Control of Ammonia Release for Ammonia-fuelled Vessels

Object of Amendment

Rules for the Survey and Construction of Steel Ships Part GF

Reason for Amendment

In recent years, plans for building ships using ammonia as fuel in order to reduce GHG emissions have been increasing. As ammonia is recognised as being toxic and corrosive, the Society issued its "Guidelines for Ships Using Alternative Fuels" to specify requirements for ensuring the safety of ships and their personnel, and the Society conducts examinations based on this Guidelines.

IACS also discussed requirements for ammonia fuel. Since there is currently no internationally accepted common threshold for ammonia exposure, IACS members agreed to develop a unified requirement (UR) to establish such a threshold among member societies. In addition, from the viewpoint that human exposure to ammonia should always be avoided, an agreement was also reached on the principle that ammonia should not be directly released into the atmosphere. The above were adopted by IACS as UR H1 in January 2024.

Accordingly, relevant requirements are amended based on UR H1.

Outline of Amendment

The main contents of this amendment are as follows:

(1) Specify thresholds of ammonia concentration for activation of safety and alarm devices.

(2) Specify that ammonia fuel systems are, in principle, to be designed so as not to directly release ammonia fuel into the atmosphere during normal operation or in abnormal scenarios, such as when released due activation of pressure relief valves or leaked into secondary barriers.

Effective Date and Application

This draft amendment applies to either of the following (1) or (2):

(1) Ships for which the date of contract for construction is on or after 1 January 2025.

(2) Ammonia fuel systems for which the application for approval is submitted to the Society on or after 1 January 2025.

ID: DD24-11

Amended	Original	Remarks
RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS **Part GF SHIPS USING LOW-FLASHPOINT FUELS** **Chapter 1 GENERAL** **1.1 General (*IGF Code* 2.1)** **1.1.1 Application** (For reference) **1** This Part is to apply to ships using low-flashpoint fuels, however, does not apply to the ships specified in the following **(1)** or **(2)**: (1) Gas carriers using their cargoes as fuel and complying with the requirements of **Part N**; or (2) Gas carriers using other low-flashpoint gaseous fuels provided that the fuel storage and distribution systems design and arrangements for such gaseous fuels comply with the requirements of **Part N**. **2** (Omitted) **3** (Omitted) **4** Notwithstanding **-1** above, **Annex 1.1.1-4** "Control of Ammonia Release" applies to ships using ammonia as fuel.	**RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS** **Part GF SHIPS USING LOW-FLASHPOINT FUELS** **Chapter 1 GENERAL** **1.1 General (*IGF Code* 2.1)** **1.1.1 Application** **1** (Omitted) **2** (Omitted) **3** (Omitted) (Newly added)	

Amended-Original Requirements Comparison Table (Control of Ammonia Releases in Ammonia-fuelled Vessels)

Amended	Original	Remarks
Annex 1.1.1-4 Control of Ammonia Release	(Newly added)	IACS UR H1
1.1 General	(Newly added)	
Ammonia is recognised as being toxic to human life and aquatic life. Attention is to be paid to the following (1) and (2): (1) Contact with or exposure to ammonia is to be avoided at all times. (2) Discharge of ammonia-containing effluents to the sea is to be prevented for all foreseeable operating scenarios.	(Newly added)	
1.2 Application	(Newly added)	
The following requirements are applicable wherever the use of ammonia as fuel onboard ships is permitted by the national administration.	(Newly added)	
1.3 Definitions	(Newly added)	
1 *Normal operation* means a condition under which all systems and equipment operate as intended.	(Newly added)	
2 *Abnormal scenario* means a condition under which one or more systems or equipment are operating outside of the intended conditions and does not present a threat to human and/or aquatic life.	(Newly added)	

Amended-Original Requirements Comparison Table (Control of Ammonia Releases in Ammonia-fuelled Vessels)

Amended	Original	Remarks
3 *Emergency scenario* means a condition under which one or more systems or equipment are operating outside of the intended conditions and present a threat to human and/or aquatic life.	(Newly added)	
4 *Dangerous ammonia concentration* means a concentration of 300 *ppm* or more or a concentration of 25 *ppm* when the exposure is longer than 8 *hours*. Other concentrations between 25 *ppm* and 300 *ppm*, may be dangerous depending on the exposure time. *NIOSH* defines 300 *ppm* as *IDLH* (Immediately Dangerous for Life and Health). *NIOSH* defines 25 *ppm* as *REL-TWA* (Recommended Exposure Level - Time Weighted Average). National Authorities may have stricter requirements.	(Newly added)	
1.4 Requirements	(Newly added)	
1 The systems are to be designed so as to avoid direct release of ammonia fuel to atmosphere during normal operation e.g., during fuel bunkering, fuel processing, purging of equipment, ventilation system discharges etc., and when possible during any foreseeable abnormal scenario.	(Newly added)	
2 If direct release is unavoidable, the resulting concentration at locations of the ship where persons normally have access is not to exceed 25 *ppm*, and this is to be demonstrated by gas dispersion analysis.	(Newly added)	
3 Releases of ammonia during normal operation and abnormal scenario are required to be identified in the risk assessment and listed in the ship design documentation, such as toxic area plan; (1) Such cases of normal operations could typically	(Newly added)	

Amended-Original Requirements Comparison Table (Control of Ammonia Releases in Ammonia-fuelled Vessels)

Amended	Original	Remarks
include but not be limited to the following: (a) disconnection of the bunkering lines after inerting / purging; (b) purging due to maintenance of equipment; (c) gas freeing before docking. (2) Such cases of abnormal scenario could typically include but not be limited to the following: (a) activation of tank pressure relief valve due to increase in pressure; (b) leakage in the secondary enclosure; (c) gas purging or ventilation after gas detection at annular space or other process room.		
4 Gas dispersion analyses are to be carried out for abnormal and emergency scenarios, which are identified as requiring quantitative analysis in the risk assessment. Depending on the results of these analyses, necessary measures are to be taken to prevent all persons onboard being exposed to dangerous ammonia concentrations.	(Newly added)	
5 The point at which ammonia is released to atmosphere, (e.g., outlet of vent mast) is to be provided with audible and visual alarms, which are to be activated when the gas being discharged has an ammonia concentration of 300 *ppm* or more. Lower threshold need to be applied to allow effective warning of people and/or activation of the necessary measures mentioned in **-4**.	(Newly added)	
6 The spaces where all reasonably foreseeable ammonia leaks may occur (e.g., secondary enclosure, fuel preparation room, bunkering station during bunkering) are to be monitored and the source of the release should be shut down when a concentration exceeding 300 *ppm* is detected. Lower threshold need to be applied to serve as a part of the necessary measures mentioned in **-4**.	(Newly added)	

Amended	Original	Remarks
EFFECTIVE DATE AND APPLICATION **1.** The effective date of the amendments is 1 January 2025. **2.** Notwithstanding the amendments to the Rules, the current requirements apply to ammonia fuel systems for which the application for approval is submitted to the Society on or after the effective date installed in ships for which the date of contract for construction* is before the effective date. * "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29. IACS PR No.29 (Rev.0, July 2009) **1.** The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding. **2.** The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder. For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided: (1) such alterations do not affect matters related to classification, or (2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval. The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed. **3.** If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.		

Amended-Original Requirements Comparison Table (Control of Ammonia Releases in Ammonia-fuelled Vessels)

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4. If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder. Note: This Procedural Requirement applies from 1 July 2009.		