



**REPUBLIC OF
THE MARSHALL ISLANDS**
MARITIME ADMINISTRATOR

Marine Notice

No. 7-041-1

Rev. Nov/2017

**TO: ALL SHIPOWNERS, OPERATORS, MASTERS AND OFFICERS OF
MERCHANT SHIPS, AND RECOGNIZED ORGANIZATIONS**

SUBJECT: Entering Enclosed Spaces - Safety Precautions

- References:**
- (a) **SOLAS**, *International Convention for the Safety of Life at Sea, Consolidated Edition 2014*, as amended
 - (b) **IMO Assembly Resolution [A.1050\(27\)](#)**, *Revised Recommendations for Entering Enclosed Spaces Aboard Ships*, adopted 30 November 2011
 - (c) **IMO Resolution [MSC.380\(94\)](#)**, *Amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, as Amended (Chapters II-2, VI and XI-1 and Appendix)*, adopted 21 November 2014
 - (d) **IMO Resolution [MSC.350\(92\)](#)**, *Amendments to the International Convention for the Safety of Life at Sea, 1974, as Amended*, adopted 21 June 2013
 - (e) **IMO Circular [MSC.1/Circ.1581](#)**, *Unified Interpretation of SOLAS Chapter II-2*, issued 16 June 2017
 - (f) **IMO Circular [MSC.1/Circ.1561](#)**, *Unified Interpretation of SOLAS Regulation XI-1/7*, issued 28 November 2016
 - (g) **IMO Circular [MSC.1/Circ.1477](#)**, *Guidelines to Facilitate the Selection of Portable Atmospheric Testing Instruments for Enclosed Spaces as Required by SOLAS Regulation XI-1/7*, issued 09 June 2014
 - (h) **IMO Circular [MSC.1/Circ.1401](#)**, *Guidelines for Tank Entry for Tankers Using Nitrogen as an Inerting Medium*, issued 09 June 2011
 - (i) **RMI Maritime Regulations ([MI-108](#))**, §7.44.7
 - (j) **RMI Marine Notice [2-011-14](#)**, *Maintenance and Inspection of Fire Protection Systems and Appliances*

PURPOSE

This Notice establishes requirements and elaborates on safety standards that must be followed by personnel entering enclosed spaces onboard ships. These requirements are necessary because lives continue to be lost by personnel entering shipboard spaces where the atmosphere is oxygen-depleted, oxygen-enriched, toxic, or flammable. This Notice supersedes Rev. Feb/2017 due to the inclusion of new International Maritime Organization (IMO) Circular MSC.1/1581.

APPLICABILITY

This Notice is applicable to all vessels registered in the Republic of the Marshall Islands (RMI) to which the International Convention for the Safety of Life at Sea (SOLAS) applies, including Commercial Yachts of 500 Gross Tons (GT) and over, and to Private Yachts Limited Charter (PYLCs) of 500 GT and over.¹

All SOLAS requirements for the carriage of Atmospheric Testing Instruments and Drills for enclosed space entry and rescue are fully in place, as follows:

- A. **Drills:** The requirements under SOLAS (Regulations III/19.3.3 and 19.3.6), per IMO Resolution [MSC.350\(92\)](#), is for crew member participation in onboard enclosed space entry and rescue drills once every two (2) months.
- B. **Carriage of Atmosphere Testing Instruments:** SOLAS Regulation III/19.3.6.2.3 requires that each enclosed space entry and rescue drill requirement includes: “*checking and use of instruments for measuring the atmosphere in enclosed spaces.*” See SOLAS Regulation XI-1/7, in IMO Resolution [MSC.380\(94\)](#).

REQUIREMENTS

1.0 Safety Strategy (Instruction, Training, and Drills)

- 1.1 The importance of regular instruction, training, and drills in the proper methods of enclosed space entry and rescue operations cannot be over-emphasized. In order to maintain a high level of personnel safety measures on RMI-flagged vessels, ship owners/operators must adopt a comprehensive safety strategy to prevent accidents while entering enclosed spaces.
- 1.2 The strategy shall give full consideration to the IMO’s recommendations for entering enclosed spaces aboard ships contained in IMO Assembly Resolution [A.1050\(27\)](#) and shall be incorporated into the Safety Management System (SMS), as appropriate. Tankers using nitrogen as an inerting medium shall also give full consideration to the guidelines of IMO Circular [MSC.1/Circ.1401](#) while developing their SMS.
- 1.3 In particular, the strategy shall be ship-specific, and shall establish safety instructions and training initiatives to emphasize proper utilization of personal safety equipment and procedures. Safety instructions and training shall consider and include a review and briefing of the following primary mistakes made by personnel that have led to casualties:
 - 1.3.1 entering an enclosed space without advising other persons of intent;
 - 1.3.2 entering an enclosed space without ensuring the space is adequately ventilated; and

¹ The application of this requirement to PYLCs of 500 GT and over is a National requirement established for reasons of safety.

- 1.3.3 attempting to enter an enclosed space to give aid to a person or persons inside the space, without first taking the necessary safety precautions.
- 1.4 The safety strategy shall also require crew members with enclosed space entry or rescue responsibilities to participate in periodic enclosed space entry and rescue drills to be held on board at least once every two (2) months (see RMI Maritime Regulations ([MI-108](#)), §7.44.7). Such drills shall be planned and conducted in a safe manner, taking into account, as appropriate, the guidance provided in IMO Assembly Resolution [A.1050\(27\)](#) and shall include the following exercises:
 - 1.4.1 checking and use of personal protective equipment required for entry;
 - 1.4.2 checking the use of communication equipment and procedures;
 - 1.4.3 checking and use of instruments for measuring the atmosphere in enclosed spaces;
 - 1.4.4 checking the suitability, including length, of sampling hoses of portable detectors for gas measurement at all levels in double bottom spaces²;
 - 1.4.5 checking and use of rescue equipment and procedures;
 - 1.4.6 calibration of instruments in accordance with the manufacturer's instructions, either on board or ashore (SOLAS II-2/4.5.7.1 and IMO Circular [MSC.1/Circ.1581](#)); and
 - 1.4.7 instructions in first aid and resuscitation techniques.
- 1.5 The Master and Safety Officer shall review periodically the safety instructions which have been issued by the shipowner and which shall be available in sufficient numbers on board for all personnel to have their own copy.
- 1.6 Every crew member, upon joining the vessel, shall be given instructions which shall include, but not necessarily be limited to, the risks associated with enclosed spaces and the onboard procedures for safe entry into such spaces which should take into account, as appropriate, the guidance contained in IMO Assembly Resolution A.1050(27).

2.0 Authorization of Entry

No person shall 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 that particular ship have been followed. See Attachment 1 of this Notice for an example of an enclosed space entry permit as extracted from IMO Assembly Resolution A.1050(27). See Attachment 2 for an example of signage as a reminder of permissions necessary prior to entering enclosed spaces.

3.0 Ventilation of Spaces

² This is a National requirement based on SOLAS II/2, Regulation 4.5.7 which addresses arrangements for gas measurement in double-hull spaces and double-bottom spaces.

- 3.1 Enclosed spaces shall be assumed to be incapable of supporting life and shall be well ventilated naturally or mechanically for a period sufficient to achieve an acceptable level of oxygen as determined by testing before entry into the space may be permitted.
- 3.2 Testing of the atmosphere of the confined area shall be carried out before any person enters the space and at regular intervals until all work is completed.
- 3.3 Only if the test results indicate acceptable levels of oxygen and acceptable levels of flammable or toxic vapors, shall entry be permitted. This means that testing must indicate an oxygen reading that is no lower than it is outside the space. If the area has a lower content of oxygen than outside the space, the cause of this difference must be determined in case the oxygen has been displaced by toxic or inflammable gases. Appropriate measures shall be taken to remove the risks.
- 3.4 It should be emphasized that the internal structure of a space, or liquid residues, may present situations where oxygen-deficient areas exist. Even when an enclosed space has been satisfactorily tested and found suitable for entry, there is a risk that oxygen-deficient areas can exist and precautions must be taken. This is especially the case where the path of supply and outlet ventilation is obstructed by structural members or liquid residues are still present.
- 3.5 Oxygen-rich and oxygen-deficient atmospheres both present serious risks. For example, oxygen enrichment will increase the flammability of clothing and other combustible materials. Conversely, a relatively small reduction in the oxygen percentage can lead to impaired mental ability, and can adversely affect those with pre-existing medical conditions, including respiratory infections, asthma, etc. The effects are very rapid and generally there will be no warning to alert the senses. This can happen even in circumstances where only a person's head is inside a confined space. Very low oxygen concentrations can lead to unconsciousness and death.
- 3.6 A safe atmospheric range for entry into enclosed spaces shall be included in the vessel's SMS. (See paragraph 7.2, IMO Assembly Resolution [A.1050\(27\)](#) as guidance.)

4.0 **Cargo Pumps**

- 4.1 In tankers, the officers and pump technicians shall be alerted to the danger which will arise if liquid cargo leaks from defective pumps or cargo piping systems and floods the pumproom bilges to a height which could obstruct the inlets of the air exhaust ducts, thus making the pumproom ventilating system ineffective and permitting heavy accumulation of cargo vapors within the compartment.
- 4.2 Constant vigilance shall be exercised by personnel on board tankers regarding the asphyxiation and toxic hazards associated with cargo pumprooms if there is any leakage of cargo into the pumproom bilges. Such spaces shall be entered only by personnel properly trained and equipped with suitable breathing apparatus for the product involved and the individual shall be secured to a lifeline. Under no

circumstances shall the breathing apparatus be removed while within a space containing atmosphere fouled by noxious vapors or gases.

5.0 Breathing Apparatus

- 5.1 A breathing apparatus of an approved type shall be carried in all ships in accordance with SOLAS Regulation II-2/10.2. Breathing apparatus for chemical carriers and liquefied gas carriers is prescribed by the Chemical Code and Gas Code respectively, and shall be carried accordingly. See also §10.0 of RMI Marine Notice [2-011-14](#) which addresses Self-Contained Breathing Apparatus (SCBAs).
- 5.2 In all cases where the atmosphere of a space is known or suspected to be unsafe, persons entering such spaces shall only do so while wearing an approved SCBA, and all such persons shall be trained in its use.
- 5.3 Under no circumstances shall an Emergency Escape Breathing Device (EEBD) be used to enter an enclosed space in which the atmosphere is known or suspected to be oxygen-depleted, oxygen-enriched, toxic, or flammable.

6.0 Records

The dates when enclosed space entry, rescue drills, and on board training are held shall be recorded in the vessel's log book. If a drill or training session is not held at the appointed time, an entry shall be made in the log book stating the circumstances and the extent of the drill or training session held.

Attachment 1

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. a 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?	<input type="checkbox"/>	<input type="checkbox"/>
• Has the space been segregated by blanking off or isolating all connecting pipelines or valves and electrical power/equipment?	<input type="checkbox"/>	<input type="checkbox"/>
• Has the space been cleaned where necessary?	<input type="checkbox"/>	<input type="checkbox"/>
• Has the space been tested and found safe for entry? (See Note 2)	<input type="checkbox"/>	<input type="checkbox"/>
• Pre-entry atmosphere test readings:		
- oxygen % vol (21%)*	By: _____	
- hydrocarbon % LFL (less than 1%)	Time: _____	
- toxic gases ppm (less than 50% OEL of the specific gas)		
(See Note 3)		
• Have arrangements been made for frequent atmosphere checks to be made while the space is occupied and after work breaks?	<input type="checkbox"/>	<input type="checkbox"/>
• Have arrangements been made for the space to be continuously ventilated throughout the period of occupation and during work breaks?	<input type="checkbox"/>	<input type="checkbox"/>
• Are access and illumination adequate?	<input type="checkbox"/>	<input type="checkbox"/>
• Is rescue and resuscitation equipment available for immediate use by the entrance to the space?	<input type="checkbox"/>	<input type="checkbox"/>
• Has an attendant been designated to be in constant attendance at the entrance to the space?	<input type="checkbox"/>	<input type="checkbox"/>
• Has the officer of the watch (bridge, engine room, cargo control room) been advised of the planned entry?	<input type="checkbox"/>	<input type="checkbox"/>
• Has a system of communication between all parties been tested and emergency signals agreed?	<input type="checkbox"/>	<input type="checkbox"/>
• Are emergency and evacuation procedures established and understood by all personnel involved with the enclosed space entry?	<input type="checkbox"/>	<input type="checkbox"/>
• Is all equipment used in good working condition and inspected prior to entry?	<input type="checkbox"/>	<input type="checkbox"/>
• Are personnel properly clothed and equipped?	<input type="checkbox"/>	<input type="checkbox"/>

* Note that national requirements may determine the safe atmosphere range. See §3.0, above.

Section 2 - Pre-entry checks

(To be checked by the person entering the space or authorized team leader)

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

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	<input type="checkbox"/>	<input type="checkbox"/>
• 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	<input type="checkbox"/>	<input type="checkbox"/>
• All personnel entering the space have been provided with rescue harnesses and, where practicable, lifelines.	<input type="checkbox"/>	<input type="checkbox"/>

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.

Enclosed Space Entry



STOP

You must not 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

THINK

Before entering an ENCLOSED SPACE, you must have a Permit to Enter completed by the master or responsible person and by any persons entering the space

ASK

Have I received instructions or permission from the master or nominated responsible person to enter the enclosed space?

IF YOU DO NOT HAVE A PERMIT TO ENTER AND HAVE NOT RECEIVED INSTRUCTIONS OR PERMISSION FROM THE MASTER OR NOMINATED RESPONSIBLE PERSON, THEN **DO NOT ENTER ANY ENCLOSED SPACE**

What is an ENCLOSED SPACE?

ENCLOSED SPACE means a space which has any of the following characteristics: limited openings for entry and exit; inadequate ventilation; and is not designed for continuous worker occupancy.

Adapted from IMO Resolution A.1050(27): Revised recommendations for entering enclosed spaces aboard ships.



A Marine Accident Investigators' International Forum project, sponsored by [The Bahamas Shipowners' Association] and the Swedish Transport Agency, supported by the International Maritime Organization and The Nautical Institute