



SLOVENSKI STANDARD
oSIST prEN IEC 60384-23:2022
01-maj-2022

Nespremenljivi kondenzatorji za uporabo v elektronski opremi - 23. del: Področna specifikacija - Nespremenljivi kondenzatorji za enosmerni tok za površinsko montažo z dielektrikom iz metaliziranega polietilen-naftalatnega filma

Fixed capacitors for use in electronic equipment - Part 23: Sectional specification - Fixed metallized polyethylene naphthalate film dielectric surface mount DC capacitors

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Ta slovenski standard je istoveten z: EN IEC 60384-23:2022

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ICS:

31.060.10 Fiksni kondenzatorji Fixed capacitors

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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

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TITLE:

Fixed capacitors for use in electronic equipment - Part 23: Sectional specification - Fixed metallized polyethylene naphthalate film dielectric surface mount DC capacitors

PROPOSED STABILITY DATE: 2030

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

**Part 23: Sectional specification:
Fixed metallized polyethylene naphthalate film
dielectric surface mount DC capacitors**

FOREWORD

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- 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.
- International Standard IEC 60384-23 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.
- This third edition cancels and replaces the second edition published in 2015 and constitutes a technical revision.
- a) This edition includes the following significant technical changes with respect to the previous edition: revision of all parts of the document based on the ISO/IEC Directives, Part 2:2021, and harmonization with other similar kinds of documents;
- b) The document structure has been organized to follow new sectional specification structure decided in TC 40;
- c) Revised tables and Clause 5 so as to prevent duplications and contradictions.
- d) Tangent of loss angle measurement has been added to resistance to soldering heat test.

- 177 e) Lot-by-lot and periodical inspection tables including requirements are moved to Annex A
178 f) Revised Inspection Level (IL) of A1 subgroup.

179 The text of this standard is based on the following documents:

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

180
181 Full information on the voting for the approval of this standard can be found in the report on
182 voting indicated in the above table.

183 This publication has been drafted in accordance with the ISO/IEC Directives, Part 2:2021.

184 The list of all parts of the IEC 60384 series, under the (new) general title *Fixed capacitors for
185 use in electronic equipment*, can be found on the IEC web site.

186 The committee has decided that the contents of this publication will remain unchanged until
187 the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data
188 related to the specific publication. At this date, the publication will be

- 189 • reconfirmed,
190 • withdrawn,
191 • replaced by a revised edition, or
192 • amended.

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FIXED CAPACITORS FOR USE IN ELECTRONIC EQUIPMENT –

Part 23: Sectional specification: Fixed metallized polyethylene naphthalate film dielectric surface mount DC capacitors

1 Scope

This part of IEC 60384 is applicable to fixed surface mount capacitors for direct current, with metallized electrodes and polyethylene naphthalate dielectric for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted directly onto printed boards or onto substrates for hybrid circuits. These capacitors can have "self-healing properties" depending on conditions of use. They are primarily intended for applications where the AC component is small with respect to the rated voltage.

This part of IEC 60384 specifies preferred ratings and characteristics, selects from IEC 60384-1:2021 the appropriate quality assessment procedures, tests and measuring methods and gives general performance requirements for this type of capacitor. Test severities and requirements specified in detail specifications referring to this sectional specification are of an equal or higher performance level. Lower performance levels are not permitted.

Capacitors for electromagnetic interference suppression are not included, but are covered by IEC 60384-14.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 60384-1:2021, *Fixed capacitors for use in electronic equipment – Part 1: Generic specification*

IEC 60417, *Graphical symbols for use on equipment*
(available at <http://www.graphicalsymbols.info/equipment>)

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

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

234 3 Terms and definition

235 For the purposes of this document, the terms and definitions of IEC 60384-1:2021, and the
236 following apply.

237 ISO and IEC maintain terminological databases for use in standardization at the following
238 addresses:

- 239 • IEC Electropedia: available at <http://www.electropedia.org/>
- 240 • ISO Online browsing platform: available at <http://www.iso.org/obp>

241 3.1

242 grade 1 capacitors

243 <long-life> capacitors for long-life applications with stringent requirements for the electrical
244 parameters

245 3.2

246 grade 2 capacitors

247 <general purpose> capacitors for general applications where the stringent requirements for
248 grade 1 capacitors are not necessary

249 3.3

250 grade 3 capacitors

251 <low temperature, miniature type> miniature type capacitors having a rated temperature of
252 85 ° C and for which less stringent requirements than for grade 2 capacitors are acceptable

253 4 Preferred ratings and characteristics

254 4.1 Preferred climatic categories

255 The values given in detail specifications should be selected from the following.

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

258 The lower and upper category temperature and the duration of the damp heat, steady-state
259 test shall be chosen from the following:

260 Lower category temperature: –55 °C, –40 °C and –25 °C.

261 Upper category temperature: +85 °C (only grade 3), +100 °C, +125 °C and +155 °C.

262 Duration of the damp heat, steady state test: 21 days and 56 days.

263 At continuous operation at 155 °C beyond the endurance test time, accelerated ageing shall
264 be carried out (see detail specification).

265 The severities for the cold and dry heat tests are the lower and upper category temperatures,
266 respectively.

267 4.2 Preferred values of ratings

268 4.2.1 Nominal capacitance (C_N)

269 Preferred values of nominal capacitance shall be taken from the E6 series of IEC 60063:

270 1,0 – 1,5 – 2,2 – 3,3 – 4,7 and 6,8 and their decimal multiples ($\times 10^n$, $n = \text{integer}$).

271 If other values are required they should be chosen from the E12 series.

272 4.2.2 Tolerance on nominal capacitance

273 The preferred tolerances on the nominal capacitance are $\pm 5\%$, $\pm 10\%$ and $\pm 20\%$.

274 4.2.3 Rated voltage (U_R)

275 The preferred values of rated voltage taken from R 10 series of ISO 3 are:

276 1,0 – 1,6 – 2,5 – 4,0 – 5,0 – 6,3 and their decimal multiples ($\times 10^n$, $n: \text{integer}$).

277 The sum of the DC voltage and the peak AC voltage applied to the capacitor shall not exceed
278 the rated voltage.

279 The value of the peak AC voltage shall not exceed the percentages of the rated voltage at the
280 frequencies stated in Table 1 and should not be greater than 280 V, unless otherwise
281 specified in the detail specification.

282 **Table 1 – Percentage limit of the rated voltage at AC voltage frequency**

AC voltage frequency Hz	Percentage limit of the rated voltage %
50	20
100	15
1 000	3
10 000	1

283

284 4.2.4 Category voltage (U_C)

285 The category voltage for Grade 1 and Grade 2 capacitors is:

286 – for upper category temperature 125 °C: $0,8 U_R$;

287 – for upper category temperature 155 °C: $0,5 U_R$;

288 The category voltage for Grade 3 capacitors is:

289 – for upper category temperature 100 °C: $0,8 U_R$;

290 – for upper category temperature 125 °C: $0,5 U_R$.

291 4.2.5 Rated temperature

292 Grade 1 and Grade 2 capacitors

293 The standard value of rated temperature is 100 °C.

294 Grade 3 capacitors

295 The standard value of rated temperature is 85 °C.

296 5 Test and measurement procedures

297 5.1 General

298 This Clause 5 supplements the information given in the relevant clauses of IEC 60384-1:2021.

299 5.2 Mounting

300 5.2.1 Initial inspections

301 The capacitance shall be measured in accordance with 5.4.2

302 The tangent of loss angle shall be measured in accordance with 5.4.3.

303 5.2.2 Mounting method

304 See IEC 60384-1:2021, 5.5.

305 5.2.3 Inspections after mounting

306 After recovery, the capacitors shall be visually examined and measured and shall meet the
307 requirements given in Table 9.

308 5.3 Visual examination and check of dimensions

309 5.3.1 General

310 See IEC 60384-1:2021, 7.1 with the details of 5.3.2 and 5.3.3.

311 5.3.2 Visual examination and check of dimensions

312 Visual examination shall be carried out with equipment with suitable approximately 10×
313 magnification and lighting appropriate to the specimen under test and the quality level
314 required.

315 The operator should have available facilities for incident or transmitted illumination as well as
316 an appropriate measuring facility.

317 5.3.3 Requirements

318 The capacitors shall be examined to verify that the materials, design, construction, physical
319 dimensions and workmanship are in accordance with the applicable requirements given in the
320 detail specification.

321 5.4 Electrical tests

322 5.4.1 Voltage proof

323 5.4.1.1 General

324 See IEC 60384-1:2021, 6.2 with the details of 5.4.1.2, 5.4.1.3 and 5.4.1.4.

325 5.4.1.2 Test circuit

326 Delete the capacitor C_1 .

327 The product of R_1 and the nominal capacitance of the capacitor under test (C_X) shall be
328 smaller than or equal to 1 s and greater than 0,01 s.