IEC 60079-29-3

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Explosive atmospheres – Part 29-3: Gas detectors – Guidance on functional safety of fixed gas detection systems

Atmosphères explosives – Partie 29-3: Détecteurs de gaz – Recommandations relatives à la sécurité fonctionnelle des systèmes fixes de détection de gaz

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

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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EXPLOSIVE ATMOSPHERES –

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FOREWORD

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International Standard IEC 60079-29-3 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This part of IEC 60079-29 is to be used in conjunction with the following standards:

- IEC 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*
- IEC 60079-29-1, *Explosive atmospheres – Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases*
- IEC 60079-29-2, *Explosive atmospheres – Part 29-2: Gas detectors – Selection, installation, use and maintenance of detectors for flammable gases and oxygen*
- IEC 60079-29-4, *Explosive atmospheres – Part 29-4: Gas detectors – Performance requirements of open path detectors for flammable gases*

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

FDIS	Report on voting
31/1105A/FDIS	31/1117/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.

A list of all parts of the 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 web site 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- withdrawn,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.

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INTRODUCTION

Fixed gas detection systems have been used for many years to perform safety instrumented functions. Like any instrumented system, a fixed gas detection system commonly comprises of a single or multiple gas detector input(s), a control unit and a single or multiple final element(s) or output(s). Additional peripheral equipment may be incorporated into a fixed gas detection system e.g. a gas sampling system or a gas conditioning system. If a fixed gas detection system, including any relevant peripheral equipment is to be effectively used for safety instrumented functions, it is essential that the total system achieves certain minimum standards and performance levels.

It is important to understand that the number of sensing points and their appropriate location, their redundancy, the management of regular maintenance, specifically response checking or calibration, and other gas detection specific features (such as design of gas sampling systems) are all likely to have a far greater effect on the integrity of the overall Safety Instrumented System (SIS) than the required Safety Integrity Level (SIL) or SIL-capability of any of the individual functional units. This, however, does not exclude the requirement for each Safety Instrumented Function (SIF) to have a stand-alone functional integrity.

This international standard addresses the minimum standards and performance levels of a fixed gas detection system which is based on the use of electrical, electronic or programmable electronic systems (E/E/PES) for any application where there is either a risk reduction target stated or if the gas detection system is used as an additional safe guarding system.

This international standard does not apply to portable gas detectors or fixed gas detection systems when there is no risk reduction target stated. However, this standard could be used as a best practice document for such devices or systems.

The expression ‘gas detection system’ within this international standard is generic and applies to standalone fixed gas detectors, which might have their own internal alarm trip levels and switching outputs up to complex standalone fixed gas detection systems (Annex A – Typical Applications).

This international standard takes into consideration the possible complexity of the supply chain which a gas detection manufacturer, seller or system integrator might encounter which includes, but is not limited to:

- the use of standalone gas detectors which are integrated into an overall safety system by a gas detection equipment manufacturer, seller or system integrator (or equivalent)
- the design and use of fixed gas detection sub-systems, including any associated and/or peripheral gas detection equipment which are integrated into an overall safety system by a gas detection equipment manufacturer, seller or system integrator (or equivalent)
- the design and use of a complete fixed gas detection system, including associated and/or peripheral gas detection equipment which is the overall safety system

NOTE IEC 61508 Parts 1, 2 and 3 cover the design of the stand-alone gas detector, control unit or final element. Guidance on the design of peripheral equipment is included within this international standard.

Before this international standard can be applied, it is important to understand and categorise the application of the fixed gas detection system. The three main applications are:

- as a prevention system – the total system or an individual instrumented control loop has a safety function and safety integrity clearly defined.
- as a mitigation system – the total system or an individual instrumented control loop has a safety function and safety integrity clearly defined.
- as an additional safe guarding system – this covers those fixed gas detection systems or individual instrumented control loops which operate in parallel (secondary) to an