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AMENDMENTS TO THE IGF CODE AND DEVELOPMENT OF GUIDELINES FOR LOW-FLASHPOINT FUELS

Proposed amendments to the IGF Code

Submitted by IACS

SUMMARY

Executive summary:	This document provides proposals for amendments to paragraphs 9.4.7, 9.4.8, 9.6.1.1, 12.5, 13.3.5 and 13.3.7 of part A-1 of the IGF Code
Strategic direction, if applicable:	2
Output:	2.3
Action to be taken:	Paragraph 22
Related documents:	None

Introduction

1 The International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code), which was adopted by resolution MSC.391(95), provides an international standard for ships using low-flashpoint fuel, other than ships covered by the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code). Part A-1 of the IGF Code addresses specific requirements for ships using natural gas as fuel.

2 Based on the experience gained to date in the application of the IGF Code, this document proposes amendments to paragraphs 9.4.7, 9.4.8, 9.6.1.1, 12.5, 13.3.5 and 13.3.7 of part A-1 of the IGF Code.

Discussion

Paragraph 9.4.7 of part A-1 of the IGF Code

3 Paragraph 9.4.7 of the IGF Code states:

> *"9.4.7 In cases where the master gas fuel valve is automatically shutdown, the complete gas supply branch downstream of the double block and bleed valve shall be automatically ventilated assuming reverse flow from the engine to the pipe."*

4 IACS notes that the requirements of paragraph 9.4.7 only requires automatic venting of the gas supply downstream of the double block and bleed valves in cases where the master valve is automatically shutdown. IACS understands that the requirement for depressurizing the gas supply system in cases where the master valve is automatically shutdown is applicable for the complete gas supply piping from the master gas valve to the consumer, regardless of consumer arrangements.

5 Consequently, IACS proposes the following amendments to paragraph 9.4.7 (shown as additions/~~deletions~~):

> *"9.4.7 In cases where the master gas fuel valve is automatically shutdown, the complete gas supply pipe between the master valve and the double block and bleed valves and between the double block and bleed valves and the consumer ~~branch downstream of the double block and bleed valve~~ shall be automatically ~~ventilated~~ vented ~~assuming reverse flow from the engine to the pipe~~."*

Paragraph 9.4.8 of part A-1 of the IGF Code

6 Paragraph 9.4.8 of the Code states:

> *"9.4.8 There shall be one manually operated shutdown valve in the gas supply line to each engine upstream of the double block and bleed valves to assure safe isolation during maintenance on the engine."*

7 IACS understands that safe isolation during maintenance should also be required for other gas consumers – such as boilers, gas combustion units and gas turbines.

8 Consequently, IACS proposes the following amendments to paragraph 9.4.8 (shown as additions/~~deletions~~):

> "9.4.8 *There shall be one manually operated shutdown valve in the gas supply line to each ~~engine~~ gas consumer upstream of the double block and bleed valves to assure safe isolation during maintenance on the ~~engine~~ gas consumer."*

Paragraph 9.6.1 of part A-1 of the IGF Code

9 Paragraph 9.6.1 of the Code states:

> *"9.6 Fuel piping in gas-safe machinery spaces shall be completely enclosed by a double pipe or duct fulfilling one of the following conditions:*
>
> *.1 the gas piping shall be a double wall piping system with the gas fuel contained in the inner pipe. The space between the concentric pipes shall be pressurized with inert gas at a pressure greater than the*

gas fuel pressure. Suitable alarms shall be provided to indicate a loss of inert gas pressure between the pipes. When the inner pipe contains high pressure gas, the system shall be so arranged that the pipe between the master gas valve and the engine is automatically purged with inert gas when the master gas valve is closed; or"

10 IACS considers that confusion is caused by paragraph 9.6.1 including purging requirements for high pressure systems in the section of the IGF Code that details the two different permitted concepts for double barrier protection. IACS also notes that the specific identification of high pressure purging and inert functions, currently provided in paragraph 9.6.1, is not provided in the requirements in paragraph 9.4.7 of the IGF Code. On this concept, IACS considers there is no justification for a difference between high pressure and low pressure systems; and IACS considers that these inconsistent requirements can lead to different interpretations of the requirements.

11 Consequently, IACS proposes the following amendments to paragraph 9.6.1 (shown as additions/~~deletions~~):

"9.6 Gas fuel piping in gas-safe machinery spaces shall be completely enclosed by a double pipe or duct fulfilling one of the following conditions:

.1 the gas fuel piping shall be a double wall piping system with the gas fuel contained in the inner pipe. The space between the concentric pipes shall be pressurized with inert gas at a pressure greater than the gas fuel pressure. Suitable alarms shall be provided to indicate a loss of inert gas pressure between the pipes. ~~When the inner pipe contains high pressure gas, the system shall be so arranged that the pipe between the master gas valve and the engine is automatically purged with inert gas when the master gas valve is closed~~; or"

Paragraph 12.5 of part A-1 of the IGF Code

12 Paragraph 12.5 of the IGF Code states:

"Hazardous area zones

12.5.1 Hazardous area zone 0

This zone includes, but is not limited to the interiors of fuel tanks, any pipework for pressure-relief or other venting systems for fuel tanks, pipes and equipment containing fuel.

*12.5.2 Hazardous area zone 1**

* Instrumentation and electrical apparatus installed within these areas should be of a type suitable for zone 1.

This zone includes, but is not limited to:

.1 tank connection spaces, fuel storage hold spaces† and interbarrier spaces;

† Fuel storage hold spaces for type C tanks are normally not considered as zone 1.

.2 fuel preparation room arranged with ventilation according to 13.6;

.3 areas on open deck, or semi-enclosed spaces on deck, within 3 m of any fuel tank outlet, gas or vapour outlet,‡ bunker manifold valve, other fuel valve, fuel pipe flange, fuel preparation room ventilation outlets and fuel tank openings for pressure release provided to permit the flow of small volumes of gas or vapour mixtures caused by thermal variation;

‡ Such areas are, for example, all areas within 3 m of fuel tank hatches, ullage openings or sounding pipes for fuel tanks located on open deck and gas vapour outlets.

.4 areas on open deck or semi-enclosed spaces on deck, within 1.5 m of fuel preparation room entrances, fuel preparation room ventilation inlets and other openings into zone 1 spaces;

.5 areas on the open deck within spillage coamings surrounding gas bunker manifold valves and 3 m beyond these, up to a height of 2.4 m above the deck;

.6 enclosed or semi-enclosed spaces in which pipes containing fuel are located, e.g. ducts around fuel pipes, semi-enclosed bunkering stations;

.7 the ESD-protected machinery space is considered a non-hazardous area during normal operation, but will require equipment required to operate following detection of gas leakage to be certified as suitable for zone 1;

.8 a space protected by an airlock is considered as non-hazardous area during normal operation, but will require equipment required to operate following loss of differential pressure between the protected space and the hazardous area to be certified as suitable for zone 1; and

.9 except for type C tanks, an area within 2.4 m of the outer surface of a fuel containment system where such surface is exposed to the weather.

12.5.3 Hazardous area zone 2§

§ Instrumentation and electrical apparatus installed within these areas should be of a type suitable for zone 2.

12.5.3.1 This zone includes, but is not limited to areas within 1.5 m surrounding open or semi-enclosed spaces of zone 1.

12.5.3.2 Space containing bolted hatch to tank connection space."

13 When verifying implementation of paragraph 12.5 of the IGF Code, IACS members have become aware of discrepancies between the above provisions of the IGF Code, IEC standard 60092 and paragraph 1.2.24 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), as amended by resolution MSC.370(93).

14 For fuel containment systems other than type C, i.e. types A, B and membrane; the IGC and IGF Codes require a secondary barrier (partial or complete) to provide protection from leakages from the primary barrier. Therefore, for such fuel containment systems, leakage into the interbarrier space is a probable scenario. IACS notes that IEC standard 60092 defines the interbarrier space as a zone 0 hazardous area, but paragraph 12.5.2.1 of the IGF Code defines it as a zone 1.

15 Furthermore, IACS notes that paragraph 12.5.2.3 of the IGF Code has only addressed "fuel tank openings for pressure release provided to permit the flow of small volumes of gas or vapour mixtures caused by thermal variation" i.e. a 3 metre zone 1 and a 1.5 metre zone 2. This is consistent with the provisions of paragraph 4.2.2.7 of IEC 60092 for the release of small volumes of gas or vapour mixture.

16 Although there may be differences in the volumes of gas or vapour that are released to the vent mast depending on the type of fuel containment system, relief and vent system design and under differing operational scenarios, including emergency situations; IACS considers that paragraph 12.5 of the IGF Code should also address the hazardous area zone distances for "… the passage of large volumes of gas or vapour mixture …", as given in paragraph 4.2.2.8 of IEC 60092, and hence, a 6 metre zone 1 and a 4 metre zone 2 should be defined around the vent mast for such arrangements.

17 Consequently, IACS proposes the following amendments to paragraph 12.5 of the IGF Code so it is consistent with IEC standard 60092 and paragraph 1.2.24 of the IGC Code (shown as additions/~~deletions~~):

"Hazardous area zones

12.5.1 Hazardous area zone 0

This zone includes, but is not limited to the interiors of fuel tanks, any pipework for pressure-relief or other venting systems for fuel tanks, pipes and equipment containing fuel, and interbarrier spaces.

*12.5.2 Hazardous area zone 1**

* Instrumentation and electrical apparatus installed within these areas should be of a type suitable for zone 1

This zone includes, but is not limited to:

.1 tank connection spaces~~,~~ and fuel storage hold spaces † *~~and interbarrier spaces~~;*

† Fuel storage hold spaces for type C tanks are normally not considered as zone 1.

.2 fuel preparation room arranged with ventilation according to 13.6;

.2bis a space separated from a fuel storage hold space by a single gastight steel boundary where the fuel containment system requires a secondary barrier.

.3 areas on open deck, or semi-enclosed spaces on deck, within 3 m of any fuel tank outlet, gas or vapour outlet,‡ *bunker manifold valve, other fuel valve, fuel pipe flange, ~~fuel preparation room~~ ventilation outlets from Zone 1 spaces and fuel tank openings for pressure release provided to permit the flow of small volumes of gas or vapour mixtures caused by thermal variation;*

‡ Such areas are, for example, all areas within 3 m of fuel tank hatches, ullage openings or sounding pipes for fuel tanks located on open deck and gas vapour outlets.

.3.bis areas on open deck, or semi-enclosed spaces on open deck above and in the vicinity of any gas outlet intended for the passage of large volumes of gas or vapour mixture, within a vertical cylinder of unlimited height and 6 m radius centered upon the center of the outlet, and within a hemisphere of 6 m radius below the outlet.

4 areas on open deck or semi-enclosed spaces on deck, within 1.5 m of fuel preparation room entrances, fuel preparation room ventilation inlets and other openings into zone 1 spaces;

.5 areas on the open deck within spillage coamings surrounding gas bunker manifold valves and 3 m beyond these, up to a height of 2.4 m above the deck;

.6 enclosed or semi-enclosed spaces in which pipes containing fuel are located, e.g. ducts around fuel pipes, semi-enclosed bunkering stations;

.7 the ESD-protected machinery space is considered a non-hazardous area during normal operation, but will require equipment required to operate following detection of gas leakage to be certified as suitable for zone 1;

.8 a space protected by an airlock is considered as non-hazardous area during normal operation, but will require equipment required to operate following loss of differential pressure between the protected space and the hazardous area to be certified as suitable for zone 1; and

.9 except for type C tanks, an area within 2.4 m of the outer surface of a fuel containment system where such surface is exposed to the weather.

12.5.3 Hazardous area zone 2[§]

§ Instrumentation and electrical apparatus installed within these areas should be of a type suitable for zone 2.

12.5.3.1 This zone includes, but is not limited to areas within 1.5 m surrounding open or semi-enclosed spaces of zone 1.

12.5.3.2 Space containing bolted hatch to tank connection space.

12.5.3.3 Spaces 4 m beyond the cylinder and 4 m beyond the sphere defined in 12.5.2.3.bis."

Paragraph 13.3 of part A-1 of the IGF Code

18 Paragraph 13.3.5 of the IGF Code states:

"13.3.5 Air inlets for hazardous enclosed spaces shall be taken from areas that, in the absence of the considered inlet, would be non-hazardous. Air inlets for non-hazardous enclosed spaces shall be taken from non-hazardous areas at least 1.5 m away from the boundaries of any hazardous area. Where the inlet duct passes through a more hazardous space, the duct shall be gas-tight and have over-pressure relative to this space."

19 IACS notes that the IGF Code does not prohibit the routeing of ducts for the ventilation of hazardous spaces passing through non-hazardous spaces e.g. accommodation spaces. IACS further notes paragraph 13.3.5 of the IGF Code specifies that where the inlet duct for non-hazardous spaces passes through a more hazardous space, the duct shall be gas tight and be overpressure relative to the hazardous space. IACS considers this overpressure concept relative to the more hazardous space may be applied to the whole ducting.

20 IACS also considers that in the absence of similar requirements for the ventilation ducts serving hazardous spaces, the risk of flammable mixtures forming in non-hazardous spaces cannot be excluded. Therefore, IACS considers that the structural and mechanical requirements for ventilation ducts serving hazardous spaces passing through non-hazardous spaces should be further developed to ensure the same level of safety as the inlet duct for non-hazardous spaces passing through more hazardous spaces.

21 Consequently, IACS proposes the following amendments to paragraphs 13.3.5 and 13.3.7 of the IGF Code (shown as additions/~~deletions~~):

> *"13.3.5 Air inlets for hazardous enclosed spaces shall be taken from areas that, in the absence of the considered inlet, would be non-hazardous. ~~Air inlets for non-hazardous enclosed spaces shall be taken from non-hazardous areas at least 1.5 m away from the boundaries of any hazardous area. Where the inlet duct passes through a more hazardous space, the duct shall be gas-tight and have over-pressure relative to this space.~~ Air inlets for non-hazardous enclosed spaces shall be taken from non-hazardous areas at least 1.5 m away from the boundaries of any hazardous area.*
>
> *13.3.7bis Where the ventilation ducts serving non-hazardous spaces pass through a more hazardous space, the ducts shall be gas-tight and have over-pressure relative to the more hazardous space. Where the ventilation ducts serving hazardous spaces pass through less hazardous spaces, the ducts shall be gas-tight and have under pressure relative to the less hazardous spaces."*

Action requested of the Sub-Committee

22 The Sub-Committee is invited to consider the foregoing, in particular the proposed amendments to the IGF Code shown in paragraphs 5, 8, 11, 17 and 21 above; and take action as appropriate.