KEW News	マルチガス検知器･閉鎖区画救助装置		2015/3/11 F

1. はじめに

SOLAS REGULATION XI-1/7の改定に基づき2016年7月1日より少なくとも4種(酸素、一酸化炭素、可燃性ガス、硫化水素)が計測できる可搬型マルチガス検知器の備え付けが就航船も含め全船に強制化されます。

尚、閉鎖区画への立入と救助に関する訓練が2015年1月1日より発効していますのでマルチガス検知器の備え付けも早く行うように勧告されています。詳細につきましては添付の規定をご参照下さい。

添付①:MSC.1/Circ.1485(2015.1.14発行) EARLY IMPLEMENTATION OF SOLAS REGULATION XI-1/7 ON ATMOSPHERE TESTING INSTRUMENT FOR ENCLOSED SPACES

添付②:Resolution A.1050(27) REVISED RECOMMENDATIONS FOR ENTERING ENCLOSED SPACES ABOARD SHIPS

添付③:MSC.1/Circ.1477 GUIDELINES TO FACILITATE THE SELECTION OF PORTABLE ATMOSPHERE TESTING INSTRUMENTS FOR ENCLOSED SPACES AS REQUIRED BY SOLAS REGULATION XI-1/7

IMOが要求するマルチガス検知器の要件は添付③に記載されています。本船の現有ガス検知器がこの要件を満足していない場合は適合する検知器の備え付けが必要になりますので注意して下さい。IMOの主な要件は次の通りです。

・4種以上のガス検知・可搬式・防塵・防水・電池寿命10時間以上・本質安全

2. 國森特別販売キャンペーン製品

現在、マルチガス検知器を備え付けている船舶は石炭積船やタンカーなど一部であり、今後、注文がラッシュして規則発効日までにマルチガス検知器を納入することが困難になる可能性があります。

従って、弊社では下記のマルチガス検知器に限定し特別値引きで販売致します。この機に弊社にご用命頂ければ幸甚です。

対象製品:理研ポータブルマルチガス検知器GX-8000 TYPE-B (添付④ カタログご参照)

測定ガス:CH4/O2/CO/H2S

※GX-8000型でも2種或いは3種のガスしか検知できないタイプがありますので注意して下さい。

バッテリー:リチウムイオン電池(乾電池式の寿命は6時間であり規則要求の10時間以上を満足できません)

ガスサンプリングホース:1m付き (オプションで30mまで使用可能)

価格:貴社担当の弊社スタッフにご相談下さい。

尚、規定には本船校正とリモートサンプリングについても記載されていますので本船校正キットと長尺サンプリングホースも必要であると推察されます。(OPTIONにて準備しています)

3. マルチガス検知器の校正について

ガス検知器の校正は1年毎にメーカーにより行う必要があります。方法としては使用中の機器を陸揚げしてメーカーに送る方法とメーカー又はメーカーが承認した業者の技師が訪船して校正する方法がありますが弊社で手配できます。

メーカー送りによる校正の場合は納期短縮の目的で交換ベースも可能ですが在庫数に限りがありますので前広にご連絡下さい。

中国諸港では技師の訪船校正が可能であり、理研の校正証明書も発行できます。

1年毎の定期交換が必要な部品:センサー4種類、フィルター2種類 等

4. 閉鎖区画の救助装置について

2015年1月1日に発効した閉鎖区域への立入と救助に関する訓練の中に救助装置の準備が記載されていますが具体的な救助装置の内容については触れられていません。

しかしながら添付②のResolution A.1050(27) の6ページにある9.4に救助用ハーネスを着用することが記載されており、付属のチェックリスト例にもハーネスが記載されています。

従って救助用ハーネスを本船に備え付けておくことをお勧めします。

弊社ではハーネスのみならず救助用三脚、ウィンチ等も取り扱っていますので、ご相談下さい

5. その他

今年9月1日から11月30日に閉鎖区画立入に関するPSC集中キャンペーンが実施される予定です。

マルチガス検知器や救助装置の早めの準備をお勧めします。

KEW KUNIMORI ENGINEERING WORKS CO.,LTD 078-686-0320
株式会社 國森

INTERNATIONAL
MARITIME
ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1485
14 January 2015

EARLY IMPLEMENTATION OF SOLAS REGULATION XI-1/7 ON ATMOSPHERE TESTING INSTRUMENT FOR ENCLOSED SPACES

1 The Maritime Safety Committee, at its ninety-third session (14 to 23 May 2014), when approving the draft new SOLAS regulation XI-1/7 "Atmosphere testing instrument for enclosed spaces", recalled that MSC 92 had adopted, by resolution MSC.350(92), SOLAS regulation III/19 "Emergency training and drills" with an entry-into-force date of 1 January 2015, requiring that each enclosed space entry and rescue drill shall include checking and use of instruments for measuring the atmosphere in enclosed spaces.

2 MSC 93, having confirmed that paragraph 3.6.2.3 of SOLAS regulation III/19 does not introduce carriage requirements for atmosphere testing instruments for enclosed spaces, recognized the need to implement the draft new SOLAS regulation XI-1/7 early, in order to expedite the carriage of portable atmosphere testing instruments for enclosed spaces.

3 Consequently, the Maritime Safety Committee, at its ninety-fourth session (17 to 21 November 2014), in adopting resolution MSC.380(94) on *Amendments to the International Convention for the Safety of Life at Sea, 1974*, as amended, invited SOLAS Contracting Governments to voluntarily implement SOLAS regulation XI-1/7, as set out below, to ships entitled to fly their flags, as soon as practicable, taking into account that the entry-into-force date of the corresponding amendments to SOLAS is 1 July 2016:

> **"Regulation 7 - Atmosphere testing instrument for enclosed spaces**
>
> Every ship to which chapter I applies shall carry an appropriate portable atmosphere testing instrument or instruments*. As a minimum, these shall be capable of measuring concentrations of oxygen, flammable gases or vapours, hydrogen sulphide and carbon monoxide prior to entry into enclosed spaces**. Instruments carried under other requirements may satisfy this regulation. Suitable means shall be provided for the calibration of all such instruments.
>
> * Refer to the *Guidelines to facilitate the selection of portable atmosphere testing instruments for enclosed spaces as required by SOLAS regulation XI-1/7* (MSC.1/Circ.1477).
>
> ** Refer to the *Revised recommendations for entering enclosed spaces aboard ships* (resolution A.1050(27))."

4 Member Governments are invited to bring this circular to the attention of all parties concerned.

(2)

Resolutions from the 27th Session of the Assembly of IMO, November 2011

Resolution A.1050(27)

Adopted on 30 November 2011

REVISED RECOMMENDATIONS FOR ENTERING ENCLOSED SPACES ABOARD SHIPS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization regarding the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECALLING ALSO its adoption, by resolution A.864(20), of the *Recommendations for entering enclosed spaces aboard ships*, incorporating therein recommendations for entering cargo spaces, tanks, pump-rooms, fuel tanks, cofferdams, duct keels, ballast tanks and similar enclosed spaces,

BEING CONCERNED about the continued loss of life resulting from personnel entering shipboard spaces in which the atmosphere is oxygen-depleted, oxygen-enriched, toxic or flammable,

BEING AWARE of the work undertaken in this regard by the International Labour Organization, Governments and segments of the private sector,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its eighty-ninth session,

1. ADOPTS the *Revised Recommendations for entering enclosed spaces aboard ships*, as set out in the Annex to the present resolution;

2. INVITES Governments to bring the annexed revised recommendations to the attention of shipowners, ship operators and seafarers, urging them to apply them, as appropriate, to all ships;

3. REQUESTS the Maritime Safety Committee to keep the revised recommendations under review and amend them as necessary;

4. REVOKES resolution A.864(20).

ANNEX

REVISED RECOMMENDATIONS FOR ENTERING ENCLOSED SPACES ABOARD SHIPS

PREAMBLE

The objective of these recommendations is to encourage the adoption of safety procedures aimed at preventing casualties to ships' personnel entering enclosed spaces where there may be an oxygen-deficient, oxygen-enriched, flammable and/or toxic atmosphere.

Investigations into the circumstances of casualties that have occurred have shown that accidents on board ships are in most cases caused by an insufficient knowledge of, or disregard for, the need to take precautions rather than a lack of guidance.

The following practical recommendations apply to all types of ships and provide guidance to ship operators and seafarers. It should be noted that on ships where entry into enclosed spaces may be infrequent, for example, on certain passenger ships or small general cargo ships, the dangers may be less apparent, and accordingly there may be a need for increased vigilance.

The recommendations are intended to complement national laws or regulations, accepted standards or particular procedures which may exist for specific trades, ships or types of shipping operations.

It may be impracticable to apply some recommendations to particular situations. In such cases, every endeavour should be made to observe the intent of the recommendations, and attention should be paid to the risks that may be involved.

1 INTRODUCTION

The atmosphere in any enclosed space may be oxygen-deficient or oxygen-enriched and/or contain flammable and/or toxic gases or vapours. Such unsafe atmospheres could also subsequently occur in a space previously found to be safe. Unsafe atmospheres may also be present in spaces adjacent to those spaces where a hazard is known to be present.

2 DEFINITIONS

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,

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. This list is not exhaustive and a list should be produced on a ship-by-ship basis to identify enclosed spaces.

2.2 *Adjacent connected space* means a normally unventilated space which is not used for cargo but which may share the same atmospheric characteristics with the enclosed space such as, but not limited to, a cargo space accessway.

2.3 *Competent person* means a person with sufficient theoretical knowledge and practical experience to make an informed assessment of the likelihood of a dangerous atmosphere being present or subsequently arising in the space.

2.4 *Responsible person* means a person authorized to permit entry into an enclosed space and having sufficient knowledge of the procedures to be established and complied with on board, in order to ensure that the space is safe for entry.

2.5 *Attendant* means a person who is suitably trained within the safety management system, maintains a watch over those entering the enclosed space, maintains communications with those inside the space and initiates the emergency procedures in the event of an incident occurring.

3 SAFETY MANAGEMENT FOR ENTRY INTO ENCLOSED SPACES

3.1 The safety strategy to be adopted in order to prevent accidents on entry to enclosed spaces should be approached in a comprehensive manner by the company.

3.2 The company should ensure that the procedures for entering enclosed spaces are included among the key shipboard operations concerning the safety of the personnel and the ship, in accordance with paragraph 7 of the International Safety Management (ISM) Code.

3.3 The company should elaborate a procedural implementation scheme which provides for training in the use of atmospheric testing equipment in such spaces and a schedule of regular onboard drills for crews.

3.3.1 Competent and responsible persons should be trained in enclosed space hazard recognition, evaluation, measurement, control and elimination, using standards acceptable to the Administration.

3.3.2 Crew members should be trained, as appropriate, in enclosed space safety, including familiarization with onboard procedures for recognizing, evaluating and controlling hazards associated with entry into enclosed spaces.

3.4 Internal audits by the company and external audits by the Administration of the ship's safety management system should verify that the established procedures are complied with in practice and are consistent with the safety strategy referred to in paragraph 3.1.

4 ASSESSMENT OF RISK

4.1 The company should ensure that a risk assessment is conducted to identify all enclosed spaces on board the ship. This risk assessment should be periodically revisited to ensure its continued validity.

4.2 In order to ensure safety, a competent person should always make a preliminary assessment of any potential hazards in the space to be entered, taking into account previous cargo carried, ventilation of the space, coating of the space and other relevant factors. The competent person's preliminary assessment should determine the potential for the presence of an oxygen-deficient, oxygen-enriched, flammable or toxic atmosphere.

The competent person should bear in mind that the ventilation procedures for an adjacent connected space may be different from the procedures for the ventilation of the enclosed space itself.

4.3 The procedures to be followed for testing the atmosphere in the space and for entry should be decided on the basis of the preliminary assessment. These will depend on whether the preliminary assessment shows that:

.1 there is minimal risk to the health or life of personnel entering the space; or

.2 there is no immediate risk to health or life but a risk could arise during the course of work in the space; or

.3 a risk to health or life is identified.

4.4 Where the preliminary assessment indicates minimal risk to health or life or potential for a risk to arise during the course of work in the space, the precautions described in sections 5, 6, 7 and 8 should be followed, as appropriate.

4.5 Where the preliminary assessment identifies a risk to life or health, if entry is to be made, the additional precautions specified in section 9 should also be followed.

4.6 Throughout the assessment process, there should be an assumption that the space to be entered is considered to be hazardous until positively proved to be safe for entry.

5 AUTHORIZATION OF ENTRY

5.1 No person should open or enter an enclosed space unless authorized by the master or the nominated responsible person and unless the appropriate safety procedures laid down for the particular ship have been followed.

5.2 Entry into enclosed spaces should be planned and the use of an entry permit system, which may include the use of a checklist, is recommended. An Enclosed Space Entry Permit should be issued by the master or the nominated responsible person, and completed by the personnel who enter the space prior to entry. An example of the Enclosed Space Entry Permit is provided in the appendix.

6 GENERAL PRECAUTIONS

6.1 Entry doors or hatches leading to enclosed spaces should at all times be secured against entry, when entry is not required.

6.2 A door or hatch cover which is opened to provide natural ventilation of an enclosed space may, wrongly, be taken to be an indication of a safe atmosphere and therefore, an attendant may be stationed at the entrance or the use of a mechanical barrier, such as a rope or chain positioned across the opening with an attached warning sign, could prevent such accidental entry.

6.3 The master or the responsible person should determine that it is safe to enter an enclosed space by ensuring that:

.1 potential hazards have been identified in the assessment and as far as possible isolated or made safe;

.2 the space has been thoroughly ventilated by natural or mechanical means to remove any toxic or flammable gases and to ensure an adequate level of oxygen throughout the space;

.3 the atmosphere of the space has been tested as appropriate with properly calibrated instruments to ascertain acceptable levels of oxygen and acceptable levels of flammable or toxic vapours;

.4 the space has been secured for entry and properly illuminated;

.5 a suitable system of communication between all parties for use during entry has been agreed and tested;

.6 an attendant has been instructed to remain at the entrance to the space whilst it is occupied;

.7 rescue and resuscitation equipment has been positioned ready for use at the entrance to the space and rescue arrangements have been agreed;

.8 personnel are properly clothed and equipped for the entry and subsequent tasks; and

.9 a permit has been issued, authorizing entry.

The precautions in subparagraphs .6 and .7 may not apply to every situation described in this section. The person authorizing entry should determine whether an attendant and the positioning of rescue equipment at the entrance to the space are necessary.

6.4 Only trained personnel should be assigned the duties of entering, functioning as attendants or functioning as members of rescue teams. Ships' crews with rescue and first aid duties should be drilled periodically in rescue and first aid procedures. Training should include as a minimum:

.1 identification of the hazards likely to be faced during entry into enclosed spaces;

.2 recognition of the signs of adverse health effects caused by exposure to hazards during entry; and

.3 knowledge of personal protective equipment required for entry.

6.5 All equipment used in connection with entry should be in good working condition and inspected prior to use.

7 TESTING THE ATMOSPHERE

7.1 Appropriate testing of the atmosphere of a space should be carried out with properly calibrated equipment by persons trained in the use of the equipment. The manufacturers' instructions should be strictly followed. Testing of the space should be carried out before any person enters the space and at regular intervals thereafter until all work is completed. Where appropriate, the testing of the space should be carried out at as many different levels as is necessary to obtain a representative sample of the atmosphere in the space. In some cases it may be difficult to test the atmosphere throughout the enclosed space without entering the space (e.g. the bottom landing of a stairway) and this should be taken into account when assessing the risk to personnel entering the space. The use of flexible hoses or fixed sampling lines, which reach remote areas within the enclosed space, may allow for safe testing without having to enter the space.

7.2 For entry purposes, steady readings of all of the following should be obtained:

.1 21% oxygen by volume by oxygen content meter;

Note: National requirements may determine the safe atmosphere range.

.2 not more than 1% of lower flammable limit (LFL) on a suitably sensitive combustible gas indicator, where the preliminary assessment has determined that there is potential for flammable gases or vapours; and

.3 not more than 50% of the occupational exposure limit (OEL) * of any toxic vapours and gases.

---

* It should be noted that the term Occupational Exposure Limit (OEL) includes the Permissible Exposure Limit (PEL), Maximum Admissible Concentration (MAC) and Threshold Limit Value (TLV) or any other internationally recognized terms.

If these conditions cannot be met, additional ventilation should be applied to the space and re-testing should be conducted after a suitable interval.

7.3 Any gas testing should be carried out with ventilation to the enclosed space stopped, and after conditions have stabilized, in order to obtain accurate readings.

7.4 Where the preliminary assessment has determined that there is potential for the presence of toxic gases and vapours, appropriate testing should be carried out, using fixed or portable gas or vapour detection equipment. The readings obtained by this equipment should be below the occupational exposure limits for the toxic gases or vapours given in accepted national or international standards, in accordance with paragraph 7.2. It should be noted that testing for flammability or oxygen content does not provide a suitable means of measuring for toxicity, nor vice versa.

7.5 It should be emphasized that the internal structure of the space, cargo, cargo residues and tank coatings may also present situations where oxygen-deficient areas may exist, and should always be suspected, even when an enclosed space has been satisfactorily tested as being suitable for entry. This is particularly the case for spaces where the path of the supply and outlet ventilation is obstructed by structural members or cargo.

8 PRECAUTIONS DURING ENTRY

8.1 The atmosphere should be tested frequently whilst the space is occupied and persons should be instructed to leave the space should there be a deterioration in the conditions.

8.2 Persons entering enclosed spaces should be provided with calibrated and tested multi-gas detectors that monitor the levels of oxygen, carbon monoxide and other gases as appropriate.

8.3 Ventilation should continue during the period that the space is occupied and during temporary breaks. Before re-entry after a break, the atmosphere should be re-tested. In the event of failure of the ventilation system, any persons in the space should leave immediately.

8.4 Particular care should be exhibited when working on pipelines and valves within the space. If conditions change during the work, increased frequency of testing of the atmosphere should be performed. Changing conditions that may occur include increasing ambient temperatures, the use of oxygen-fuel torches, mobile plant, work activities in the enclosed space that could evolve vapours, work breaks, or if the ship is ballasted or trimmed during the work.

8.5 In the event of an emergency, under no circumstances should the attending crew member enter the space before help has arrived and the situation has been evaluated to ensure the safety of those entering the space to undertake rescue operations. Only properly trained and equipped personnel should perform rescue operations in enclosed spaces.

9 ADDITIONAL PRECAUTIONS FOR ENTRY INTO A SPACE WHERE THE ATMOSPHERE IS KNOWN OR SUSPECTED TO BE UNSAFE

9.1 Spaces that have not been tested should be considered unsafe for persons to enter. If the atmosphere in an enclosed space is suspected or known to be unsafe, the space should only be entered when no practical alternative exists. Entry should only be made for further testing, essential operation, safety of life or safety of a ship. The number of persons entering the space should be the minimum compatible with the work to be performed.

9.2 Suitable breathing apparatus, e.g. of the air-line or self-contained type, should always be worn, and only personnel trained in its use should be allowed to enter the space. Air-purifying respirators should not be used as they do not provide a supply of clean air from a source independent of the atmosphere within the space.

9.3 Persons entering enclosed spaces should be provided with calibrated and tested multi-gas detectors that monitor the levels of oxygen, carbon monoxide and other gases as appropriate.

9.4 Rescue harnesses should be worn and, unless impractical, lifelines should be used.

9.5 Appropriate protective clothing should be worn, particularly where there is any risk of toxic substances or chemicals coming into contact with the skin or eyes of those entering the space.

9.6 The advice in paragraph 8.5 concerning emergency rescue operations is particularly relevant in this context.

10 HAZARDS RELATED TO SPECIFIC TYPES OF SHIPS OR CARGO

10.1 Dangerous goods in packaged form

10.1.1 The atmosphere of any space containing dangerous goods may put at risk the health or life of any person entering it. Dangers may include flammable, toxic or corrosive gases or vapours that displace oxygen, residues on packages and spilled material. The same hazards may be present in spaces adjacent to the cargo spaces. Information on the hazards of specific substances is contained in the International Maritime Dangerous Goods (IMDG) Code, the Emergency Procedures for Ships Carrying Dangerous Goods (EMS Pdf file opens in new window) and Material Safety Data Sheets (MSDS) *. If there is evidence or suspicion that leakage of dangerous substances has occurred, the precautions specified in section 9 should be followed.

---

* Refer to the *Recommendations for material safety data sheets (MSDS) for MARPOL Annex I oil cargo and oil fuel* (resolution MSC.286(86)).

10.1.2 Personnel required to deal with spillages or to remove defective or damaged packages should be appropriately trained and wear suitable breathing apparatus and appropriate protective clothing.

10.2 Liquid bulk

The tanker industry has produced extensive advice to operators and crews of ships engaged in the bulk carriage of oil, chemicals and liquefied gases, in the form of specialist international safety guides. Information in the guides on enclosed space entry amplifies these recommendations and should be used as the basis for preparing entry plans.

10.3 Solid bulk

On ships carrying solid bulk cargoes, dangerous atmospheres may develop in cargo spaces and adjacent spaces. The dangers may include flammability, toxicity, oxygen depletion or self-heating, as identified in the shipper's declaration. For additional information, reference should be made to the International Maritime Solid Bulk Cargoes (IMSBC) Code.

10.4 Use of Nitrogen as an inert gas *

---

* Refer to the Guidelines on tank entry for tankers using nitrogen as an inerting medium (MSC.1/Circ.1401).

Nitrogen is a colourless and odourless gas that, when used as an inert gas, causes oxygen deficiency in enclosed spaces and at exhaust openings on deck during purging of tanks and void spaces and use in cargo holds. It should be noted that one deep breath of 100% nitrogen gas will be fatal.

10.5 Oxygen-depleting cargoes and materials

A prominent risk with such cargoes is oxygen depletion due to the inherent form of the cargo, for example, self-heating, oxidation of metals and ores or decomposition of vegetable oils, fish oils, animal fats, grain and other organic materials or their residues. The materials listed below are known to be capable of causing oxygen depletion. However, the list is not exhaustive. Oxygen depletion may also be caused by other materials of vegetable or animal origin, by flammable or spontaneously combustible materials and by materials with a high metal content, including, but not limited to:

.1 grain, grain products and residues from grain processing (such as bran, crushed grain, crushed malt or meal), hops, malt husks and spent malt;

.2 oilseeds as well as products and residues from oilseeds (such as seed expellers, seed cake, oil cake and meal);

.3 copra;

.4 wood in such forms as packaged timber, round wood, logs, pulpwood, props (pit props and other propwood), woodchips, woodshavings, wood pellets and sawdust;

.5 jute, hemp, flax, sisal, kapok, cotton and other vegetable fibres (such as esparto grass/Spanish grass, hay, straw, bhusa), empty bags, cotton waste, animal fibres, animal and vegetable fabric, wool waste and rags;

.6 fish, fishmeal and fishscrap;

.7 guano;

.8 sulphidic ores and ore concentrates;

.9 charcoal, coal, lignite and coal products;

.10 direct reduced iron (DRI);

.11 dry ice;

.12 metal wastes and chips, iron swarf, steel and other turnings, borings, drillings, shavings, filings and cuttings; and

.13 scrap metal.

10.6 Fumigation

When a ship is fumigated, the detailed recommendations contained in the Recommendations on the safe use of pesticides in ships (MSC.1/Circ.1358) should be followed. Spaces adjacent to fumigated spaces should be treated as if fumigated.

11 CONCLUSION

Failure to observe simple procedures can lead to persons being unexpectedly overcome when entering enclosed spaces. Observance of the principles and procedures outlined above will form a reliable basis for assessing risks in such spaces and for taking necessary precautions.

APPENDIX

EXAMPLE OF AN ENCLOSED SPACE ENTRY PERMIT

This permit relates to entry into any enclosed space and should be completed by the master or responsible person and by any persons entering the space, e.g. competent person and attendant.

General

Location/name of enclosed space

Reason for entry .....

This permit is valid from:..... hrs ..... Date .....

to: :..... hrs ..... Date .....

(See Note 1)

Section 1 – Pre-entry preparation

(To be checked by the master or nominated responsible person)

	Yes	No
• Has the space been thoroughly ventilated by mechanical means?		
• Has the space been segregated by blanking off or isolating all connecting pipelines or valves and electrical power/equipment?		
• Has the space been cleaned where necessary?		
• Has the space been tested and found safe for entry? (See note 2)		
• Pre-entry atmosphere test readings:		

- oxygen..... % vol (21%) * By:

* Note that national requirements may determine the safe atmosphere range.

- hydrocarbon ..... % LFL (less than 1%)
- toxic gases ..... ppm (less than 50% OEL of the specific gas) Time:

(See note 3)

	Yes	No
• Have arrangements been made for frequent atmosphere checks to be made while the space is occupied and after work breaks?		
• Have arrangements been made for the space to be continuously ventilated throughout the period of occupation and during work breaks?		
• Are access and illumination adequate?		
• Is rescue and resuscitation equipment available for immediate use by the entrance to the space?		
• Has an attendant been designated to be in constant attendance at the entrance to the space?		
• Has the officer of the watch (bridge, engine-room, cargo control room) been advised of the planned entry?		
• Has a system of communication between all parties been tested and emergency signals agreed?		
• Are emergency and evacuation procedures established and understood by all personnel involved with the enclosed space entry?		
• Is all equipment used in good working condition and inspected prior to entry?		
• Are personnel properly clothed and equipped?		

Section 2 – Pre-entry checks

(To be checked by each person entering the space)

	Yes	No
• I have received instructions or permission from the master or nominated responsible person to enter the enclosed space		
• Section 1 of this permit has been satisfactorily completed by the master or nominated responsible person		
• I have agreed and understand the communication procedures		
• I have agreed upon a reporting interval of ..... minutes		
• Emergency and evacuation procedures have been agreed and are understood		

• I am aware that the space must be vacated immediately in the event of ventilation failure or if atmosphere tests show a change from agreed safe criteria		

Section 3 – Breathing apparatus and other equipment

(To be checked jointly by the master or nominated responsible person and the person who is to enter the space)

	Yes	No
• Those entering the space are familiar with any breathing apparatus to be used		
• The breathing apparatus has been tested as follows:		
- gauge and capacity of air supply		
- low pressure audible alarm if fitted		
- face mask – under positive pressure and not leaking		
• The means of communication has been tested and emergency signals agreed		
• All personnel entering the space have been provided with rescue harnesses and, where practicable, lifelines		

Signed upon completion of sections 1, 2 and 3 by:

Master or nominated responsible person ..... Date .....Time

Attendant..... Date .....Time

Person entering the space..... Date .....Time

Section 4 – Personnel entry

(To be completed by the responsible person supervising entry)

Names	
Time in	Time out .....

Section 5 – Completion of job

(To be completed by the responsible person supervising entry)

• Job completed	Date	Time
• Space secured against entry	Date	Time
• The officer of the watch has been duly informed	Date	Time

Signed upon completion of sections 4 and 5 by:

Responsible person supervising entry ..... Date ..... Time .....

THIS PERMIT IS RENDERED INVALID SHOULD VENTILATION OF THE SPACE STOP

OR IF ANY OF THE CONDITIONS NOTED IN THE CHECKLIST CHANGE

Notes:

1 The permit should contain a clear indication as to its maximum period of validity.

2 In order to obtain a representative cross-section of the space's atmosphere, samples should be taken from several levels and through as many openings as possible. Ventilation should be stopped for about 10 minutes before the pre-entry atmosphere tests are taken.

3 Tests for specific toxic contaminants, such as benzene or hydrogen sulphide, should be undertaken depending on the nature of the previous contents of the space.

IMO-Vega Guide

See MSC.1/Circ.1477 of 2014-06-09 *Guidelines to facilitate the selection of portable atmosphere testing instruments for enclosed spaces as required by SOLAS regulation XI-1/7.*

IMO-Vega Note

This resolution revoked res. A.864(20).

Document id: RESA1050ARS

(3)

INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

MSC.1/Circ.1477
9 June 2014

GUIDELINES TO FACILITATE THE SELECTION OF PORTABLE ATMOSPHERE TESTING INSTRUMENTS FOR ENCLOSED SPACES AS REQUIRED BY SOLAS REGULATION XI-1/7

1 The Maritime Safety Committee, at its ninety-third session (14 to 23 May 2014), having considered the proposal by the Sub-Committee on Dangerous Goods, Solid Cargoes and Containers, at its eighteenth session (16 to 20 September 2013), approved the *Guidelines to facilitate the selection of portable atmosphere testing instruments for enclosed spaces as required by SOLAS regulation XI-1/7*, as set out in the annex.

2 The Guidelines are intended to be read in conjunction with new SOLAS regulation XI-1/7 (Atmosphere testing instruments for enclosed spaces) upon its entry into force and the *Revised recommendations for entering enclosed spaces aboard ships* (resolution A.1050(27)).

3 Member Governments are invited to bring the annexed Guidelines to the attention of all parties concerned.

***

ANNEX

GUIDELINES TO FACILITATE THE SELECTION OF PORTABLE ATMOSPHERE TESTING INSTRUMENTS FOR ENCLOSED SPACES AS REQUIRED BY SOLAS REGULATION XI-1/7

Introduction

1 These Guidelines are to facilitate the selection of a portable atmosphere testing instrument for enclosed spaces as required by SOLAS regulation XI-1/7. They are intended to be read in conjunction with this SOLAS regulation and the *Revised recommendations for entering enclosed spaces aboard ships* (resolution A.1050(27)). They are not intended to constitute a performance standard for such equipment.

2 It should be noted that, given a ship's specific characteristics and operations, additional atmospheric hazards in enclosed spaces may be present that may not be detected by the instrument recommended to be selected by these Guidelines, and in such cases, if known, additional appropriate instruments should be carried.

General

3 These Guidelines refer to the instrument that is used to test the atmosphere in an enclosed space before entry and at appropriate intervals thereafter until all work is completed. They do not refer to a personal gas detector that is intended to be carried by an individual whilst inside the enclosed space.

4 The instrument should be capable of remote sampling and detection for all gases that it is designed for, without interference from the atmosphere or other characteristics of the intervening space.

5 Upon activation, the instrument should perform a "self-test" which indicates that the instrument is functioning correctly.

6 Training requirements should be considered when selecting the instrument. Any atmosphere testing should be performed by trained personnel.

Gases and vapours to be measured

7 The instrument should be capable of measuring and displaying concentrations of:

.1 oxygen;

.2 flammable gases or vapours (% of LFL);

.3 carbon monoxide; and

.4 hydrogen sulphide,

8 The instrument should clearly and unambiguously show which gas or vapour it is measuring (noting that the display may be switchable or menu accessible).

9 If the instrument is fitted with an alarm function, it should activate at the appropriate level as determined by the flag State Administration.

Use of the instrument for atmosphere testing of enclosed spaces on board ships

10 The instrument should be suitably protected, having due regard for the environment and temperatures in which it is expected to operate.

11 The instrument should be capable of being easily carried.

12 The instrument should be suitably protected from the ingress of dust and water.

13 The minimum battery life of the instrument (with fresh batteries of recommended type) should be 10 hours.

14 The instrument should be intrinsically safe.

15 The instrument display should be readable in all lighting conditions.

Calibration

16 The manufacturers' instructions should have clearly defined calibration requirements.

17 If the instrument is fitted with an alarm or shutdown function that activates if the manufacture's calibration interval is exceeded, this should not stop the instrument from functioning during actual use and the unit should not restart once the alarm or function has been activated.

Instruction manual

18 The instrument should be provided with a manual that describes its features and alarms and explains how to calibrate, operate and maintain it. The information in this manual should be available in the working language of the ship.

RIKEN KEIKI

PORTABLE MULTI GAS MONITOR

MODEL GX-8000

◆ Application

- Confined space
- Refineries/Petrochemical/Chemical plants
- Oil tanker/Gas carrier/Bulk carrier
- Chemical tanker
- Water/Wastewater treatment
- Fire services
- Telecommunication services
- Power plant
- Gas plant/Gas supplier services
- Utilities
- Coating field
- Fuel cell facilities

◆ Features

- Real-time detection of max. 5 ranges Combustibles 100vol%/100%LEL, O_2, H_2S & CO
- Large simultaneous display with auto back lighting
- Strong sample drawing capability
- Loud alarm buzzer with 95dB
- 3 bright LED alarm windows
- ATEX Exia IICT4 approved/MED approved
- Water and dust resistant IP67
- Lithium-ion rechargeable battery
- Compact and light weight
- Ergonomic design with waist strap for hands free operation
- Datalogging standard

RIKEN KEIKI

COMPONENT DESIGNATIONS

The GX-8000 sets the new industry standard for rugged, reliable portable gas detection. It's tough, water proof design utilized features based on years of gas detection design experience, to assure that the instrument will operate properly to protect workers and property in all kinds of harsh gas detection applications.

Display screen example

Digital display and bargraph
Simultaneously displays all gases

Pilot indicator
Blinking for normal operation

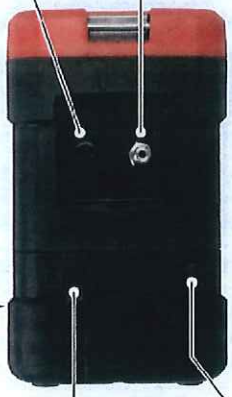
Pump driving indicator
Rotating for normal operation

Battery sign

Time
Adjustable to local time

Display space
Alarms, Operating message, Optional gas names

Side view



Sample gas outlet

Sample gas inlet

Battery unit
Lithium-ion battery unit, Standard
Dry battery unit, Option

Charge LED

Charging port

Rear view

Charcoal filter holder

Sensor compartment

Direct readout combustibles

Standard		LEL	Detection range
iso-Butane	$i\text{-}C_4H_{10}$	1.8vol%	0-100%LEL/0-100vol%
Methane	CH_4	5.0vol%	0-100%LEL/0-100vol%
Hydrogen	H_2	4.0vol%	0-100%LEL/0-100vol%
Acetylene	C_2H_2	1.5vol%	0-100%LEL

NOTE : Availalble gas combinations for Hydrogen(H_2) : Type-E & Type-F
for Acetylene(C_2H_2) : Type-C & Type-F

Data logger download via IrDA communication

GX-8000 gas combinations available

		Combustibles 0-100vol%	Combustibles 0-100%LEL	O_2 0-40.0%	H_2S 0-100.0ppm	CO 0-500ppm
Four gases/ Five ranges	Type-A	●	●	●	●	●
Four gases	Type-B		●	●	●	●
Three gases	Type-C		●	●	●	
	Type-D		●	●		●
Two gases/ Three ranges	Type-E	●	●	●		
Two gases	Type-F		●	●		

Please specify gas combinations when ordering

Specifications

MODEL GX-8000

Target gas	Combustibles (CH_4, i-C_4H_{10}, H_2, others)		Oxygen (O_2)	Hydrogen sulfide (H_2S)	Carbon monoxide (CO)
Detection principle	Thermal conductivity	Catalytic combustion	Galvanic cell	Electrochemical	Electrochemical
Detection range (Increments)	0-100vol% (1vol%)	0-100%LEL (1%LEL)	0-40.0% (0.1%)	0-100.0ppm (0.5ppm)	0-500ppm (1ppm)
Gas alarm	N/A	1st : 10%LEL 2nd : 50%LEL	Low alarm : 19.5% High alarm : 23.5%	1st : 5.0ppm 2nd : 30.0ppm TWA : 10.0ppm STEL : 15.0ppm	1st : 25ppm 2nd : 50ppm TWA : 25ppm STEL : 200ppm
Types of alarm	Gas alarm : Latching, 2 alarms Failure alarm : Flow failure, Sensor failure, Battery failure, Circuit failure, Calibration failure				
Display of alarm	LED : LED's flash Buzzer : Buzzer sounds alternating between a low and high pitch Visual indication : Indication value flashes. Alarm message displays and flashes.				
Alarm sound	More than 95dB (A) at 30cm				
Display	Digital LCD with auto backlight Digital display (7 segments) and digital bargraph (25 segments)				
Sampling method	Sample Draw, Minimum 0.75L/min				
Power source	Lithium-ion battery, Standard (3 hours for a full charge) AA Alkaline battery (3pcs), Option				
Continuous operation	Lithium-ion battery : more than 12 hours AA Alkaline battery : more than 6 hours				
Operating temp & humidity	-20~+50℃, -4~+122℉ below 95%RH (Non-condensing)				
Dimensions & Weight	Approx. 154(W) × 81(H) × 130(D) mm, Approx. 1.1kg Approx. 6.1"(W) × 3.1"(H) × 5.0"(D), Approx. 2.4lb				
Ingress proof rating	Equivalent to IP67				
Explosion proof	Intrinsically safe Exia II CT4				
Approvals	IECEx, ATEX, TIIS MED, HK, CE mark Complying to IEC60079-29-1				
Additional features	Indication to show energizing (pilot indicator and pump driving indicator), "Activating confirmation beep and LED's flash (every one min)" Pump stop function, Bump test function, IrDA communication, Data logger, Password protection				

Specfications subject to change without notice

Standard accessories

- AC powered charger
  (Input : AC100V~AC240V, 50/60Hz
  Output : DC12V, 1.25A)
- Gas sampling probe
- Gas sampling hose (Spiral 1m)
- Lithium-Ion battery unit BUL-8000
- Neck/shoulder strap
- Instruction manual

Optional accessories

- Dry battery unit BUD-8000
- Gas sampling hose 8m with float type sampling head
- Gas sampling hose 30m with plummet
- Telescopic sampling rod
  (9step : 3.0m / 2step : 0.72m)
- Filter tube
- Junction tube
- Gas diluting probe with sampling hose (Spiral 1m)
- Waist strap
- Sampling probe holder on the neck/shoulder strap
- Leather carrying case
- Storage box for marine use
- Carrying box
- Calibration gas set
- Flow control demand valve
- Datalogging software

RIKEN KEIKI Co., Ltd.

2-7-6 Azusawa, Itabashi-ku, Tokyo 174-8744, Japan
Phone : +81-3-3966-1113
Telefax : +81-3-3558-9110
E-mail : intdept@rikenkeiki.co.jp
Web site : http://www.rikenkeiki.co.jp

★ Distributed by:

Printed in Japan COE-0700-111030-E