



SLOVENSKI STANDARD
oSIST prEN 60079-31:2018
01-april-2018

Eksplzivne atmosfere - 31. del: Zaščita opreme pred vžigom gorljivega prahu z ohišjem "t"

Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"

Explosionsgefährdete Bereiche - Teil 31: Geräte-Staubexplosionsschutz durch Gehäuse "t"

iTeh STANDARD PREVIEW

Atmosphères explosives - Partie 31: Protection contre l'inflammation de poussières par enveloppe "t" relative au matériel

Ta slovenski standard je istoveten z: prEN 60079-31:2018

ICS:

| | | |
|-----------|---|--|
| 29.260.20 | Električni aparati za eksplozivna ozračja | Electrical apparatus for explosive atmospheres |
|-----------|---|--|

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en,fr,de

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31/1358/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

| | |
|--|---|
| PROJECT NUMBER: IEC 60079-31 ED3 | |
| DATE OF CIRCULATION: 2018-01-12 | CLOSING DATE FOR VOTING: 2018-04-06 |
| SUPERSEDES DOCUMENTS: 31/1320/CD,31/1335A/CC | |

| | |
|---|---|
| IEC TC 31 : EQUIPMENT FOR EXPLOSIVE ATMOSPHERES | |
| SECRETARIAT: United Kingdom | SECRETARY: Mr Mick Maghar |
| OF INTEREST TO THE FOLLOWING COMMITTEES: | PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> |
| <p>iTeh STANDARD PREVIEW (standards.iteh.ai)</p> <p>Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.</p> | |
| FUNCTIONS CONCERNED: | |
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| <input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING | |
| <p>Attention IEC-CENELEC parallel voting</p> <p>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.</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p> | |

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TITLE:

Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –**Part 31: Equipment dust ignition protection by enclosure "t"**

FOREWORD

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International Standard IEC 60079-31 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This third edition cancels and replaces the second edition published in 2013. This edition constitutes a technical revision.

103 The significance of changes between IEC 60079-31, Edition 3 and IEC 60079-31, Edition 2
104 (2013) is as listed below:

| Changes | Clause | Type | | |
|--|---------------------|---|-----------|-------------------------|
| | | Minor and editorial changes | Extension | Major technical changes |
| Document has been restructured from edition 2 | Numerous | X | | |
| Fault current rating of interrupting contacts | 4.3.1 and 4.4.1 | | | C1 |
| Cells and batteries | 4.3.5.1 and 4.4.5.1 | | | C2 |
| Overload or malfunction condition for the determination of temperature class for "tb" converter fed rotating electric machines | Table 2 | | | C3 |
| Additional requirements for entry devices with dust ignition protection by enclosure "t" | Annex A | | | C4 |
| Thermal tests are relocated to IEC 60079-0. | Formerly 6.1.2 | See "Information about the background of Changes" | | |

105 NOTE The technical changes referred to include the significance of technical changes in the revised IEC
106 Standard, but they do not form an exhaustive list of all modifications from the previous version. More guidance may
107 be found by referring to the Redline Version of the standard.

108 **Explanations:**

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109 **A) Definitions**

110 **Minor and editorial changes**

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111 clarification

112 decrease of technical requirements

113 minor technical change

114 editorial corrections

115 These are changes which modify requirements in an editorial or a minor technical way. They
116 include changes of the wording to clarify technical requirements without any technical change,
117 or a reduction in level of existing requirement.

118 **Extension** addition of technical options

119 These are changes which add new or modify existing technical requirements, in a way that
120 new options are given, but without increasing requirements for equipment that was fully
121 compliant with the previous standard. Therefore, these will not have to be considered for
122 products in conformity with the preceding edition.

123 **Major technical changes**

124 addition of technical requirements

125 increase of technical requirements

126 These are changes to technical requirements (addition, increase of the level or removal)
127 made in a way that a product in conformity with the preceding edition will not always be able
128 to fulfil the requirements given in the later edition. These changes have to be considered for
129 products in conformity with the preceding edition. For these changes additional information is
130 provided in clause B) below.

131 NOTE These changes represent current technological knowledge. However, these changes should not normally
132 have an influence on equipment already placed on the market.

133 B) Information about the background of 'Major Technical Changes'

134 C1 –Ex Equipment having Level of Protection "ta" shall be rated for connection to a circuit
135 with a prospective short circuit current of not greater than 1.5 kA. For Ex Equipment having
136 Level of Protection "tb" or "tc" which is intended for mains connection and intended to
137 interrupt fault current above 10kA, the equipment shall have a rated maximum short circuit
138 withstand current, be tested according to 6.1.1.1, and be marked according to Clause 7.

139 C2 – For Ex Equipment having Level of Protection "ta" which contains a cell or battery, only a
140 sealed cell or battery shall be used. For Ex Equipment having Level of Protection "tb" and "tc"
141 where there are sparking contacts or hot surfaces, and which contains a cell or battery, only a
142 sealed cell or battery shall be used.

143 C3 – Table 2 now includes malfunction conditions for temperature class determination of
144 Level of Protection "tb" converter-fed electric machines.

145 C4 – Annex A added for entry devices with Type of Protection "t" including cable transit
146 devices.

147 Thermal test formerly located in Clause 6.1.2 are relocated to IEC 60079-0 Ed 7.

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

| FDIS | Report on voting |
|----------|------------------|
| 31//FDIS | 31//RVD |

149 Full information on the voting for the approval of this standard can be found in the report on
150 voting indicated in the above table.
151

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

153 This International Standard is to be used in conjunction with IEC 60079-0.
154

155 A list of all parts of the IEC 60079 series, under the general title *Explosive atmospheres*, can
156 be found on the IEC website.

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

- 160 • reconfirmed,
- 161 • withdrawn,
- 162 • replaced by a revised edition, or
- 163 • amended.

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EXPLOSIVE ATMOSPHERES –

Part 31: Equipment dust ignition protection by enclosure "t"

168
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173 **1 Scope**

174 This part of IEC 60079 is applicable to equipment protected by enclosure and surface
175 temperature limitation for use in explosive dust atmospheres. It specifies requirements for
176 design, construction and testing of Ex Equipment and Ex Components.

177 This standard supplements and modifies the general requirements of IEC 60079-0. Where a
178 requirement of this standard conflicts with a requirement of IEC 60079-0, the requirement of
179 this standard takes precedence.

180 This standard does not apply to dusts of explosives, which do not require atmospheric oxygen
181 for combustion, or to pyrophoric substances.

182 This standard does not apply to Ex Equipment or Ex Components intended for use in
183 underground parts of mines as well as those parts of surface installations of such mines
184 endangered by firedamp and/or combustible dust.

185 This standard does not take account of any risk due to an emission of flammable or toxic gas
186 from the dust.

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187 **2 Normative references**

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[https://standards.iteh.ai/catalog/standards/sist/5d1ac01f-9d49-4b69-90e5-](https://standards.iteh.ai/catalog/standards/sist/5d1ac01f-9d49-4b69-90e5-311358-31)

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

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

193 IEC 60127 (all parts), *Miniature fuses*

194 IEC 60691, *Thermal-links – Requirements and application guide*

195 IEC 60529, *Degrees of Protection Provided by Enclosures*

196 IEC 60034-5, *Rotating electrical machines – Part 5: Degrees of protection provided by the*
197 *integral design of rotating electrical machines (IP code) – Classification*

198 ISO 965-1, *ISO general-purpose metric screw threads – Tolerances – Part 1: Principles and*
199 *basic data*

200 ANSI/ASME B1.20.1, *Pipe threads, general purpose (inch)*

201 ANSI/UL 248 (all parts), *Standard for Low-Voltage Fuses*

202 3 Terms and definitions

203 For the purposes of this document, the terms and definitions given in IEC 60079-0 and the
204 following apply.

205 ISO and IEC maintain terminological databases for use in standardization at the following
206 addresses:

- 207 • IEC Electropedia: available at <http://www.electropedia.org/>
- 208 • ISO Online browsing platform: available at <https://www.iso.org/obp/ui>

209 3.1

210 dust ignition protection by enclosure “t”

211 Type of Protection for explosive dust atmospheres where equipment is provided with an
212 enclosure providing dust ingress protection and a means to limit surface temperatures

213 4 General

214 4.1 Levels of Protection

215 Type of Protection “t” is divided into three Levels of Protection based on the risk of the Ex
216 Equipment becoming an ignition source in an explosive dust atmosphere. Ex Equipment with
217 Type of Protection “t” shall be one of the following:

- 218 • Level of Protection “ta” for EPL “Da”;
- 219 • Level of Protection “tb” for EPL “Db”;
- 220 • Level of Protection “tc” for EPL “Dc”

221 The construction and marking requirements apply to all Ex Equipment, and in addition, the
222 requirements for “ta” as given in 4.3 and the requirements for “tb” and “tc” as given in 4.4.

223 Failure modes as defined in the industrial standard for particular internal components
224 affecting the temperatures of the equipment shall be taken into account when considering
225 applicable malfunctions.

226 When a resistor is used for current limiting, it shall not be considered to fail as short circuit if it
227 is of metal film or of wire wound construction. The resistor shall be rated for the maximum
228 rated voltage of the equipment.

229 4.2 General requirements

230 4.2.1 Equipment groups and ingress protection

231 The relationship between the Level of Protection, the group, and ingress protection required is
232 shown in Table 1.

233 **Table 1 – Level of Protection, equipment group and ingress protection (IP) relationship**

| Level of Protection | Group IIIC | Group IIIB | Group IIIA |
|---------------------|------------|------------|------------|
| “ta” | IP6X | IP6X | IP6X |
| “tb” | IP6X | IP6X | IP5X |
| “tc” | IP6X | IP5X | IP5X |

234 4.3 Requirements for Ex Equipment with Level of Protection “ta”

235 4.3.1 Fault current

236 Ex Equipment shall be rated for connection to a circuit with a prospective short circuit current
237 of not greater than 1,5 kA, unless marked according to Clause 7.

238 4.3.2 Maximum surface temperature

239 These requirements modify and supplement the requirements of IEC 60079-0.

240 The marked maximum surface temperature shall be determined based upon measurements of
241 the surfaces of the internal components in accordance with 6.1.2. The highest of the
242 measured temperatures shall be the basis for the marked maximum surface temperature. If
243 the equipment includes a supplementary internal enclosure, the temperature shall be
244 measured on the external surfaces of the supplementary internal enclosure.

245 NOTE 1 Partial rupture of the external enclosure is considered to be a potential rare malfunction and is considered
246 in the temperature determination for “ta” equipment.

247 NOTE 2 Due to the limited thermal dissipation available to Level of Protection “ta” equipment, the maximum normal
248 power dissipation is generally limited to a few watts.

249 4.3.3 Overpressure

250 A positive internal pressure of 4 kPa shall be applied to the enclosure in accordance with
251 6.1.1.3 prior to the dust exclusion test.

252 4.3.4 Dust exclusion

253 Dust exclusion by enclosure shall be carried out in accordance with 6.1.1.

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254 4.3.5 Protective devices

255 4.3.5.1 General

256 If the Ex Equipment is capable of exceeding the marked maximum surface temperature as a
257 result of the temperature test of 6.1.2 under expected malfunction or for rare malfunction
258 conditions, a protective device is required. The protective device may be directly integrated
259 into the Ex Equipment or be external to the Ex Equipment.

260 Where the external protective device is not provided by the manufacturer as part of the Ex
261 Equipment, the marking shall include the symbol “X” in accordance with IEC 60079-0, and the
262 Specific Conditions of Use shall detail the required ratings and characteristics of the
263 protective device. The protective device shall be capable of interrupting the maximum current
264 of the circuit in which it is installed. If the Ex Equipment contains a cell or battery, only a
265 sealed cell or battery shall be used. A control device shall be provided to prevent overheating
266 of the cell or battery. The control device may also be considered as a protective device,
267 provided it also protects the complete Ex Equipment from exceeding the maximum surface
268 temperature.

269 4.3.5.2 Thermal protective devices

270 The Ex Equipment shall be protected by one or more integral thermal protective devices.
271 Thermal protective devices shall not be of a self-resettable type and shall be duplicated
272 unless conforming to the IEC 60127 series, IEC 60691 or ANSI/UL 248 series, in which case
273 only one device is necessary.

274 Alternatively, if it can be demonstrated that an overcurrent protective device can be used to
275 provide thermal protection, such a device may be used. When an overcurrent protective
276 device is not also used as a thermal protective device, it is permissible for the overcurrent