H1 Control of Ammonia releases in Ammonia fuelled vessels

(Jan 2024)

1 Introduction

1.1 Ammonia is recognised as being toxic to:

a) human life and as such contact with or exposure to ammonia is to be avoided at all times.

b) aquatic life and as such discharge of ammonia-containing effluents to sea is to be prevented for all foreseeable operating scenarios.

2 Application

2.1 The following requirements are applicable wherever the use of ammonia as fuel onboard ships is permitted by the National Administration.

3 Definitions

3.1 Normal operation - A condition under which all systems and equipment operate as intended.

3.2 Abnormal scenario – 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.

3.3 Emergency scenario - 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.

3.4 Dangerous ammonia concentration[*] - 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.

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[*] NIOSH defines 300 ppm as IDLH (Immediately Dangerous for Life and Health). NIOSH defines 25 ppm as REL-TWA (Recommended Exposure Level – Time Weigthed Average). National Authorities may have stricter requirements.

1. This UR is to be uniformly implemented by IACS Societies:

i) For existing ships, where an application for approval for the plans of the Ammonia fuel system is made on or after 1 January 2025; and

ii) For new ships contracted for construction on or after 1 January 2025

2. The “contracted for construction” date means the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. For further details regarding the date of “contract for construction”, refer to IACS Procedural Requirement (PR) No. 29.

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4 Requirements

4.1 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

4.2 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.

4.3 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;

4.3.1 Such cases of normal operations could typically include but not be limited to the following:

- disconnection of the bunkering lines after inerting / purging;
- purging due to maintenance of equipment;
- gas freeing before docking.

4.3.2 Such cases of abnormal scenario could typically include but not be limited to the following:

- activation of tank pressure relief valve due to increase in pressure;
- leakage in the secondary enclosure.
- gas purging or ventilation after gas detection at annular space or other process room

4.4 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.

4.5 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 §4.4

4.6 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 §4.4

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