IEC 60079-26

Edition 4.0 2021-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

This document is a preview generated by EVS

Explosive atmospheres –
Part 26: Equipment with Separation Elements or combined Levels of Protection

Atmosphères explosives –
Partie 26: Appareil avec éléments de séparation ou niveaux de protection combinés



IEC 60079-26:2021-02(en-fr)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2021 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 Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
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 corrigendum or an amendment might have been published.

IEC publications search - 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 It also gives information on projects, replaced and withdrawn publications.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
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - 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.

IEC online collection - oc.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 18 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

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.

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

Service Clients - 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.

IEC online collection - oc.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

This document is a preview generated by EVS

IEC 60079-26

Edition 4.0 2021-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

This document is a preview generated by EVS

Explosive atmospheres –
Part 26: Equipment with Separation Elements or combined Levels of Protection

Atmosphères explosives –
Partie 26: Appareil avec éléments de séparation ou niveaux de protection combinés

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.260.20

ISBN 978-2-8322-9390-4

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.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

CONTENTS

FOREWORD 4
1 Scope 7
2 Normative references 7
3 Terms and definitions 8
4 Ex Equipment with two combined Types of Protection 8
4.1 General 8
4.2 Basic requirements 8
4.3 Electrical Connections 9
5 Ex Equipment containing parts with different EPLs and a separation element 9
5.1 General 9
5.2 Separation elements 9
5.2.1 General 9
5.2.2 Basic requirements 10
5.2.3 Mechanical partition walls 10
5.2.4 Metallic partition walls with gas-tight conductor bushings 10
5.2.5 Partition wall supplemented with a joint 11
5.2.6 Partition wall for explosive gas atmospheres supplemented with natural ventilation 11
5.2.7 Requirements depending on the thickness of the partition wall 12
6 Process connection 13
7 Type tests 14
7.1 Standardized Types of Protection 14
7.2 Separation elements 14
7.3 Temperature evaluation 14
8 Marking 14
8.1 General 14
8.2 Ex Equipment with two combined Types of Protection 14
8.3 Ex Equipment containing parts with different EPLs 15
8.4 Examples of marking: 15
9 Instructions 16
9.1 Separation elements 16
9.2 Process connection 16
9.3 EPL allocation 16
Annex A (normative) Types of construction for separation elements 17
Bibliography 23

Figure 1 – Partition wall with a conductor bushing considered as gas diffusion tight 11
Figure 2 – Example of a separation element with a cylindrical shaft joint and ventilation 12
Figure 3 – Example g) of marking of equipment with a separation element 15

Table 1 – Requirements for Ex Equipment containing parts with different EPLs. 9
Table A.1 – Ex Equipment with separation elements mounted at a boundary of Zone 0 17
Table A.2 – Ex Equipment with separation elements mounted at a boundary of Zone 1 18
Table A.3 – Ex Equipment with separation elements mounted at a boundary of Zone 20 19
Table A.4 – Ex Equipment with separation elements mounted at a boundary of Zone 21 19

This document is a preview generated by EVS

Table A.5 – Ex Equipment with separation elements mounted at a boundary of Zone 0 in Zone 21 or 22 20
Table A.6 – Ex Equipment with separation elements mounted at a boundary of Zone 1 in Zone 21 or 22 20
Table A.7 – Ex Equipment with separation elements mounted at a boundary of Zone 20 in Zone 1 or 2 21
Table A.8 – Ex Equipment with separation elements mounted at a boundary of Zone 21 in Zone 1 or 2 22

This document is a preview generated by EVS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

EXPLOSIVE ATMOSPHERES –

Part 26: Equipment with Separation Elements or combined Levels of Protection

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 60079-26 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This fourth edition cancels and replaces the third edition published in 2014 and constitutes a technical revision.

This document is a preview generated by EVS

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

Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
The scope of the standard was extended for separation elements between all EPLs for gas and dust hazardous areas as well as for non-electrical equipment. The title and the structure of the standard was modified accordingly.	5		x	
The requirements for combined Types of Protection 4.1.2 were restructured and included in Clause 4	4	x		
The requirements for equipment with moving parts was removed and transferred to IEC 60079-0	4.2 (ed. 3)	x		
For equipment with partition walls other than corrosion resistant metals, glass or ceramic the type tests were detailed and the cycling test acc. to IEC TS 60079-40 specified, if they were exposed to constant vibrational stress	7.2			C1
The marking is extended for equipment to be mounted between different Zones	8		x	
The thickness of the partition wall must be specified in the instructions	9	x		
Additional warnings are included in the instructions for equipment with separation elements exposed to abrasive dust flow	9		x	
Table 1 "Separation elements" was moved to Annex A as Table A.1 and modified for clarification	Table A.1	x		
Table A.2 to table A.8 added for the extended separation elements			x	

NOTE The technical changes referred to include the significance of technical changes in the revised IEC Standard, but they do not form an exhaustive list of all modifications from the previous version.

Explanation of the types of changes:

A) Definitions

1. Minor and editorial changes:

- Clarification
- Decrease of technical requirements
- Minor technical change
- Editorial corrections

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

2. Extension: Addition of technical options

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

This document is a preview generated by EVS

3. Major technical changes:

- addition of technical requirements
- increase of technical requirements

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

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

B) Information about the background of 'Major technical changes'

C1 to ensure that partition walls consisting of materials other than stainless steel, ceramics or glass, which are exposed to pressure or vibrational stress, provide a comparable level of safety, additional endurance tests were included. Reference to tests in IEC TS 60079-40 were considered appropriate.

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

FDIS	Report on voting
31/1562/FDIS	31/1564/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.

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 document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

This document is a preview generated by EVS

EXPLOSIVE ATMOSPHERES –

Part 26: Equipment with Separation Elements or combined Levels of Protection

This document is a preview generated by EVS

1 Scope

This part of IEC 60079 specifies requirements for construction, testing and marking for Ex Equipment that contains parts of the equipment with different Equipment Protection Levels (EPLs) and a separation element. This equipment is mounted across a boundary where different EPLs are required, for example between different gas hazardous areas, dust hazardous areas or gas hazardous areas adjacent to dust hazardous areas.

EXAMPLE: Equipment installed in the wall of storage tanks located in Zone 1 and containing Zone 0 inside.

Separation elements are considered for both electrical and non-electrical equipment. If mechanical energy can be transformed into a potential ignition source, additionally an ignition hazard assessment in accordance with ISO 80079-36 is performed and appropriate measures are undertaken. Suitable measures can be selected from ISO 80079-37 or IEC TS 60079-42.

This document also specifies requirements for the combination of two Types of Protection, each with EPL Gb, to achieve EPL Ga. Examples are included in 4.2.

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

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

IEC 60079-11, *Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"*

IEC 60079-31, *Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure "t"*

IEC TS 60079-40, *Explosive atmospheres – Part 40: Requirements for process sealing between flammable process fluids and electrical systems*

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

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

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

3 Terms and definitions

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

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

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

4 Ex Equipment with two combined Types of Protection

4.1 General

To achieve EPL Ga, electrical equipment may comply with the requirements of two independent Types of Protection each of EPL Gb. If one Type of Protection fails, the other Type of Protection shall continue to function. Then even during rare malfunctions, for example two independent faults, no ignition source can occur.

4.2 Basic requirements

The independent Types of Protection shall not have a common mode of failure, except as specified below (see a) and b)). Combined Types of Protection of EPL Gb shall depend on different physical protection principles.

NOTE 1 An example for an unacceptable common mode of failure is an Ex "db" enclosure containing arcing components installed inside an Ex "eb" enclosure. Should the Ex "db" enclosure be compromised, it would also compromise the Ex "eb" enclosure.

NOTE 2 The combination of Ex "db" and Ex "q" both depend on the avoidance of flame propagation (same physical protection principle) and are not suitable in combination. In practice, some combinations are not suitable, for example the combination of liquid immersion "ob" and powder filling "q".

Both Types of Protection shall be assessed using the most onerous malfunction condition of the other Type of Protection. When combining intrinsic safety, i.e. Level of Protection "ib", with another Type of Protection, the second Type of Protection shall be assessed after the application of faults to the intrinsically safe apparatus which result in the most onerous condition as specified in IEC 60079-11. Thermal dissipation shall be considered in case of a fault of one Type of Protection.

When using two Types of Protection, which both rely on the same parameter (for example, the creepage distance when combining Ex "ib" with Ex "eb"), the most stringent requirement of both Types of Protection shall be applied.

If two Types of Protection are combined which both rely on the enclosure, one of the following shall be met:

a) if two enclosures are used (one totally enclosed within the other), each enclosure shall comply with the requirements of the respective Type of Protection; or

b) if only one enclosure is used, the enclosure and the Cable Glands shall meet the impact test requirements of IEC 60079-0, using the Group I values.

Examples of relevant combinations of two independent Types of Protection are as follows:

– inductive transmitters (for example proximity switches, electrical position sensors) with intrinsic safety "ib" enclosed by encapsulation "mb";

This document is a preview generated by EVS