

INTERNATIONAL STANDARD

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**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**



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CONTENTS

| | |
|---|----|
| FOREWORD | 5 |
| INTRODUCTION | 7 |
| 1 Scope | 10 |
| 2 Normative references | 11 |
| 3 Terms and definitions | 11 |
| 4 Requirements | 13 |
| 4.1 General | 13 |
| 4.2 Demand rate | 13 |
| 5 Gas detection unique features | 13 |
| 5.1 Objective | 13 |
| 5.2 Features | 14 |
| 5.2.1 General | 14 |
| 5.2.2 Sensor location | 14 |
| 5.2.3 Sensor filter elements (passive) | 14 |
| 5.2.4 Sensor filter elements (active) | 14 |
| 5.2.5 Sensor principles | 14 |
| 5.2.6 Poisoning and adverse chemical reactions | 15 |
| 5.2.7 ppm.hr or %vol.hr lifetime | 15 |
| 5.2.8 Negative gas readings | 15 |
| 5.2.9 Hazard and risk analysis | 15 |
| 5.2.10 Preventative effectiveness or mitigation effectiveness | 16 |
| 5.2.11 Cross sensitivities | 16 |
| 5.2.12 Special states | 16 |
| 5.2.13 Metrological performance standards | 16 |
| 5.2.14 Fault signal handling | 16 |
| 5.2.15 Over-range indication | 16 |
| 5.2.16 Surrogate calibration | 16 |
| 5.2.17 Maximum/minimum alarm set points | 17 |
| 6 Functional safety management | 17 |
| 6.1 Objective | 17 |
| 6.2 Requirements | 17 |
| 6.3 Competence | 18 |
| 7 General requirements | 19 |
| 7.1 Objective | 19 |
| 7.2 Requirements | 19 |
| 7.2.1 General | 19 |
| 7.2.2 Safety and non safety functions | 19 |
| 7.2.3 Safety functions of different integrity targets | 19 |
| 7.2.4 Behaviour under dangerous failure conditions | 19 |
| 7.2.5 Behaviour under safe failure conditions | 20 |
| 7.2.6 Behaviour under special state conditions | 20 |
| 7.2.7 Power supply | 21 |
| 7.2.8 Gas detector | 21 |
| 7.2.9 Gas detection control unit (logic solver) | 21 |
| 7.2.10 Final element (actuator) | 22 |
| 7.2.11 Visual indication | 22 |

| | | |
|--------|---|----|
| 7.2.12 | Switching outputs | 22 |
| 7.2.13 | Protocol outputs | 24 |
| 7.2.14 | Protocol inputs..... | 24 |
| 7.2.15 | System architecture, PFD and PFH values | 24 |
| 8 | Gas detection unique requirements | 24 |
| 8.1 | Objectives..... | 24 |
| 8.2 | Requirements | 25 |
| 8.2.1 | Introduction to gas sampling | 25 |
| 8.2.2 | Gas sampling..... | 25 |
| 8.2.3 | Gas multiplexer | 26 |
| 8.2.4 | Gas multiplexer control system | 27 |
| 8.2.5 | Conditioning of measured gas | 27 |
| 8.2.6 | Gas sampling by diffusion mode | 28 |
| 8.2.7 | Automatic calibration and adjustment..... | 28 |
| 8.2.8 | Automatic calibration and adjustment control system | 29 |
| 9 | Alternative control units (logic solvers) | 30 |
| 9.1 | Objectives..... | 30 |
| 9.2 | Requirements | 30 |
| 9.2.1 | Performance (metrological)..... | 30 |
| 9.2.2 | Programming of logic..... | 30 |
| 10 | Factory acceptance testing | 30 |
| 10.1 | Objectives..... | 30 |
| 10.2 | Requirements | 30 |
| 10.2.1 | Planning | 30 |
| 10.2.2 | Execution | 31 |
| 11 | Installation and commissioning | 31 |
| 11.1 | Objectives..... | 31 |
| 11.2 | Requirements | 32 |
| 11.2.1 | Planning | 32 |
| 11.2.2 | Execution | 32 |
| 12 | System validation | 33 |
| 12.1 | Objectives..... | 33 |
| 12.2 | Requirements | 33 |
| 12.2.1 | Planning | 33 |
| 12.2.2 | Execution | 33 |
| 13 | Operation and maintenance..... | 34 |
| 13.1 | Objectives..... | 34 |
| 13.2 | Requirements | 34 |
| 13.2.1 | Planning | 34 |
| 13.2.2 | Execution | 34 |
| 14 | System modification | 35 |
| 14.1 | Objectives..... | 35 |
| 14.2 | Requirements | 35 |
| 14.2.1 | Planning | 35 |
| 14.2.2 | Execution | 35 |
| 15 | System decommissioning | 36 |
| 15.1 | Objectives..... | 36 |
| 15.2 | Requirements | 36 |

| | | |
|-----------------------|--|----|
| 15.2.1 | Planning | 36 |
| 15.2.2 | Execution | 36 |
| 16 | Documentation | 37 |
| 16.1 | Objectives..... | 37 |
| 16.2 | Requirements | 37 |
| Annex A (informative) | Typical Applications | 38 |
| A.1 | Typical diffusion applications | 39 |
| A.1.1 | Application 1..... | 39 |
| A.1.2 | Application 2..... | 40 |
| A.1.3 | Application 3..... | 40 |
| A.1.4 | Application 4..... | 40 |
| A.2 | Typical sampling applications..... | 41 |
| A.2.1 | Point to Point sampling..... | 41 |
| A.2.2 | Multi-stream sampling..... | 42 |
| Annex B (informative) | Cross references between standards..... | 43 |
| Annex C (informative) | Transformation of requirements..... | 44 |
| C.1 | General..... | 44 |
| C.2 | SIL capability 1 | 44 |
| C.2.1 | Characteristic | 44 |
| C.2.2 | Transformation | 44 |
| C.3 | SIL capability 2 | 44 |
| C.3.1 | Characteristic | 44 |
| C.3.2 | Transformation | 45 |
| C.4 | SIL capability 3 | 45 |
| C.4.1 | Characteristic | 45 |
| C.4.2 | Transformation | 45 |
| Bibliography | | 46 |
| Figure 1 | – Gas Detection System Architecture | 8 |
| Figure 2 | – Related Safety Instrumented System Standards..... | 10 |
| Figure A.1 | – Gas detection safety loops..... | 39 |
| Figure A.2 | – Typical gas detector aspiration configurations..... | 41 |
| Figure B.1 | – Cross references between standards | 43 |
| Table 1 | – Typical Job Descriptions and Most Relevant Clauses | 9 |
| Table 2 | – Demand for Functional Safety Management (see IEC 61508-1)..... | 18 |

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EXPLOSIVE ATMOSPHERES –**Part 29-3: Gas detectors – Guidance on
functional safety of fixed gas detection systems**

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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

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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 1 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