

AS 26142:2020



Hydrogen detection apparatus — Stationary applications (ISO 26142:2010 (ED 1.0) MOD)



AS 26142:2020

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Preface

This Standard was prepared by the Standards Australia Committee ME-093, Hydrogen Technologies.

The objective of this document is to define the performance requirements and test methods of hydrogen detection apparatus that is designed to measure and monitor hydrogen concentrations in stationary applications. The provisions in this document cover the hydrogen detection apparatus used to achieve the single and/or multilevel safety operations, such as nitrogen purging or ventilation and/or system shut-off corresponding to the hydrogen concentration.

The requirements applicable to the overall safety system, as well as the installation requirements of such apparatus, are excluded. This document sets out only the requirements applicable to a product standard for hydrogen detection apparatus, such as precision, response time, stability, measuring range, selectivity and poisoning.

This document is an adoption with national modifications, and has been reproduced from ISO 26142:2010, *Hydrogen detection apparatus — Stationary applications*. The modifications are additional requirements and are set out in [Appendix ZZ](#), which has been added at the end of the source text.

[Appendix ZZ](#) lists the variations to ISO 26142:2010, for the application of this document in Australia.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Contents

Preface	ii
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 General requirements	4
4.1 Construction	4
4.1.1 General	4
4.1.2 Enclosure	4
4.1.3 Measuring range	4
4.1.4 Alarm system	4
4.1.5 Indicators	5
4.1.6 Adjustments	5
4.1.7 Software-controlled hydrogen detection apparatus	6
4.1.8 Reliability	7
4.2 Labelling and marking	7
4.3 Instruction manual	8
4.4 Vibration	9
5 Performance requirements	9
6 Tests	9
6.1 General requirements for tests	9
6.1.1 Number of samples	9
6.1.2 Sequence of tests	9
6.1.3 Preparation of the hydrogen detection apparatus before testing	9
6.2 Test equipment	10
6.3 Normal test conditions	10
6.3.1 Temperature	10
6.3.2 Pressure	10
6.3.3 Humidity	10
6.3.4 Voltage	10
6.3.5 Orientation	10
6.4 Test methods	10
6.4.1 General	10
6.4.2 Standard response test	11
6.4.3 Measuring range and calibration	11
6.4.4 Stability	12
6.4.5 Alarm set point(s)	12
6.4.6 Temperature	13
6.4.7 Pressure	13
6.4.8 Humidity	14
6.4.9 Vibration	14
6.4.10 Orientation	15
6.4.11 Flow rate for aspirated apparatus	15
6.4.12 Air velocity	16
6.4.13 Time of response and time of recovery	16
6.4.14 Selectivity	16
6.4.15 Poisoning	17
6.4.16 Operation above the measuring range	17
6.4.17 Power supply variations	18
6.4.18 Power supply interruptions, voltage transients and step changes of voltage	18
6.4.19 Warm-up time after restart	19

6.4.20	Electromagnetic immunity	19
6.4.21	Field calibration kit	19
Annex A	(informative) Chamber test method	20
Annex B	(informative) Flow-through test method	23
Bibliography	26
Appendix ZZ	(normative) Variations to ISO 26142:2010 for Australia	27

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 26142 was prepared by Technical Committee ISO/TC 197, *Hydrogen technologies*.

Introduction

Over the course of several years, international efforts have been initiated for the development of necessary regulations, codes and standards required for the introduction of hydrogen energy systems in consumer environments. Such codes and standards usually require a safety system to detect hydrogen concentrations before a fraction of the flammable or explosive limit is reached, in order to allow for purging, shut-off, and similar safety operations.

This International Standard provides requirements for stationary hydrogen detection apparatus, covering both performance requirements and test methods. This International Standard is intended to cover situations where the user desires the ability to detect hydrogen leaks and monitor hydrogen concentrations relevant to safety. This International Standard is primarily intended for hydrogen detection apparatus at vehicle refuelling stations, where a high level of safety management is required. This sector has an immediate need for this standard and is expected to be the main application for such apparatus, but this standard can also be applied to other stationary installations where the detection of hydrogen is required.

This International Standard is not intended to exclude any specific technologies that meet the performance requirements herein.

This International Standard contains the important quantitative and technical specifications against the danger of hydrogen leakage. This standard will promote international cooperation under easy-to-understand requirements, by leading to widespread use of hydrogen energy.

Benefits to be gained by the implementation of this International Standard include using the performance requirements in the standard to overcome safety concerns and aiding in development of the hydrogen fuel infrastructure.

In this International Standard, attention is concentrated on specific requirements related to performance and testing of hydrogen detection apparatus, such as a specific detection range for single and multiple safety systems, selectivity, poisoning, fast response time, and hydrogen-specific test methods needed by the hydrogen energy industry. This International Standard focuses primarily on stationary hydrogen technologies whose main purpose is to produce, store and handle hydrogen, and not on systems that might generate hydrogen as an undesirable by-product. The purpose of a hydrogen detection apparatus according to this standard is to mitigate risk from unintended hydrogen releases within a wide range of hydrogen concentrations including those exceeding the lower flammability limit.

Hydrogen-related facilities might be required to have the ability to detect hydrogen concentrations before a specified concentration of hydrogen or fraction of flammable limit is reached, in order to allow for single and/or multilevel safety operations, such as nitrogen purging or ventilation and/or system shut-off; or there might be a desire to detect hydrogen concentrations above the lower flammability limit, in order to monitor concentrations following a release. The hydrogen detection apparatus described in this International Standard can detect the hydrogen leak concentration at multiple points determined by users to realize such multilevel safety operations.

Australian Standard[®]

Hydrogen detection apparatus — Stationary applications (ISO 26142:2010 (ED 1.0) MOD)

1 Scope

This International Standard defines the performance requirements and test methods of hydrogen detection apparatus that is designed to measure and monitor hydrogen concentrations in stationary applications. The provisions in this International Standard cover the hydrogen detection apparatus used to achieve the single and/or multilevel safety operations, such as nitrogen purging or ventilation and/or system shut-off corresponding to the hydrogen concentration. The requirements applicable to the overall safety system, as well as the installation requirements of such apparatus, are excluded. This International Standard sets out only the requirements applicable to a product standard for hydrogen detection apparatus, such as precision, response time, stability, measuring range, selectivity and poisoning.

This International Standard is intended to be used for certification purposes.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 14687-1:1999, *Hydrogen fuel — Product specification — Part 1: All applications except proton exchange membrane (PEM) fuel cell for road vehicles*

ISO 14687-1:1999/Cor.2:2008, *Hydrogen fuel — Product specification — Part 1: All applications except proton exchange membrane (PEM) fuel cell for road vehicles — Technical Corrigendum 2*

IEC 61000-4-1, *Electromagnetic compatibility (EMC) — Part 4-1: Testing and measurement techniques — Overview of IEC 61000-4 series*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test*

IEC 60079-0:2008, *Explosive atmospheres — Part 0: Equipment — General requirements*

IEC 60079 (all parts), *Explosive atmospheres*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

alarm set point

fixed or adjustable setting of the hydrogen detection apparatus that is intended to select the hydrogen volume fraction at which an indication, an alarm or another output function will automatically be activated

3.2

ambient air

normal atmosphere surrounding the hydrogen detection apparatus