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Interested committees:

Title: BS ISO/IEC 80079-50 Explosive atmospheres

Part 50: Explosion venting devices

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



31M/247/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER: ISO 80079-50 ED1	
DATE OF CIRCULATION: 2025-01-10	CLOSING DATE FOR COMMENTS: 2025-03-07
SUPERSEDES DOCUMENTS: 31M/156/NP, 31M/159/RVN	

IEC SC 31M : NON-ELECTRICAL EQUIPMENT AND PROTECTIVE SYSTEMS FOR EXPLOSIVE ATMOSPHERES		
SECRETARIAT: Germany	SECRETARY: Mrs Anke Sachtleben	
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 31	HORIZONTAL FUNCTION(S):	
ASPECTS CONCERNED: Safety		

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TITLE: Explosive atmospheres - Part 50: Explosion venting devices

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –
Explosion venting devices

FOREWORD

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International Standard ISO 80079-50 has been prepared by subcommittee SC 31M: Non-electrical equipment and protective systems for explosive atmospheres, of IEC technical committee TC 31: Equipment for explosive atmospheres.

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

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

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

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

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

- 142 • reconfirmed,
- 143 • withdrawn,
- 144 • replaced by a revised edition, or
- 145 • amended.

146

147 The National Committees are requested to note that for this document the stability date
148 is 20XX..

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

151

152

INTRODUCTION

153

The introduction is an optional/conditional element of the text.

154

For rules on the drafting of the introduction, refer to the ISO/IEC Directives, Part 2:2016,
Clause 13.

155

156

157

EXPLOSIVE ATMOSPHERES –

Explosion Venting Devices

1 Scope

This standard specifies the requirements for venting devices used to protect enclosures against the major effects of internal explosions arising from the rapid burning of suspended dust, vapour or gas contained within. It includes the requirements for the design, inspection, testing, marking, documentation, and packaging. No electrical aspects are covered.

This standard specifies explosion venting devices which are put on the market as autonomous protective systems. Explosion venting devices are safety devices comprised of a pressure sensitive membrane fixed to and forming part of the structure that it protects, designed to intervene in the event of an explosion at a predetermined low pressure, to immediately open a vent area sufficient to ensure that the maximum pressure attained by the explosion within the enclosure does not exceed its designed resistance to pressure.

The application and specification of explosion venting devices is outlined for dust explosion protection in standards such as NFPA 68 and EN 14491 and for gas explosion protection in standards such as NFPA 68 and EN 14994. The use of venting devices according to these standards on pipelines and on applications other than described in NFPA 68, EN 14491 or EN 14994 shall be carefully evaluated and where appropriate their suitability shall be confirmed by tests.

This standard does not cover details for the avoidance of ignition sources from detection devices or other parts of the venting devices.

2 Normative references

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

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

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

ISO 80079-36, *Explosive atmospheres – Part 36: Non-electrical equipment for explosive atmospheres – Basic method and requirements*

EN 14491, *Dust explosion venting protective systems*

EN 14994, *Gas explosion venting protective systems*

NFPA 68, *Standard on Explosion Protection by Deflagration Venting*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

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

3.1

batch

quantity of venting device elements made as a single group of the same type, size, materials and specified static activation pressure requirements

3.2

effective vent area

A_E

product of the geometric vent area A_d and the venting efficiency E_f for the venting device

Note to entry: It is the effective vent area that should be used in making up the vent area for explosion venting.

3.3

explosion venting

protective measure which will prevent the explosion pressure in a vessel or other closed volume from exceeding the vessel design strength by exhausting the explosion through an explosion venting device in the vessel walls

3.4

explosion venting device

device which protects a vessel or other closed volume by explosion venting

3.5

gas explosion constant

K_G

maximum value of the pressure rise per unit time $(d_p/dt)_{\max}$ during the explosion of a specific explosive atmosphere in a closed vessel under specific test conditions normalized to a vessel volume of 1 m³ multiplied by $V^{1/3}$

[SOURCE: EN 14994:2005, 3.8]

3.6

dust explosion constant

K_{st}

maximum value of explosion pressure rise per unit of time $(dp/dt)_{\max}$ in a volume of 1 m³ multiplied by $V^{1/3}$

3.7

laminar burning velocity

S_u

maximum velocity of the flame front relative to the unburned gases just ahead of flame front for unstretched laminar flow conditions

3.8

retaining element

part or parts of the explosion venting device that determines the activation pressure

239 Note to entry: It may or may not be re-useable.

240 **3.9**
241 **reduced explosion pressure**

242 p_{red}
243 overpressure generated by an explosion of an explosive atmosphere in an enclosure protected
244 by explosion venting

245 **3.10**
246 **restraining element**

247 parts of some explosion venting devices that prevent components or objects from becoming
248 dangerous missiles

249 Note to entry: They may or may not be reusable.

250 **3.11**
251 **specific mass**

252 total mass per unit area (A_d) of the venting element. The specific mass is used in determining
253 the effect of inertia

254 **3.12**
255 **static activation pressure**

256 p_{stat}
257 differential pressure at which the retaining element activates such that the venting element is
258 able to open

259 **3.13**
260 **static activation pressure tolerance range**

261 range of differential pressure between the specified maximum static activation pressure and the
262 specified minimum static activation pressure or the range of differential pressure in positive and
263 negative percentages or quantities which is related to the specified static activation pressure

264 **3.14**
265 **vent area**

266 A_d
267 geometric vent area of an explosion venting device.

268 Note to entry: The vent area is the minimum cross-sectional flow area of the explosion venting device taking into
269 consideration the possible reduction of the cross section, for example by back pressure support, restraining devices
270 and parts of the explosion venting device which remain after venting

271 **3.15**
272 **venting efficiency**

273 E_f
274 dimensionless number used to define the efficiency of the explosion venting device as
275 determined in 7.3.4

276 **3.16**
277 **venting element**

278 part of the explosion venting device that covers the vent area and opens under explosion
279 conditions

280 Note to entry: It may or may not incorporate the retaining element - it may or may not be reusable.

281

282

Table 1 – Symbols and their descriptions

Symbol	Description	Units
A	Required vent area	m^2
A_E	Effective vent area	m^2
A_d	Geometric vent area	m^2
E_f	Venting efficiency	-
p_{stat}	Static activation pressure	bar
p_{red}	Reduced explosion pressure	bar
$p_{\text{red, baseline}}$	Reduced explosion pressure measured using an explosion venting device with a specific mass $< 0,5 \text{ kg m}^{-2}$	bar
$p_{\text{red, test device}}$	Reduced explosion pressure measured using an explosion venting device under investigation	bar
K_G	Gas explosion constant	bar m s^{-1}
S_u	Laminar burning velocity	m.s^{-1}
K_{st}	Dust explosion constant	bar m s^{-1}
V	Volume of vessel to be protected by explosion venting	m^3

283

284 4 Design requirements

285 4.1 General

286 4.2

287 Explosion venting devices shall be designed so that they open when subjected to pressure
 288 exceeding their static activation pressure (within a stated static activation pressure tolerance
 289 range). Any part not designed to rupture shall not rupture. Venting elements shall be designed
 290 so that they shall not fragment to produce dangerous missiles. These requirements shall be
 291 verified by either explosion testing or other methods, for example calculation, if their validity
 292 has been verified from representative explosion tests.

293 Explosion venting devices employ re-usable elements or non-reusable elements (see Clause
 294 5). Explosion venting devices may be provided with back pressure supports (see Clause 6).

295 The performance capability of an explosion venting device is defined by the following
 296 parameters:

- 297 – the static activation pressure p_{stat} and its tolerance;
- 298 – the maximum $S_u/K_G/K_{\text{St}}$ values specified by the manufacturer;
- 299 – the maximum reduced pressure p_{red} specified by the manufacturer;
- 300 – the minimum venting efficiency E_f of the device.

301 Tests to determine or prove these parameters are given in Clause 7.

302 Explosion venting devices shall be designed to maintain their specified performance taking into
 303 account environmental and process conditions. Build-up or addition of any substance on
 304 external surfaces of the device (for example snow and ice) and the build-up of product on the
 305 internal surfaces of the device may affect the correct operation of the device, so particular
 306 attention shall be given to preventing such effects by proper installation.