INTERNATIONAL MARITIME ORGANIZATION

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BIENNIAL STATUS REPORT AND PROVISIONAL AGENDA FOR SSE 11

Proposal to include the output "Development of amendments to chapter 15 of the FSS Code on enclosed spaces containing a nitrogen receiver or a buffer tank of nitrogen generator system" in the provisional agenda of SSE 11

Submitted by IACS

SUMMARY

Executive summary:	This document proposes to include the output "Development of amendments to chapter 15 of the FSS Code on enclosed spaces containing a nitrogen receiver or a buffer tank of nitrogen generator system" in the provisional agenda for SSE 11.
Strategic direction, if applicable:	7
Output:	Not applicable
Action to be taken:	Paragraph 14
Related documents:	SSE 6/12/12, SSE 6/18; MSC 104/15/1 and MSC 105/20

Background

1 MSC 93 adopted the amended chapter 15 ("Inert Gas Systems") of the FSS Code (resolution MSC.367(93)), which entered into force on 1 January 2016.

2 Document SSE 6/12/12 (IACS) submitted a draft IACS unified interpretation of paragraph 15.2.4.1.4 of the FSS Code clarifying requirements pertaining to ventilation, access, and oxygen detection for the spaces/compartments in which nitrogen receivers or buffer tanks are located. Regarding this draft unified interpretation, the Sub-Committee noted a view that the draft interpretation of paragraph 2.4.1.4 of the FSS Code went beyond the intent of the requirement and did not take any action at that stage (SSE 6/18, paragraph 12.17).

3 Taking into account the views expressed at SSE 6 and in order to progress this issue, document MSC 104/15/1 (Marshall Islands and IACS) proposed a new output to amend chapter 15 of FSS Code. Having considered the proposal at MSC 105, the Committee agreed to include in its post-biennial agenda an output on "Development of amendments to chapter 15 of the FSS Code on enclosed spaces containing a nitrogen receiver or a buffer tank of nitrogen generator system", with two sessions needed to complete the item, assigning the SSE Sub-Committee as the associated organ. The Committee also agreed that "the

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instrument to be amended was the FSS Code" and "the amendments to be developed should enter into force on 1 January 2028, provided that they were adopted before 1 July 2026" (MSC 105/20, paragraph 18.5).

Discussion

4 Paragraph 2.4.1.4 of FSS Code Chapter 15 reads as follows:

> "2.4.1.4 Where a nitrogen receiver or a buffer tank is installed, it may be installed in a dedicated compartment, in a separate compartment containing the air compressor and the generator, in the engine room, or in the cargo area. Where the nitrogen receiver or a buffer tank is installed in an enclosed space, the access shall be arranged only from the open deck and the access door shall open outwards. Adequate, independent mechanical ventilation, of the extraction type, shall be provided for such a compartment."

5 In recent years concerns have been expressed regarding the expression "enclosed space" in the case of a nitrogen receiver or a buffer tank installed in the engine-room of a ship. A literal reading of requirements in paragraph 2.4.1.4 of chapter 15 of the FSS Code could lead to conclude that the engine-room should have access from the open deck only and a separate ventilation of the extraction type, which is not the case on the vast majority of ships.

6 According to the provisions of the FSS Code, where a nitrogen receiver or a buffer tank is installed in an enclosed space, the access shall be arranged only from the open deck and the access door shall open outwards. Adequate, independent mechanical ventilation, of the extraction type, shall be provided for such a compartment.

7 IACS has considered the following issues:

.1 whether the engine-room is considered to be an enclosed space in terms of paragraph 2.4.1.4 of chapter 15 of the FSS Code as regards access from the open deck only;

.2 the type of ventilation and the conditions under which nitrogen receivers or buffer tanks are located in the engine-room;

.3 the conditions under which positive pressure ventilation can be provided where nitrogen receivers or buffer tanks are located in a separate compartment also containing the nitrogen generator and associated compressors; and

.4 access to and ventilation of an enclosed space containing nitrogen receivers or buffer tanks that are located adjacent to the engine-room.

8 At the same time, while considering changes to chapter 15 of the FSS Code to resolve the above concerns and issues, IACS noted that there are also other requirements in the FSS Code on access, ventilation, fire integrity and oxygen detection to the spaces/compartments in which the inert gas generators or nitrogen generators or nitrogen receivers/buffer tanks are located, such as:

> "2.2.4.5.4 Two oxygen sensors shall be positioned at appropriate locations in the space or spaces containing the inert gas system. If the oxygen level falls below 19%, these sensors shall trigger alarms, which shall be both visible and audible inside and outside the space or spaces and shall be placed in such a position that they are immediately received by responsible members of the crew."

"2.3.1.1.2 The inert gas generators shall be located outside the cargo tank area. Spaces containing inert gas generators shall have no direct access to accommodation service or control station spaces, but may be located in machinery spaces. If they are not located in machinery spaces, such a compartment shall be separated by a gastight steel bulkhead and/or deck from accommodation, service and control station spaces. Adequate positive-pressure-type mechanical ventilation shall be provided for such a compartment."

"2.4.1.3 The air compressor and nitrogen generator may be installed in the engine-room or in a separate compartment. A separate compartment and any installed equipment shall be treated as an "Other machinery space" with respect to fire protection. Where a separate compartment is provided for the nitrogen generator, the compartment shall be fitted with an independent mechanical extraction ventilation system providing six air changes per hour. The compartment is to have no direct access to accommodation spaces, service spaces and control stations."

9 Together with the requirements in paragraph 2.4.1.4, these requirements in chapter 15 of the FSS Code persist to cause confusion within the industry, for example:

.1 When the inert gas generator is fitted inside the engine-room, should the oxygen detectors be fitted in the engine-room or not?

.2 In paragraph 2.3.1.1.2, what is the relationship between terms "space", "machinery space" and "compartment", which are used in this paragraph?

.3 In paragraph 2.3.1.1.2, what is the "machinery space"? Is it a space other than the engine-room quoted in paragraph 2.4.1.3?

.4 What is the relationship between the "engine-room" and "machinery spaces" used in different paragraphs?

.5 In paragraph 2.4.1.3, is a different ventilation system acceptable for the "separate compartment"?

.6 In paragraph 2.4.1.4, in the first sentence "…it may be installed in a dedicated compartment, in a separate compartment containing the air compressor and the generator, in the engine-room, or in the cargo area", how to understand "in the engine-room, or in the cargo area"? Is the "nitrogen receiver or buffer tank" or the "dedicated compartment or separate compartment" in the engine-room, or in the cargo area?

.7 In paragraph 2.4.1.4, what does the "enclosed space" stand for in this paragraph? Is it any space on board physically enclosed by decks and bulkheads or is it the "dedicated compartment", the "separate compartment" or the engine-room?

10 Understandably, those issues have led to inconsistency in design, construction and system arrangements on board.

11 To resolve confusion and eliminate misunderstandings in application, IACS has further studied the matter, taking into consideration previous version of chapter 15 of the FSS Code and *Regulation for inert gas systems on chemical tankers* (resolution A.567(14)), as well as practices on board different ships, and reached the following conclusions:

.1 a flue gas or inert gas generator shall be located outside and aft of the cargo area, while a nitrogen generator shall be located outside the cargo area but the nitrogen receiver or a buffer tank may be located in the cargo area;

.2 when the spaces/compartments in which the inert gas generators or nitrogen generators or nitrogen receivers/buffer tanks are located are the engine-room:

.1 the oxygen sensors as required in paragraph 2.2.4.5.4 of chapter 15 of the FSS Code shall also be fitted in the engine-room. But when the spaces/compartments are an enclosed compartment inside the engine-room, which is also part of the engine-room, these oxygen sensors may be fitted in other suitable places in the engine-room; and

.2 no other additional requirements mentioned in chapter 15 of the FSS Code (for example, the direct access from the open air) shall be imposed onto the engine-room; and

.3 when the spaces/compartments in which the inert gas generators or nitrogen generators or nitrogen receivers/buffer tanks are located, are not the engine-room, these shall be a dedicated compartment. Except for oxygen sensors as required in paragraph 2.2.4.5.4 of chapter 15 of the FSS Code, these compartments shall also be arranged so as to comply with the following:

.1 these spaces/compartments shall be classified as "machinery space of category A" or "other machinery space" as defined in SOLAS regulation II-2/3;

.2 suitable segregation between these spaces/compartments and accommodation, service or control station spaces shall be arranged;

.3 direct access from the open air shall be arranged; and

.4 a suitable efficient mechanical ventilation system (positive-pressure-type or extraction type) shall be provided.

Proposal

12 In order to resolve all those issues as a whole, IACS developed comprehensive amendments to the relevant paragraphs of chapter 15 of the FSS Code, as presented in the annex.

13 Noting that the original output was agreed by MSC 105 to be included in its post-biennial (2024-2025) agenda with two sessions needed to complete the item, assigning the SSE Sub-Committee as the associated organ and that the amendments to be developed should enter into force on 1 January 2028, provided that they were adopted before 1 July 2026, and considering the available text of the extended and comprehensive amendments presented in the annex of this document, IACS propose to place this output on the agenda of SSE 11.

Action requested of the Sub-Committee

14 The Sub-Committee is invited to consider the above, the proposal in paragraph 13 and in the annex and take action, as appropriate.

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ANNEX*

DRAFT AMENDMENTS TO THE INTERNATIONAL CODE FOR FIRE SAFETY SYSTEMS (FSS CODE)

CHAPTER 15
INERT GAS SYSTEMS

The following changes are proposed:

"**2 Engineering specifications**

2.1 Definitions

…

2.1.2 *Inert gas system* includes inert gas systems using flue gas, inert gas generators, and nitrogen generators and means the inert gas plant and inert gas distribution together with means for preventing backflow of cargo gases to gas-safe spaces ~~to machinery spaces~~, fixed and portable measuring instruments and control devices."

"2.1.5 *Engine-room or main machinery space* is the space where the main machinery for propulsion and power generation is located, which is classified as a "Machinery Space of Category A", as defined in SOLAS regulation II-2/3. Normally, the engine control room, machinery control room or main machinery control room is part of the engine-room or main machinery space."

2.2 Requirements for all systems

"2.2.4.4.2 in the machinery control room/engine control room/main machinery control room or in the ~~machinery space~~ engine-room/main machinery space to indicate the oxygen content referred to in paragraph 2.2.4.2.2."

"2.2.4.5.2 The alarms required in paragraphs 2.2.4.5.1.1, 2.2.4.5.1.3, ~~and~~ 2.2.4.5.1.5, 2.2.6.3.1.1 ii), 2.2.6.3.1.2 ii) and 2.2.6.3.2.2 shall be fitted in the ~~machinery space~~ engine-room/main machinery space and cargo control room, where provided, in each case in such a position that they are immediately received by responsible members of the crew."

"2.2.4.5.4 ~~Two oxygen sensors shall be positioned at appropriate locations in the space or spaces containing the inert gas system. If the oxygen level falls below 19%, these~~ The oxygen sensors ~~fitted~~ shall trigger alarms when the oxygen level falls below 19%, which shall be both visible and audible inside and outside the space or spaces containing the inert gas system and shall be placed in such a position that they are immediately received by responsible members of the crew."

"2.2.6 Installation on board

2.2.6.1 A flue gas or inert gas generator shall be located outside and aft of the cargo area, while a nitrogen generator, the nitrogen receiver or a buffer tank may be located in the cargo area.

2.2.6.2 The vent outlets and relief valve outlets from the inert gas generator, nitrogen generator, the receiver or buffer tank shall lead to open deck at a safe location and be arranged at least [3 m] from all openings leading to accommodation, service or control station spaces, and any other space/compartment where crews are supposed to work in or access regularly."

* The annex is provided in English only. Tracked changes are indicated using "strikeout" for deleted text and "grey shading" to highlight all modifications and new insertions, including deleted text.

"2.2.6.3.1 In the case in which either the flue gas or inert gas generator or the nitrogen generator, the nitrogen receiver or buffer tank are located in the engine-room:

.1 if located in open area of the engine-room/main machinery space:

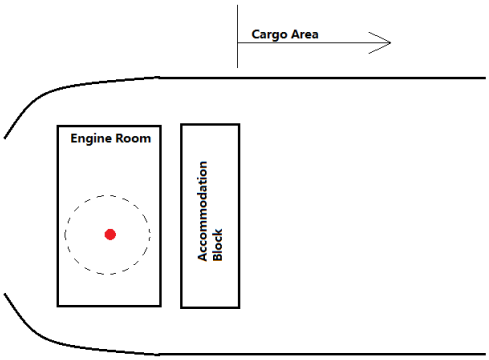

Figure 1: Illustration of the open area of the engine-room/main machinery space
Dotted line means there is no boundaries around the inert gas system

i) this area shall be continuously ventilated such that any leakage of inert gas or nitrogen will be effectively dispersed, thus preventing the formation of a low oxygen atmosphere; and

ii) at least two oxygen detectors shall be fitted at suitable positions near the inert gas system including receivers or buffer tanks in the engine-room/main machinery space with due consideration of the engine-room ventilation effect.

.2 if located in an enclosed compartment of the engine-room/main machinery space:

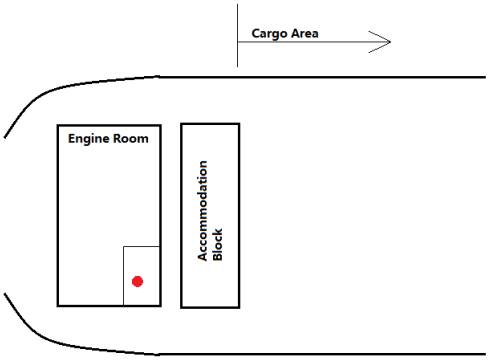

Figure 2: Illustration of enclosed compartment of the engine-room/main machinery space
Solid line means this space containing the inert gas system is separated from the other part of the engine-room by boundaries

i) this compartment shall be continuously ventilated by providing at least six air changes per hour. The ventilation outlets shall lead to open deck and be arranged at least [3 m] from all openings leading to accommodation, service or control station spaces, as well as any other space/compartment where crews are supposed to work in or access regularly; and

ii) at least two oxygen detectors shall be fitted at suitable positions in this compartment.

2.2.6.3.2 In the case in which the flue gas or inert gas generator or the nitrogen generator, the nitrogen receiver or buffer tank are located outside the engine-room/main machinery space, they shall be installed in a dedicated compartment. This dedicated compartment shall be arranged so as to comply with the following:

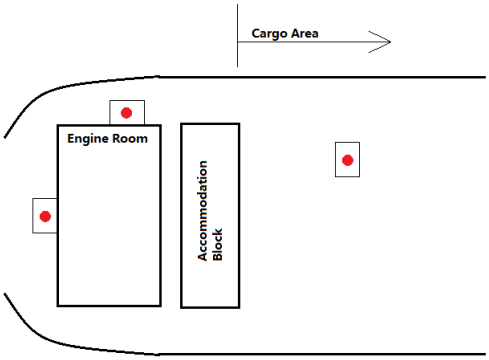

Figure 3: Illustration of possible positions of the dedicated compartment outside the engine-room This dedicated compartment has no access to the engine-room, with only access from open deck

.1 in the case in which a flue gas or inert gas generator is installed, it shall be classified as a "Machinery Space of Category A", while in the case a compartment in which a nitrogen generator, the nitrogen receiver or buffer tank is installed outside the cargo area, it shall be classified as "Other Machinery Space", as defined in SOLAS regulation II-2/3;

.2 it shall be provided with at least two oxygen detectors;

.3 it shall not have direct or indirect access or opening to accommodation, service or control station spaces, and any other space/compartment where crews are supposed to work in or access regularly;

.4 the access to this compartment shall be arranged only from open deck and the access door shall open outwards;

.5 any access door and opening, including ventilation intakes and outlets, from/to this compartment shall be arranged at least [3 m] from all openings leading to accommodation, service or control station spaces, and any other space/compartment where crews are supposed to work in or access regularly;

.6 it shall be provided with a suitable efficient and independent mechanical ventilation system (positive-pressure-type or extraction type) with due consideration to the inert plant operation, as well as the ship's arrangement so as to ensure good performance of the inert plant and to avoid accumulation of leaked inert gas in any other space/compartment as well as creating any other potential danger to this compartment (for example, when this compartment is arranged in cargo area, measures shall be taken to avoid sucking cargo gases into this compartment). This ventilation system shall have a capacity of providing at least six air changes per hour based on the void volume of this compartment. The ventilation outlets shall lead to open deck and be arranged at least [3 m] from all openings leading to accommodation, service or control station spaces, and any other space/compartment where crews are supposed to work in or access regularly;

.6.1 at loss of ventilation, audible and visual alarms shall be effected at suitable locations so as to be acknowledged by responsible crews; and

.7 in case of this compartment being outside cargo area and sharing common bulkhead(s) and/or deck(s) with the engine-room/main machinery space, an access leading to the engine-room/main machinery space may be permitted in addition to the above-mentioned direct access from the open deck. The access leading to the engine-room/main machinery space shall be through a gas-tight and self-closing door (with a warning a warning notice stating "To be kept closed" indicated/posted on both sides of the door) maintaining fire integrity of the boundary, which shall be opened toward into this compartment and placed in a continuously ventilated area in the engine-room/main machinery space.

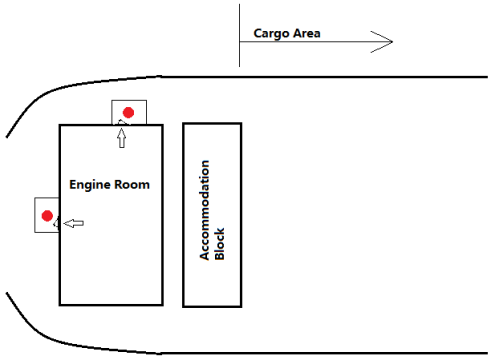

Figure 4: Illustration of possible positions of the dedicated compartment outside the engine-room with access to the engine-room, except the access from open deck

~~2.3.1.1.2 The inert gas generators shall be located outside the cargo tank area. Spaces containing inert gas generators shall have no direct access to accommodation service or control station spaces, but may be located in machinery spaces. If they are not located in machinery spaces, such a compartment shall be separated by a gastight steel bulkhead and/or deck from accommodation, service and control station spaces. Adequate positive pressure-type mechanical ventilation shall be provided for such a compartment.~~

~~2.4.1.3 The air compressor and nitrogen generator may be installed in the engine-room or in a separate compartment. A separate compartment and any installed equipment shall be treated as an "Other machinery space" with respect to fire protection. Where a separate compartment is provided for the nitrogen generator, the compartment shall be fitted with an independent mechanical extraction ventilation system providing six air changes per hour. The compartment is to have no direct access to accommodation spaces, service spaces and control stations.~~

~~2.4.1.4 Where a nitrogen receiver or a buffer tank is installed, it may be installed in a dedicated compartment, in a separate compartment containing the air compressor and the generator, in the engine-room, or in the cargo area. Where the nitrogen receiver or a buffer tank is installed in an enclosed space, the access shall be arranged only from the open deck and the access door shall open outwards. Adequate, independent mechanical ventilation, of the extraction type, shall be provided for such a compartment.~~"