

Marine Industry

An Introduction

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1. Introduction

Marine industry many portable and fixed gas detectors. Indeed, the use of gas detectors is often compulsory: **SOLAS regulations XI-1/7** requires that vessels have at least one portable gas monitor on board for oxygen and flammable gas detection. In addition to personal detectors, fixed detectors are widely used in various locations throughout the vessel.

Every ship must carry at least one appropriate portable atmosphere-testing instrument which, as a *minimum*, can measure concentrations of oxygen (O₂), flammable gases or vapours, hydrogen sulphide (H₂S) and carbon monoxide (CO) prior to entry into enclosed/confined spaces.

Marine applications often generate extreme temperatures, high humidity and dirty conditions. From O₂ monitoring in cargo room exhausts, to monitoring flammable and toxic gases within various void spaces, to pump room or cabins, fixed systems with sampling are all commonly used in marine settings.

Potential buyers



Shipyard owners and contractors



Ship owner and chandlers



Coast Guard/ Navy



Offshore rigs



Custom inspectors



Ferries

2. Gas Hazards in Marine Industry

Marine vessels can present multiple gas hazards, which makes gas detection and monitoring crucial. The table below shows some examples of such vessels and applications.

Vessel Type	Application
FPSO (Floating, Production, Storage and Offloading)	<ul style="list-style-type: none"> • Flammable gas and hydrogen sulphide detection. • Flammable gas leak detection in pump rooms. • Nitrogen is used to inert tank voids; therefore, oxygen detectors are necessary wherever the nitrogen is stored. • Hydrocarbon and oxygen monitoring during the purging of tanks. • The fixed gas sampling system is dedicated to sequential gas monitoring in tanks, void spaces, pump room or houses adjacent to cargo storage tanks and handling systems. Up to 48 channels can be connected to the sampling system.
Tankers	<ul style="list-style-type: none"> • As above.
Ferries	<ul style="list-style-type: none"> • CO and NOx accumulation from vehicle exhausts.
Submarines	<ul style="list-style-type: none"> • Hydrogen detection in battery rooms. CO₂ leaks from air conditioning systems.
General	<ul style="list-style-type: none"> • CO and NOx detection in engine rooms. • H₂S and O₂ depletion in bilges, arising from the on-board sewage treatment plant. • Vessels carrying food produce, such as grain, will sometimes install H₂S detectors.
Cargo Tanks	<ul style="list-style-type: none"> • Vapour emission control systems are used to analyse waste vapour gas for oxygen gas content. The system includes a pressure transmitter to monitor the pressure on the waste vapour line.

3. Products for Marine Industry

Portable Monitors

T4



- Easy to use one button functionality
 - TWA resume function
 - MED certification
 - Easy servicing and quick turnaround
-

Gas-Pro



- Integrated pump (up to 30 m sampling)
 - One button operation
 - IR sensor for wide range of hydrocarbons
 - MED certified
 - Confined space entry (CSE) kit available
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Gas-ProTK



- Integrated pump
 - One button operation
 - Dual range IR sensor for wide range of hydrocarbons
 - Auto-ranges switch between %vol and %LEL measurements
-

Fixed Monitors

Xgard



- Rugged reliable detector for marine service
-

Xgard Bright



- Addressable
 - Local display
 - Non-intrusive calibration
-

Vortex



- Up to 12 configurable channels
 - MODBUS compatibility
 - SIL 1 (IEC 61508) validated
-

Gasmonitor



- Simple to use
 - Flexible architecture
 - Simple maintenance
-

GM Controllers



- Up to 128 channel inputs
 - Modular configuration
 - Screen display
-

Confined Space Entry in Vessels

On 1 January 2015, within the [SOLAS Resolution MSC.350\(92\)](#), it became mandatory for all crew members with enclosed space entry or rescue responsibilities to participate in an enclosed space entry and rescue drill. These drills are to be held on board the ship at least once every two months.

This regulation states the drill must include:

- Checks and use of PPE (Personal Protective Equipment)
- Checks and use of communications equipment and procedure
- Checks and use of atmosphere-measuring devices
- Checks and use of rescue equipment
- Instruction on first aid and resuscitation

[SOLAS Resolution A.1050\(27\)](#) defines an enclosed space as:

2.1 Enclosed space means a 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.

Marine Standards

Products installed on any marine vessel must comply with internationally recognized regulations. The international standards that apply to a vessel depend upon where it is registered.

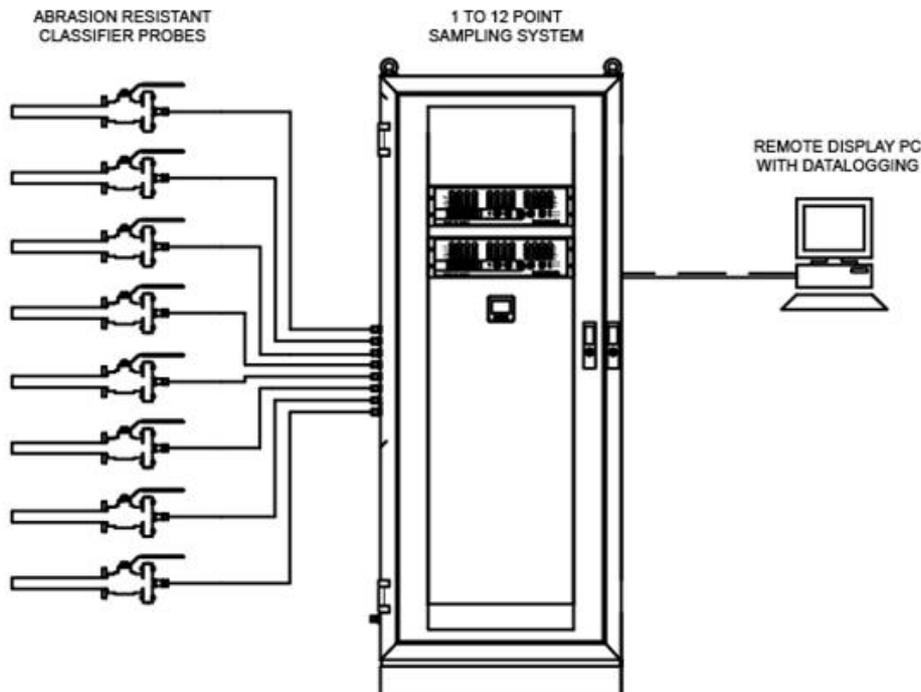
Examples of countries and relevant standards are:

- **EU (European Union) countries: MED (Marine Equipment Directive 96/98/EC).**
- **North America: US Coast Guard (USCG) regulations.**
- **Other countries: SOLAS (Safety of Life At Sea) regulations provide the minimum requirements, however individual countries will require compliance with the standards of their chosen marine insurance body (e.g. BV, DNV etc).**

It is essential that products sold for use on a vessel comply with the standards relevant to the country in which the ship is registered. For example, products fitted to a European-registered vessel undergoing a re-fit in Singapore must comply with the European MED directive.

Sample Handling in Marine

The fixed gas sampling system is dedicated to sequential gas monitoring in tanks, void spaces, pump room or cabin space adjacent to cargo storage tanks and handling systems. Up to 48 channels can be connected to the sampling system. An example of sampling system is shown below.



Picture courtesy of Crowcon China

4. References

1. [Enclosed space ship safety rule enters into force](#) (IMO website, 30 June 2016)
2. [Resolution MSC.350\(92\)](#) (Adopted on 21 June 2013) Amendments to the international convention for the safety of life at sea, 1974, as amended (IMO website, 21 June 2013)
3. [Resolution A.1050\(27\)](#) Adopted on 30 November 2011 (Agenda item 9) Revised recommendations for entering enclosed spaces aboard ships (IMO website, 20 Dec 2011).

ABOUT CROWCON

For over 50 years, Crowcon has been developing and manufacturing high-quality gas detection products, securing a reputation for reliability and technical innovation that continuously improves efficiency and safety. Globally respected, and part of FTSE 100 Halma, today, over 500,000 Crowcon devices are in use around the world.

Our vision is to grow a safer, cleaner, healthier future for everyone, every day, by providing best in class gas sensing solutions. The Crowcon range offers both fixed and portable gas detection equipment enhanced with Crowcon Connect, our digital solution, which protects people and places in industries including petrochemical, oil and gas, water, industrial manufacturing and food production. In every case, we combine our expertise with emerging technologies to develop process insights and protection for our customers, improving their operational efficiency and creating safer, cleaner and healthier workplaces.

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