INF.28

Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Dangerous Goods

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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)

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Item 5 (b) of the provisional agenda
Proposals for amendments to the regulations annexed to the ADN: other proposals

Classification of UN 1010, mixtures of Butadienes and Hydrocarbons

Transmitted by CEFIC

Executive Summary: The concentration of butadiene in the butadienes/hydrocarbon-mixtures produced in Europe usually varies between 35% and 45%, which poses a practical problem to comply with the harmonization of UN 1010 with the Model Regulations.

Action to be taken: Paragraphs 11 and 12

Related documents: ECE/TRANS/WP.15/AC.2/2021/8 - (Germany) - Tables A and C of ADN – entries for UN No. 1010 BUTADIENES

ECE/TRANS/WP.15/AC.1/2019/16 - (Spain) UN No. 1010 Butadienes, stabilized

I. Introduction

1. Following the adoption of document "ECE/TRANS/WP.15/AC.1/2019/16 - (Spain) UN No. 1010 Butadienes, stabilized" at the Joint Meeting of March 2019, and for the purpose of harmonization with the UN Model Regulations, RID, ADR and ADN (only Table A) changed the description of butadienes/hydrocarbon-mixtures (UN 1010) from "BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED having a vapour pressure at 70 °C not exceeding 1.1 MPa (11 bar) and a density at 50 °C not lower than 0.525 kg/l" to "BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED containing more than 40% butadienes", with entry into force on 1 January 2021.

2. Document ECE/TRANS/WP.15/AC.2/2021/8 proposes to further harmonize Table C with Table A.

3. Cefic would like to draw the attention on this proposal, as it recently came to the conclusion that these changes have substantial implications for the chemical industry in Europe. The producers of butadienes/hydrocarbon-mixtures within the European chemical industries have been looking at the sales specifications and typical analytical values of these products and have found that:

(a) sales specifications have a percentage of Butadiene of at least 30% or 35%;

(b) the typical values are, in about half of the cases, lower than 40%.

4. This has the following consequences:

(a) For each shipment, and even each parcel (truckload, rail tank car, ISO-container), the percentage of butadiene must be determined as higher or lower than 40%.

(b) If the butadiene content is below 40%, we should not be able to use UN 1010 but should use a different UN-number, most likely UN 3161 or UN 1965.

(c) The transport conditions would not differ, so from a technical point of safety, this change of UN number does to result in stricter or safer transport conditions.

(d) The IT-systems must be accommodated, so it would introduce a reason for human error, leading to administrative mistakes. Therefore, there is both a safety risk and an increase of administrative costs at all parties like the producers, carriers and customers.

(e) Having the same product with two UN numbers implies potential issues with local permits.

(f) In case of an incident, emergency responders could also be confused. UN 1010 clearly reflects the specific danger of butadiene (e.g. carcinogenic), whereas UN 3161 is a n.o.s.-entry, and emergency responders need access to the transport document before realizing butadiene is involved. And UN 1965 is ordinarily referred to as LPG, in which butadiene is not present, and normally referred to as Mixture A - C, not identifying butadiene as component at all.

(g) Neither UN 1965 nor UN 3161 have a description that accommodates ‘stabilized’, so that specific aspects will not be addressed in the transport documents. In fact, unlike UN 1010, UN 1965 doesn’t contain remark 3 of column (20), which requires to have provisions to stabilize the product during transport and extra information on the transport document.

(h) Furthermore, there might be a definition issue for LPG that makes use of UN 1965 due to composition. Chapter 1.2 states that LPG may only consist of substances with the following UN numbers 1011, 1075, 1965, 1969 and 1978. UN 1010 is not listed, so butadiene/hydrocarbon-mixtures are not LPG by definition and using UN 1965 would again create confusion.

5. It can be concluded that the use of UN 1010 reflects the risks of butadiene mixtures better than UN 3161 or UN 1965 and is therefore in line with the general classification rule that a substance should be transported under the most specific entry that covers its properties (chapter 2.1.3.6).

II. Historical background

6. All of this are the downstream consequences of the choice of the current limit of 40%, and all producers in Europe have an issue with it. This concentration limit has been adopted at the UN in the beginning of this century.

7. In 2001, United States requested to change the entry for UN 1010 in a way that mixtures of hydrocarbons and butadienes could be transported under this UN number according to the UN Recommendations (now: Model Regulations). The proposal stated:

(a) “A mixture of 1,3-butadiene (in concentrations greater than 40%), butane, acetylene, propylene, and 1,2-butadiene is produced as a by-product of the process of synthesizing ethylene.

(b) This mixture of liquefied petroleum gases is transported to various facilities where the 1,3-butadiene is separated for further use. The mixture has characteristics similar to butadienes transported under UN 1010 in that it requires stabilization to prevent it from polymerizing violently when exposed to high temperatures. The proper shipping name (PSN) “Mixtures of 1,3-Butadiene and hydrocarbons, stabilized” is currently included in the ADR for UN 1010 but is not listed as an alternative PSN in the Model Regulations.”

(c) The actual proposal “To more adequately describe this mixture, the expert from the United States of America proposes to introduce an alternative PSN for the entry UN 1010 as follows:

In column 2 of the Dangerous Goods List add the words “or BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, containing more than 40% butadienes” after “BUTADIENES, STABILIZED””, was adopted in the July 2001 meeting of UN.

https://unece.org/DAM/trans/doc/2001/ac10c3/ST-SG-AC10-C3-2001-32e.pdf ,

https://unece.org/DAM/trans/doc/2001/ac10c3/ST-SG-AC10-C3-38e.pdf .

8. Although the US proposal refers to ADR, the Joint Meeting did not take over the 40% concentration limit in the September meeting of 2003.

9. After a lengthy discussion, the Joint Meeting agreed not to amend the existing description of these mixtures which appeared as a lower-case addition to the proper shipping name, while accepting the new name in upper-case.

https://unece.org/DAM/trans/doc/2003/wp15ac1/TRANS-WP15-AC1-94e.pdf

10. More background information can be found in a document (INF.4) from the UIC.

https://unece.org/DAM/trans/doc/2003/wp15ac1/TRANS-WP15-AC1-2003-GE-inf04e.pdf

(a) “The 40% concentration limit value was proposed by the USA because this mixture is produced as a by-product of the process of synthesizing ethylene, and because, according to the expert from the USA, in RID/ADR there has been always such a limit value for the concentration of butadiene. According to our recollection, however, there has never been such a concentration limit in RID/ADR. The RID/ADR, however, specifies limit values for the vapor pressure of the mixtures at 70 °C and density at 50 °C. These values are used to establish test pressure and maximum permissible mass of contents per liter of capacity for pressure receptacles and tanks and they are the basis for the markings of the receptacles and the tanks.

(b) According to experts from the petrochemical industries mixtures with a concentration less than 40% butadienes should also be stabilized for safety reasons.

(c) If the 40% limit value is adopted, mixtures with less than 40% butadienes cannot be classified under UN 1010, and will have to be classified under UN 1965, mixtures A to C or even under UN 3161. This is definitely a misleading situation for emergency response.

Because these mixtures are transported on a very large scale between oil refineries and petrochemical industries in Europe in rail tank wagons and other tanks, the UIC/IUR urgently asks the Joint RID/ADR-meeting not to adopt the amendments in the form proposed by the secretariat.

The UN-Sub-Committee in its July 2003 session unfortunately did not discuss this matter to an end, but there seemed to be enough sympathy with the experts to delete at least the 40% limit value.”

III. Proposal

11. Cefic would like to submit the following options to the consideration of the Committee:

(a) In RID/ADR/AND, for entry UN 1010, change “more than 40% butadienes” into “more than 30% butadienes”.

(b) Add a note to the entry in RID/ADR/ADN stating that mixtures with > 30% butadiene are also allowed to be transported under the current entry UN 1010.

(c) Change the entry back to the 2019 entry.

12. In addition:

(a) Prepare a Multilateral Agreement to keep it possible for industry to transport the substance under UN 1010.

(b) Propose to UN to reduce the current 40% limit to 30%.