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Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

Sub-Committee of Experts on the Transport of Dangerous Goods

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Item 3 of the provisional agenda
Listing, classification and packing

Transport conditions for UN 2426 ammonium nitrate

Transmitted by the expert from Spain*

Introduction

1. In the last years, Spain has been searching for harmonizing the names of the UN numbers, specifically for the Spanish language version. Special attention has been drawn to those cases where the name and description of the UN numbers are not the same in the UN Model Regulations as in RID/ADR, for all languages.

2. This last objective has led to a series of proposals for harmonization submitted to the Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods (see documents ECE/TRANS/WP.15/AC.1/2019/32, ECE/TRANS/WP.15/AC.1/2020/37, ECE/TRANS/WP.15/AC.1/2020/39, ECE/TRANS/WP.15/AC.1/2020/41, ECE/TRANS/WP.15/AC.1/2021/13 and ECE/TRANS/WP.15/AC.1/2021/14).

3. Specifically, UN 2426 AMMONIUM NITRATE (hot concentrated solution) had a different name in the UN Model Regulations and in RID/ADR, but following the discussion at the Joint Meeting of documents ECE/TRANS/WP.15/AC.1/2020/41 and ECE/TRANS/WP.15/AC.1/2021/13 from Spain, and informal document INF.22 from Sweden at the March 2021 session, the Joint Meeting adopted the name and description from the UN Model Regulations to be used in RID/ADR.

4. Nevertheless, Spain was invited to submit a proposal to the Sub-Committee to see if additional amendments were needed to harmonize the transport conditions multimodally, specifically on the maximum temperature during transport and the water contents (see report ECE/TRANS/WP.15/AC.1/160, para. 23).

* A/75/6 (Sect.20), para. 20.51

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Transport conditions for ammonium nitrate

5. UN 2426 AMMONIUM NITRATE (hot concentrated solution) has special provision SP 252 assigned in the UN Model Regulation, which has been taken over also for RID/ADR, International Maritime Dangerous Goods (IMDG) Code and TTII (for air transport):

"**252** Provided the ammonium nitrate remains in solution under all conditions of transport, aqueous solutions of ammonium nitrate, with not more than 0.2 % combustible material, in a concentration not exceeding 80 %, are not subject to these Regulations."

6. Additionally, for inland transport special provision SP 644 (RID/ADR only) is assigned to UN 2426 with the following text (text as amended for RID/ADR 2023, see report ECE/TRANS/WP.15/AC.1/160, annex II):

"This substance is admitted for carriage, provided that:

- The pH is between 5 and 7 measured in aqueous solution of 10 % of the substance carried.
- The solution does not contain more than 93 % ammonium nitrate.
- The solution does not contain more than 0.2 % combustible material or chlorine compounds in quantities such that the chlorine level exceeds 0.02 %."

7. Transport of UN 2426 in the IMDG code is subject to the following conditions, as explained in column (17) of properties and observations:

"Hot aqueous solution of not more than 93 % ammonium nitrate with not more than 0.2 % combustible material (including organic material calculated as carbon) and free from any other added matter, containing at least 7 % water, while the maximum content of chloride ions should not exceed 0.02 %. May cause fire and explosion in contact with combustible material (e.g. wood, straw, cotton, oil, sugar, etc.), strong acids, and other class 5.1 substances and burn fiercely. Maximum allowable transport temperature of the solution is 140 °C. This temperature should be indicated on the transport unit. The acidity (pH) of the cargo when diluted with ten parts of water to one part of cargo, by mass, should be between 5.0 and 7.0. The concentration and temperature of the solution at the time of loading, its percentage of combustible materials and of chlorides, and the contents of free acid should be certified."

8. In addition to SP 252, SP 942 applies (for sea mode only):

"SP 942: The concentration and temperature of the solution at the time of loading, its percentage of combustible material and of chlorides as well as the contents of free acid shall be certified."

9. Transport of UN 2426 in the TTII is forbidden, both for passenger and cargo planes, with the addition of special provision A129 to this number, which is equivalent to SP 252 of the UN Model Regulations.

Analysis

10. SP 252 in the UN Model Regulations gives indications on when the material is not dangerous enough to be covered by the regulations. Nevertheless, in the case this material falls under the regulations, it does not impose any transport conditions or limitations. In this document it is proposed to review the situation and consider if it is necessary to include limitations on the transported solution.

11. In RID/ADR and IMDG Code the following conditions for the transport of UN 2426 are imposed, which would be interesting to analyze to see if it could be convenient to include them into the Model Regulations:

- The solution does not contain more than 93 % ammonium nitrate;
- The solution shall contain at least 7 % of water;

- The maximum allowable transport temperature of the solution shall be 140 ºC;
- The solution does not contain more than 0.2 % combustible material;
- The solution does not contain chlorine compounds in quantities such that the chlorine level exceeds 0.02 %; and
- The pH is between 5 and 7 measured in aqueous solution of 10 % of the substance carried.

12. During the discussion of the different proposals in the Joint Meeting, two aspects were considered of particular interest: the maximum allowable transport temperature and the minimum content of water.

13. Both RID/ADR and the IMDG Code fix 93 % as the limitation on the maximum content of ammonium nitrate in the solution. The indication of a minimum content of 7 % of water included into the IMDG Code is not taken over into RID/ADR; but as the maximum concentration of the solution is fixed at 93 %, then it could be thought that the other 7 % has to be water. Introducing a 7 % minimum limit for the water content would therefore not change the provisions, only simplify the application for the reader.

14. However, during the discussion of document ECE/TRANS/WP.15/AC.1/2020/13 in the Joint Meeting, some delegations considered that this conclusion would be based on the assumption that ammonium nitrate and water are the only two components in the mixtures; but these solutions could also contain other substances to ensure quality and stability, and sometimes comprise also other nitrate salts (other than ammonium nitrate). Including a 7 % minimum value of water would therefore limit the maximum content of other components of the mixture, limiting inter alia also the amount of impurities contained in the mixture. Therefore, it could be interesting to take over the limitation of a minimum water content of 7 % for all modes of transport.

15. On the transport temperature, in RID/ADR UN 2426 is affected by special provision TU29, but only for RID/ADR tanks (not for portable tanks and bulk containers). This special provision reads as follows:

> "Tanks shall be filled to not more than 97 % of their capacity and the maximum temperature after filling shall not exceeded 140 ºC."

16. So, the limit of 140 ºC included in the IMDG Code for all transports is already included for RID/ADR for the case of RID/ADR tanks. Nevertheless, it seems prudent to include the same limit also for other cases, considering that ammonium nitrate decomposes at 180 ºC, a situation that should be avoided during transport. Therefore, it was considered to introduce a general limit for the transport temperature of 140 ºC for all modes of transport.

17. In the UN Model Regulations, the combustible material is limited to 0.2 % to be exempted from the Regulations. Nevertheless, this limit is not applicable for those materials that are not exempted, as is the case in RID/ADR and the IMDG Code. It could be interesting to include this limitation too.

18. In addition, during the discussions of document ECE/TRANS/WP.15/AC.1/2020/13 in the Joint Meeting, some delegations commented that the limitations of the chlorine level to 0.02 %, as included in RID/ADR (see paragraph 6 above) should also be included into the UN Model Regulations.

19. Finally, both IMDG Code and RID/ADR establish a limitation on the pH of the aqueous solution, establishing that it shall be in between 5 and 7, measured in aqueous solution of 10 % of the transported substance. Similarly, it could be interesting to introduce this parameter also into the UN Model Regulations.

Proposals

20. Spain invites the Sub-Committee to consider the technical necessity of including the following conditions for the transport of UN 2426 AMMONIUM NITRATE (hot concentrated solution):

(a) Is it necessary to limit the maximum content of ammonium nitrate in the solution to 93 %;

(b) Should a minimum water content of 7 % of the solution be specified;

(c) Should a maximum allowable transport temperature of 140 ºC be established;

(d) Should the content of combustible materials be limited to 0.2 %;

(e) Should the content of chorine level be limited;

(f) Should the pH level of the aqueous solution be limited.

21. If the Sub-Committee endorse these principles, it may consider the following proposal for amendments to special provision 252 (new text is underlined):

"**252** Provided the ammonium nitrate remains in solution under all conditions of transport, aqueous solutions of ammonium nitrate, with not more than 0.2 % combustible material, in a concentration not exceeding 80 %, are not subject to these Regulations.

This substance is admitted for transport, provided that:

- The solution does not contain more than 93 % ammonium nitrate;
- The solution shall contain at least 7 % of water;
- The solution does not contain more than 0.2 % combustible material;
- The solution does not contain chlorine compounds in quantities such that the chlorine level exceeds 0.02 %;
- The pH is between 5 and 7 measured in aqueous solution of 10 % of the substance carried; and
- The maximum allowable transport temperature of the solution shall be 140 ºC."