AMERICAN NATIONAL STANDARD

ANSI/ISA-60079-29-2 (12.13.02)-2012

Explosive Atmospheres – Part 29-2: Gas detectors – Selection, installation, use and maintenance of detectors for flammable gases and oxygen

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INTRODUCTION

Flammable gas detection apparatus may be used whenever there is the possibility of a hazard to life or property caused by the accumulation of a flammable gas-air mixture. Such apparatus can provide a means of reducing the hazard by detecting the presence of a flammable gas and issuing suitable audible or visual warnings. Gas detectors may also be used to initiate precautionary steps (for example plant shutdown, evacuation, and operation of fire extinguishing procedures).

Apparatus may be used to monitor a gas atmosphere below the lower flammable limit in circumstances where accumulation of gas may result in a concentration of the gas/air mixture to potentially explosive levels. Performance requirements for gas detecting apparatus for such purposes are set out in ~~IEC~~ ISA-60079-29-1 and ANSI/ISA-12.13.04. However performance capability alone cannot ensure that the use of such apparatus will properly safeguard life or property where flammable gases may be present. The level of safety obtained depends heavily upon correct selection, installation, calibration and periodic maintenance of the apparatus, combined with knowledge of the limitations of the detection technique required. This cannot be achieved without responsible informed management.

An additional hazard to life is the toxicity of some gases and of the vapours of all liquids except water. It is not generally appreciated that all flammable vapours are potentially toxic at concentration levels which are very small fractions of their respective lower flammable limits. Apparatus covered by the ~~IEC~~ ISA-60079-29-1 and ANSI/ISA-12.13.04 is not specifically intended for toxic protection, and additional personal protection precautions will normally be needed where personnel could be exposed to toxic vapours.

Portable apparatus covered by the ~~IEC~~ ISA-60079-29-1 and the ~~IEC~~ ANSI/ISA-60079-29-2 commonly have additional detectors for specific toxic gases and also for oxygen deficiency. Users are cautioned that even mild oxygen deficiency may be due to toxic concentrations of some other gas or vapour, which may not be detectable or adequately detected by the apparatus in use.

Minimum requirements for the instruction manual of any particular ~~General requirements for the handbook or manual of any particular~~ flammable gas detection apparatus are specified in ~~IEC~~ ISA-60079-29-1 and ANSI/ISA-12.13.04. ~~This~~ These standards provide~~s~~ some necessary background knowledge on the points mentioned above.

This standard has been specifically written to cover all the functions necessary ~~to go~~ from the need for gas detection all the way through ongoing maintenance of a successful gas detection operation. Different clauses are appropriate for different tasks within this range of operations. Each clause has been written as stand-alone as far as practicable. This means~~t~~ that some information is repeated in different clauses but with a different emphasis.

The following table gives a broad suggestion as to the most relevant clauses to the typical~~ly~~ tasks to be performed.

	Definitions	Basic information properties of gas and vapours	Measuring principles	Selection of apparatus	Behaviour of gas releases	Design and installation of fixed gas detection systems	Use of portable and transportable flammable gas detection apparatus	Training of operational personnel	Maintenance, routines procedures, and Ggeneral administrative control	Measuring principles (full detail) (normative)	Environmental parameters (informative)
Function (Clause)	3	4	5	6	7	8	9	10	11	Annex A	Annex B
Authorities	+	+++	+++	+	+	-	-	-	+	-	-
General management	+	+++	+++	+	+	-	-	+	+	-	+
Selection	+++	+++	+	+++	+++	+	++	-	+	+++	+++
Design engineering / management	+++	+++	+	+++	+++	+++	-	-	-	+++	+++
Installation engineering / management	+++	+++	+	++	+++	+++	-	-	-	+++	+++
Installation, technical	++	+++	++	++	++	++	-	-	-	+	++
Commissioning	+++	+++	++	+	++	+++	-	++	+	-	-
Operations management	++	+++	++	+	+	++	++	+++	+++	+	+++
Operation training	+++	+++	+	+	+	+++	+++	+++	+++	+++	+++
Servicing / Calibration	+++	+++	-	-	-	++	++	+	+++	++	++
Repair	++	+++	++	-	-	+	+	+	+++	++	-

"+++" Essential
"++" Advisable
"+" Useful
"-" Not applicable
NOTE It should be noted that Clause 5 is a simplified version of Annex A.

This standard makes recommendations how to establish maintenance and calibration intervals. In certain countries there are general or industry-specific regulations that are mandatory and those shall be followed as a minimum requirement.

1 Scope

This part of ~~IEC~~ ISA-60079-29 gives guidance on, and recommended practice for, the selection, installation, ~~safe~~ use and maintenance of electrically operated group II apparatus intended for use in industrial and commercial safety applications for the detection and measurement of flammable gases complying with the requirements of ~~IEC~~ ISA-60079-29-1 and ANSI/ISA-12.13.04.

This standard is applicable for oxygen measurement for the purpose of inertisation where explosion protection is provided by the exclusion of oxygen instead of measuring the combustible gases or vapours present.

This standard is a compilation of practical knowledge to assist the user, and applies to apparatus, instruments and systems that indicate the presence of a flammable or potentially explosive mixture of gas or vapour with air by using an electrical signal from a gas sensor to produce a meter reading, to activate a visual or audible pre-set alarm or other device, or any combination of these.

Such apparatus may be used as a means of reducing the risk whenever there is the possibility of a risk to life or property specifically due to the accumulation of a combustible gas-air mixture, by providing such warnings. It may also be used to initiate specific safety precautions (e.g. plant shutdown, evacuation, fire extinguishing procedures).

This standard ~~is applicable~~ can be applied to all new permanent installations and, where reasonably practicable, to existing permanent installations. It is also applicable to temporary installations, whether new or existing.

Similarly it is applicable to the safe use of portable or transportable apparatus, irrespective of the age or complexity of such apparatus. Since much modern apparatus of this type also includes oxygen deficiency detection and/or specific toxic gas sensors, some additional guidance is given for these topics.

NOTE When in explosive gas atmosphere ~~classified~~ areas, the apparatus should be so installed and used such that it is not capable of itself igniting a combustible gas-air mixture. It should therefore comply with the requirements of the area in which the apparatus is to be installed per ~~IEC 60079-10~~ the National Electrical Code®, ANSI/NFPA 70, Articles 500-506.

For the purposes of this standard, except where specifically stated otherwise, flammable gases shall include flammable vapours.

This standard applies only to ~~group II~~ apparatus ~~(i.e. apparatus~~ intended for use in industrial and commercial safety applications, involving areas classified in accordance with ~~IEC 60079-10~~ the National Electrical Code, ANSI/NFPA 70, Articles 500-506~~)~~.

For the purposes of this standard, apparatus includes

a) fixed apparatus;

b) transportable apparatus; and

c) portable apparatus.