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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 6 of the provisional agenda

Reports of informal working groups

Report on the thirteenth meeting of the informal working group on substances

Transmitted by the Central Commission for the Navigation of the
Rhine (CCNR)*,**

Introduction

1. The informal working group on substances held its thirteenth meeting on 13 and 14 September 2023 in Berlin, at the invitation of the Central Commission for the Navigation of the Rhine (CCNR).
2. The meeting was attended by representatives of Germany, Luxembourg, the Netherlands, the European Barge Union/European Skippers Organization (EBU/ESO), FuelsEurope and approved classification societies. Statements and instructions had been submitted in advance by the European Chemical Industry Council (Cefic) concerning items on the agenda. Mr. Krischok (Germany) chaired the meeting.

Results

3. In accordance with the mandate given to it by the ADN Safety Committee, the group examined the following topics:

* Distributed in German by the Central Commission for the Navigation of the Rhine under the symbol CCNR-ZKR/ADN/WP.15/AC.2/2024/8.

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



A. Calibration of gas detection system with n-Hexane and gas detectors

4. At the conclusion of the twelfth meeting of the informal working group, it was agreed that the group supported the proposal to waive the requirement for calibration with a “more critical substance” that may be present in the list of substances admitted for transport, and to lower, from T6 to T4, the temperature class requirements for permanent gas detection systems. A subsequent exchange with the Physikalisch Technische Bundesanstalt (PTB) confirmed these positions.

5. In a further discussion, it was noted that it was not possible to calibrate all sensors with n-Hexane or methane. The group therefore considers it possible and appropriate, also in view of the high safety margins provided for in ADN, to add to the ADN requirements, as a requirement for gas detection systems and gas detectors, that calibration of this equipment may also be carried out with the gases prescribed by the respective manufacturers.

6. The informal working group therefore proposes the following changes to the definitions of gas detection system and gas detector in 1.2.1 (changes are shown in bold, deletions are struck through and additions are underlined):

Proposal 1:

“Gas detection system

means a steady state monitoring system with direct-measuring sensors capable of detecting in time significant concentrations of flammable gases **from the cargo** at concentrations below their (LEL) and capable of activating the alarms when a limiting value is exceeded. It must be calibrated ~~at least~~ for n-Hexane **or for a gas prescribed by the system’s manufacturer**. The threshold level of the sensors shall be set at not more than 10% of the LEL of n-Hexane **or of the calibration gas prescribed by the system’s manufacturer**.

It shall be certified according to IEC/EN⁷ 60079-29-1:2016 and, with electronically driven systems, also according to EN 50271:2010 or EN 50271:2018. If it is used in explosion hazardous areas, it shall also comply with the requirements for use in the zone concerned and evidence of such compliance (e.g., conformity assessment procedure according to Directive 2014/34/EU,¹ the IECEx System,⁵ ECE/TRADE/391⁶ or at least equivalent) shall be supplied;”

Proposal 2:

“Gas detector

means a portable device allowing measurement of any significant concentration of flammable gases below the LEL and which clearly indicates the concentration of such gases. Flammable gas detectors may be designed for measuring flammable gases only, but also for measuring both flammable gases and oxygen. This device shall be so designed that measurements are possible without the necessity of entering the spaces to be checked.

The maximum detection level of the sensors is 5% of the LEL **of the methane or the gas prescribed by the equipment manufacturer of the most critical substance in the vessel substance list for tank vessels or the cargo for dry cargo vessels**. The flammable gas detector shall be certified according to IEC/EN⁷ 60079-29-1:2016. If it is used in explosion hazardous areas, it shall also comply with the requirements for use in the zone concerned and evidence of such compliance (e.g., conformity

⁷ IEC/EN means: This standard is available as an IEC standard and as a European standard.

¹ Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.

⁵ <http://iecex.com/rules>.

⁶ A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.

⁷ IEC/EN means: This standard is available as an IEC standard and as a European standard.

assessment procedure according to Directive 2014/34/EU,¹ the IECEx System,⁵ ECE/TRADE/391⁶ or at least equivalent) shall be supplied;”

7. Consequently, the requirement applicable to vessels in 7.2.2.6 (Gas detection system) should be deleted and the requirements in the second paragraph of 7.2.3.51.7 (Electrical and non-electrical installations and equipment) and the second paragraph of 9.3.x.17.6 (below-deck pump room) should be adapted.

Proposal 3:

“7.2.2.6 Gas detection system:

~~When the list of substances on the vessel according to 1.16.1.2.5 contains substances for which n-Hexane is not representative, the gas detection system shall also be calibrated in addition according to the most critical LEL of the substances accepted for carriage on the vessel.~~

(Reserved)

Proposal 4:

“7.2.3.51.7 ... ; or

- If values corresponding to 10% of the LEL of n-Hexane or of the calibration gas prescribed by the manufacturer ~~or 10% of the LEL of the cargo, whichever is the more critical,~~ are not [*] reached in the wheelhouse, accommodation and service spaces located outside the cargo area.”

*[*Note from the CCNR secretariat: The initial text of ADN 2023 in French does not correspond to the German version. In addition to the proposed change, a further correction was necessary (use of the negative in French)].*

8. The results of the measurements shall be recorded in writing.

Proposal 5:

“9.3.x.17.6 ...

If the list of substances on the vessel according to 1.16.1.2.5 is going to include substances that require explosion protection in accordance with column (17) of Table C of Chapter 3.2, then the cargo pump room shall also be provided with a permanent gas detection system which automatically indicates the presence of flammable gases and actuates a visual and audible alarm when the gas concentration has reached ~~20% of the LEL of the cargo or~~ 20% of the LEL of n-Hexane or of the calibration gas prescribed by the system’s manufacturer, whichever gives the more critical value.”

9. The informal working group also recommends changing the temperature class currently required for gas detection systems, T6, to T4.

Proposal 6:

9.1.0.12.3 / 9.3.x.12.4 respectively letter (b), requirement (v), condition 1

“1. It is appropriate at least for use in zone 1, explosion group IIC and temperature class ~~T4T6~~;”

¹ Official Journal of the European Union No. L 96 of 29 March 2014, p. 309.

⁵ <http://iecex.com/rules>.

⁶ A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere, United Nations, 2011.

B. Review of Table C entries with remark 44

10. In the course of the discussion, the arguments for and against changes to entries with remark 44 were once again considered. Reducing the number of lines in Table C would certainly improve clarity, but the correct assignment of substances in explosion subgroup II B and the simplest possible correlation between Table C and the lists of substances accepted for carriage must remain guaranteed.

11. Entries for substances belonging to explosion subgroup II B in column (16) of Table C should not be included in the list of substances permitted for carriage on vessels equipped only for explosion subgroup II B3. It was pointed out that the classification societies' new "software for lists of substances admitted for transport" accurately takes account of this performance parameter in the context of the requirements currently in force.

12. Given that the classification societies have completed their work on this subject, the working group on substances also considers that there is now no need to amend the requirements and that there is therefore no immediate need to pursue this point.

C. Examination of Table C entries with more than 10% benzene and entries marked with an asterisk

13. The proposal previously submitted by Cefic to modify schemes A, B and C of flowchart 3.2.3.3 concerns only a change in presentation, without any change in the content of schemes A, B and C. The proposal does, however, include a few additions. Thus, in the proposal of Cefic, ignition temperature has been added as a criterion, a presentation of the hierarchy for type N boats has been added after scheme B, and the meaning of "yes" and "no" in the flowchart has been clearly defined.

14. In the meantime, the presentation of schemes A, B and C was clarified and made more comprehensible, on the basis of proposals submitted by the delegation of the Netherlands. It is therefore proposed that it should be verified with Cefic whether it considers that any further clarification is required. Attention is also drawn to the fact that 7.2.1.21 also includes requirements concerning the hierarchy of tank vessels. In the group's opinion, the provisions relating to the hierarchy of tank vessels should be brought together in a single place in the requirements.

15. It is planned to continue discussions aimed at clarifying the above issues at the next meeting of the informal working group.

D. Remark 44 missing from Table C for UN No. 2924, UN No. 1198, UN No. 1289 and UN No. 2276, and verification that remark 34 is assigned only to Class 8 or also to the "corrosive" subsidiary hazard

16. It was noted that for entry UN No. 2924, FLAMMABLE LIQUID, CORROSIVE, N.O.S., packing group III, for which the explosion subgroup (II B) is indicated in column (16), remark 44 should be deleted from column (20).

17. It was clarified that remark 34 must be entered for substances with corrosive properties (whether a primary or secondary hazard) which may be carried on board type N vessels. A review of Table C showed that, apart from UN Nos. 1764 and 2430 (twice), for which the addition of remark 34 had already been decided at the forty-second session of the ADN Safety Committee, no other entries require the addition of remark 34.

18. Following the above clarification, the informal working group also concluded that the deletion of remark 34 decided at the forty-second session of the ADN Safety Committee from the two entries for UN No. 2924, FLAMMABLE LIQUID, CORROSIVE, N.O.S., packing group III, should be cancelled, i.e., remark 34 should be retained for the two entries in question.

Proposal 7:

19. Delete without replacement the following amendments adopted at the forty-second session of the ADN Safety Committee (ECE/TRANS/WP.15/AC.2/84, Annex 1, Chapter 3.2, Table C):

“For UN No. 2924, first entry, “FLAMMABLE LIQUID, CORROSIVE, N.O.S.”, packing group III (without “II B3”), delete “; 34” in column (20).

(Reference document: ECE/TRANS/WP.15/AC.2/2023/1).”

and

“For UN No. 2924, second entry, “FLAMMABLE LIQUID, CORROSIVE, N.O.S.”, packing group III (with “II B3”), replace “; 34” with “; 44” in column (20).

(Reference document: ECE/TRANS/WP.15/AC.2/2023/1).”

20. Further to the indications provided by the ADN Safety Committee during the forty-second session, the informal working group also checked the entries for UN No. 1198 FORMALDEHYDE IN FLAMMABLE SOLUTION, UN No. 1289 SODIUM METHYLATE SOLUTION IN ALCOHOL and UN No. 2276 2-ETHYL HEXYLAMINE in Table C.

21. These three entries concern substances with classification code FC in packing group III, which can be carried by a type N vessel. Remark 34 is therefore justified in column (20). For UN No. 1198, the explosion group based on the data is II B, and group II A has been assigned to UN Nos. 1289 and 2276. Remark 44 is not necessary in these cases. This means that, in the opinion of the informal working group, no changes to the requirements are necessary.

E. Remark 37, not used in Table C

22. Approved classification societies have not indicated a need to make any changes to remark 37, either to delete it or to add it to entries in Table C.

23. The informal working group on substances too considers that there is no need to change the requirements in the current situation.

F. Harmonization of explosion groups between the IBC Code and ADN

24. After further examination, it was confirmed that the amendments adopted at the forty-second session of the ADN Safety Committee concerning UN Nos. 1108, 1157, 2323, 2370 and 3079 (ECE/TRANS/WP.15/AC.2/84, Annex 1, Chapter 3.2, Table C) are correct.

G. Amendment to column (16) of Table C for UN No. 2527

25. After further examination, it was also confirmed that the amendment adopted at the forty-second session of the ADN Safety Committee concerning UN No. 2527, Annex 1, Chapter 3.2, Table C, is correct.

H. Non-measurable substances for which a toximeter is required

26. The informal working group notes that the industry has begun work following the step-by-step approach proposed by the group at its last meeting, with a view to proposing amendments to extend the definition of the term “toximeter”.

27. During the discussion, it was pointed out that operational measurements for substances that cannot be detected directly or indirectly, even with the extended range of measuring instruments available thanks to the new definition, could also include calculations (by analogy with the International Maritime Organization) using LC₅₀ values and vapour pressure. This means that calculations could be carried out to determine the extent to which

the substances concerned can give rise to an accumulation of toxic vapours in dangerous concentrations. However, this instruction is provided bearing in mind that, in the opinion of the informal working group, measurements are always preferable to calculations.

28. This topic will be examined in greater detail on the basis of proposed texts at the next meeting of the informal working group on substances.

I. Loading-on-Top – “Positive list”

29. The basis for this is the ADN Safety Committee’s decision that only mixed loading of identical dangerous goods should be taken into consideration. The informal working group reiterates its proposal in principle to adopt a systematic approach that is as broad as possible by giving an appropriate definition of “identical cargo”, based primarily on the protection objectives to be achieved.

30. The informal working group discussed and confirmed the proposals for a new definition of “identical cargo” in 1.2.1 and for a new remark “xx” for column (20) of Table C. At the end of this discussion, it was noted that from the point of view of safety, it is appropriate for batches of the same dangerous goods to come from one and the same consignor if they are loaded one on top of the other. The proposals for the definition of “identical cargo” and for a new remark xx in column (20) of Table C have been worded accordingly.

31. In 1.2, “Definitions and units of measurement”, 1.2.1 “Definitions”, under letter I, insert the following definition:

“Identical cargo means two or more batches of a dangerous good accepted for carriage in tank vessels, from a single consignor, provided

- (a) that these batches correspond to the same entry in Table C, “List of dangerous goods accepted for carriage in tank vessels in numerical order” under 3.2.3, with the same packing groups and the same hazards, and that the mixed loading of these batches does not entail any change in the classification and conditions of carriage,
- (b) that there is no chemical reaction between the cargo batches, and
- (c) that there is no reaction of the cargo with the construction materials of the tanks, gaskets, equipment and protective linings, and that any weakening of these construction materials is excluded.

NOTE: For the purposes of this definition, the absence of cargo reactions means, for example:

- (i) *no formation of new substances (e.g. release of flammable, asphyxiating, oxidizing or toxic gases or vapours; formation of flammable, corrosive, toxic, oxidizing or environmentally hazardous solids or liquids; formation of unstable substances);*
- (ii) *no decomposition or polymerization reaction;*
- (iii) *no combustion or evolution of considerable heat;*
- (iv) *no increase in pressure resulting from chemical reactions;*
- (v) *no catalytic reaction;*
- (vi) *no change in reaction capacity.”*

32. Joint loading of several batches of the same cargo will be made possible by means of a new remark in column (20) of Table C. In Table C, this new remark will be added only for the substances concerned by the need to load several batches together and for which the conditions set out in the definition of “identical cargo” can be met.

33. In 3.2.3, 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. If the conditions set out in the definition of identical cargo in 1.2.1 are met, several batches of this cargo from a single consignor may be loaded one on top of the other.”

34. With regard to additional necessary modifications, the informal working group considered the requirements relating to documentation. In the opinion of the informal working group, transport in which two or more batches of the same cargo from the same consignor are loaded on top of each other must be transparent and fully traceable. Each batch therefore requires a new transport document and an updated loading plan.

35. For the next meeting, in addition to the proposals relating to documentation, the informal working group is also scheduled to consider proposals for adapting Part 7, “Requirements concerning loading, carriage, unloading and handling of cargo”, Chapter 7.2 “Tank vessels”, with regard to the requirements relating to the stabilization certificate, as well as proposals for adding the new remark XX to entries in Table C.

J. Classes other than 3, 6.1, 8 and 9 in 3.2.3.3 (flowchart) and 3.2.4.3 (criteria for assignment)

36. The informal working group interprets the current state of the requirements, as reflected in 3.2.3.3, Flowchart, schemes and criteria for determining applicable special requirements (columns (6) to (20) of Table C) and in 3.2.4, Modalities for the application of section 1.5.2 on special authorizations concerning transport in tank vessels, as resulting from the evolution of the requirements through revisions, additions and adaptations. The fact that the requirements, particularly those in 3.2.3.3 and 3.2.4.3, are presented in partially different ways, and that their content largely overlaps, albeit without being identical, regularly leads to difficulties in the understanding and development of the law.

37. The informal working group on substances therefore proposes that the ADN Safety Committee exchange views on the following fundamental principles and, where appropriate, take decisions:

- (i) The requirements of 3.2.3.3 and 3.2.4 should be merged.
- (ii) In these merged requirements, it should be clearly and prominently indicated which parts of the special requirements are used to determine which of the applicable requirements (columns (6) to (20) of Table C) are applicable to the entries in Table C, for which the words “*see 3.2.3.3” appear in column (20).

*NOTE: In column (20) of Table C, the words “*see 3.2.3.3” are added only for substances in classes 3, 6.1, 8 and 9.*

- (iii) To improve comprehensibility and provide a better overview, the merged requirements could be structured more clearly, by adding additional headings.
- (iv) This could also be an opportunity to include editorial improvements, such as the systematic replacement of “Toxic substances” with “Substances with the letter T in the classification code”.

38. If the ADN Safety Committee supports the implementation of fundamental principles (i) to (iv), the informal working group on substances could draw up more detailed proposals at its next meeting.

K. Reclassification of UN No. 1918, ISOPROPYLBENZENE (cumene) and substances containing cumene at or above 0.1%

39. The informal working group believes that the proposed changes for UN No. 1918 ISOPROPYLBENZENE (cumene) are correct.

40. For the existing entries for UN No. 1223 KEROSENE and UN No. 1307 XYLENE, the informal working group recommends adding the words “contains less than 0.1% cumene” in column (2) of Table C. The new entries for these UN numbers should be supplemented with “contains 0.1% or more cumene”.

41. The working group also exchanged views on UN No. 1863, which can also contain 0.1% or more cumene. Since Table C already provides options for declaring the entry for UN No. 1863 as a carcinogen, it was decided that UN No. 1863 should not be classified as CMR if cumene is the only trigger for such classification under ADN 2023. This follows the conclusion of the discussion within the ADN Safety Committee, according to which the transport of cumene, as such, can continue in accordance with the provisions of Table C of ADN 2023.

42. However, the informal working group also raised the possibility that new findings on the carcinogenic properties of other materials might lead to a large number of modifications and additions to Table C.

43. A more general solution might be, in such cases, to add “+ (CMR)” in column (5) of Table C, an “*” in other relevant columns and “; *see 3.2.3.3” in column (20). This would make it possible to avoid increasing the number of rows in Table C.

44. The members of the informal working group announced that they would submit new proposals for modifications, with adaptations, for the next meeting of the ADN Safety Committee.

45. The requirements of 2.1.2.8 were introduced in case a consignor becomes aware that a substance listed by name handed over by the consignor for carriage has hazardous properties within the meaning of ADN which are not yet taken into account in the requirements. During the last meeting of the ADN Safety Committee, it was, however, noted that the current wording of 2.1.2.8 covered only Table A, and not Table C.

46. The informal working group on substances therefore proposes that the wording of 2.1.2.8 and of the related NOTE 2 be amended as follows:

Proposal 8:

“**2.1.2.8** A consignor who has identified, on the basis of test data, that a substance listed by name in column 2 of Table A **or in column (2) of Table C** of Chapter 3.2 meets classification criteria for a class that is not identified in column 3a or 5 of Table A **or in column (3a) or (5) of Table C** of Chapter 3.2, may, with the approval of the competent authority, consign the substance:

Proposal 9:

“**NOTE 1:** ...

NOTE 2: *When a competent authority grants such approvals, it should inform the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods **in respect of Table A and the ADN Safety Committee in respect of Table C** accordingly and submit a relevant proposal of amendment to the Dangerous Goods List of the UN Model Regulations **or to Table C of ADN**. Should the proposed amendment be rejected, the competent authority should withdraw its approval.*

3:”

L. Carriage of liquid hydrogen on board tank vessels

47. On the basis of an informal document submitted by the Belgian delegation, the ADN Safety Committee at its last meeting examined the question of the transport of refrigerated

liquid hydrogen. A proposal for special authorization under 1.5.2 has been announced for the next meeting of the Safety Committee. Subsequently, the informal working group is also scheduled to carry out an assessment of the hazards and risks that may arise from the transport of refrigerated liquid hydrogen. The informal working group believes that it would be possible to draw on the lessons learned in the maritime sector and the corresponding regulations.
