

**Economic Commission for Europe**

Inland Transport Committee

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**Working Party on the Transport of Dangerous Goods**

English

**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)****Fortieth session**

Geneva, 22-26 August 2022

Item 4 (b) of the provisional agenda

**Proposals for amendments to the Regulations annexed to ADN: other proposals**

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**Report on the 12th meeting of the informal working group on substances****Submitted by the Central Commission for Navigation on the Rhine (CCNR)****Introduction**

1. The twelfth meeting of the informal working group on substances took place from 31 May to 2 June 2022 as a video conference at the invitation of the Central Commission for Navigation on the Rhine (CCNR).
2. Mr. Krischok (Germany) chaired the meeting, which was attended by representatives of Germany, the Netherlands, the European Chemical Industry Council (CEFIC), the European Barge Union (EBU), the European Skipper Organisation (ESO) and FuelsEurope.

**Results**

3. In accordance with the mandate issued by the Safety Committee, the group addressed the following issues:

**A. Environmentally hazardous substances (flash-point >60 °C and ≤100 °C) assigned to UN number 3082 or identification number 9003**

4. The informal working group on substances unanimously favoured the assignment to the regular UN number 3082 taking precedence over the assignment to the ADN-specific identification number 9003. However, the information that the flash-point of the substances carried, in particular for heavy heating oil, can be between 60 °C and 100 °C is lost in this case. The informal working group believes that this information gap can be closed by a remark in Column (20) of Table C that indicates the possibility of a low flash-point. Consequently, in the general entry for identification number 9003, the "N1" danger in

Column (5) of Table C has to be deleted, since compliance with the "N1" criteria would automatically result in the assignment to UN 3082.

**Proposals:**

5. Add the following new remark to the explanations concerning Table C for Column (20) in 3.2.3.1:

"xx The flash-point of the substances carried can be between 60 °C and 100 °C."

6. In 3.2.3.3 and 3.2.4.3, add the following remark for Column (20):

"Remark xx: Reference shall be made in column (20) to remark xx for UN 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (HEAVY HEATING OIL)."

7. In Column (5) of Table C for identification number 9003 "SUBSTANCES WITH A FLASH-POINT ABOVE 60 °C BUT NOT MORE THAN 100 °C which are not affected to another class", delete danger "N1".

**B. Calibration of gas detection systems with n-hexane and gas detectors**

8. Informal document INF.17 submitted by EBU/ESO for the thirty-fifth session of the ADN Safety Committee proposed that stationary gas detection systems be calibrated with n-hexane and portable gas detectors with methane, waiving the requirement of calibration with a "more critical substance" that might be on the vessel's substance list. Moreover, it proposed that the temperature class requirements for stationary gas detection systems be reduced from T6 to T4.

9. The proposals were discussed in detail by the informal working group. In principle, the working group took a positive view of the recommended amendments with regard to calibration. The informal working group believes that it is very difficult to assess whether a substance is more critical than another substance in terms of explosion protection. However, before giving its final opinion, the informal working group would like to consult the German National Metrology Institute (PTB) again.

10. There was agreement in the informal working group that it is logical in terms of safety to adapt the temperature class requirements to be met by stationary gas detection systems to the requirements to be met by the vessel. This question also is to be submitted to the PTB again.

**C. Discussion of the entries in Table C containing remark 44**

11. First, the development and the reasons behind the addition of additional lines with explosion subgroup II B3 to Column (16) and remark 44 to Column (20) were presented once again. In general, proposals that reduce the number of lines in Table C and thus improve clarity are welcome. However, this is based on the condition that the proposals do not result in safety deficits.

12. Among the questions raised within the framework of the discussion was how substances of explosion subgroup II B can be correctly assigned if the number of lines is reduced and how as simple a correlation as possible between Table C and the vessel substance lists can be retained.

13. The information was provided that vessel substance lists that also contain the entries for the entire explosion group II B, i.e. including explosion subgroup II B, might be in

circulation for vessels equipped in accordance with explosion subgroup II B3. This would be problematic in the opinion of the informal working group.

14. Given the fact that the proposed amendments to the provisions could not be incorporated into ADN before the 2025 edition, the informal working group agreed to interrupt the discussion at that point and ask the recognized classification societies for an opinion first.

#### **D. Discussion of the entries in Table C with more than 10% benzene and the entries marked with an asterisk**

15. The starting point of the discussion is the three-stage system for determining the conditions of carriage for tank vessels (vessel of type C — determination of cargo tank internal pressure / vessel of type C, lack of data — boiling point / vessel of type N — vapour pressure). In the case of vessels of type C, the content of these provisions leads to duplication.

16. In the discussions, it was found that there are different conditions for the individual users of the provisions (e. g. consignors, carriers or recognized classification societies) and that, as a result, the requirements when implementing the provisions also vary. There was consensus that the interests of all parties involved in the carriage need to be considered.

17. Irrespective of this, the informal working group arrived at the conclusion that it should be possible to improve the entries for vessels of type C with regard to the interaction of additional information on the boiling point in the names and descriptions and in Schemes A, B and C in a way that might also result in a reduction in the number of lines in Table C.

18. One solution could be to show Schemes A, B and C in the form of flowcharts. CEFIC's suggestion to that effect was revisited. It is planned to continue the discussion of this issue at the next meeting of the informal working group.

#### **E. Bilge water, contains sludge (vapour pressure at 50 °C > 1 kPa)**

19. In the entry for UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (BILGE WATER, CONTAINS SLUDGE) in Table C, a vessel of type N-2-3 is required. However, this is contradictory to the system (3.2.3.3 and 3.2.4.3). Water on its own causes a vapour pressure at 50 °C of more than 12 kPa, which would result in the substance with the danger N1 having to be carried in a vessel of type C.

20. The informal working group believes that the principle that more specific provisions for a substance should take precedence over more general provisions should be applied also in this case, i.e. the requirements concerning the conditions of carriage as set out in Table C for this substance apply. Therefore, the informal working group sees no need to amend the provisions.

#### **F. Substances that have no dangerous properties other than an auto-ignition temperature of $\leq 200$ °C**

21. If the flowchart in 3.2.3.3 is applied consistently, the first box results in substances that have no dangerous properties other than an auto-ignition temperature of  $\leq 200$  °C not being classified as a dangerous good. This is not justified in terms of safety.

22. Even though this might be a theoretical issue, and so far no problems have become known in practice, the informal working group would like to propose to the Safety

Committee that the auto-ignition temperature be added to the bullet points in the first box of the flowchart.

**Proposal:**

23. In the first box of the flowchart in 3.2.3.3 after the second bullet point, insert the following bullet point:

- Auto-ignition temperature  $\leq 200$  °C,".

**G. Missing remark 44 in Table C for UN 2924**

24. It was found that in the second entry for UN 2924 "FLAMMABLE LIQUID, CORROSIVE, N.O.S." packing group III where explosion subgroup "(II B3)" is indicated in Column (16), remark 44 is missing in Column (20). What is more, in both entries for UN 2924 packing group III, Column (20) contains remark 34. Remark 34, however, is only assigned to substances of Class 8 that are permitted to be carried in a vessel of type N.

25. Therefore, the informal working group proposes that, in the first entry for UN 2924 packing group III (without "(II B3)" in Column (16)), remark 34 be deleted in Column (20) and, in the second entry for UN 2924 packing group III (with "(II B3)" in Column (16)), remark 34 be replaced by remark 44 in Column (20).

26. When addressing this issue, it was found that, in the entry for UN 1764 "DICHLOROACETIC ACID" and in the two entries for UN 2430 "ALKYLPHENOLS, SOLID, N.O.S. (NONYLPHENOL, ISOMERIC MIXTURE, MOLTEN)", remark 34 is not indicated in Column (20). The informal working group proposes that remark 34 be added in Column (20) in these three cases, as these are substances of Class 8.

**Proposals:**

27. In the first entry for UN 2924 "FLAMMABLE LIQUID, CORROSIVE, N.O.S." packing group III (without "(II B3)" in Column (16)), delete "; 34" in Column (20).

28. In the second entry for UN 2924 "FLAMMABLE LIQUID, CORROSIVE, N.O.S." packing group III (with "(II B3)" in Column (16)), replace "; 34" with "; 44" in Column (20).

29. In the entries for UN 1764 "DICHLOROACETIC ACID" and UN 2430 "ALKYLPHENOLS, SOLID, N.O.S. (NONYLPHENOL, ISOMERIC MIXTURE, MOLTEN)" (both entries), add "; 34" in Column (20).

**H. Remark 37 that is not used in Table C**

30. Remark 37, which states that the cargo tank system must be capable of resisting the vapour pressure of the cargo at higher ambient temperatures whatever the system that has been adopted for treating the boil-off gas, was already contained in ADN. However, remark 37 is currently not assigned to any entry in Table C.

31. Nevertheless, it was found that remark 37 is made reference to in 9.3.x.24.3. Against this background, the informal working group arrived at the conclusion of asking the recognized classification societies whether remark 37 continues to be relevant and to which entries in Table C remark 37 should be assigned.

## I. Harmonization of the explosion groups between the IBC Code and the ADN

32. Informal document INF.21 submitted by CEFIC for the thirty-sixth session of the ADN Safety Committee proposed based on the particulars in the IBC Code that for 8 entries in Table C "II B <sup>4)</sup>" in Column (16) be replaced by "II A". The informal working group examined the proposals and found that for two entries (UN 2381 and UN 2618) the information in Column (16) had already been changed to "II A".

33. For UN 1300 "TURPENTINE SUBSTITUTE", the IBC Code only contains data for turpentine. As these are two different substances, the informal working group is of the opinion that it is not permissible to incorporate the particulars from the IBC Code.

34. The informal working group can agree with the other proposals (for UN 1108, UN 1157, UN 2323, UN 2370 and UN 3079). As the IBC Code not only uses the standard gap width but also the minimum ignition currents for the assignment of the explosion groups, the informal working group proposes to supplement the particulars taken from the IBC Code with footnote 9), which is intended for this purpose and states that the assignment is in accordance with IMO's IBC Code.

### **Proposal:**

35. In Table C, for the entries  
 UN 1108 "1-PENTENE (n-AMYLENE)",  
 UN 1157 "DIISOBUTYL KETONE",  
 UN 2323 "TRIETHYL PHOSPHITE",  
 UN 2370 "1-HEXENE" and  
 UN 3079 "METHACRYLONITRILE, STABILIZED"  
 replace "II B <sup>4)</sup>" with "II A <sup>9)</sup>" in Column (16).

## J. Amendments to Column (16) of Table C for UN number 2527

36. Informal document INF.22 submitted by CEFIC for the thirty-sixth session of the ADN Safety Committee proposed that in the entry for UN 2527 "ISOBUTYL ACRYLATE, STABILIZED" in Column (16) of Table C "II B <sup>9)</sup>" be replaced with "II B3 <sup>14)</sup>".

37. The informal working group agrees with the presented considerations on structure-property-analogies with methyl-, ethyl- and n-butyl-substituted compounds. In the opinion of the group, the assignment of explosion group II B3 is duly substantiated in terms of safety.

### **Proposal:**

38. In Column (16) of Table C in the entry for UN 2527 "ISOBUTYL ACRYLATE, STABILIZED", replace "II B <sup>9)</sup>" with "II B3 <sup>14)</sup>".

**K. Examination of Column (17) of Table C for UN number 1999**

39. The explosion protection requirements (Columns (16), (17) and (18)) and the permissibility of open cargo tanks seem contradictory. However, the substances carried under the entry UN 1999 "TARS, LIQUID, including road oils, and cutback bitumens" are liable to clog the self-contained protection systems. This can lead to dangerous situations and conditions.

40. Since self-contained protection systems cannot be operated at sufficiently high temperatures to safely avoid these dangerous situations, the informal working group believes that it is less risky to maintain the other explosion protection measures while allowing the use of open cargo tanks. The informal working group sees no need to amend the provisions.

**L. Undetectable substances for which a toximeter is required**

41. The issue is described in informal document INF.20 submitted by CEFIC for the thirty-ninth session of the ADN Safety Committee, taking the carriage of titanium tetrachloride (TiCl<sub>4</sub>) as an example. It turned out that the members of the informal working group favour a general solution instead of many individual solutions.

42. After a thorough discussion, the informal working group agreed on the following gradual approach as a basic system:

- The definition of the term "toximeter" is to be extended. It is to be clarified that the term not only comprises devices that operate on the basis of gas detection tubes but that in general appropriate measuring devices (including PIDs) can be used.
- Afterwards, it is to be determined which substances can be directly detected with this extended range of devices.
- For substances that cannot be measured directly, it is to be examined whether indirect measuring methods can be applied. If there are both direct and indirect procedures for a substance, preference is to be given to direct measurement.
- For substances for which there are neither direct nor indirect procedures, alternatives, such as stowage on deck for instance in dry-cargo shipping, are to be made possible.

43. Furthermore, based on text proposals, the informal working group would address the issue of how the above approach can be implemented in the provisions.

**M. Check of all entries without a packing group in Table A for which the use of blue cones/lights is required**

44. In accordance with the criteria, the display of blue cones (lights) for substances of Classes 3 to 9 depends on the classification code (flammable and/or toxic properties) and the packing group. In the case of packing group III, generally, no blue cones (lights) are required to be displayed. After the discussion, the informal working group concluded that, for articles that, in accordance with the system, are not assigned a packing group, it should also in principle not be required to display blue cones (lights) .

45. Therefore, the informal working group proposes that in two entries with articles of Class 3, three entries with articles of Class 6.1 and two entries with articles of Class 9 the particulars in Column (12) of Table A be amended to read "0".

**Proposals:**

46. For **UN 3540** "ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S.", replace "1" with "0" in Column (12) of Table A.
47. For **UN 1700** "TEAR GAS CANDLES", **UN 2016** "AMMUNITION, TOXIC, NON-EXPLOSIVE, without burster or expelling charge, non-fuzed" and **UN 2017** "AMMUNITION, TEAR-PRODUCING, NON-EXPLOSIVE without burster or expelling charge, non-fuzed", replace "2" with "0" in Column (12) of Table A.
48. For **UN 3473** "FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUELL CELL CARTRIDGES PACKED WITH EQUIPMENT containing flammable liquids", **UN 3359** "FUMIGATED CARGO TRANSPORT UNIT" and **UN 3363** "DANGEROUS GOODS IN ARTICLES or DANGEROUS GOODS IN MACHINERY or DANGEROUS GOODS IN APPARATUS", insert "0" in Column (12) of Table A.
49. In Class 2, the system does not provide for packing groups. There, blue cones (lights) are required to be displayed for all substances depending solely on the classification code (flammable and/or toxic properties).
50. In the opinion of the informal working group, the amount of flammable or toxic gases in articles is relatively small and the release of larger amounts very unlikely. In line with the rule for articles containing substances of classes 3 to 9 proposed in paragraph 43 above, the working group, in this case, too, concluded that, for articles containing gas, it should also in principle not be required to display blue cones (lights). Therefore, the informal working group proposes that "1" or "2" be replaced with "0" in Column 12 of Table A for seven entries of Class 2.

**Proposal:**

51. For UN 1057 "LIGHTERS or LIGHTER REFILLS containing flammable gas", UN 3150 "DEVICES, SMALL, HYDROCARBON GAS POWERED or HYDROCARBON GAS REFILLS FOR SMALL DEVICES with release devices", UN 3358 "REFRIGERATING MACHINES containing flammable, non-toxic, liquefied gas", UN 3478 "FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing liquefied flammable gas", UN 3479 "FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUELL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing hydrogen in metal hydride" and UN 3537 "ARTICLES CONTAINING FLAMMABLE GAS, N.O.S.", replace "1" with "0" in Column (12) of Table A.
52. For UN 3539 "ARTICLES CONTAINING TOXIC GAS, N.O.S.", replace "2" with "0" in Column (12) of Table A.

**N. Correction of an inconsistency in Column (2) of Table C for UN number 1972**

53. FuelsEurope found that in Table C there are differences between the language versions in the name and description (Column (2)) of the entry for UN 1972 "METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID with a high methane content" in which carriage in membrane tanks (G-2-4) is laid down. In the English, German and Russian language versions, the addition "LIQUID" is missing in two places.

54. Moreover, in the German language version, there is a typo in remark 42 in the flowchart (3.2.3.3) and in the assignment criteria for the substances (3.2.4.3 L.).

55. The informal working group has examined the proposals and proposes that "LIQUID" be added in the name and description in Table C in the entry for UN 1972 that may be carried in membrane tanks in the three mentioned language versions and that the typo in the German language version of remark 42 be corrected.

**Proposals:**

56. In the English, German and Russian language versions of Table C of ADN, in the name and description (Column (2)) of the entry for UN 1972 "METHANE, REFRIGERATED or NATURAL GAS, REFRIGERATED with a high methane content" in which carriage in membrane tanks (G-2-4) is laid down, add "LIQUID" after "REFRIGERATED" (twice).

57. In the German language version, in remark 42 in the flowchart (3.2.3.3) and in the assignment criteria for the substances (3.2.4.3 L.), replace "TIEFGEHÜHLT" with "TIEFGEKÜHLT" (twice).

**O. Loading on top – "positive list"**

58. The starting point for the deliberations on this issue are the decisions the ADN Safety Committee took based on proposals by the informal working group "loading on top in barges". Accordingly, only the co-loading of the same cargo is to be considered.

59. The detailed discussion focussed on the proposed definition of the term "same cargo". The informal working group agreed that a systematic approach should be adopted that is as broad as possible and based mainly on the protection targets to be achieved. The proposed definition contains three basic elements:

- same entry in Table C,
- no reaction among the cargo batches and
- no reaction of the cargo with the construction materials of the vessel.

A note to the definition explains on the basis of a series of examples what is to be understood by reactions within the meaning of the proposed definition.

**Proposal:**

60. In Chapter 1.2 "Definitions and units of measurement", 1.2.1 "Definitions" insert the following definition under S:

"*Same cargo* means two or more batches of a dangerous good permitted for carriage in tank vessels, provided that:

- (a) these batches are assigned to the same entry in 3.2.3 Table C "List of dangerous goods accepted for carriage in tank vessels in numerical order" with the same packing groups and same dangers and that the mixed loading of these batches does not change the classification and the conditions of carriage,
- (b) there are no chemical reactions between the cargo batches and
- (c) there are no reactions of the cargo with materials of construction of the shells, gaskets, equipment and protective linings and the weakening of these materials of construction is excluded.

**Note:** Within the meaning of this definition, no reaction of the cargo means, for example:

- (a) no formation of new substances (e.g. evolution of flammable, asphyxiant, oxidizing or toxic gases or vapours; formation of flammable, corrosive, toxic, oxidizing or environmentally hazardous solids or liquids; formation of unstable substances);
- (b) no disintegration or polymerization reaction;
- (c) no combustion or evolution of considerable heat;
- (d) no pressure rise as a result of chemical reactions;
- (e) no catalysation of a reaction;
- (f) no change of the reactivity."

61. In the opinion of the informal working group, mixed loading of several batches of the same cargo is not permitted in accordance with the current status of the provisions. The informal working group therefore proposes that mixed loading of several batches of the same cargo be permitted by means of a new remark in Column (20) of Table C. This new remark is to be assigned to entries in Table C for which there is a corresponding need for mixed loading of several batches and for which the conditions set out in the definition of "same cargo" can be met. The basis for this will be the "positive list" prepared by FuelsEurope (containing approx. 180 entries/rows for 30 UN numbers) and made available to the working group.

**Proposal:**

62. In 3.2.3 of Table C "List of dangerous goods accepted for carriage in tank vessels in numerical order", 3.2.3.1 "Explanations concerning Table C", "Explanatory notes for each column", Column (20) "Additional requirements/Remarks", add the following new remark:

"XX. Where the conditions set out in the definition of same cargo in accordance with 1.2.1 are met, several batches of this cargo may be loaded on top of each other."

63. Once the ADN Safety Committee has approved the proposals for a new definition and a new remark in Table C, the informal working group believes that it is necessary to address further required amendments in a next step. In the opinion of the informal working group, amendments would have to be made to the provisions on documentation, to Part 7 "Requirements concerning loading, carriage, unloading and handling of cargo", to Chapter 7.2 "Tank vessels" and to the provisions on the stabilization certificate.

## **P. Carriage of carbon dioxide and required refrigeration system**

64. Remark 42 in Table C states, among other things, that under certain conditions the carriage of refrigerated liquefied gases in tank vessels does not require a refrigeration system on board. Currently, remark 42 is assigned to the entries for UN 1038 "ETHYLENE, REFRIGERATED LIQUID" and UN 1972 "METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID with high methane content". So far, the remark has not been assigned to the entry for UN 2187 "CARBON DIOXIDE, REFRIGERATED LIQUID".

65. In the opinion of the informal working group, this is due to the special location of the triple point in the phase diagram of carbon dioxide. In the case of an unintended relief with a pressure drop to below 5.1 bar in installations filled with liquid carbon dioxide, this special property of carbon dioxide may result in the spontaneous formation of solid and gaseous CO<sub>2</sub>. The solid carbon dioxide (dry ice) may impair fittings and safety devices and thus massively damage the entire installation.

66. The informal working group recognizes that refrigerated liquefied carbon dioxide is usually carried at a temperature of approx. -30 °C and a pressure of approx. 40 bar. Thus, the distance to the triple point is sufficiently large in the opinion of the informal working group.

67. The informal working group is of the opinion that, under the following conditions, remark 42 may be assigned to carbon dioxide and that the requirement of a refrigeration system can thus be waived in accordance with the remark:

(a) It must be ensured that information on the special properties of carbon dioxide is provided; and

(b) the conditions of carriage must be laid down, in binding form, in such a manner that a sufficiently large distance to the triple point with a view to safety is ensured.

EBU/ESU will examine whether a document with corresponding proposals for amendments to the provisions can be prepared for submission to the ADN Safety Committee.

**Q. Completion of the particulars in Table A for UN 3550 COBALT DIHYDROXIDE**

68. The informal working group had been asked by the ADN Safety Committee to complete the particulars in Table A for the new entry for UN 3550 "COBALT DIHYDROXIDE POWDER, containing not less than 10% respirable particles". In the discussion, the informal working group arrived at the conclusion that Columns (6), (9) and (12) of Table A need to be supplemented.

**Proposal:**

69. In the new entry for UN 3550 "COBALT DIHYDROXIDE POWDER, with not less than 10% respirable particles" in Table A, insert "802" in Column (6), "PP, EP" in Column (9) and "2" in Column (12).

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