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Ships and marine technology — Specifications for gas detectors intended for use on board ships —

Part 1: Portable gas detectors for atmosphere testing of enclosed spaces

Navires et technologie maritime — Spécifications pour les détecteurs de gaz destinés à être utilisés à bord des navires —

Partie 1: Détecteurs de gaz portables pour les essais atmosphériques des espaces clos

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 8, *Ships and marine technology*, Subcommittee SC 1, *Lifesaving and fire protection*.

ISO 19891 consists of the following parts, under the general title *Ships and marine technology — Specifications for gas detectors intended for use on board ships*:

— *Part 1: Portable gas detectors for atmosphere testing of enclosed spaces* [Publicly Available Specification]

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Introduction

This part of ISO/PAS 19891 specifies performance, gases to be measured, tolerances for gas measurement, and testing requirements of portable gas detectors used for testing of the atmosphere in enclosed spaces on board ships prior to entry into those spaces, as required by SOLAS regulation XI-1/7 "Atmosphere testing instrument for enclosed spaces".

This part of ISO/PAS 19891 specifies the characteristics that portable gas detectors should be assessed against for items such as: which gases can be measured, sensitivities, indications, alarm levels, protection against shock, temperature and water ingress, and additional requirements for spaces or areas where a risk of explosion exists.

This part of ISO/PAS 19891 specifies the marine environmental conditions in which portable gas detectors are expected to be used.

This part of ISO/PAS 19891 does not define differences between gases and vapours, nor does it give technical detail on calculations and methodology for explosive limits or operational exposure levels. The intent of this part of ISO/PAS 19891 is to simplify the subject to the essentials and use references for the actual scientific standards if more detailed explanations are required.

This part of ISO/PAS 19891 does not provide a specification on how to use portable gas detectors, or how to enter enclosed spaces.

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Ships and marine technology — Specifications for gas detectors intended for use on board ships —

Part 1: Portable gas detectors for atmosphere testing of enclosed spaces

1 Scope

This part of ISO/PAS 19891 provides specifications in performance, gases to be measured, sensitivities, indications, alarm levels, protection against shock, temperature and water ingress, and testing requirements of portable gas detectors used for atmosphere testing of enclosed spaces on board ships prior to entry into those spaces.

This part of ISO/PAS 19891 specifies suitable portable gas detectors for compliance with SOLAS regulation XI-1/7 "Atmosphere testing instrument for enclosed spaces", and can be used for deciding whether portable gas detectors available on the market are suitable for compliance with these SOLAS requirements.

NOTE 1 SOLAS regulation XI-1/7 requires appropriate portable atmosphere testing instrument or instruments to be carried on board ships by 1 July 2016. The SOLAS regulation states that, as a minimum, the appropriate portable atmosphere testing instrument or instruments be capable of measuring concentrations of oxygen, flammable gases or vapours, hydrogen sulphide and carbon monoxide prior to entry into enclosed spaces.

For the purpose of measurement of concentrations of flammable gases or vapours, this part of ISO/PAS 19891 specifies the flammable gas as either "methane" or "propane and butane", and requires clear marking of types of flammable gases which can be measured by the portable gas detectors. For an optimal use of ISO/PAS 19891, it should be noted that flammable vapours/gases which are not marked, cannot be measured, or detected by the portable gas detector.

NOTE 2 Iso-butane can be used as calibration gas of portable gas detectors measuring propane and butane.

This part of ISO/PAS 19891 does not give any indication of the toxicity of the flammable gases.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

SOLAS regulation XI-1/7, *Atmosphere testing instrument for enclosed spaces*

IMO Resolution A.1050(27), *Revised recommendations for entering enclosed spaces aboard ships*, Annex, section 7, Testing the atmosphere

IEC 60079-0:2011, *Explosive atmospheres- Part 0: Equipment — General requirements*

IEC 60079-29-1:2007, *Explosive atmospheres — Part 29-1: Gas detectors — Performance requirements of detectors for flammable gases*

IEC 60079-29-2:2015, *Explosive atmospheres — Part 29-2: Gas detectors — Selection, installation, use and maintenance of detectors for flammable gases and oxygen*

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IEC 60092-504:2001, *Electrical installations in ships — Part 504: Special features — Control and instrumentation*

IEC 60529:2013, *Degrees of protection provided by enclosures (IP Code)*

IEC 60533:1999, *Electrical and electronic installations in ships — Electromagnetic compatibility*

3 Terms and definitions

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

3.1
enclosed space
space which has any of the following characteristics:

1) limited openings for entry and exit;

2) inadequate ventilation; and

3) is not designed for continuous worker occupancy,

and includes, but is not limited to, cargo spaces, double bottoms, fuel tanks, ballast tanks, cargo pump-rooms, cargo compressor rooms, cofferdams, chain lockers, void spaces, duct keels, inter-barrier spaces, boilers, engine crankcases, engine scavenge air receivers, sewage tanks, and adjacent connected spaces

Note 1 to entry: See IMO resolution A.1050(27).

3.2
portable gas detector
device to measure gas or vapour concentrations in the atmosphere and which is portable to be carried on board in order to comply with SOLAS regulation XI-1/7

Note 1 to entry: This does not refer to a personal gas detector that is intended to be carried by an individual whilst inside the enclosed space.

Note 2 to entry: In this part of ISO/PAS 19891, portable gas detector means a “transportable gas detector” or a “portable gas detector” as specified in IEC 60079-29-1:2007.

3.3
external replaceable module
external plug-in sensor which can be directly plugged into a base or via short cable connection

Note 1 to entry: After sensor exchange, the manufacturer’s instructions are to be observed.

4 Specification of portable gas detectors for atmosphere testing of enclosed spaces

4.1 General requirements

4.1.1 Gases required to be measured

A portable gas detector shall clearly indicate gases which are measured by the detector.

A portable gas detector shall only measure gases which are calibrated or which are covered by the cross sensitivity.

Portable gas detectors and sensors shall be selected depending on measuring method and application in accordance with the requirements of IEC 60079-29-2:2015.

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