IEC 60079-5

Edition 4.0 2015-02

REDLINE VERSION

colour inside

Explosive atmospheres –
Part 5: Equipment protection by powder filling “q”

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.260.20

ISBN 978-2-8322-2270-6

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

EXPLOSIVE ATMOSPHERES –

Part 5: Equipment protection by powder filling “q”

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.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions and deletions are displayed in red, with deletions being struck through.

International Standard IEC 60079-5 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This fourth edition cancels and replaces the third edition, published in 2007, and constitutes a technical revision.

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

NOTE The technical changes referred to include the significant technical changes in the revised IEC standard, but they do not form an exhaustive list of all modifications from the previous edition. More guidance may be found by referring to the redline version of the IEC standard, if available.

		Type		
Significant changes	**Clause/subclause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Specific references to IEC 60079-0 have been reworded so the references to IEC 60079-0 can be non-dated references	4.1.3 4.8 4.8.3	X		
The “housing” surrounding the powder filled equipment or Ex Component has been redefined as a “container” to avoid confusion with the “enclosure” requirements of IEC 60079-0	4.1	X		
A relaxation has been introduced to permit reduced distances through filling material for instances where there is no adjacent gap in the container	4.3.1		X	
A relaxation has been introduced to permit the use of creepage dimensions per IEC 60079-7 where CTI is better than 175	4.8.3		X	
An evaluation of joints employed when the reduced distances according to Table 1 are applied, has been added.	5.1.1		X	
Text for determination of maximum temperature clarified with respect to overloads and malfunctions	5.1.4	X		
A batch routine test has been introduced	5.2.1		X	

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

FDIS	Report on voting
31/1156/FDIS	31/1171/RVD

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

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

The list of all parts of IEC 60079 series, 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.

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 publication using a colour printer.

EXPLOSIVE ATMOSPHERES –

Part 5: Equipment protection by powder filling “q”

1 Scope

This part of IEC 60079 contains specific requirements for the construction, testing and marking of electrical equipment, parts of electrical equipment and Ex components in the type of protection powder filling “q”, intended for use in explosive gas atmospheres.

NOTE 1 Electrical equipment and Ex components protected by powder filling “q” ~~may~~ can contain electronic circuits, transformers, protection fuses, relays, intrinsically safe electrical apparatus, associated electrical apparatus, switches, etc.

NOTE 2 Type of protection powder filling “q” provides Equipment Protection Level (EPL) Gb or Mb. ~~For further information, see Annex A.~~

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

This standard applies to electrical equipment, parts of electrical equipment and Ex components with:

– a rated supply current less than or equal to 16 A;

– a rated supply voltage less than or equal to 1 000 V;

– a rated power consumption less than or equal to 1 000 W.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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~~:2004~~, *Explosive atmospheres – Part 0: Equipment – General requirements*

~~IEC 60079-1, *Electrical apparatus for explosive gas atmospheres – Part 1: Flameproof enclosure “d”*~~

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

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

IEC 60127 (all parts), *Miniature fuses*

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

IEC 61558-1, *Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests*

IEC 61558-2-6, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers*

ISO 2859-1, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 3310-1, *Test sieves – Technical requirements and testing – Part 1: Test sieves of metal wire cloth*

ISO 3310-2, *Test sieves – Technical requirements and testing – Part 2: Test sieves of perforated metal plates*

ISO 2591-1, *Test sieving – Methods using test sieves of woven wire cloth and perforated metal plate*

IEC 60079-5

Edition 4.0 2015-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Explosive atmospheres –
Part 5: Equipment protection by powder filling “q”

Atmosphères explosives –
Partie 5: Protection du matériel par remplissage pulvérulent “q”

IEC 60079-5:2015-02(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

EXPLOSIVE ATMOSPHERES –

Part 5: Equipment protection by powder filling “q”

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 60079-5 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This fourth edition cancels and replaces the third edition, published in 2007, and constitutes a technical revision.

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

NOTE The technical changes referred to include the significant technical changes in the revised IEC standard, but they do not form an exhaustive list of all modifications from the previous edition. More guidance may be found by referring to the redline version of the IEC standard, if available.

		Type		
Significant changes	**Clause/subclause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Specific references to IEC 60079-0 have been reworded so the references to IEC 60079-0 can be non-dated references	4.1.3 4.8 4.8.3	X		
The “housing” surrounding the powder filled equipment or Ex Component has been redefined as a “container” to avoid confusion with the “enclosure” requirements of IEC 60079-0	4.1	X		
A relaxation has been introduced to permit reduced distances through filling material for instances where there is no adjacent gap in the container	4.3.1		X	
A relaxation has been introduced to permit the use of creepage dimensions per IEC 60079-7 where CTI is better than 175	4.8.3		X	
An evaluation of joints employed when the reduced distances according to Table 1 are applied, has been added.	5.1.1		X	
Text for determination of maximum temperature clarified with respect to overloads and malfunctions	5.1.4	X		
A batch routine test has been introduced	5.2.1		X	

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

FDIS	Report on voting
31/1156/FDIS	31/1171/RVD

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

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

The list of all parts of IEC 60079 series, 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.

EXPLOSIVE ATMOSPHERES –

Part 5: Equipment protection by powder filling “q”

1 Scope

This part of IEC 60079 contains specific requirements for the construction, testing and marking of electrical equipment, parts of electrical equipment and Ex components in the type of protection powder filling “q”, intended for use in explosive gas atmospheres.

NOTE 1 Electrical equipment and Ex components protected by powder filling “q” can contain electronic circuits, transformers, protection fuses, relays, intrinsically safe electrical apparatus, associated electrical apparatus, switches, etc.

NOTE 2 Type of protection powder filling “q” provides Equipment Protection Level (EPL) Gb or Mb.

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

This standard applies to electrical equipment, parts of electrical equipment and Ex components with:

– a rated supply current less than or equal to 16 A;
– a rated supply voltage less than or equal to 1 000 V;
– a rated power consumption less than or equal to 1 000 W.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 60079-7, *Explosive atmospheres – Part 7: Equipment protection by increased safety "e"*

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

IEC 60127 (all parts), *Miniature fuses*

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

IEC 61558-1, *Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests*

IEC 61558-2-6, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers*

ISO 2859-1, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 3310-1, *Test sieves – Technical requirements and testing – Part 1: Test sieves of metal wire cloth*

ISO 3310-2, *Test sieves – Technical requirements and testing – Part 2: Test sieves of perforated metal plate*

ISO 2591-1, *Test sieving – Methods using test sieves of woven wire cloth and perforated metal plate*

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

_____

ATMOSPHÈRES EXPLOSIVES –

Partie 5: Protection du matériel par remplissage pulvérulent “q”

AVANT-PROPOS

1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l’IEC). L’IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l’IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l’IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l’IEC, participent également aux travaux. L’IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
2) Les décisions ou accords officiels de l’IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l’IEC intéressés sont représentés dans chaque comité d'études.
3) Les Publications de l’IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l’IEC. Tous les efforts raisonnables sont entrepris afin que l’IEC s'assure de l'exactitude du contenu technique de ses publications; l’IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l’IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l’IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l’IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
5) L’IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l’IEC. L’IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
7) Aucune responsabilité ne doit être imputée à l’IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l’IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l’IEC ou de toute autre Publication de l’IEC, ou au crédit qui lui est accordé.
8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L’attention est attirée sur le fait que certains des éléments de la présente Publication de l’IEC peuvent faire l’objet de droits de brevet. L’IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 60079-5 a été établie par le comité d'études 31 de l’IEC: Équipements pour atmosphères explosives.

Cette quatrième édition annule et remplace la troisième édition parue en 2007. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

NOTE Les modifications techniques auxquelles il est fait référence comprennent les modifications techniques majeures par rapport à la norme IEC révisée, mais ne constituent pas une liste exhaustive de toutes les modifications apportées par rapport à la version précédente. Il est possible de trouver des précisions supplémentaires en se référant à la version en mode révision de la norme IEC, si elle est disponible.

		Type		
Modifications majeures	**Article / paragraphe**	**Modifications mineures et rédactionnelles**	**Extension**	**Modifications techniques majeures**
Les références spécifiques à l'IEC 60079-0 ont été reformulées pour qu'elles ne soient pas datées	4.1.3 4.8 4.8.3	X		
L'"enveloppe" contenant l'appareil à remplissage pulvérulent ou le Composant Ex a été redéfinie par le terme "conteneur" pour éviter la confusion avec les exigences relatives aux "enveloppes" de l'IEC 60079-0	4.1	X		
Un assouplissement des exigences a été introduit pour autoriser des distances réduites entre matériaux de remplissage, par exemple lorsqu'il n'y a pas d'interstice adjacent dans le conteneur	4.3.1		X	
Un assouplissement des exigences a été introduit pour autoriser l'utilisation des lignes de fuite selon l'IEC 60079-7 où l'IRC est meilleur que 175	4.8.3		X	
Une évaluation des joints utilisés en cas d'application des distances réduites selon le Tableau 1 a été ajoutée	5.1.1		X	
Le texte définissant la température maximale a été clarifié au sujet des surcharges et des dysfonctionnements	5.1.4	X		
Un essai individuel par lot a été introduit.	5.2.1		X	

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
31/1156/FDIS	31/1171/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

La liste de toutes les parties de la série IEC 60079, publiées sous le titre général *Atmosphères explosives*, peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives à la publication recherchée. À cette date, la publication sera

- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

ATMOSPHÈRES EXPLOSIVES –

Partie 5: Protection du matériel par remplissage pulvérulent “q”

1 Domaine d'application

La présente partie de l’IEC 60079 contient les exigences spécifiques de construction, d'essais et de marquage d'appareil électrique, des parties d'appareil électrique et des composants Ex à remplissage pulvérulent, mode de protection “q”, destinés à être utilisés dans des atmosphères explosives gazeuses.

NOTE 1 L'appareil électrique à remplissage pulvérulent, mode de protection “q” et les composants Ex peuvent contenir des circuits électroniques, des transformateurs, des fusibles de protection, des relais, des matériels électriques de sécurité intrinsèque, des matériels électriques associés, des interrupteurs, etc.

NOTE 2 Le mode de protection par remplissage pulvérulent “q” procure un Niveau de Protection du Matériel (EPL[1]) Gb ou Mb.

La présente norme complète et modifie les exigences générales de l’IEC 60079-0. Lorsqu’une exigence de la présente norme diverge d’une exigence de l’IEC 60079-0, l’exigence de cette norme prévaut.

La présente norme s'applique aux appareils électriques, aux parties d'appareil électrique et aux composants Ex avec:

– un courant assigné d'alimentation inférieur ou égal à 16 A;
– une tension assignée d'alimentation inférieure ou égale à 1 000 V;
– une puissance consommée assignée inférieure ou égale à 1 000 W.

2 Références normatives

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. Pour les références datées, seule l’édition citée s’applique. Pour les références non datées, la dernière édition du document de référence s’applique (y compris les éventuels amendements).

IEC 60079-0, *Atmosphères explosives – Partie 0: Matériel – Exigences générales*

IEC 60079-7, *Atmosphères explosives – Partie 7: Protection de l'équipement par sécurité augmentée "e"*

IEC 60079-11, *Atmosphères explosives – Partie 11: Protection de l'équipement par sécurité intrinsèque "i"*

IEC 60127, (toutes les parties), *Coupe-circuit miniatures*

IEC 60529, *Degrés de protection procurés par les enveloppes (Code IP)*

IEC 61558-1, *Sécurité des transformateurs, alimentations, bobines d'inductance et produits analogues – Partie 1: Exigences générales et essais*

_____

1 EPL = *equipment protection level*

IEC 61558-2-6, *Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et produits analogues pour des tensions d'alimentation jusqu'à 1 100 V – Partie 2-6: Règles particulières et essais pour les transformateurs de sécurité et les blocs d'alimentation incorporant des transformateurs de sécurité*

ISO 2859-1, *Règles d'échantillonnage pour les contrôles par attributs – Partie 1: Procédures d'échantillonnage pour les contrôles lot par lot, indexés d'après le niveau de qualité acceptable (NQA)*

ISO 3310-1, *Tamis de contrôle – Exigences techniques et vérifications – Partie 1: Tamis de contrôle en tissus métalliques*

ISO 3310-2, *Tamis de contrôle – Exigences techniques et vérifications – Partie 2: Tamis de contrôle en tôles métalliques perforées*

ISO 2591-1, *Tamisage de contrôle – Partie 1: Modes opératoires utilisant des tamis de contrôle en tissus métalliques et en tôles métalliques perforées*