

INTERNATIONAL ELECTROTECHNICAL COMMISSION

IEC 60079-11
Edition 5.0 2006-07

EXPLOSIVE ATMOSPHERES –

Part 11: Equipment protection by intrinsic safety "i"

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by subcommittee 31G: Intrinsically-safe apparatus, of IEC technical committee 31: Equipment for explosive atmospheres.

The text of this interpretation sheet is based on the following documents:

DISH	Report on voting
31G/310/DISH	31G/313/RVDISH

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

Background

IEC 60079-11:2006 subclause 10.5.3 b) states the following:

The maximum surface temperature shall be determined as follows:

All current-limiting devices external to the cell or battery shall be short-circuited for the test. Any external sheath (of paper or metal, etc.) not forming part of the actual cell enclosure shall be removed for the test. The temperature shall be determined on the outer enclosure of each cell or battery and the maximum figure taken. The test shall be carried out both with internal current-limiting devices in circuit and with the devices short-circuited using 10 cells in each case. The 10 samples having the internal current-limiting devices short-circuited shall be obtained from the cell/battery manufacturer together with any special instructions or precautions necessary for safe use and testing of the samples.

The intent of the cited paragraphs is to simulate an internal short inside a cell, by shorting the cell's external terminals for the purpose of thermal assessment.

It was found that two details have been misinterpreted in this subclause:

- a) The subjects of this subclause are cells or batteries, while the intent is clearly to simulate internal shorts inside cells and not inside batteries in which case the shorts could be interpreted as being external to the cell(s) within a battery.

- b) It is unclear what constitutes a current limiting device that protects against internal shorts.

A separator with shutdown function may be interpreted as a current limiting device that protects against internal shorts by its function, but since it is a constructional part of the cell that is not removable without invalidating the functionality of the basic cell, it is not a current limiting device for the purposes of implementing the standard. Conversely, a CID (Current interruption device), for example, is a switch that is triggered by increased pressure inside the cell, and the cell's functionality is not invalidated by the absence of the CID.

The reference to internal current limiting devices that protect against internal shorts in edition 6 was included to address unknown future cell technologies which could include such current limiting devices, however at this time no such current limiting devices are known.

Question

For either Level of Protection "ia" or "ib", what are the current limiting devices that are required to be disabled (or equivalent e.g. not fitted, short-circuited or removed) by IEC 60079-11:2006, Subclause 10.5.3 b), and what are the current limiting devices that need not be disabled?

Answer

All discrete protective devices that can be schematically represented as individual devices apart from the cell are to be disabled for the purposes of testing according to IEC 60079-11:2006, Subclause 10.5.3 b), regardless if they are located inside the cell or if they are external to the cell. This includes, but is not limited to resistors, fuses, resettable fuses (NTC, PTC, PPTC), CID (current interruption device), semiconductors, etc.

Features that provide essential cell functions, such as a separator with shutdown function or the ohmic resistance of the electrolyte, are not considered current limiting devices in the sense of this clause and need not be shorted or removed, and such cells can be considered for Level of Protection "ia".

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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ATMOSPHÈRES EXPLOSIVES –

Partie 11: Protection de l'équipement par sécurité intrinsèque "i"

FEUILLE D'INTERPRÉTATION 1

Cette feuille d'interprétation a été établie par le sous-comité 31G: Matériels à sécurité intrinsèque, du comité d'études 31 de l'IEC: Equipements pour atmosphères explosives.

Le texte de cette feuille d'interprétation est issu des documents suivants:

DISH	Rapport de vote
31G/310/DISH	31G/313/RVDISH

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

Contexte

Les deuxième et troisième alinéas de l'IEC 60079-11:2006, 10.5.3 b) spécifient ce qui suit:

La température maximale de surface doit être déterminée comme suit:

Tous les dispositifs de limitation de courant extérieurs à l'élément ou à la batterie doivent être court-circuités pour l'essai. Tout fourreau externe (de papier ou métallique, etc.) ne faisant pas partie de l'enveloppe même de l'élément doit être enlevé pour l'essai. La température doit être déterminée sur l'enveloppe externe de chaque élément ou batterie, et on doit retenir la valeur maximale. L'essai doit être effectué avec les dispositifs internes de limitation de courant en circuit puis en court-circuit, en utilisant 10 éléments dans chaque cas. Les 10 échantillons ayant les dispositifs internes de limitation de courant court-circuités doivent être fournis par le fabricant de l'élément ou de la batterie avec toutes les instructions ou précautions particulières nécessaires pour une utilisation et une mise en essai sûres des échantillons.

L'objectif des alinéas cités est de simuler un court-circuit interne à l'intérieur d'un élément, en court-circuitant les bornes externes de l'élément dans le cadre de l'évaluation thermique.