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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)

#### Thirty-fifth session

Geneva, 26-30 August 2019

Item 5 of the provisional agenda

#### Report of informal working groups

### Report informal working group membrane tanks

Transmitted by the governments of France and the Netherlands\*, \*\*

#### *Summary*

<b>Executive summary:</b>	The document contains the report of the fourth meeting of the informal Working Group on Membrane tanks. During the meeting provisional amendments to the Regulations annexed to ADN have been developed to facilitate the use of membrane tanks on Type G vessels carrying dangerous goods, in particular deeply refrigerated or liquefied gases.
<b>Action to be taken:</b>	The Safety Committee is invited to discuss the report and the provision amendments which can be found in Annex I.
<b>Related documents:</b>	Informal document INF.6 of the twenty-seventh session ECE/TRANS/WP.15/AC.2/56 (Paragraphs 9-12) ECE/ADN/33 (Paragraph 12 and Annex II) Informal document INF.26 of the thirty-first session ECE/TRANS/WP.15/AC.2/64 (Paragraph 62) ECE/TRANS/WP.15/AC.2/2018/35 Informal document INF.25 of the thirty-third session ECE/TRANS/WP.15/AC.2/68 (Paragraphs 68-70) ECE/TRANS/WP.15/AC.2/2019/14 ECE/TRANS/WP.15/AC.2/70 (Paragraphs 72-74)

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\*\* In accordance with the programme of work of the Inland Transport Committee for 2018–2019 (ECE/TRANS/2018/21/Add.1, cluster 9.3).

## **Introduction**

1. On 24 and 25 April 2019, the fourth meeting of the informal working group on Membrane tanks was held at the premises of the Ministry for the Ecological and Solidary Transition in Paris, France. The meeting was attended by delegates of Belgium, France and the Netherlands and by Bureau Veritas, EBU/ESO and industry representatives.
2. At the start of the meeting, the Chairman of the informal working group concluded, based on the report of the Safety Committee, that the Safety Committee supports the work carried out by the informal working group, in particular the proposal to add entries in Table C with alternative carriage requirements for identified relevant substances. In that light, it was noted that the Safety Committee tasked the informal working group to develop adequate provision in the Regulations annexed to ADN regarding the use of membrane tanks on inland tank vessels. Furthermore it was noted that the informal working group on Substances will develop a list of substances suitable for carriage in membrane tanks and, if deemed necessary, a rationalized approach to determine which dangerous substances are suitable.
3. The participants agreed to develop at this meeting only provisional amendments to the ADN 2019 that will be revised at the next meeting of the informal working group, taking into account the comments made during the thirty-fifth session of the Safety Committee in August 2019.

## **Amendments to be discussed**

4. Before starting drafting amendments, the delegate from the Netherlands invited industry representatives to compare loading and unloading manuals of manufactures of membrane tanks with the existing loading and unloading provisions in the Regulations annexed to ADN. Industry representatives made it clear that loading and unloading procedures for membrane tanks do not differ from the prescribed loading and unloading procedures in the Regulations annexed to ADN, especially taking into account that the Regulations already contain specific requirements for the loading and unloading of (deeply) refrigerated or liquefied gases.
5. The informal working group also took note of a document drafted by Bureau Veritas, comparing the prescriptions in the Regulations annexed to ADN and in the IGC Code. This overview turned out to be very helpful in deciding if amendment of the Regulations annexed to ADN was necessary, and if yes, provided guidance on how to draft the actual amendment.
6. Based on list of subsections of the Regulations annexed to ADN, the informal working group considered and developed several amendments regarding the introduction of membrane tanks. This process resulted in the list of provisional amendments which can be found in Annex I. Issues which were considered and discussed as well, but which did not lead to propose provisional amendments to the Regulations annexed to ADN are reflected in Annex II of this report.
7. Additionally, the informal group took note of the fact that 9.3.1.21.1 d) of the Regulations annexed to ADN refers to a degree of filling of 97.5%, while the maximum degree of filling on board a Type G vessel may reach 95% according to subsection 3.2.3.3 (Column (11)). Subsection 9.3.1.21.10 was discussed as well, since it refers to a calculated maximum pressure according to 9.3.1.27, which is not mentioned at all in 9.3.1.27.

## **List of substances**

8. The Chair announced that he and the Dutch delegation would attend the meeting of the informal working group on Substances which volunteered to draft a list of substances of

Table C which are suitable for carriage in membrane tanks. The other participants supported their intention to contribute to a comprehensive and rationalized list.

### **Next meeting**

9. The next meeting of the informal working group is scheduled for 1-2 October 2019 in Brussels, Belgium. All interested parties are as always welcome to join.

### **Conclusion**

10. The informal working group invites the Safety Committee to discuss the report of the informal working group, to comment the developed provisional amendments and to take action as it deems appropriate.

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## Annex I

### Provisional amendments to the ADN 2019

The cancelled text is struck through, the additional text is marked in bold and underlined

1.2.1 Definitions

“1.2.1 *Cargo tank type:*

(a) *Independent cargo tank* means a cargo tank which is permanently built in, but which is independent of the vessel’s structure;

(b) *Integral cargo tank* means a cargo tank which is constituted by the vessel’s structure itself and bounded by the outer hull or by walls separate from the outer hull;

© *Cargo tank with walls distinct from the outer hull* means an integral cargo tank of which the bottom and side walls do not form the outer hull of the vessel or an independent cargo tank;

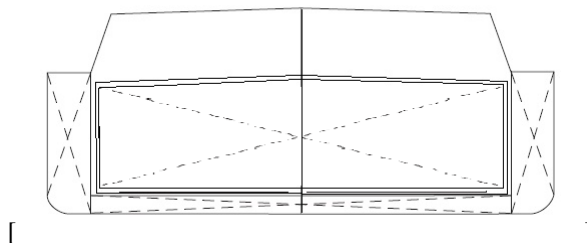
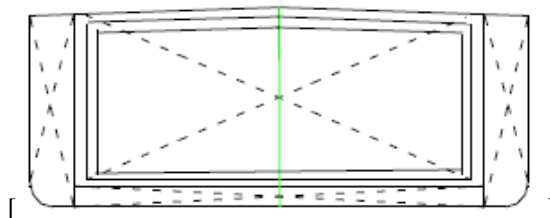
**(d) Membrane tank means a cargo tank which consists of a thin liquidtight and gastight layer (membrane) and insulation supported by the adjacent inner hull and inner bottom structure of a double hull vessel.**”

“1.2.1 **IGC Code means the International Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk, published by the International Maritime Organization (IMO)**”

“1.2.1 *Type of vessel*

Type G: means a tank vessel intended for the carriage of **pressurized or refrigerated** gases. ~~Carriage may be under pressure or under refrigeration.~~

...



Type G Cargo tanks design 2  
Type of cargo tank 4  
(also by flush-deck)”

“3.2.3.1 *Explanations concerning Table C:*

...

Column (8) “Cargo tank type”

Contains information concerning the cargo tank type.

1. Independent cargo tank
2. Integral cargo tank
3. Cargo tank with walls distinct from the outer hull
4. **Membrane tank**

...”

“3.2.3.2 Add G.2.4 etc. to the following lines, identified by the ADN iWG Substances”

“7.2.3.28 ~~Refrigeration system~~ **Instruction on maximum loading temperature**

For the carriage of refrigerated substances, an instruction shall be on board mentioning the permissible maximum loading temperature, in relation to the ~~capacity of the refrigeration system and the~~ insulation design of the cargo tanks **and, if on board, the capacity of the refrigeration system.**”

“8.6.1.3 *Model for a certificate of approval for tank vessels*

...

6. Types of cargo tanks:
  1. Independent cargo tanks
  2. Integral cargo tanks
  3. Cargo tank wall distinct from the hull

**4. Membrane tanks**

...

cargo tank wall distinct from the hull
<b><u>membrane tank</u></b>
opening pressure relief device/high velocity vent valve/safety valve in kPa

”

“8.6.1.4 *Model for a provisional certificate of approval for tank vessels*

...

6. Types of cargo tanks:
  1. Independent cargo tanks
  2. Integral cargo tanks
  3. Cargo tank wall distinct from the hull

**4. Membrane tanks**

...

cargo tank wall distinct from the hull
<b><u>membrane tank</u></b>
opening pressure relief device/high velocity vent valve/safety valve in kPa

”

“8.6.3

...

8. Are suitable means of collecting leakages placed under the pipe connections which are in use and are they empty? Is a water film mentioned in 9.3.1.21.11 activated?

...

20. Is the loading temperature within the range of the maximum permissible temperature as prescribed in 7.2.3.28? O\*\* O\*\*

...”

“9.3.1.0.1 a) The vessel’s hull and the cargo tank shall be constructed of shipbuilding steel or other at least equivalent metal.

The independent cargo tanks [and membrane tanks] may also be constructed of other materials, provided these have at least equivalent mechanical strength properties and resistance against the effects of temperature and fire.

[Membrane tanks may also be constructed of other materials, provided these have at least equivalent mechanical strength and resistance against the effect of temperature and fire.

The equivalence for resistance against the effect of temperature and fire is deemed to be proven where the materials of the membrane tanks fulfil the following requirements:

2. They withstand the range between the maximum temperature in service and 5°C below the minimum design temperature, but not lower than -196°C; and
2. They are fire-resistant or protected by a suitable system such as a permanent inert gas environment or provided with a fire-retardant barrier.]”

“9.3.1.18.1 ...” (renumbering existing text and add)

[“9.3.1.18.2 In case of inerting of insulation spaces, the vessel shall be equipped with an inerting system.

The system shall be capable of maintaining a permanent minimum pressure of 7 kPa (0.07 bar) in the spaces to be inerted.

The inert gas shall be produced on board or carried in a quantity that is sufficient for the entire holding time as determined in accordance with 7.2.4.16.16 and 7.2.4.16.17 (minimum holding time is 15 days). The circulation of inert gas throughout the spaces to be inerted shall be sufficient to allow for effective means of gas detection.

The spaces to be inerted shall be equipped with connections for introducing the inert gas and monitoring systems so as to ensure the correct atmosphere on a permanent basis.

When the pressure, the temperature or the concentration of the inert gas in the gaseous phase falls below a given value, this monitoring system shall activate an audible and visible alarm in the wheelhouse. When the wheelhouse is unoccupied, the shall alarm shall also be perceptible in a location occupied by a crew member.]”

“9.3.1.23.1 Cargo tanks and piping for loading and unloading shall comply with the provisions concerning pressure vessels which have been established by the competent authority of a recognized classification society for the substances carried.”

## Annex II

### Issues which have been discussed by the informal working group but which did not lead to provisional amendments to the ADN 2019

- “7.2.1.21 Carriage in cargo tank”:  
*Purposeless when adding rows in 3.2.3.2 Table C of chapter 3.2*
- “7.2.2.21 Safety and control equipment”:  
*Applicable as existing to Membrane tanks, there is no necessity for an amendment*
- “7.2.3.51 Electrical and non-electrical installations and equipment”:  
*Applicable as existing to Membrane tanks, there is no necessity for an amendment*
- “7.2.4.16.16 Measures to be taken before loading refrigerated liquefied gases”:  
*Applicable as existing to Membrane tanks, there is no necessity for an amendment*
- “7.2.4.16.17 Determination of the holding time”:  
*Applicable as existing to Membrane tanks, there is no necessity for an amendment*
- “7.2.4.18 Blanketing of the cargo and inerting”:  
*Applicable as existing to Membrane tanks, there is no necessity for an amendment*
- “7.2.4.21.3 Maximum permissible degree of filling”:  
*Applicable as existing to Membrane tanks, there is no necessity for an amendment*
- “7.2.4.29 Transport of refrigerated liquefied gases”:  
*Applicable as existing to Membrane tanks, there is no necessity for an amendment*
- “8.2.2.3.3.1 Objectives of the specialization course on gases”:  
*There is no particular necessity to add knowledge on membrane tanks and its safety equipment. A specific training in the framework of ADN 1.3.2.2.1 is sufficient.*
- “8.2.2.7.2.3 Catalogue of questions”:  
*There is no particular necessity to add knowledge on membrane tanks and its safety equipment. A specific training in the framework of ADN 1.3.2.2.1 and the loading and unloading manuals as referred to in paragraph 4 are sufficient.*
- “9.3.1.8.1 Classification”:  
*Applicable as existing to Membrane tanks, there is no necessity for an amendment*
- “9.3.1.11 Hold spaces and cargo tanks”:  
*Applicable as existing to Membrane tanks, there is no necessity for an amendment*
- “9.3.1.11.2 (a) Double hull and double bottom”:  
*Applicable as existing to Membrane tanks, there is no necessity for an amendment*

“9.3.1.21.11 and 9.3.1.21.12 Safety and control installations”:

*9.3.1.21.11 is applicable as existing to Membrane tanks, there is no necessity for an amendment.*

*9.3.1.21.12 is included in the “Operating Requirements” as referred to in IGC Code 18.2.2, there is no necessity for an amendment in ADN.*

“9.3.1.24 Regulation of cargo pressure and temperature”:

*Applicable as existing to Membrane tanks, there is no necessity for an amendment*

“9.3.1.28 Water-spray system”:

*Applicable as existing to Membrane tanks, there is no necessity for an amendment*

“9.3.1.51 to 9.3.1.53 Electrical and non-electrical installations and equipment”:

*Applicable as existing to Membrane tanks, there is no necessity for an amendment*

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