for use in electronic equipment - Part 2: Sectional
specification - Electric double layer capacitors for power application

iTeh Standards

Condensateurs électriques fixes à double couche utilisés dans les équipements
électroniques - Partie 2: Spécification intermédiaire - Condensateurs électriques à
double couche pour application de puissance

Ta slovenski standard je istoveten z: prEN IEC 62391-2:2024

<https://standards.iteh.ai/catalog/standards/sist/27f783d9-135b-4265-a851-e624f78afc27/osist-pren-iec-62391-2-2024>

ICS:

31.060.10 Fiksni kondenzatorji Fixed capacitors

oSIST prEN IEC 62391-2:2024 en



40/3122/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:

IEC 62391-2 ED2

DATE OF CIRCULATION:

2024-03-29

CLOSING DATE FOR VOTING:

2024-06-21

SUPERSEDES DOCUMENTS:

40/3070/CD, 40/3108/CC

IEC TC 40 : CAPACITORS AND RESISTORS FOR ELECTRONIC EQUIPMENT	
SECRETARIAT: Netherlands	SECRETARY: Mr Ronald Drenthen
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> 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.	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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:

Fixed electric double-layer capacitors for use in electronic equipment - Part 2: Sectional specification - Electric double layer capacitors for power application

PROPOSED STABILITY DATE: 2034

NOTE FROM TC/SC OFFICERS:

Copyright © 2024 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

CONTENTS

1	CONTENTS		
2			
3	FOREWORD	4	
4	1 Scope.....	6	
5	2 Normative references	6	
6	3 Terms and definitions.....	7	
7	4 Preferred rating and characteristics	7	
8	4.1 Preferred characteristics	7	
9	4.2 Preferred values of ratings	8	
10	5 Test and measurement procedures, and performance requirement	8	
11	5.1 General.....	8	
12	5.2 Preliminary drying	8	
13	5.3 Test conditions and measuring conditions	8	
14	5.4 Visual examination and check of dimensions	9	
15	5.5 Electrical tests	9	
16	5.6 Robustness of terminations	10	
17	5.7 Resistance to soldering heat	10	
18	5.8 Solderability	11	
19	5.9 Rapid change of temperature	11	
20	5.10 Vibration	11	
21	5.11 Maintain voltage	12	
22	5.12 Storage at high temperature.....	12	
23	5.13 Damp heat, steady state	12	
24	5.14 Endurance	13	
25	5.15 Characteristics at high and low temperature.....	13	
26	5.16 Passive flammability (if applicable)	13	
27	5.17 Pressure relief (if applicable)	14	
28	6 Marking	14	
29	6.1 General.....	14	
30	6.2 Information for marking	14	
31	6.3 Marking on capacitors	14	
32	6.4 Marking on packaging	14	
33	6.5 Adding marking.....	14	
34	7 Information to be given in a detail specification.....	15	
35	7.1 General.....	15	
36	7.2 Outline drawing and dimensions	15	
37	7.3 Mounting.....	15	
38	7.4 Rating and characteristics.....	15	
39	7.5 Marking.....	16	
40	8 Quality assessment procedures	16	
41	8.1 Primary stage of manufacture	16	
42	8.2 Structurally similar components	16	
43	8.3 Certified test records of released lots	16	

44	8.4	Qualification approval procedures	16
45	8.5	Quality conformance inspection	21
46	Annex A (informative)	Calculation procedure for power density	24
47	A.1	General.....	24
48	A.2	Calculation procedure for power density	24
49	Annex X (informative)	Cross-references to IEC 62391-2:2006.....	26
50			
51	Figure A.1	– Voltage characteristics between capacitor terminals.....	25
52			
53	Table 1	– Fixed sample size test plan for qualification approval	18
54	Table 2	– Tests schedule for qualification approval.....	19
55	Table 3	– Lot-by-lot inspection	22
56	Table 4	– Periodic test	22
57	Table X.1	– Cross-references to the previous edition	26
58			
59			

iTeh Standards
 (<https://standards.iteh.ai>)
 Document Preview

[oSIST prEN IEC 62391-2:2024](https://standards.iteh.ai/catalog/standards/sist/27f783d9-135b-4265-a851-e624f78afc27/osist-pren-iec-62391-2-2024)

<https://standards.iteh.ai/catalog/standards/sist/27f783d9-135b-4265-a851-e624f78afc27/osist-pren-iec-62391-2-2024>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIXED ELECTRIC DOUBLE-LAYER CAPACITORS
FOR USE IN ELECTRONIC EQUIPMENT –****Part 2: Sectional specification –
Electric double layer capacitors for power application**

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.

IEC 62391-2 has been prepared by 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 2006. This edition constitutes a technical revision.

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

111 a) The document has been completely restructured to comply with the ISO/IEC Directives,
112 Part 2; a new technical categorization of test methods has been introduced and the test
113 methods have been reorganized according to these new categories; tables, figures and
114 references have been revised accordingly.

115 b)

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

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

117 Full information on the voting for its approval can be found in the report on voting indicated in
118 the above table.
119

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

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

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

- 128 • reconfirmed,
- 129 • withdrawn,
- 130 • replaced by a revised edition, or
- 131 • amended.

[oSIST prEN IEC 62391-2:2024](https://standards.iteh.ai/catalog/standards/sist/27f783d9-135b-4265-a851-e624f78afc27/osist-pren-iec-62391-2-2024)

<https://standards.iteh.ai/catalog/standards/sist/27f783d9-135b-4265-a851-e624f78afc27/osist-pren-iec-62391-2-2024>

133

134

FIXED ELECTRIC DOUBLE-LAYER CAPACITORS

135

FOR USE IN ELECTRONIC EQUIPMENT –

136

137

Part 2: Sectional specification –

138

Electric double-layer capacitors for power application

139

140

1 Scope

142 This part of IEC 62391 applies to double-layer capacitors for power application.

143 Electric double-layer capacitors for power are intended for applications that require discharge
144 currents in the range from mA to A. The characteristics of the capacitors include such
145 performance as relatively high capacitance and low internal resistance, which is applicable to
146 Class 3 and Class 5 of the measurement classification specified in IEC 62391-1:2022.

147 The object of this standard is to prescribe preferred ratings and characteristics and to select
148 from IEC 62391-1 the appropriate quality assessment procedures, tests and measuring
149 methods and to give general performance requirements for this type of capacitor. Test severities
150 and requirements prescribed in detail specifications referring to this sectional specification shall
151 be of equal or higher performance level; lower performance levels are not permitted.

152 The definition of power density and its calculating procedure should be in accordance with
153 Annex A.

2 Normative references

155 The following documents are referred to in the text in such a way that some or all of their content
156 constitutes requirements of this document. For dated references, only the edition cited applies.
157 For undated references, the latest edition of the referenced document (including any
158 amendments) applies.

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

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

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

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

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

165 IEC 61193-2: 2007 *Quality assessment systems – Part 2: Selection and use of sampling plans*
166 *for inspection of electronic components and packages*

167 IEC 62391-1:2022, *Fixed electric double-layer capacitors for use in electric and electronic*
168 *equipment – Part 1: Generic specification*

169 IEC 62391-2-1:2006, *Fixed electric double-layer capacitors for use in electronic equipment –*
 170 *Part 2-1: Blank detail specification – Electric double-layer capacitors for power application –*
 171 *Assessment level EZ*

172 ISO 3, *Preferred numbers – Series of preferred numbers*

173 3 Terms and definitions

174 For the purposes of this document, the terms and definitions given in IEC 62391-1 and the
 175 following apply.

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

- 178 • IEC Electropedia: available at <https://www.electropedia.org/>
- 179 • ISO Online browsing platform: available at <https://www.iso.org/obp>

180 3.1 181 surface mount capacitor

182 capacitor whose small dimensions and nature or shape of terminations make it suitable for
 183 surface mounting

184 3.2 185 electric double layer capacitors for power application

186 capacitors with relatively high capacitance and low internal resistance characteristics

187 Note 1 to entry: Capacitors intended for the applications that require discharge currents in the range from mA to A,
 188 which is applicable to Class 3 and Class 5 of the measurement classification specified in IEC 62391-1:2022.

189 3.3 190 power density

191 P_d

192 electric power that can be taken out per mass (W/kg) or volume (W/l) of a capacitor

193 Note 1 to entry: Refer to Annex A.

194 Note 2 to entry: The higher the power density is, the higher current can be taken efficiently.

195 4 Preferred rating and characteristics

196 4.1 Preferred characteristics

197 The values given in the detail specification shall preferably be selected from the following:

198 The surface mount capacitors covered by this specification are classified into climatic
 199 categories according to the general rules given in IEC 60068-1:2013, Annex A.

200 Unless otherwise agreed upon between manufacturer and customer, the lower and upper
 201 category temperatures and the duration of the damp-heat, steady-state test shall be chosen
 202 from the following.

203 Lower category temperature: –25 °C or –40 °C

204 Upper category temperature: +60 °C or +70 °C

205 Duration of the damp-heat, steady-state test: 10 days

206 The severities for the cold and dry heat tests are the lower and upper category temperatures
207 respectively.

208 The damp-heat steady-state test conditions shall be at a temperature of $40\text{ °C} \pm 2\text{ °C}$, and the
209 relative humidity shall be $93\% \pm 3\%$, unless otherwise specified in the relevant detail
210 specification.

211 **4.2 Preferred values of ratings**

212 **4.2.1 Nominal capacitance (C_N)**

213 The nominal capacitance shall be expressed in farads (F) and as agreed between manufacturer
214 and customer. Preferred values of rated capacitance are the values from the E24 series of IEC
215 60063 and their decimal multiples

216 **4.2.2 Tolerance on nominal capacitance**

217 The preferred values of tolerance on nominal capacitance are:

218 $\pm 20\%$ or $-20\%/+80\%$.

219 **4.2.3 Rated voltage (U_R)**

220 The rated voltage shall be as agreed between manufacturer and customer. The preferred values
221 of the rated direct voltages are taken from the R20 series of ISO 3 and their decimal multiples.

222 **4.2.4 Rated temperature**

223 Unless otherwise agreed upon between manufacturer and customer, the value of the rated
224 temperature is 60 °C or 70 °C .

225 **4.2.5 Internal resistance**

226 The internal resistance shall be as agreed between manufacturer and customer. The internal
227 resistance shall be measured with the DC resistance method. However, if a coefficient can be
228 obtained from both DC and AC resistance methods, the AC resistance method may be used for
229 measurement.

230 **5 Test and measurement procedures, and performance requirement**

231 **5.1 General**

232 Test severities and requirements prescribed in detail specifications referring to this sectional
233 specification are of equal or higher performance level, because lower performance levels are
234 not permitted.

235 This clause supplements the information given in IEC 62391-1:2022, Clause 5 to Clause 10.

236 **5.2 Preliminary drying**

237 If prescribed in the detail specification, the conditions as given in IEC 62391-1:2022, 5.3.

238 **5.3 Test conditions and measuring conditions**

239 Test conditions: See IEC 62391-1:2022, 5.2.1.

240 Measuring conditions: See IEC 62391-1:2022, 5.2.2.