



SLOVENSKI STANDARD
oSIST prEN IEC 62813:2024
01-april-2024

Litij-ionski kondenzatorji za električno in elektronsko opremo - Metode za preskušanje električnih karakteristik

Lithium ion capacitors for use in electric and electronic equipment - Test methods for electrical characteristics

Lithium-Ionen-Kondensatoren zur Verwendung in elektrischen und elektronischen Geräten - Prüfverfahren für die elektrischen Kennwerte

Condensateurs au lithium-ion destinés à être utilisés dans les équipements électriques et électroniques - Méthodes d'essai relatives aux caractéristiques électriques

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Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

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 QUALITY ASSURANCE

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TITLE:

Lithium ion capacitors for use in electric and electronic equipment - Test methods for electrical characteristics

PROPOSED STABILITY DATE: 2034

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LITHIUM ION CAPACITORS FOR USE

IN ELECTRIC AND ELECTRONIC EQUIPMENT –
TEST METHODS FOR ELECTRICAL CHARACTERISTICS

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IEC 62813 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 2015.

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

- a) The document has been restructured to comply with the ISO/IEC Directives, Part 2.
- b)

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

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

95
96 Full information on the voting for its approval can be found in the report on voting indicated in
97 the above table.

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

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

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

- 106 • reconfirmed,
- 107 • withdrawn,
- 108 • replaced by a revised edition, or
- 109 • amended.

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111

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112 **LITHIUM ION CAPACITORS FOR USE**
113 **IN ELECTRIC AND ELECTRONIC EQUIPMENT –**
114 **TEST METHODS FOR ELECTRICAL CHARACTERISTICS**
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118 **1 Scope**

119 This International Standard specifies the electrical characteristics (capacitance, internal
120 resistance, discharge accumulated electric energy, and voltage maintenance rate) test methods
121 of lithium ion capacitors (LIC) for use in electric and electronic equipment.

122 **2 Normative references**

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

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

128 **3 Terms and definitions**

129 For the purposes of this document, the following terms and definitions apply.

130 ISO and IEC maintain terminology databases for use in standardization at the following
131 addresses:

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

134 **3.1**

135 **upper category temperature**

136 highest ambient temperature including internal heating in which a LIC is designed to operate
137 continuously

138 [SOURCE: IEC 61881-3:2012, 3.17, modified – The note to entry has been deleted.]

139 **3.2**

140 **rated voltage**

141 U_R

142 maximum direct current (DC) voltage that may be applied continuously for a certain time
143 under the *upper category temperature* (3.1) to a LIC so that it can exhibit specified demand
144 characteristics

145 Note 1 to entry: This voltage is the setting voltage in LIC design.

146 Note 2 to entry: The endurance test using the rated voltage is described in Annex A.

147 [SOURCE: IEC 62576:2018, 3.20, modified]

148 **3.3**
149 **rated lower limit voltage**

150 U_L

151 minimum DC voltage such that a LIC can exhibit specified demand characteristics

152 Note 1 to entry: The rated lower limit voltage is designated by manufacturer.

153 **3.4**
154 **charging current**

155 current required to charge a LIC

156 **3.5**
157 **discharging current**

158 current required to discharge a LIC

159 **3.6**
160 **discharge accumulated electric energy**

161 amount of discharged energy of a LIC accumulated from the *discharge start time* (3.7) to the
162 *time to reach rated lower limit voltage* (3.10)

163 **3.7**
164 **discharge start time**

165 T_0

166 time when discharge of a LIC starts

167 Note 1 to entry: It is the basis time for the *calculation start time* (3.8) and the *time to reach rated lower limit voltage*
168 (3.10).

169 **3.8**
170 **calculation start time**

171 T_1

172 time at a selected start point used to calculate the *capacitance* (3.12) and the *internal*
173 *resistance* (3.14) during discharge of a LIC

174 Note 1 to entry: The calculation start time is expressed as elapsed time since the *discharge start time* (3.7).

175 **3.9**
176 **calculation end time**

177 T_2

178 time at a selected end point used to calculate the *capacitance* (3.12) and the *internal*
179 *resistance* (3.14) during discharge of a LIC

180 Note 1 to entry: The calculation end time is expressed as elapsed time since the *discharge start time* (3.7).

181 **3.10**
182 **time to reach rated lower limit voltage**

183 T_L

184 time when the voltage reaches the *rated lower limit voltage* (3.3) during discharge of a LIC

185 Note 1 to entry: The time to reach rated lower limit voltage is expressed as elapsed time since the *discharge start*
186 *time* (3.7).

187 **3.11**
188 **instant drop voltage at discharge**

189 U_0

190 voltage at the *discharge start time* (3.7) of a least-squares regression line over the time period
191 from the *calculation start time* (3.8) to the *calculation end time* (3.9) for the voltage drop
192 characteristic of a LIC during discharge

193 **3.12**
194 **capacitance**

195 ability of a LIC to store electrical charge (F)

196 [SOURCE: IEC 62576:2018, 3.5, modified]

197 **3.13**
198 **nominal capacitance**

199 C_N

200 designated capacitance value usually indicated on a LIC

201 [SOURCE: IEC 62391-1:2022, 3.21, modified]

202 **3.14**
203 **internal resistance**

204 resistance component in an equivalent series circuit of capacitance and resistance of a LIC

205 [SOURCE: IEC 62391-1:2022, 3.10, modified]

206 **3.15**
207 **nominal internal resistance**

208 R_N

209 nominal value of the internal resistance to be used in design and measurement condition
210 setting, generally at the ambient temperature

211 [SOURCE: IEC 62576:2018, 3.17]

212 **3.16**
213 **constant voltage charging**

214 charging during which the voltage is maintained at a constant value regardless of charge
215 current or temperature

216 [SOURCE: IEC 62576:2018, 3.9]

217 **3.17**
218 **constant current charging**

219 method of charging a LIC with specified constant current

220 **3.18**
221 **constant current discharging**

222 method of discharging a LIC with specified constant current

223 **3.19**
224 **pre-conditioning**

225 charging and discharging and storage of a LIC under specified ambient conditions
226 (temperature, humidity, and pressure) before testing

227 Note 1 to entry: Generally, pre-conditioning implies that the LIC is stored until its inner temperature attains thermal
228 equilibrium with the surrounding temperature, before its electrical characteristics are measured.

229 [SOURCE: IEC 62576:2018, 3.19, modified]

230 **3.20**
231 **voltage maintenance rate**

232 *A*

233 ratio of the voltage at the open-ended terminals to the charge voltage after a specified time
234 period subsequent to the charging of a LIC

235 [SOURCE: IEC 62576:2018, 3.25, modified]

236 **4 Test methods**

237 **4.1 Test requirements**

238 **4.1.1 Standard atmospheric conditions for tests**

239 Unless otherwise specified in the detail specification, all tests shall be made under standard
240 atmospheric conditions for tests as given in IEC 60068-1:2013, 4.3:

241 – temperature: 15 °C to 35 °C; IEC 62813:2024

242 – relative humidity: 25 % to 75 %;

243 – air pressure: 86 kPa to 106 kPa.

244 If any question about determining measurement value arises under the atmospheric conditions
245 or if it is requested, 4.1.2 is applied.

246 If it is difficult to perform measurements under the standard atmospheric conditions and if no
247 question about determining measurement value arises, tests and measurements may be
248 performed under other conditions than the standard atmospheric conditions.

249 **4.1.2 Standard atmospheric conditions for measurements**

250 Unless otherwise specified in the detail specification, all measurements shall be made under
251 standard atmospheric conditions for testing as given in IEC 60068-1:2013, 4.3, with the
252 following exception:

253 – temperature: 20 °C ± 2 °C;

254 Or

255 – temperature: 25 °C ± 2 °C;

256 one of the temperature shall be selected.