



SLOVENSKI STANDARD
oSIST prEN IEC 60127-1:2022
01-junij-2022

Miniature varovalke - 1. del: Definicije za miniature varovalke in splošne zahteve za miniature taljive vložke

Miniature fuses - Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links

Geräteschutzsicherungen - Teil 1: Begriffe für Geräteschutzsicherungen und allgemeine Anforderungen an G-Sicherungseinsätze

Coupe-circuits miniatures - Partie 1: Définitions pour coupe-circuits miniatures et exigences générales pour éléments de remplacement miniatures

Ta slovenski standard je istoveten z: prEN IEC 60127-1:2022

ICS:

29.120.50	Varovalke in druga nadtokovna zaščita	Fuses and other overcurrent protection devices
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en,fr,de

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32C/600/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: IEC 60127-1 ED3	
DATE OF CIRCULATION: 2022-04-08	CLOSING DATE FOR VOTING: 2022-07-01
SUPERSEDES DOCUMENTS: 32C/588/CD, 32C/594/CC	

IEC SC 32C : MINIATURE FUSES	
SECRETARIAT: China	SECRETARY: Mr Jianqiang Zou
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 checked="" type="checkbox"/> SAFETY	
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TITLE:

Miniature fuses - Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

The mark of changes indicate the revision compared to the CD document (32C/588/CD).

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MINIATURE FUSES –
**Part 1: Definitions for miniature fuses and
general requirements for miniature fuse-links**
FOREWORD

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International Standard IEC 60127-1 has been prepared by subcommittee 32C: Miniature fuses, of IEC technical committee 32: Fuses.

This third edition cancels and replaces the second edition (2006), together with amendment 1 (2011) and amendment 2 (2015), and constitutes a technical revision.

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

- a) modified subclause 6.3 to clarify the marking items;
- b) modified subclause 9.3.1 to introduce a tolerance for the prospective current for the breaking capacity test;
- c) deleted clause 9.6, Pulse test;
- d) added annex D user guide for miniature fuse-links.

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

FDIS	Report on voting
32C/**/***	32C/**/***

153
154 Full information on the voting for the approval of this standard can be found in the report on
155 voting indicated in the above table.

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

157 This Part 1 of the IEC 60127 series covers definitions, general requirements and tests
158 applicable to all types of miniature fuses (e.g. cartridge fuse-links, sub-miniature fuse-links,
159 universal modular fuse-links and miniature fuse-links for special applications). All subsequent
160 parts of the complete series are to be read in conjunction with this Part 1.

161 IEC 60127 consists of the following parts, under the general heading *Miniature fuses*:

162 IEC 60127, Miniature fuses (general title).

163 IEC 60127-1, Miniature fuses – Part 1: Definitions for miniature fuses and general
164 requirements for miniature fuse-links

165 IEC 60127-2, Miniature fuses – Part 2: Cartridge fuse-links

166 IEC 60127-3, Miniature fuses – Part 3: Sub-miniature fuse-links

167 IEC 60127-4, Miniature fuses – Part 4: Universal modular fuse-links (UMF) – Through-hole
168 and surface mount types

169 IEC 60127-5, Miniature fuses – Part 5: Guidelines for quality assessment of miniature
170 fuselinks

171 IEC 60127-6, Miniature fuses – Part 6: Fuse holders for miniature fuse-links

172 IEC 60127-7, Miniature fuses – Part 7: Miniature fuse-links for special applications

173 IEC 60127-8, Miniature fuses – Part 8: Fuse resistors with particular overcurrent protection

174 IEC 60127-9, (Free for further documents)

175 IEC 60127-10, Moved to IEC 60127-1 as an Annex.

176 The committee has decided that the contents of the base publication and its amendments will
177 remain unchanged until the stability date indicated on the IEC web site under
178 "http://webstore.iec.ch" in the data related to the specific publication. At this date, the
179 publication will be

- 180 • reconfirmed,
- 181 • withdrawn,
- 182 • replaced by a revised edition, or
- 183 • amended.

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MINIATURE FUSES –

Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links

194 **1 Scope and object**

195 This part of IEC 60127 covers the general requirements and tests applicable to all types of
196 miniature fuse-links (e.g. cartridge fuse-links, sub-miniature fuse-links, universal modular
197 fuse-links and miniature fuse-links for special applications) for the protection of electric
198 appliances, electronic equipment and component parts thereof normally intended to be used
199 indoors.

200 This standard does not apply to fuses intended for the protection of low-voltage electrical
201 installations. These are covered by IEC 60269, *Low Voltage Fuses*.

202 Specific details covering each major subdivision are given in subsequent parts.

203 This standard does not apply to fuses for appliances intended to be used under special
204 conditions, such as in a corrosive or explosive atmosphere.

205 The object of this standard is

- 206 a) to establish uniform requirements for miniature fuses so as to protect appliances or parts
207 of appliances in the most suitable way,
- 208 b) to define the performance of the fuses, so as to give guidance to designers of electrical
209 appliances and electronic equipment and to ensure replacement of fuse-links by those of
210 similar dimensions and characteristics,
- 211 c) to define methods of testing,
- 212 d) to define maximum sustained dissipation of fuse-links to ensure good compatibility of
213 stated power acceptance when used with fuse-holders according to this standard (see
214 IEC 60127-6).

215 **2 Normative references**

216 The following referenced documents are indispensable for the application of this document.
217 For dated references, only the edition cited applies. For undated references, the latest edition
218 of the referenced document (including any amendments) applies.

219 IEC 60038, *IEC standard voltages*

220 IEC 60127-6:2014, *Miniature fuses – Part 6: Fuse-holders for miniature fuse-links*

221 **3 Terms and definitions**

222 For the purposes of this document, the following definitions apply.

223 **3.1** 224 **fuse**

225 device that, by the fusing of one or more of its specially designed and proportioned
226 components, opens the circuit in which it is inserted by breaking the current when this
227 exceeds a given value for a sufficient time

- 228 NOTE The fuse comprises all the parts that form the complete device.
- 229 **3.2**
230 **miniature fuse**
231 fuse in which the fuse-link is a miniature fuse-link
- 232 **3.3**
233 **fuse-link**
234 part of a fuse including the fuse-element(s) intended to be replaced after the fuse has
235 operated
- 236 **3.4**
237 **enclosed fuse-link**
238 fuse-link in which the fuse-element is totally enclosed, so that during operation within its
239 rating it cannot produce any harmful external effects, e.g. due to development of an arc, the
240 release of gas or the ejection of flame or metallic particles
- 241 **3.5**
242 **miniature fuse-link**
243 enclosed fuse-link for the protection of electric appliances, electronic equipment and
244 component parts thereof normally intended to be used indoors
- 245 **3.5.1**
246 **cartridge fuse-link**
247 enclosed miniature fuse-link of rated breaking capacity not exceeding 2 kA and which has at
248 least one of its principle dimensions not exceeding 10 mm
- 249 Note 1 to entry Principle dimensions are length, width, height and diameter.
- 250 **3.5.2**
251 **miniature fuse-link for special applications**
252 enclosed miniature fuse-link which is not covered in IEC 60127-2, IEC 60127-3 or IEC 60127-4 and of rated
253 breaking capacity not exceeding 50 kA and having a width and height not exceeding 12 mm and a length not
254 exceeding 50 mm
- 255 **3.5.3**
256 **sub-miniature fuse-link**
257 miniature fuse-link of which the case (body) has no principal dimension exceeding 10 mm
- 258 Note 1 to entry Principal dimensions are length, width, height and diameter.
- 259 **3.5.4**
260 **universal modular fuse-link**
261 miniature fuse-link primarily adapted for direct electrical connection to printed circuit boards
262 or other conductive substrates, incorporating features designed to provide a degree of non-
263 interchangeability where necessary
- 264 **3.6**
265 **fuse-link contact**
266 conductive part of a fuse-link designed to engage with a fuse-base contact or with a fuse-
267 carrier contact
- 268 **3.7**
269 **fuse-holder**
270 combination of a fuse-base with its fuse-carrier
- 271 **3.8**
272 **fuse-base**
273 fuse-mount
274 fixed part of a fuse provided with contacts and terminals for connection to the system

- 275 **3.9**
 276 **fuse-base contact**
 277 fuse-mount contact
 278 conductive part of a fuse-base, connected to a terminal designed to engage with a fuse-
 279 carrier contact or with a fuse-link contact
- 280 **3.10**
 281 **fuse-carrier**
 282 movable part of a fuse designed to carry a fuse-link
- 283 **3.11**
 284 **fuse-carrier contact**
 285 conductive part of a fuse-carrier connected to a fuse-link contact and designed to engage with
 286 a fuse-base contact
- 287 **3.12**
 288 **fuse-element**
 289 part of the fuse-link designed to melt when the fuse operates
- 290 **3.13**
 291 **homogeneous series (of fuse-links)**
 292 series of fuse-links, deviating from each other only in such characteristics that, for a given
 293 test, the testing of one or a reduced number of particular fuse-links of the series may be taken
 294 as representative of all the fuse-links of the series
- 295 Note 1 to entry Fuse-links are considered as forming a homogeneous series when the characteristics comply with
 296 the following:
 297 – the bodies have the same dimensions, material and method of manufacture;
 298 – the caps or other end closures of the body have the same dimensions, materials and method of attachment and
 299 sealing;
 300 – the granular filler, if any, of the body is of the same material and completeness of filling. It should be of the
 301 same size or any variation of the grain size with current rating should be monotonous;
 302 – the fuse-elements are of the same material with the same principles of design and construction; any changes of
 303 fuse-element dimensions with current rating should be monotonous;
 304 – the rated voltage is the same;
 305 – for low-breaking capacity fuse-links it is only necessary to test the highest rated breaking capacity in a
 306 homogeneous series.
- 307 **3.14**
 308 **rating**
 309 general term employed to designate the characteristic values that together define the working
 310 conditions upon which the tests are based and for which the fuse is designed
- 311 Examples of rated values usually stated for fuses:
 312 – voltage (U_N);
 313 – current (I_N);
 314 – breaking capacity.
- 315 **3.15**
 316 **time/current characteristics (of a fuse-link)**
 317 a) For a.c.: curve giving, under stated conditions of operation, the value of time expressed as
 318 virtual time as a function of the prospective symmetrical current, expressed as the r.m.s.
 319 value
- 320 b) For d.c.: curve giving, under stated conditions of operation, the value of time expressed as
 321 actual time as a function of the d.c. prospective current
- 322 Note 1 to entry Time/current characteristics usually stated for a fuse-link relate to the pre-arcing time and the
 323 operating time.

324 **3.16**
 325 **conventional non-fusing current**
 326 value of current specified as that which the fuse-link is capable of carrying for a specified time
 327 (conventional time) without melting

328 **3.17**
 329 **prospective current (of a circuit and with respect to a fuse)**
 330 current that would flow in a circuit, if a fuse situated therein were replaced by a link of
 331 negligible impedance

332 **3.18**
 333 **pre-arcing time (melting time)**
 334 interval of time between the beginning of a current large enough to cause a break in the fuse-
 335 element and the instant when an arc is initiated

336 **3.19**
 337 **arcing time**
 338 interval of time between the instant of the initiation of the arc and the instant of final arc
 339 extinction

340 **3.20**
 341 **operating time (total clearing time)**
 342 sum of the pre-arcing time and the arcing time

343 **3.21**
 344 **virtual time**
 345 value of I^2t divided by the value of the square of the value of the prospective current
 346 Note 1 to entry The values of the virtual times, usually stated for a fuse-link, are the values of the pre-arcing time
 347 and of the operating time.

348 **3.22**
 349 **I^2t (joule integral)**
 350 integral of the square of the current over a given time interval:

$$I^2t = \int_{t=0}^t i^2 dt$$

351
 352 Note 1 to entry The pre-arcing I^2t is the I^2t integral extended over the pre-arcing time of the fuse.

353 Note 2 to entry The operating I^2t is the I^2t integral extended over the operating time of the fuse.
 354 Note 3 to entry The energy in joules released in 1 Ω of resistance in a circuit protected by a fuse is equal to the
 355 value of the operating I^2t expressed in A²s.

356 **3.23**
 357 **breaking capacity of a fuse-link**
 358 value (r.m.s. for a.c.) of prospective current that a fuse-link is capable of breaking at a stated
 359 voltage under prescribed conditions of use and behaviour

360 **3.24**
 361 **recovery voltage**
 362 voltage which appears across the terminals of a fuse after breaking of the current

363 Note 1 to entry This voltage may be considered in two successive intervals of time, one during which a transient
 364 voltage exists, followed by a second one during which the power frequency or the steady-state recovery voltage
 365 exists.

366 **3.25**
 367 **maximum sustained dissipation**
 368 power dissipation of a fuse-link measured under prescribed conditions of measurement at the
 369 maximum current level that can be sustained for a minimum of 1 h or, as specified in the
 370 standard sheet for ratings above 6,3 A

371 Note 1 to entry The figure for maximum sustained dissipation is used in connection with the maximum power
372 acceptance of fuse-holders for miniature fuse-links in accordance with IEC 60127-6.

373 Note 2 to entry These values are often exceeded for short periods of time immediately before the fuse-element
374 melts. Values as high as twice the maximum sustained dissipation have been recorded.

375 4 General requirements

376 Fuse-links shall be so constructed that they are reliable and safe in operation and consistent
377 in performance at any current up to and including the breaking capacity rating and at any
378 voltage up to the rated voltage, when used within the limits of this standard.

379 During normal use of the fuse-link and within the conditions given in this standard, no
380 permanent arc, no external arcing, nor any flame that can endanger the surroundings, shall be
381 produced. During the test for establishing the maximum sustained dissipation and after
382 operation, the fuse-link shall not have suffered damage hindering its replacement and the
383 marking shall still be legible.

384 In general, compliance is checked by carrying out all the tests specified.

385 5 Standard ratings

386 In the relevant standard sheets, values are given for

387 – rated voltage,

388 – rated current,

389 – rated breaking capacity.

390 6 Marking

391 Unless otherwise stated in subsequent parts, the requirements for marking are as follows:

392 **6.1** Each fuse-link shall be marked with the below in the order given:

393 a) A symbol denoting the relative pre-arcing time/current characteristic as given in the
394 relevant standard sheet. This symbol shall be placed before and adjacent to the rated
395 current.

396 These symbols read as follows:

397 FF: denoting very quick acting

398 F: denoting quick acting

399 M: denoting medium time-lag

400 T: denoting time-lag

401 TT: denoting long time-lag.

402 b) Rated current in milliamperes (mA) for rated currents below 1 A, and in amperes (A) for
403 rated currents of 1 A or more. ~~The marking of the rated current shall precede and be~~
404 ~~adjacent to the marking of the rated voltage.~~

405 To accommodate existing practice in some countries, for the time being, the current may
406 also be indicated in fractions of ampere.

407 c) Rated voltage in volts (V).

408 d) ~~Maker's~~ Manufacturer's name or trade mark (does not need to follow order of marking).

409

410 **6.2** Marking shall be indelible and easily legible.