



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 60079-45:2024**  
**01-september-2024**

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**Eksplzivne atmosfere - 45. del: Električni sistemi za vžig motorjev z notranjim izgorevanjem**

Explosive atmospheres - Part 45: - Electrical ignition systems for internal combustion engines

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Ta slovenski standard je istoveten z: **prEN IEC 60079-45:2024**

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**ICS:**

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29.260.20	Električni aparati za eksplozivna ozračja	Electrical apparatus for explosive atmospheres

**oSIST prEN IEC 60079-45:2024**

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# 31/1776/CDV

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IEC TC 31 : EQUIPMENT FOR EXPLOSIVE ATMOSPHERES	
SECRETARIAT: United Kingdom	SECRETARY: Mr Tom Stack
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:

**Explosive atmospheres - Part 45 - Electrical Ignition Systems for Internal Combustion Engines**

PROPOSED STABILITY DATE: 2029

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## 104 INTERNATIONAL ELECTROTECHNICAL COMMISSION

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109 **Part 45: Electrical Ignition Systems for Internal Combustion Engines**

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**FOREWORD**

112 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising  
 113 all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international  
 114 co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and  
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144 International Standard IEC 60079-45 has been prepared by subcommittee PNW 31-1717 ED1:  
 145 Explosive atmospheres – Part 45 - Electrical Ignition Systems for Internal Combustion Engines,  
 146 of IEC technical committee TC31.

147 Users of this document are advised that interpretation sheets clarifying the interpretation of this  
 148 document can be published. Interpretation sheets are available from the IEC webstore and can  
 149 be found in the "history" tab of the page for each document.

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

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

151 Full information on the voting for the approval of this International Standard can be found in the  
 152 report on voting indicated in the above table.

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

154 The committee has decided that the contents of this document will remain unchanged until the  
155 stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to  
156 the specific document. At this date, the document will be

- 157 • reconfirmed,  
158 • withdrawn,  
159 • replaced by a revised edition, or  
160 • amended.

161

162 The National Committees are requested to note that for this document the stability date  
163 is XXXX.

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

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## INTRODUCTION

168 This part also refers to IEC 60079-0 and its associated standards for the construction, testing  
169 and marking requirements of suitable electrical Ex Equipment.

170 This international standard has been developed from ANSI/UL 122001 Standard for safety,  
171 *General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class*  
172 *I, Division 2 or Zone 2, Hazardous (Classified) Locations.*

173 The original content was developed primarily by the user community in response to operations  
174 and maintenance problems arising from the use of shielded ignition systems (flameproof or  
175 explosionproof) on reciprocating engines driving compressors and pumps handling flammable  
176 materials and installed in hazardous areas. Experience has shown that these types of ignition  
177 systems are subjected to significant dielectric stress due to being completely encapsulated in  
178 grounded metallic raceways and suffer premature failure resulting in engine cylinder misfiring  
179 and engine miss-operation and shutdown.

180 The standard is intended to supplement IEC 80079-41 with the requirements for the ignition  
181 systems for reciprocating spark-ignited engines to be installed in hazardous areas for Gc  
182 applications. In addition, it is also a standalone set of requirements for a complete ignition  
183 system or for the individual components thereof to be installed on a reciprocating engine located  
184 in a Zone 2 hazardous area in a repair or replacement activity.

185 Examples of reciprocating gas engines located in a Zone 2 are:

- 186 a) Offshore oil and gas platforms that are typically crowded or congested by design and the  
187 gas engine and driven equipment is located in a Zone 2.
- 188 b) Onshore facilities where the gas engine and driven equipment assembly is located under a  
189 shelter or in an enclosed building for environmental protection or noise suppression.

190 NOTE 1 Certified ignition systems can also be considered as an alternative replacement to non-Ex systems for  
191 engines located in a non-hazardous area where the driven equipment is located in a Zone 2 area. This could provide  
192 the additional explosion protection for larger than anticipated flammable releases.

193 NOTE 2 Ongoing inspection, maintenance and repair aspects also play an important role in control of hazardous  
194 area installations and the user's attention is drawn to IEC 60079-17, IEC 60079-19 and manufacturer's instructions  
195 for further information concerning these aspects.

196 NOTE 3 In any industrial installation, irrespective of size, there can be numerous sources of ignition apart from  
197 those associated with electrical equipment. Precautions are necessary to ensure safety from other possible ignition  
198 sources, but guidance on this aspect is outside the scope of this standard.

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## EXPLOSIVE ATMOSPHERES –

### Part 45: Electrical Ignition Systems for Internal Combustion Engines

#### 203 1 Scope

204 This part of IEC 60079 is intended to enhance the safety of personnel by providing minimum  
205 requirements for electrical ignition systems for spark-ignited reciprocating internal combustion  
206 engines, parts of which provide EPL Gc.

207 This standard provides minimum construction and test requirements, in addition to manufacturer  
208 installation and maintenance recommendations, for the safe operation of ignition systems and  
209 components for spark-ignited reciprocating internal combustion engines providing EPL Gc for  
210 equipment Group IIB+H<sub>2</sub>, IIB or IIA. These requirements apply to systems rated for normal  
211 operation with secondary voltages less than or equal to 60 kV.

212 This standard is intended to apply only to the ignition systems or the individual ignition system  
213 components used on reciprocating internal combustion engines that are stationary when in  
214 operation and mobile machinery where the internal combustion engine may be potential source  
215 of ignition. Applications addressed by the scope of this document include but are not limited to  
216 gas compressors, electric power generators, forklift trucks, and pumps.

217 This standard does not apply to:

- 218 a) engine ignition systems that utilize a breaker point or magneto type ignition systems as  
219 these would not be suitable for use in a hazardous area.
- 220 b) Road vehicles.
- 221 c) Low voltage parts and electrical installation that are not included in the ignition system, such  
222 as various sensors and thermocouples, throttle actuator(s), fuel control valve(s), human  
223 machine interface (HMI), respective harness and wiring and all the other items that might  
224 belong to the integrated control system besides the ignition system.

225 This standard supplements and modifies the general requirements of IEC 60079-0 and the  
226 requirements of ISO/IEC 80079-41. Where a requirement of this standard conflicts with  
227 IEC 60079-0 or ISO/IEC 80079-41, the requirement of this standard takes precedence.

228 NOTE See ISO/IEC 80079-41 for the requirements for explosion protection for EPL Gc reciprocating  
229 internal combustion engines.

#### 230 2 Normative references

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

235 IEC 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*

236 IEC 60079-1, *Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures*  
237 *"d"*

238 IEC 60079-7, *Explosive atmospheres – Part 7: Equipment protection by increased safety "e"*

239 IEC 60079-14, *Explosive atmospheres – Part 14: Electrical installations design, selection and*  
240 *erection*

241 ISO 11565: 2006, *Road vehicles — Spark-plugs — Test methods and requirements; Second*  
242 *edition*

243 ISO/IEC 80079-41, Explosive atmospheres – Part 41: Reciprocating internal combustion  
244 engines<sup>1</sup>

245 SAE J2031 - High-Tension Ignition Cable

### 246 **3 Terms and definitions**

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

248 ISO and IEC maintain terminological databases for use in standardization at the following  
249 addresses:

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

#### 252 **3.1**

##### 253 **ignition coil**

254 inductive device used to convert primary voltage to secondary voltage intended to initiate  
255 combustion

#### 256 **3.2**

##### 257 **ignition control unit (ICU)**

258 component assembly that transforms energy from the ignition system power source and  
259 provides it to the primary distribution system

260 Note 1 to entry: The ignition control unit is sometimes referred to as an ignition control module

#### 261 **3.3**

##### 262 **engine control module (ECM)**

263 electronic processor managing the timing relationship of the engine, transfer of data between  
264 engine sensors, actuators, control elements, and information-storage and -display units

#### 265 **3.4**

##### 266 **ignition system**

267 electrical system designed to produce and distribute electrical energy to initiate combustion

268 Note 1 to entry: An ignition system may be a part of integrated control system of the engine and hence connected  
269 to the engine control module ECM. This can be a capacitive or inductive type system.

270 Note 2 to entry: A capacitive discharge ignition system is a type of ignition system, a charging circuit creates an  
271 intermediate voltage on a capacitor, and at the instant of ignition timing applies the capacitor energy and voltage to  
272 the ignition coil primary side which subsequently reflects to the secondary coil winding and spark plug.

273 Note 3 to entry: An inductive discharge ignition system is where the primary winding is directly connected to the  
274 battery and stores energy while the primary winding conducts current from the battery. At the desired ignition timing,  
275 the primary winding current is interrupted which drives a flyback event on the primary, which reflected to the  
276 secondary and generates a voltage high enough to ionize the spark plug gap. Following ionization of the spark plug  
277 gap, most of the ignition coil energy is driven through the spark plug gap.

#### 278 **3.5**

##### 279 **installation drawing**

280 drawing or other document prepared by the equipment manufacturer that details the allowed  
281 interconnections of ignition system components, indicates any special conditions of use,  
282 provides initial parameters if required, and provides the necessary information for operational  
283 use of the system or any component

#### 284 **3.6**

##### 285 **integral ignition coil**

286 ignition coil with a rigid connection to the spark plug (coil on plug). No flexible cable is used

#### 287 **3.7**

##### 288 **maximum secondary peak output circuit voltage <ignition system>**

289 maximum open circuit voltage produced by the ignition system with the secondary lead  
290 disconnected from the spark plug

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<sup>1</sup> Under development.

291 **3.8**  
292 **normal operation**  
293 operation of equipment conforming electrically and mechanically with its design specification  
294 and used within the limits specified by the manufacturer

295 SOURCE IEC 60050-426, 426-04-10, Notes modified

296 Note1 to entry: For electrical ignition systems, this can include:

- 297 • supply voltage, current, and frequency;
- 298 • environmental conditions;
- 299 • minimum and maximum engine operating and cranking speeds;
- 300 • all removable parts in place; and
- 301 • all operator-accessible adjustments at their most unfavourable settings within the normal range.

302 **3.9**  
303 **engine driven power source**

304 power source that relies on mechanical energy from the engine for conversion to ignition system  
305 electrical energy

306 **3.10**  
307 **external power source <ignition system>**

308 power source that relies on energy from a source other than the engine for ignition system  
309 electrical energy

310 **3.11**  
311 **primary distribution system**

312 components that deliver the primary voltage (low voltage) and current from the power supply  
313 and ignition control unit to the ignition coil, including the coil primary terminations

314 **3.12**  
315 **low voltage**

316 a nominal supply voltage not exceeding 1 000 V for alternating current (AC) and 1 500 V for  
317 direct current (DC)

318 SOURCE IEC 60204-1

319 **3.13**  
320 **primary wire**

321 insulated conductor interconnecting the ignition control unit and the ignition coil

322 **3.14**  
323 **primary voltage**

324 voltage produced across the primary of the ignition coil under normal operating conditions

325 **3.15**  
326 **primary wiring harness**

327 group of wires transporting voltage to the primary of the ignition coil

328 **3.16**  
329 **raceway**

330 enclosure for routing, protecting, and supporting wires or cables

331 **3.17**  
332 **secondary distribution system**

333 component assembly that electrically interconnects the ignition coil and the spark gap, including  
334 the coil secondary terminations