



**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****Fifty-ninth session**

Geneva, 29 November – 8 December 2021

Item 3 of the provisional agenda

Listing, classification and packing**Transport conditions for UN 2426 Ammonium nitrate****Submitted by the expert from Spain*****Introduction**

1. In the last years, Spain has been looking for harmonizing the names of UN numbers, in particular for the Spanish language version. Additionally, attention has been focused on those cases where the name and description of the UN numbers is not the same in the UN Model Regulations as those in RID/ADR, for all languages.
2. 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 in the Joint Meeting of documents ECE/TRANS/WP.15/AC.1/2020/41 and ECE/TRANS/WP.15/AC.1/2021/13 tabled by 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. Spain was invited to submit a proposal to the Sub-Committee to see if additional amendments were needed to harmonize the transport conditions multimodally; thus Spain submitted document ST/SG/AC.10/C.3/2021/21, which was discussed at the fifty-eighth session of the Sub-Committee.

Analysis of transport conditions for ammonium nitrate

3. Conditions for transport of ammonium nitrate are fixed in International Maritime Dangerous Goods (IMDG) Code and RID/ADR, while transport of UN 2426 in the TTII (for air transport), both for passenger and cargo planes, is forbidden.
4. Special provision 252, as found now in the UN Model Regulations, gives indications on when the material is not dangerous enough to be covered by the regulations. Nevertheless, for the case when this material falls under the regulations, it does not impose any transport conditions or limitations. In this document it is proposed to review this situation and see if it is necessary to include limitations on the transported solution.

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

5. In RID/ADR and IMDG Code the following conditions on 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 UN 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 °C;
- 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.

6. On the maximum content of ammonium nitrate, 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 therefore would not change the provisions, only simplify the application for the reader.

7. However, during the discussion of document ECE/TRANS/WP.15/AC.1/2020/13 at 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 added 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 also inter alia the amount of impurities contained in the mixture. Therefore, it is interesting to take over limitation to at the minimum 7 % of water for all modes of transport.

8. 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 °C”.

9. So, the limit of 140 °C included in the IMDG Code for all transports is already included for RID/ADR for the case of RID/ADR tanks. Nevertheless, it may seem prudent to include the same limit also for other cases, considering that ammonium nitrate decomposes at 180 °C, a situation that should be avoided during transport. Therefore, it was thought interesting to analyze if a general limit of the transport temperature to 140 °C for all modes of transport should be introduced.

10. In the UN Model Regulations, to be exempted from the regulations the combustible material is limited to 0.2 %; 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 also this limitation.

11. 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 for the chlorine level to 0.02 %, as included in RID/ADR (see paragraph 5 above), should also be included into the UN Model Regulations.

12. Finally, both IMDG Code and RID/ADR establish a limitation for the pH of the aqueous solution, establishing that it must be 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. Following the discussion at the previous Sub-Committee session, it is proposed to specify 25 °C as the temperature for measuring the pH level. Searching for the origin of these provisions, the reference to the aqueous solution of

10 % of the transported substance has been traced back to the testing procedure established by CH Solomon and KS Barclay in 1965 for the ISF (International Fertiliser Society, proceeding n° 85).

Discussion

13. At the fifty-eighth session of the Sub-Committee, Spain requested to study the technical necessity of including the following conditions for the transport of UN 2426 AMMONIUM NITRATE (hot concentrated solution):

- (a) If it is necessary to fix a limitation on the maximum content of ammonium nitrate in the solution to 93 %;
- (b) If the minimum water content of 7 % of the solution should be specified;
- (c) If a maximum allowable transport temperature of 140 °C should be established;
- (d) If limitations on the content of combustible materials to 0.2 % should be established;
- (e) If limitations on the content of chlorine level should be included;
- (f) If limitations on the pH level of the aqueous solution should be established.

14. During the fifty-eighth session, there was no objection by the Explosive Working Group to the amendments proposed in ST/SG/AC.10/C.3/2021/21. Some experts suggested minor editorial amendments, others preferred to verify the proposed pH value. Spain informed the Sub-Committee that they would come back with an updated proposal at the next session, leaving more time for delegations and stakeholders to check the possible impacts of the suggested changes. Spain also asked to be sent in writing any further comments on the proposed conditions.

15. Searching for the origins of the proposed values for the pH value the provisions similar to those included into the present special provision 644 of ADR, including the present conditions on the pH value (5-7), were already in place in 1978 (ADR marginal 51121, and later marginal 2501 20°). It was not possible to find the original justification of those values, but they seem to be a very accepted value. In the IMDG Code, the same provisions are included since the first mandatory version of the IMDG Code in 2004 and some editions before, but it was neither possible to find justification of the values used nor to verify if the initial versions of the IMDG Code used different values.

Proposal

16. Spain included into this proposal the editorial amendments received and proposes to modify special provision 252 as follows (new text is underlined):

“SP 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 if they do not fulfil the conditions for any other class.

This substance is admitted for transport, provided that:

- (a) The solution does not contain more than 93 % ammonium nitrate;
- (b) The solution shall contain at least 7 % of water;
- (c) The solution does not contain more than 0.2 % combustible material;
- (d) The solution does not contain chlorine compounds in quantities such that the chloride ion level exceeds 0.02 %;
- (e) The pH is between 5 and 7 measured at 25 °C in aqueous solution of 10 % of the substance carried; and
- (f) The maximum allowable transport temperature of the solution shall be 140 °C.”