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**Economic Commission for Europe****Inland Transport Committee****Working Party on the Transport of Dangerous Goods**

**Joint Meeting of Experts on the Regulations annexed to the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) (ADN Safety Committee)**

**Forty-third session**

Geneva, 22-26 January 2024

Item 4 (b) of the provisional agenda

**Implementation of the European Agreement concerning the International Carriage of****Dangerous Goods by Inland Waterways (ADN):****Special authorizations, derogations and equivalents****Request for a recommendation on the use of hydrogen fuel cells for the propulsion of the vessel “Rhenus Mannheim”****Transmitted by the Government of the Netherlands\*\*,\*\****Summary*

**Related documents:** ECE/TRANS/WP.15/AC.2/2023/34  
Informal document INF.5 of the forty-second session  
Informal document INF.22 of the forty-second session  
Informal document INF.27 of the forty-second session  
ECE/TRANS/WP.15/AC.2/86 (Paragraph 14)

**Introduction**

1. In light of the energy transition towards cleaner fuels, several vessels are now being built that use alternative fuels for their propulsion. One of these vessels is the Rhenus Mannheim, which will be outfitted with a hydrogen fuel system as part of a hybrid power train. The hydrogen will be stored in swappable 20” containers.

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\* Distributed in German by the Central Commission for the Navigation of the Rhine under the symbol CCNR-ZKR/ADN/WP.15/AC.2/2024/33

\*\* A/78/6 (Sect. 20), table 20.5



2. The Rhenus Mannheim is a motor vessel, carrying containers. It will be part of a container convoy.
3. The Rhenus Mannheim has received a derogation from the CCNR. This derogation was communicated to the ADN Safety Committee in informal document INF.22 of the forty-second session. Furthermore, the CCNR is working to expand Chapter 30 and Annex 8, with regulations on hydrogen fuel systems to allow for these kind of propulsion systems on a permanent basis.
4. As the use of hydrogen as a fuel is currently not allowed according to 7.1.3.31, 9.1.0.31.1 of ADN, the Netherlands would like to request for a recommendation from the ADN Administrative Committee to issue a derogation for this vessel.
5. The following (updated) documents are provided to support the request for the derogation, the derogation will also refer to these documents:
  - (a) Project description of the Rhenus H2-System with Fuel Cell 800 kW (400 kW) and 500 bar H2-Storage Tank Rev04;
  - (b) HAZID report by Lloyds Register;
  - (c) Updated ATEX zones arrangement drawing;
  - (d) Bunkering procedure;
  - (e) Crew training.

## Questions received

6. During the forty-second session of the ADN Safety Committee the hydrogen system for the Rhenus Mannheim was presented. Based on the presentation and the documentation provided additional questions were received by the Dutch delegation. Based on the questions the request for the recommendation has been updated to reflect a reporting requirement to the ADN Safety Committee on the project. As well as a reference to the updated documentation included in informal document INF.7.
7. One of the concerns raised were the stowing provisions of 7.1.4.4.4. These stowing provisions are complied with because the multiple-element gas containers (MEGCs) containing the hydrogen fuel will be located on the foreship outside the cargo area. Nevertheless, it was decided to include an extra stowing provision in the recommendation for containers containing ADN goods and reefer containers. This stowing provision will ensure that these containers will not be stowed in the first row of containers in the cargo hold.
8. With regard to the concerns raised on the venting mast, the venting mast is canalized to a mast in front of the MEGCs, away from the cargo hold. The vent mast is located more than 8 m away from the forward end of the cargo hold. Furthermore a service bridge is located in between the vent mast and the front forward end of the cargo hold, providing an extra physical barrier between the mast and the cargo.
9. A concern regarding the use of ventilators in proximity of the MEGCs was raised. However the Rhenus Mannheim will be equipped with ATEX fans which are suitable for the use in the designated zones.

## Justification and sustainable development goals

10. The use of alternative fuels for propulsion of inland navigation vessels is one of the steps to be taken in the general energy transition towards the use of sustainable energy. CCNR is planning on expanding European standard ES-TRIN Chapter 30 and Annex 8 to include hydrogen fuel systems. The ADN Safety Committee could decide to expand the current exception for the use of liquefied natural gas (LNG), to the other systems that are going to be included in the European standard ES-TRIN. This derogation could provide the ADN Safety Committee with further information, which could help make that decision in the future.

11. The issuing of this recommendation is a step towards the regulation of these systems within ADN, as such this proposal could be linked to Sustainable Development Goals: 7; to increase substantially the share of renewable energy in the global energy mix, and 13; Climate action.

### **Action to be taken**

12. The ADN Safety Committee is requested to consider the proposals and to advise the ADN Administrative Committee as it deems appropriate.

## Annex

### **Decision of the ADN Administrative Committee relating to the use of hydrogen fuel system on the dry cargo vessel Rhenus Mannheim I (ENI 04814490)**

#### **Derogation No. X/2024 of XX January 2024**

1. Pursuant to paragraph 1.5.3.2 of the Regulations annexed to ADN, the above-mentioned vessel may deviate until 31 December 2028 from the requirements of paragraphs:
  - 7.1.3.31 fuel having a flashpoint below 55 degrees
  - 9.1.0.31.1 fuel having a flashpoint below 55 degrees
2. The Administrative Committee decides that the use of this hydrogen fuel system is sufficiently safe if the conditions set by the Central Commission for the Navigation of the Rhine (CCNR) are met at all times.
3. The following additional conditions shall also apply:
  - No containers carrying [\[dangerous goods authorized by the annexed Regulations to ADN \]](#)[\[ADN goods\]](#) nor reefer containers may be placed in the first row aft of the hydrogen installation
4. All information on the use of the fuel cell system needs to be collected by the ship owner and kept for at least five years. This info will be submitted to the competent authority upon request.
5. The ship owner will submit an evaluation report to the competent authority [\[and the UNECE secretariat for information of the Administrative Committee\]](#) at the following moments:
  - 6 months after the commissioning of the ship
  - 2.5 years after the issue of this recommendation
  - 5 years after the issue of this recommendation
6. These evaluation reports should at least contain the following information:
  - failure and damage of the fuel cell system
  - leakage
  - bunkering information
  - repairs and alterations of the fuel cell system
  - operational data
  - incidents

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