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## **INFORMATION**

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<b>From:</b>	General Secretariat of the Council
<b>To:</b>	Working Party on Shipping
<b>Subject:</b>	Preparation of IMO/CCC 11 (London, 8-12 September 2025) - Draft submission by Belgium - Development of guidelines for the use of ammonia cargo as fuel and provisions for the use of alternative fuels other than cargo on gas carriers - Comments on the report of the Correspondence Group (CCC 11/4) concerning emergency ventilation in the event of ammonia leakage scenario

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Delegations will find attached a draft submission by Belgium, in view of the 11th session of the IMO Sub-Committee on Carriage of Cargoes and Containers (agenda item 4).

Belgium invites interested Member States to take note of/support the document.

SUB-COMMITTEE ON CARRIAGE OF  
CARGOES AND CONTAINERS  
11th session  
Agenda item 4

CCC 11/4/XX  
04 July 2025  
Original: ENGLISH  
Pre-session public release:

**DEVELOPMENT OF GUIDELINES FOR THE USE OF AMMONIA CARGO AS FUEL AND  
PROVISIONS FOR THE USE OF ALTERNATIVE FUELS OTHER THAN CARGO ON GAS  
CARRIERS**

**Comments on the report of the Correspondence Group (CCC 11/4) concerning  
emergency ventilation in the event of ammonia leakage scenario**

**Submitted by Belgium**

**SUMMARY**

*Executive summary:* This document presents the results obtained from ventilation and gas dispersion analyses conducted for the design of new gas carriers, using ammonia cargo as fuel. It is written in view of sharing experience, offers a new perspective on ventilation arrangements in the event of ammonia leakage within the ammonia fuel preparation room and proposes that these considerations be taken into account during discussions in the Working Group XX, if established.

*Strategic direction, if applicable:* 1

*Output:* 1.17

*Action to be taken:* Paragraph 16

*Related documents:* CCC 10/4/1; CCC 10/4/7; CCC 10/16; CCC 10/WP.7; CCC 11/4 and MSC 109/22

**Introduction**

1 This document is submitted in accordance with paragraph 6.12.5 of the Organization and method of work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies (MSC-MEPC.1/Circ.5/Rev.5) and provides comments on document CCC 11/4, the report of the Correspondence Group on the Development of guidelines for the use of ammonia cargo as fuel.

2 The Sub-Committee on Carriage of Cargoes and Containers (CCC), at its tenth session (CCC 10), reviewed the documents CCC 10/4/1 (Australia et al.), CCC 10/4/7 (IACS) and CCC 10/WP.7 (Marshall Islands) and agreed to establish the Correspondence Group on Development of Guidelines for the Use of Ammonia Cargo as Fuel, subject to the decision by Maritime Safety Committee (MSC).

3 At CCC 10, the Working Group agreed to consider the framework and the structure of the guidelines and to conduct a detailed revision of the draft interim guidelines, taking into account documents CCC 10/4/1 and CCC 10/4/7. The Group developed appropriate Terms of Reference concluding with the submission of a written report to CCC 11 (CCC 10/16, paragraph 4.34).

4 The Maritime Safety Committee (MSC), at its 109<sup>th</sup> session, agreed to extend the target completion year of the existing output 1.17 to 2026 and to modify the title to read "Development of guidelines for the use of ammonia cargo as fuel and provisions for the use of alternative fuels other than cargo on gas carriers" (MSC 109/22, paragraph 19.38.1).

### **Interim Guidelines as proposed by the Correspondence Group**

5 Paragraph 2.5.4.5 of the draft Interim Guidelines annexed to document CCC 11/4 proposes increased mechanical gas evacuation in the ammonia fuel preparation room to mitigate the risks of ammonia release, as follows:

*2.5.4.5 An ammonia fuel preparation room should be provided with an increased mechanical type of gas evacuation system to limit the consequences of a flammable or/and toxic release by a reasonably foreseeable ammonia leakage scenario.] [The system should be designed and constructed in accordance with the following requirements:*

- .1 The gas evacuation system is to be independent of other shipboard ventilation systems.*
- .2 The gas evacuation system is to be arranged to automatically start when the concentration of ammonia in the space exceeds 220 ppm.*
- .3 The combined capacity of the ventilation and gas evacuation fans is to provide minimum 45 air changes per hour based on the total empty volume of the space.*
- .4 The increased ventilation capacity may cause under pressure or overpressure in the fuel preparation room which should be considered.*
- .5 Safe escape from the fuel preparation room should be guaranteed.]*

6 The draft Interim Guidelines for the use of ammonia cargo as fuel, as introduced by document CCC 10/4/1, have been developed on the basis of MSC.1/Circ.1679 on Interim Guidelines for the use of LPG cargo as fuel, while integrating technical requirements addressing the characteristics and physical properties of ammonia, which were copied from preliminary work done under IGF ammonia Interim Guidelines.

7 The provisions referred to in paragraph 2.5.4.5 of the draft Interim Guidelines specify that the gas evacuation system is to be started at a certain concentration of ammonia in combination with an increased number of air changes per hour. However, similar provisions have been withdrawn from the IGF Interim Guidelines by the IGF Working Group but have not been withdrawn from the IGC draft Interim Guidelines.

8 Taking into account the outcomes presented in paragraphs 12 to 14, Belgium is of the view that, in considering the provisions of paragraph 2.5.4.5 of the draft Interim Guidelines, the ventilation shutdown or the use of water spray around a ventilation outlet opening, or a

combination of both, could further increase the level of safety, on the basis of gas dispersion analyses.

### **Analysis of ventilation and gas dispersion**

9 Early movers from maritime industry conducted analyses in view of future shipbuilding and operation of gas carriers using ammonia cargo as fuel. The risk assessment included a study for the consequences of an ammonia fuel leakage, as foreseen in section 2.5.1 (Risk Assessment) of the draft Interim Guidelines. Belgium considers the outcomes of these analyses to be relevant in the ongoing development of robust guidelines.

10 The aim of the Belgian analysis was to compare the level of safety between the cargo system and the fuel system. The cargo system has a much larger ammonia inventory at a lower pressure, the fuel system has a much lower ammonia inventory on a higher pressure. A leak in any of these systems will create an ammonia gas cloud on the ventilation outlet.

11 As part of the risk assessment and gas dispersion analysis, the movement of a gas cloud resulting from a leak in the fuel preparation room was simulated. This included its spread throughout the ship's spaces via openings, access to life-saving appliances, muster stations, and escape routes. The simulations were carried out using specialized Computational Fluid Dynamics (CFD) software. Key input data included technical drawings, 3D models, and predefined leakage scenarios, aligned with international standards and based on worst-case environmental conditions. Several mitigation measures were evaluated with respect to gas evacuation and gas dispersion.

12 The simulations, resulting from the analysis of ventilation and gas dispersion, conducted with 30 air changes per hour (ACH) and 45 ACH, indicate that the gas cloud could reach critical receptors such as air intakes, escape routes, and lifeboats. In the case of ventilation shutdown or the use of water spray around a ventilation outlet opening, the risk appeared to be more effectively mitigated. In the simulation, the effectiveness of water spray around the heating, ventilation and air conditioning (HVAC) exhaust was reviewed.

13 The review of the mitigation measures showed that reduced ventilation rates could result in a reduction of the hazardous gas cloud size. Ventilation shutdown or the use of water spray around a ventilation outlet opening or a combination of both, were found to mitigate the risk even more effectively.

14 The analysis and visual simulations of the reviewed mitigation measures are set out in document CCC 11/INF.X.

### **Proposal**

- 15 Belgium invites the Sub-Committee to:
- .1 take note of the ventilation and gas dispersion analysis outlined in paragraphs 10 to 14;
  - .2 further consider paragraph 2.5.4.5 in the draft Interim Guidelines, taking into account the outcomes of the analyses as described in paragraphs 12 to 14; and
  - .3 in particular, reconsider subparagraphs .2 and .3 of paragraph 2.5.4.5.

### **Action requested of the Sub-Committee**

16 The Sub-Committee is invited to consider the information provided in this document and the proposals outlined in paragraph 15 and to take action, as appropriate.