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INTERNATIONAL STANDARD

colour inside

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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EXPLOSIVE ATMOSPHERES –

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

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.
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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.
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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 of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60079-31:2013. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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.

The significance of changes between IEC Standard, IEC 60079-31, Edition 3.0 and IEC 60079-31, Edition 2.0, are as listed below:

		Type		
Changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Document has been restructured from edition 2	Numerous	X		
Withstand of prospective short-circuit current	4.3.1		X	
Fault current rating of interrupting contacts rated greater than 10 kA for mains connected circuits	4.4.1 and 6.1.1.1			C1
Thermal protective device can include a thermal protective circuit with an appropriate sensor.	4.4.4.1		X	
Cells and batteries	4.3.6 and 4.4.5			C2
Joints employing parallel threads with an additional seal or gasket are permitted to have less than five threads.	5.1.2		X	
Gasket joints that interlock (not a butt joint) and are designed such that under the intended compression no gap between the pieces exist so that an uninterrupted periphery is formed, these joints do not need to be permanently joined.	5.1.3		X	
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	A1		

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. More guidance may be found by referring to the Redline Version of the standard.

Explanations:

A) Definitions

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.

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.

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 – For Ex Equipment having Level of Protection "tb" or "tc" which is intended for mains connection and intended to interrupt fault current above 10kA is tested according to 6.1.1.1, and is marked according to Clause 7.

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

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

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

A1 – Thermal tests formerly located in 6.1.2 are relocated to IEC 60079-0 for the 2017 and later editions.

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

Draft	Report on voting
31/1595/FDIS	31/1606/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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.

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INTRODUCTION

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent. IEC takes no position concerning the evidence, validity, and scope of this patent right.

The holder of this patent right has assured IEC that s/he is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with IEC. Information may be obtained from the patent database available at http://patents.iec.ch.

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EXPLOSIVE ATMOSPHERES –

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

1 Scope

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

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.

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

This document does not apply to ~~electrical equipment~~ Ex Equipment or Ex Components intended for use in underground parts of mines as well as those parts of surface installations of such mines endangered by firedamp and/or combustible dust.

This document does not take account of any ~~risk~~ hazard due to an emission of flammable or toxic gas from the dust.

~~Consideration of additional protective measures is required where the application of electrical equipment is in atmospheres, which can contain combustible dust and explosive gas, whether simultaneously or separately.~~

This document does not contain requirements for Ex Equipment used in areas where both combustible dust and explosive gas atmospheres can occur, whether simultaneously or separately. Requirements for explosive gas atmospheres can be found in other parts of the IEC 60079 series. Guidance on Ex Equipment to be used where combustible dust and explosive gas atmospheres occur simultaneously ("hybrid mixtures") can be found in IEC 60079-14.

Where the ~~electrical equipment~~ Ex Equipment has to meet other environmental conditions, for example, protection against ingress of water and resistance to corrosion, additional measures which do not adversely affect the integrity of the enclosure can be necessary. ~~The measures used should not adversely affect the integrity of the enclosure.~~

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 60127 (all parts), *Miniature fuses*

IEC 60269 (all parts), *Low-voltage fuses*

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

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

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

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

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

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

IEC 60079-31

Edition 3.0 2022-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Atmosphères explosives –
Partie 31: Protection contre l'inflammation de poussières par enveloppe "t" relative à l'appareil



IEC 60079-31:2022-01(en-fr)

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Thermal protective device can include a thermal protective circuit with an appropriate sensor.	4.4.4.1		X	
Cells and batteries	4.3.6 and 4.4.5			C2
Joints employing parallel threads with an additional seal or gasket are permitted to have less than five threads.	5.1.2		X	
Gasket joints that interlock (not a butt joint) and are designed such that under the intended compression no gap between the pieces exist so that an uninterrupted periphery is formed, these joints do not need to be permanently joined.	5.1.3		X	
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C3 – Table 2 now includes malfunction conditions for temperature class determination of Level of Protection "tb" converter-fed electric machines.

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

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EXPLOSIVE ATMOSPHERES –

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

This document does not take account of any hazard due to an emission of flammable or toxic gas from the dust.

This document does not contain requirements for Ex Equipment used in areas where both combustible dust and explosive gas atmospheres can occur, whether simultaneously or separately. Requirements for explosive gas atmospheres can be found in other parts of the IEC 60079 series. Guidance on Ex Equipment to be used where combustible dust and explosive gas atmospheres occur simultaneously ("hybrid mixtures") can be found in IEC 60079-14.

Where the Ex Equipment has to meet other environmental conditions, for example, protection against ingress of water and resistance to corrosion, additional measures which do not adversely affect the integrity of the enclosure can be necessary.

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

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

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

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

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

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

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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ATMOSPHÈRES EXPLOSIVES –

Partie 31: Protection contre l'inflammation de poussières par enveloppe "t" relative à l'appareil

AVANT-PROPOS

1) La Commission Électrotechnique 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. À 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.
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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.

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

Cette troisième édition annule et remplace la deuxième édition parue en 2013. Cette édition constitue une révision technique.

L'importance des modifications entre l'IEC 60079-31, Édition 3.0 et l'IEC 60079-31, Édition 2.0 est indiquée ci-dessous:

		Type		
Modifications	**Article/ Paragraphe**	**Modifications mineures et rédactionnelles**	**Extension**	**Modifications techniques majeures**
Le document a été restructuré par rapport à l'édition 2	Plusieurs articles	X		
Tenue du courant de court-circuit présumé	4.3.1		X	
Caractéristiques assignées de courant de défaut des contacts de coupure supérieures à 10 kA pour les circuits connectés avec le secteur.	4.4.1 et 6.1.1.1			C1
Le dispositif de protection thermique peut comprendre un circuit de protection thermique avec un capteur approprié.	4.4.4.1		X	
Piles et batteries	4.3.6 et 4.4.5			C2
Les joints à filets parallèles avec scellement ou garniture supplémentaire sont autorisés à avoir moins de cinq filets.	5.1.2		X	
Il n'est pas nécessaire de raccorder en permanence les joints avec garniture à verrouillage (pas un joint bout à bout) et qui sont conçus de telle sorte que, en compression prévue, aucun espace entre les pièces n'existe au risque de former une périphérie ininterrompue.	5.1.3		X	
Conditions de surcharge ou de dysfonctionnement relatives à la détermination de la classe de température pour les machines électriques tournantes alimentées par un convertisseur "tb".	Tableau 2			C3
Exigences supplémentaires pour les dispositifs d'entrée équipés d'une protection contre l'inflammation de poussières par enveloppe "t"	Annexe A			C4
Les essais thermiques ont été intégrés à l'IEC 60079-0.	Précédemment 6.1.2	A1		

NOTE Les modifications techniques désignées incluent l'importance des modifications techniques apportées dans la version révisée de la Norme IEC, mais il ne s'agit pas d'une liste exhaustive de toutes les modifications apportées à la version précédente. Des recommandations supplémentaires peuvent être consultées dans la version Redline de la norme.

Explications:

A) Définitions

Modifications mineures et rédactionnelles

clarification
diminution des exigences techniques
modification technique mineure
corrections rédactionnelles

Ces modifications portent sur les exigences et sont de nature rédactionnelle ou technique mineure. Elles comprennent des modifications de formulation destinées à clarifier les exigences techniques sans apporter de modification technique ni réduire le niveau actuel de l'exigence.

Extension ajout d'options techniques

Ces modifications ajoutent de nouvelles exigences techniques ou modifient les exigences techniques existantes, de manière à fournir de nouvelles options sans toutefois augmenter les

niveaux d'exigences pour les appareils qui sont totalement conformes à la norme précédente. Par conséquent, ces modifications ne doivent pas être prises en considération dans le cas de produits conformes à l'édition précédente.

Modifications techniques majeures

ajout d'exigences techniques
augmentation des exigences techniques

Ces modifications sont apportées aux exigences techniques (ajout, augmentation de leur niveau ou suppression) de telle manière qu'un produit conforme à l'édition précédente ne puisse pas toujours satisfaire aux exigences données dans la dernière édition. Ces modifications doivent être prises en considération dans le cas de produits conformes à l'édition précédente. Des informations supplémentaires relatives à ces modifications sont données à l'Article B) ci-dessous.

NOTE Ces modifications sont représentatives des connaissances technologiques actuelles. Toutefois, il convient qu'elles n'aient généralement aucune influence sur les appareils déjà présents sur le marché.

B) Informations relatives aux origines des "modifications techniques majeures"

C1 – L'Appareil Ex avec le niveau de protection "tb" ou "tc" destiné à la connexion avec le secteur et destiné à interrompre tout courant de défaut supérieur à 10 kA, est soumis à l'essai selon 6.1.1.1, et est marqué selon l'Article 7.

C2 – L'Appareil Ex avec le niveau de protection "ta" qui contient une pile ou une batterie doit seulement utiliser une pile ou batterie à bac hermétique. Pour l'Appareil Ex avec le niveau de protection "tb" ou "tc", pour lequel il existe des contacts qui produisent des étincelles ou des surfaces chaudes, et qui contient une pile ou une batterie, seule une pile ou batterie à bac hermétique doit être utilisée.

C3 – Le Tableau 2 comporte désormais les conditions de dysfonctionnement pour la détermination de la classe de température des machines électriques alimentées par un convertisseur de niveau de protection "tb".

C4 – Ajout de l'Annexe A pour les dispositifs d'entrée avec le mode de protection "t", y compris les dispositifs de passage de câbles.

A1 – Les essais thermiques précédemment spécifiés en 6.1.2 ont été intégrés à l'IEC 60079-0 pour l'édition 2017 et celles à venir.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
31/1595/FDIS	31/1606/RVD

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

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Le présent document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

Le comité a décidé que le contenu du présent document 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 au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

INTRODUCTION

La Commission Électrotechnique Internationale (IEC) attire l'attention sur le fait qu'il est déclaré que la conformité avec les dispositions du présent document peut impliquer l'utilisation d'un brevet. L'IEC ne prend pas position quant à la preuve, à la validité et à la portée de ces droits de propriété.

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ATMOSPHÈRES EXPLOSIVES –

Partie 31: Protection contre l'inflammation de poussières par enveloppe "t" relative à l'appareil

1 Domaine d'application

La présente partie de l'IEC 60079 est applicable à l'appareil protégé par enveloppe et limitation de la température de surface, pour une utilisation en atmosphère de poussières explosives. Elle spécifie les exigences de conception, de construction et d'essai pour l'Appareil Ex et les Composants Ex.

Le présent document complète et modifie les exigences générales de l'IEC 60079-0. Lorsqu'une exigence du présent document est en contradiction avec une exigence de l'IEC 60079-0, l'exigence du présent document prévaut.

Le présent document ne s'applique pas aux poussières d'explosifs dont la combustion n'exige pas l'oxygène de l'air ni aux substances pyrotechniques.

Le présent document ne s'applique ni à l'Appareil Ex ni aux Composants Ex destinés à une utilisation dans les parties souterraines des mines, ni aux parties des installations de surface des mines dans lesquelles il existe des risques de grisou et/ou de poussières combustibles.

Le présent document ne prend en compte aucun danger qui résulte d'une émission de gaz inflammable ou toxique qui provient de la poussière.

Le présent document ne contient aucune exigence relative à l'Appareil Ex utilisé dans les emplacements où les atmosphères de poussières combustibles et les atmosphères explosives gazeuses peuvent toutes deux survenir, soit de manière simultanée, soit séparément. Les autres parties de la série IEC 60079 comportent les exigences relatives aux atmosphères explosives gazeuses. L'IEC 60079-14 fournit des recommandations relatives à l'Appareil Ex à utiliser dans un environnement où surviennent de manière simultanée des atmosphères de poussières combustibles et des atmosphères explosives gazeuses ("mélanges hybrides").

Lorsque l'Appareil Ex doit satisfaire à d'autres conditions environnementales, par exemple, la protection contre la pénétration d'eau et la résistance à la corrosion, des mesures supplémentaires qui ne portent pas atteinte à l'intégrité de l'enveloppe peuvent être nécessaires.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document 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, *Explosive atmospheres – Part 0: Equipment – General requirements* (disponible en anglais seulement)

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

IEC 60269 (toutes les parties), *Fusibles basse tension*

IEC 60691*, Protecteurs thermiques – Exigences et guide d'application*

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

IEC 60034-5, *Machines électriques tournantes – Partie 5: Degrés de protection procurés par la conception intégrale de machines électriques tournantes (code IP) – Classification*

ISO 965-1, *Filetages métriques ISO pour usages généraux – Tolérances – Partie 1: Principes et données fondamentales*

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

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