

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

---

**Explosive atmospheres –  
Part 13: Equipment protection by pressurized room "p" and artificially ventilated  
room "v"**

**Atmosphères explosives –  
Partie 13: Protection du matériel par salle à surpression interne «p» et salle à  
ventilation artificielle «v»**



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2017 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

### About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

### About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

#### IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

---

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Catalogue IEC - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

#### Recherche de publications IEC - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 21 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### Glossaire IEC - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

---

**Explosive atmospheres –**

**Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v"**

**Atmosphères explosives –**

**Partie 13: Protection du matériel par salle à surpression interne «p» et salle à ventilation artificielle «v»**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 29.260.20

ISBN 978-2-8322-6204-7

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references .....	10
3 Terms and definitions .....	11
4 Requirements for all rooms.....	13
4.1 General.....	13
4.2 Type and level of protection .....	13
4.2.1 Pressurization "p" .....	13
4.2.2 Artificial ventilation "v" .....	14
4.3 Construction .....	14
4.4 Mechanical strength.....	14
4.5 Penetrations and seals .....	14
4.6 Personnel access doors .....	14
4.7 Inlets and outlets .....	15
4.8 Ducts .....	15
4.9 Purging and cleaning .....	15
4.9.1 General .....	15
4.9.2 Gases – Purging.....	15
4.9.3 Enclosures within the room.....	16
4.10 Ignition prevention under system failure .....	16
5 Clean air supply.....	16
5.1 General.....	16
5.2 Source of clean air.....	16
5.3 Environmental and air temperature conditions.....	17
5.4 Heating, ventilation and air conditioning services .....	17
6 Requirements for pressurized rooms .....	17
6.1 General.....	17
6.1.1 Design .....	17
6.1.2 Source of clean air .....	17
6.1.3 Flow .....	17
6.1.4 Pressurization system.....	17
6.1.5 Preventing the explosive atmosphere from entering through an open door.....	18
6.1.6 Airlock .....	18
6.1.7 Outward air velocity through a door .....	18
6.1.8 Air consuming device.....	19
6.1.9 Action when pressurization system fails.....	19
6.1.10 Re-energizing the room .....	19
6.2 Purging of rooms .....	19
6.2.1 General .....	19
6.2.2 Sequence of operations of the purging safety devices .....	20
6.2.3 Dusts – Cleaning .....	20
6.3 Minimum safety provisions, safety devices and electrical disconnects.....	20
6.3.1 Safety devices .....	20
6.3.2 Safety devices based upon level of protection .....	21

6.3.3	Gas detectors .....	21
6.4	Verification for pressurized rooms .....	21
6.4.1	General .....	21
6.4.2	Tests .....	21
6.4.3	Overpressure test .....	22
6.4.4	Purging test .....	22
6.4.5	Minimum pressure differential test .....	22
6.4.6	Confirmation of the ratings of the safety devices .....	22
6.4.7	Verification of sequence of operation of the safety devices .....	22
7	Requirements for artificially ventilated rooms .....	22
7.1	General .....	22
7.1.1	Design .....	22
7.1.2	Source of clean air .....	22
7.1.3	Minimum flow rate .....	23
7.1.4	Ventilation system .....	23
7.1.5	Air consuming device .....	24
7.1.6	Safety actions when ventilation system fails .....	24
7.1.7	Energizing the artificially ventilated area .....	24
7.2	Purging of artificially ventilated rooms .....	25
7.2.1	General .....	25
7.2.2	Sequence of operations of the purging safety devices .....	25
7.3	Minimum safety provisions, safety devices and electrical disconnects .....	25
7.3.1	Safety devices .....	25
7.3.2	Safety devices based upon equipment protection level .....	25
7.3.3	Artificial ventilation protection .....	26
7.3.4	Gas detectors .....	26
7.4	Loss of artificial ventilation .....	26
7.5	Verification for artificially ventilated rooms .....	27
7.5.1	General .....	27
7.5.2	Tests .....	27
7.5.3	Purging test .....	27
7.5.4	Minimum ventilation flow rate test .....	27
7.5.5	Confirmation of the ratings of the safety devices .....	27
7.5.6	Verification of sequence of operation of the safety devices .....	27
7.5.7	Testing of ventilation system .....	28
8	Marking .....	28
8.1	General .....	28
8.2	Marking of pressurized rooms .....	28
8.3	Marking for artificially ventilated rooms .....	29
9	Instructions .....	30
9.1	General .....	30
9.2	Technical documentation for pressurized rooms .....	30
9.3	Technical documentation for artificially ventilated rooms .....	30
9.4	Technical documentation for rooms protected by pressurization and artificial ventilation combined .....	31
9.5	Modifications .....	31
Annex A (informative)	Maintenance .....	32
A.1	Periodic verification .....	32
A.2	Modifications .....	32

Annex B (informative) Guidelines when pressurization or artificial ventilation is not immediately restored.....	33
Annex C (informative) Examples of applications and associated guidelines .....	34
C.1 Examples of applications .....	34
C.2 Guidelines for gas turbine enclosure/package .....	34
Bibliography.....	35
Table 1 – Exclusion of specific clauses or subclauses of IEC 60079-0 .....	9
Table 2 – Safety devices for pressurized rooms .....	21
Table 3 – Safety actions for artificial ventilation failure.....	24
Table 4 – Required safety devices for artificial ventilation .....	26

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**EXPLOSIVE ATMOSPHERES –****Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v"**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60079-13 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This bilingual edition (2018-11) corresponds to the monolingual English version, published in 2017-05.

This second edition cancels and replaces the first edition published in 2010. This edition constitutes a technical revision.

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

- a) modification of the title of this document to include artificially ventilated room "v" in addition to pressurized room "p";
- b) addition of types of protection "pb", "pc", and "vc" and removal of types of protection "px", "py", "pz" and "pv";

- c) definition of the differences between pressurization and artificial ventilation types of protection;
- d) removal of protection of rooms with an inert gas or a flammable gas from the scope of this document;
- e) addition of an informative annex to include examples of applications where types of protection pressurization or artificial ventilation or pressurization and artificial ventilation can be used and associated guidelines.

The text of this document is based on the following documents:

FDIS	Report on voting
31/1309/FDIS	31/1317/RVD

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

The French version of this standard has not been voted upon.

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

This document is to be used in conjunction with the principles of hazardous area classification from IEC 60079-10-1 and artificial ventilation for the protection of analyser(s) houses from IEC 60079-16.

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

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

## INTRODUCTION

This part of IEC 60079 gives requirements for the design, construction, assessment, verification and marking of rooms used to protect internal equipment by pressurization or artificial ventilation or both as applicable when located in an explosive gas atmosphere or combustible dust atmosphere hazardous area with or without an internal source of a flammable gas or vapour. It also includes a room located in a non-hazardous area that has an internal source of release of a flammable gas or vapour.

This document deals with rooms that are partially constructed in a manufacturer's facility and intended to have the final installation completed on-site, as well as rooms that are constructed completely on-site. Rooms partially constructed in a manufacturer's facility may include third-party verification. For rooms built on-site, this document can be used by plant operators as a guide for assessment of those facilities.

This document represents a major technical revision of the requirements for equipment protection by pressurized room "p" and artificially ventilated room "v" and should be considered as introducing all new requirements.

## EXPLOSIVE ATMOSPHERES –

### Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v"

#### 1 Scope

This part of IEC 60079 gives requirements for the design, construction, assessment, verification and marking of rooms used to protect internal equipment:

- located in a Zone 1 or Zone 2 or Zone 21 or Zone 22 explosive atmosphere (an area normally requiring an equipment protection level (EPL) Gb, Gc, Db or Dc) without an internal source of gas/vapour release and protected by pressurization;
- located in a Zone 2 explosive atmosphere (an area normally requiring EPL Gc) with or without an internal source of gas/vapour release and protected by artificial ventilation;
- located in a non-hazardous area, containing an internal source of gas/vapour release and protected by artificial ventilation;
- located in a Zone 1 or Zone 2 or Zone 21 or Zone 22 explosive atmosphere (an area normally requiring EPL Gb, Gc, Db or Dc), containing an internal source of gas/vapour release and protected by both pressurization and artificial ventilation.

The term "room" used in this document includes single rooms, multiple rooms, a complete building or a room contained within a building. A room is intended to facilitate the entry of personnel and includes inlet and outlet ducts. An acoustic hood and other like enclosures designed to permit the entry of personnel can be considered as a room.

This document also includes requirements related safety devices and controls necessary to ensure that artificial ventilation, purging and pressurization is established and maintained.

A room assembled or constructed on site, can be either on land or off-shore. The room is primarily intended for installation by an end-user but could be constructed and assessed at a manufacturer's facility, where the final construction such as ducting can be completed on site.

Rooms can be located in an explosive gas atmosphere requiring EPL Gb or Gc, or a combustible dust atmosphere requiring EPL Db, or Dc.

This document does not specify the methods that may be required to ensure adequate air quality for personnel with regard to toxicity and temperature within the room. National or other regulations and requirements may exist to ensure the safety of personnel in this regard.

Protection of rooms by using an inert gas or a flammable gas is outside of the scope of this document. It is recognized that such applications are special cases, which in part may be addressed using the principles from IEC 60079-2, but in all probability will also be the subject of additional, stringent engineering standards, procedures and practices. Pressurized enclosures for equipment that are not intended to facilitate the entry of personnel are addressed in IEC 60079-2, and are not in the scope of this document.

NOTE Maintenance recommendations are contained in Annex A until they can be included in IEC 60079-17.

This document supplements and modifies the general requirements of IEC 60079-0, except exclusions as indicated in Table 1. Where a requirement of this document conflicts with a requirement of IEC 60079-0, the requirement of this document takes precedence.