



**SLOVENSKI STANDARD**  
**oSIST prEN ISO/IEC 80079-41:2023**  
**01-junij-2023**

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**Eksplzivne atmosfere - 41. del: Batni motorji z notranjim zgorevanjem (ISO/IEC DIS 80079-41:2023)**

Explosive atmospheres - Part 41: Reciprocating internal combustion engines (ISO/IEC DIS 80079-41:2023)

Explosionsfähige Atmosphären - Teil 41: Hubkolben-Verbrennungsmotoren (ISO/IEC DIS 80079-41:2023)

Atmosphères explosives - Partie 41: Moteurs alternatifs à combustion interne (ISO/IEC DIS 80079-41:2023)

**Ta slovenski standard je istoveten z: prEN ISO/IEC 80079-41**

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**ICS:**

13.230	Varstvo pred eksplozijo	Explosion protection
27.020	Motorji z notranjim zgorevanjem	Internal combustion engines
29.260.20	Električni aparati za eksplozivna ozračja	Electrical apparatus for explosive atmospheres

**oSIST prEN ISO/IEC 80079-41:2023 en,fr,de**



# DRAFT INTERNATIONAL STANDARD

## ISO/IEC DIS 80079-41

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Secretariat: ISO

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2023-07-14

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## Explosive atmospheres —

### Part 41: Reciprocating internal combustion engines

ICS: 29.260.20; 27.020

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Member bodies are requested to consult relevant national interests in IEC/SC 31M before casting their ballot to the e-Balloting application.

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Reference number  
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**Explosive atmospheres**

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**Part 41: Reciprocating internal combustion engines**

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 182 all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international  
 183 co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and  
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213 International Standard ISO/IEC 80079-41 has been prepared by ISO/IEC subcommittee 31M:  
 214 Non-electrical equipment and protective systems for explosive atmospheres.

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

FDIS	Report on voting
31M/XX/FDIS	31M/XX/RVD

216

217 Full information on the voting for the approval of this standard can be found in the report on  
 218 voting indicated in the above table.

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

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

223 • reconfirmed,

- 224 • withdrawn,  
225 • replaced by a revised edition, or  
226 • amended.

227

228 The National Committees are requested to note that for this publication the stability date  
229 is 2020.

230 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED  
231 AT THE PUBLICATION STAGE.

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## Explosive atmospheres

### Part 41: Reciprocating internal combustion engines

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#### 1 Scope

238 This part of ISO/IEC 80079 specifies the technical requirements for design, construction,  
239 testing, marking and the information required for use to avoid or minimise the possibility of  
240 ignition which could from reciprocating internal combustion engine intended for use in explosive  
241 atmospheres including:

- 242 • Group I EPL Mb for use in underground workings susceptible to firedamp or combustible  
243 dust,
- 244 • Group II EPL Gb for use in explosive atmospheres of flammable gas and vapour, and
- 245 • Group III EPL Db for use in explosive atmospheres of combustible dust.
- 246 • For EPL Gc and Dc engines, only normal operating conditions need to be taken into account.  
247 Malfunctions need not be considered (see B.2.1).

248 This part of ISO/IEC 80079 includes those tests of the engine and its ancillary devices that are  
249 required to verify compliance with this standard.

250 This part of ISO/IEC 80079 applies to both reciprocating internal combustion engines with  
251 compression ignition for EPL Mb, Gb, Gc, Db, Dc and spark ignition engines for EPL Gc. See  
252 Annex G.

253 This part of ISO/IEC 80079 does not define requirements relating to the driven machinery and  
254 equipment.

255 This part of ISO/IEC 80079 does not apply to [IEC 80079-41:2023](https://standards.iteh.ai/catalog/standards/sist/e497f18e-50ec-4d0e-953c-1e3d4c4c4c4c/iso-iec-80079-41-2023)

- 256 • explosive mixtures of vapours and gases, which tend to self-decompose (for example carbon  
257 disulphide (CS<sub>2</sub>), ethylene oxide (C<sub>2</sub>H<sub>4</sub>O), acetylene) or which are chemically unstable;
  - 258 • engines used in areas for the processing, manufacture or storage of explosives;
  - 259 • gasoline and other spark ignited engines where the fuel is injected into the combustion  
260 chamber as a liquid; or
  - 261 • high voltage electrical ignition systems.

262

263 This part of ISO/IEC 80079 solely deals with explosion protection requirements. Requirements  
264 on gaseous or particulate exhaust emissions are not covered by this standard.

265 General safety requirements are not included in this International Standard.

266 NOTE 1 General safety requirements (for example those common to internal combustion engines) are covered for  
267 the EU in EN 1679-1:1998+A1:2011.

268 This standard does not specify requirements for safety, other than those directly related to the  
269 possibility of ignition which can lead to an explosion.

270 The standard atmospheric conditions (relating to the explosion characteristics of the  
271 atmosphere) under which it may be assumed that the engine may be operated are:

- 272 • temperature –20 °C to +60 °C
- 273 • pressure 80 kPa (0,8 bar) to 110 kPa (1,1 bar); and
- 274 • air with normal oxygen content, typically 21% v/v.

275 An engine for use outside of the standard atmospheric conditions is to be designed, constructed  
276 tested and marked for those conditions. The ignition hazard assessment, ignition, protection  
277 provided, additional testing (if necessary) manufacturer's technical documentation and

278 instructions to the user are intended to clearly demonstrate the engine's suitability for the  
279 conditions.

280 NOTE 2 It is recognised that changes in temperature and pressure have an influence on the characteristics of the  
281 explosive atmosphere including ignitability

282 NOTE 3 IEC TS 60079-43 gives information for equipment used in explosive atmospheres in environmental  
283 conditions which include ambient temperatures below –20 °C and additional adverse conditions, including maritime  
284 applications.

285 NOTE 4 Reciprocating internal combustion engines are not considered as pressure vessels.

286 This standard supplements and modifies the general requirements of IEC 60079-0:2017, as  
287 shown in Table 1. Where a requirement of this standard conflicts with a requirement of  
288 IEC 60079-0:2017 as far as applicable for Ex engines, the requirement of this standard takes  
289 precedence.

290 On-going inspection, maintenance and repair aspects play an important role in control of  
291 hazardous area installations and the user's attention is drawn to IEC 60079-17, IEC 60079-19  
292 and manufacturer's instructions for further information concerning these aspects.

## 293 2 Normative references

294 The following documents, in whole or in part, are normatively referenced in this document and  
295 are indispensable for its application. For dated references, only the edition cited applies. For  
296 undated references, the latest edition of the referenced document (including any amendments)  
297 applies.

298 IEC 60034-5:2020, *Rotation electrical machines — Part 5: Degrees of protection provided by*  
299 *the integral design of rotating electrical machines (IP code) — Classification (Amendment 1)*

300 IEC 60079-0:2017, *Explosive atmospheres — Part 0: Equipment — General requirements*

301 IEC 60079-1:2014, *Explosive atmospheres — Part 1: Equipment protection by flameproof*  
302 *enclosures "d"*

303 IEC 60079-10-1:2020 + COR1:2021, *Explosive atmospheres — Part 10-1: Classification of areas*  
304 *— Explosive gas atmospheres*

305 IEC 60079-20-1:2017, *Explosive atmospheres — Part 20-1: Material characteristics for gas and*  
306 *vapour classification — Test methods and data*

307 IEC 60079-29-1:2016, *Explosive atmospheres - Part 29-1: Gas detectors - Performance*  
308 *requirements of detectors for flammable gases*

309 IEC 60079-29-2:2015, *Explosive atmospheres - Part 29-2: Gas detectors - Selection,*  
310 *installation, use and maintenance of detectors for flammable gases and oxygen*

311 IEC 60079-29-3:2014, *Explosive atmospheres - Part 29-3: Gas detectors - Guidance on*  
312 *functional safety of fixed gas detection systems*

313 IEC/TS 60079-42:2019, *Explosive atmospheres - Part 42: Electrical Safety Devices for the*  
314 *control of potential ignition sources from Ex-Equipment*

315 IEC 60079-45<sup>1</sup>, *Explosive Atmospheres – Electrical Ignition Systems for Internal Combustion*  
316 *Engines*

317 IEC/TS 60079-46:2017, *Explosive atmospheres - Part 46: Equipment assemblies*

318 IEC 60204-1:2016, *Electrical equipment of industrial machines — Part 1: General requirements*

319 IEC 60243-1:2013, *Electric strength of insulating materials - Test methods - Part 1: Tests at*  
320 *power frequencies*

<sup>1</sup> In preparation

- 321 IEC 60529:1989 + A1:1999 + A2:2013, *Degrees of protection provided by enclosures (IP*  
322 *Codes)*
- 323 IEC 61508-1:2010, *Functional safety of electrical/electronic/programmable electronic safety-*  
324 *related systems - Part 1: General requirements*
- 325 IEC 61508-2:2010, *Functional safety of electrical/electronic/programmable electronic safety-*  
326 *related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-*  
327 *related systems*
- 328 IEC 61508-4:2010, *Functional safety of electrical/electronic/programmable electronic safety-*  
329 *related systems - Part 4: Definitions and abbreviations*
- 330 IEC 61511-1:2016 + COR1:2016 + A1:2017, *Functional safety - Safety instrumented systems*  
331 *for the process industry sector - Part 1: Framework, definitions, system, hardware and*  
332 *application programming requirements*
- 333 ISO 1813, *Belt drives — V-ribbed belts, joined V-belts and V-belts including wide section belts*  
334 *and hexagonal belts — Electrical conductivity of antistatic belts: Characteristics and methods*  
335 *of test*
- 336 ISO 3046-3:2006, *Reciprocating internal combustion engines — Performance — Part 3: Test*  
337 *measurements*
- 338 ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and*  
339 *risk reduction*
- 340 ISO 15510:2014, *Stainless steels — Chemical composition*
- 341 ISO/IEC 80079-49, *Flame arresters — Performance requirements, test methods and limits for*  
342 *use*
- 343 ISO 29463 (all parts), *High-efficiency filters and filter media for removing particles in air*  
344 *https://standards.iteh.ai/catalog/standards/sist/e497f18e-50ec-4d0e-953c-*  
345 *ISO/IEC 80079-20-1:2017, Explosive atmospheres - Part 20-1: Material characteristics for gas*  
*and vapour classification - Test methods and data*
- 346 ISO 80079-36:2016, *Explosive atmospheres — Part 36: Non-electrical equipment for explosive*  
347 *atmospheres — Basic method and requirements*
- 348 ISO 80079-37:2016, *Explosive atmospheres — Part 37: Non-electrical equipment for explosive*  
349 *atmospheres - Non-electrical type of protection constructional safety "c", control of ignition*  
350 *sources "b", liquid immersion "k"*
- 351 ISO/IEC 80079-38:2016, *Explosive atmospheres — Part 38: Equipment and components in*  
352 *explosive atmospheres in underground mines*
- 353 EN 1822-1:2019, *High efficiency air filters (EPA, HEPA and ULPA) — Part 1: Classification,*  
354 *performance testing, marking*
- 355 EN 1834-1:2006, *Reciprocating internal combustion engines - Safety requirements for design*  
356 *and construction of engines for use in potentially explosive atmospheres - Part 1: Group II*  
357 *engines for use in flammable gas and vapour atmospheres*
- 358 IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-*  
359 *related systems*
- 360 **3 Definitions**
- 361 For the purposes of this standard, the definitions in ISO 2710-1:2017, ISO 7967-1, ISO 7967-  
362 2:2010, ISO 7967-3, ISO 7967-4, ISO 7967-8, IEC 60079-0, IEC 60079-10-1, IEC 60079-10-2,  
363 ISO 80079-36, ISO 80079-37, ISO/IEC 80079-38, and the following definitions apply:

364 **3.1**  
365 **maximum surface temperature**  
366

367 highest temperature that can be attained in service under the most adverse operating conditions (but  
368 within the recognized tolerance) by any part or surface of the equipment, protective system or  
369 component that can produce an ignition of the surrounding explosive atmosphere

370 Note 1 to entry: The maximum surface temperature marked on the equipment includes safety margins depending on  
371 the EPL of the equipment.

372 Note 2 to entry: The surface temperature which is relevant can be internal or external depending upon the Type of  
373 Protection concerned.

374 Note 3 to entry: For Ex Equipment in an explosive dust atmosphere, this temperature occurs on the external surface  
375 of the enclosure and can include a defined dust layer condition.,

376 Note 4 to entry: This includes the engine, its fittings, its ancillary equipment including flame  
377 arrester, spark arrester, ducts, etc.[SOURCE: IEC 60079-0:2017, modified definitionNotes to  
378 entry added]

379 **3.2**  
380 **maximum exhaust gas temperature**

381 highest temperature under the most adverse operating conditions measured at the point where  
382 the gas stream first meets the surrounding atmosphere

383 **3.3**  
384 **maximum charge air temperature**

385 highest temperature under the most adverse operating conditions measured at the outlet of the  
386 boosting device

387 **3.4**  
388 **gas path**

389 parts of an engine through which air and exhaust gas passes when the engine is running

390 **3.5**  
391 **flame arrester**  
392 **FA**

393 device fitted to the opening of an enclosure, or to the connecting pipe work of a system of  
394 enclosures, and whose intended function is to allow flow but prevent the transmission of flame

395 **3.6**  
396 **closed joint**

397 assembly between two parts which is intended to be gas or dust tight or both

398 **3.7**  
399 **open joint**

400 joint between two parts designed to reduce the heat energy from a gas explosion to the point  
401 where it will not ignite a similar external explosive gas mixture

402 **3.8**  
403 **spark arrester**

404 device, system, or method which controls the emission from an engine exhaust of particles  
405 potentially capable of igniting combustible material in the vicinity by virtue of their size and  
406 temperature

407 **3.9**  
408 **engine control module**  
409 **ECM**

410 electronic processor managing the transfer of data between engine sensors, actuators, control  
411 elements, and information-storage and display units