



**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****Forty-ninth session**

Geneva, 27 June – 6 July 2016

Item 2 (i) of the provisional agenda

Explosives and related matters: miscellaneous**Clarification of the classification of ammonium nitrate based
fertilizers – draft amendments to the Model Regulations and
the Manual of Tests and Criteria****Transmitted by the expert from Sweden¹****Introduction**

1. Ammonium nitrate (AN) based fertilizers may be transported under UN 2067 in Division 5.1 (oxidizing substances), provided that special provisions (SP) 186, 306 and 307 are met, or under UN 2071 in Class 9 provided that SP193 and 306 are met. Particularly SP307, which contains a number of criteria on the composition grouped into three categories (a)-(c), is written in a way that is not always easily understood. Apart from quite entangled wording and some fertilizer-specific terminology that is not defined, criteria may even appear somewhat contradictory due to some implicit understandings.

2. An example of what may appear to be contradictory criteria is that binary fertilizers of AN and ammonium sulphate (AS) according to SP307(c) are not allowed to contain more than 70% AN, while SP307(a) or (b) do not state any explicit limit on the amount of AS for fertilizers with a higher AN-content. Another example is that it is nowhere stated how to classify a fertilizer that does not fit into SP307 due to too high content of AN, which may lead non-experts to the absurd conclusion that such a fertilizer is not a dangerous good. Furthermore, it is not clear whether fertilizers should ever be subjected to testing for their oxidising properties, and whether they can be excluded from Division 5.1 on basis of this.

¹ In accordance with the programme of work of the Sub-Committee for 2015–2016 approved by the Committee at its seventh session (see ST/SG/AC.10/C.3/92, paragraph 95 and ST/SG/AC.10/42, para. 15).

3. In order to improve the situation, an *ad hoc* working group under IGUS², consisting of experts from Sweden, the Netherlands, the United Kingdom, France and Germany, took it upon themselves to clarify the United Nations classification of AN-based fertilizers. This concerns the provisions of SP307 in particular, but comprises all provisions applicable to fertilizers in the Model Regulations and in the Manual of Tests and Criteria, including Special Provisions 186, 193 and 306. The work took the form of constructing a flow chart for the classification of fertilizers, which lessens the possibilities for misunderstandings and gaps. A draft flow chart was presented in informal document INF.34 to the Sub-Committee at its 48th session in December 2015, and subsequently discussed in the Working Group on Explosives. Since IGUS has no formal status in the Sub-Committee, this paper, like the previous one, is submitted by the expert from Sweden on behalf of the IGUS *ad hoc* working group.

4. Since last December, the working group under IGUS has continued its efforts to clarify the situation, on the basis of comments made and further discussions both within the group and with representatives of the fertilizer industry. The outcomes of this effort are proposals for amendments to the Model Regulations and to the Manual of Tests and Criteria, as presented in annexes 1 and 2 to this document. Some issues are still pending resolution, which is why at this point only draft proposals for amendments are made. However, the working group anticipates that formal proposals along the lines presented in annexes 1 and 2 will be made for the 50th session of the Sub-Committee in December 2016.

5. It needs to be emphasized that the aim of the work at this point is not to introduce any new requirements or criteria for fertilizers – only to clarify the already existing ones in order to avoid misinterpretations (deliberate or unintended) in the classification of fertilizers. In annex 3 to this document (informal document INF.5), a detailed explanation to how the proposed draft changes correspond to the current provisions for classification of AN-based fertilizers is given. During the work, however, a number of issues and inconsistencies have been identified which, although not included in this document, could be subject to future proposals for changes to the current provisions.

6. The expert from Sweden, on behalf of the working group, appreciates comments to the draft amendments as presented herein. Since several of the criteria for classification of AN-based fertilizers in Division 5.1 are intended to prevent them from being able to behave explosively, the Sub-Committee may wish to consider referring the discussions of this document to the Working Group on Explosives. As already stated, the previous paper on this topic (informal document INF.34 (48th session)) was discussed in that working group.

² IGUS is the International Group of experts on the explosion risks of Unstable Substances, which has been active in the field of hazardous materials, including dangerous goods, for over 50 years. Experts participate in IGUS due to their expertise, and not as representatives of their country or organization. See www.igus-experts.org for further information.

Annex 1

Proposals of amendments to the Model Regulations and the Manual of Tests and Criteria

A. Changes to the Model Regulations

In Chapter 2.5

- Renumber current 2.5.2.1.2 into 2.5.2.1.3.
- Insert new 2.5.2.1.2, reading:

“By exception, solid ammonium nitrate based fertilizers shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39.”

In Chapter 2.9

- Insert a new paragraph in section 2.9.2, reading:

“Ammonium nitrate based fertilizers
2071 AMMONIUM NITRATE BASED FERTILIZERS
Ammonium nitrate based fertilizers shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39.”
- Under “Other *substances* ...”, delete “2071 AMMONIUM NITRATE BASED FERTILIZERS”.

In Chapter 3.2

- For UN No. 2067, delete 186 and 306 from column (6) Special provisions;
- For UN No. 2071, delete 186 and 193 from column (6) Special provisions, and add 307.

In Chapter 3.3

- Delete Special provision 186;
- Delete Special provision 193;
- Change Special provision 306 into.

“This entry may only be used for technical grade, non-fertilizer grade ammonium nitrate that is too insensitive for acceptance into Class 1 when tested in accordance with Test Series 2 (see Manual of Tests and Criteria, Part I). See also UN No. 0222.”
- Change Special provision 307 into:

“This entry may only be used for uniform ammonium nitrate based fertilizers. They shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39.”
- In Special provision 370, before ‘ammonium nitrate’ add ‘technical grade, non-fertilizer grade’ (twice).

B. Changes to the Manual of Tests and Criteria

In Section 34:

- Add the following to paragraph 34.3.1:
“By exception, solid ammonium nitrate based fertilizers are not classified as oxidizing solids on the basis of results from tests O.1 or O.3, since the hazardous properties are not sufficiently described by the outcome of tests for oxidizing properties. Instead, such fertilizers are classified on the basis of acquired experience and knowledge of their hazardous behaviour. They shall be classified in accordance with the procedure as set out in Section 39.”

In Section 38:

- Throughout the Section, change ‘ammonium nitrate fertilizers’ into ‘ammonium nitrate based fertilizers’ (occurs six times in Section 38).
- In paragraph 38.2.1.1, change 193 into 307.
- Insert a new paragraph 38.2.3.3, reading:
“The overall classification procedure for ammonium nitrate based fertilizers is set out in Section 39.”

After Section 38:

- Insert a new section 39³, reading as in annex 2:

³ Insertion of this new section has consequences for the Table of Contents of Part III (page 340) and for the General Table of Contents (page iv).

Annex 2

Draft new Section 39 for the Manual of Tests and Criteria

Section 39

Classification procedure and criteria relating to ammonium nitrate based fertilizers

39.1 Purpose

This section presents the United Nations scheme for the classification of solid ammonium nitrate based fertilizers as referred to in the Model Regulations, Chapter 3.3, special provision 307.

39.2 Scope

Any new solid fertilizer composition based on ammonium nitrate shall be subjected to the classification procedure as set out in 39.4.

This procedure does not cover the classification of technical grade ammonium nitrate (UN Nos. 1942 and 0222 for transport).

39.3 Definitions

39.3.1 An ammonium nitrate based fertilizer is a fertilizer in which ammonium nitrate is the predominant source of nitrogen (N).

39.3.2 A compound fertilizer is a fertilizer that contains at least two of the three primary nutrients nitrogen (N), phosphorus (P) and potassium (K).

39.3.3 Fertilizer grade ammonium nitrate (FGAN) is an ammonium nitrate based fertilizer that is used for agricultural purposes, in contrast to technical grade ammonium nitrate (TGAN) that is used for e.g. the production of explosives.

39.3.4 In determining the ammonium nitrate content, all nitrate ions for which a molecular equivalent of ammonium ions is present in the fertilizer shall be calculated as ammonium nitrate.

39.3.5 Combustible substances as referred to in paragraph 39.4 include also non-organic substances that can be oxidized, e.g. elemental sulphur. For organic substances the content of combustibles is expressed in terms of the carbon content.

39.3.6 Materials that are incompatible with ammonium nitrate include e.g. urea, acids, superphosphates with free acid, elemental sulphur, sulphides and most transition metals, including heavy metals (e.g. copper) and chlorides. Note however that this listing is not exhaustive. Incompatible materials should not be added deliberately.

39.4 Classification procedure

39.4.1 Solid ammonium nitrate based fertilizers are classified on the basis of composition, experience and knowledge of their hazardous behaviour. Occasionally, the classification is complemented by testing for the ability to undergo self-sustaining decomposition or for explosive properties. These principles are condensed in the flowchart of 39.5.

39.4.2 UN No. 2067 may only be used for ammonium nitrate based fertilizers that do not show explosive properties when tested in accordance with Test Series 2 of this Manual.

39.4.3 Ammonium nitrate based fertilizers that do not fulfil the requirements for transport under UN No. 2067, can be transported under another suitable UN No. provided that the suitability for transport is demonstrated and this is approved by the competent authority. This may for instance be when contamination has occurred in e.g. an accident, so that the fertilizer can be transported under a suitable UN No. e.g. in Class 1 as approved by the competent authority.

39.4.4 Ammonium nitrate based fertilizers that meet composition limits relevant for inclusion in the class of Explosives as set out in 39.5 shall be classified in that class regardless of the results when tested in accordance with Test Series 2 of this Manual.

39.4.5 Ammonium nitrate based fertilizers that meet composition limits relevant for classification as Oxidizing solid as set out in 39.5 shall not be exempted from that classification on the basis of the results from tests O.1 and/or O.3 in Section 34 of this Manual. See also paragraph 34.3.1 in Section 34 of this Manual.

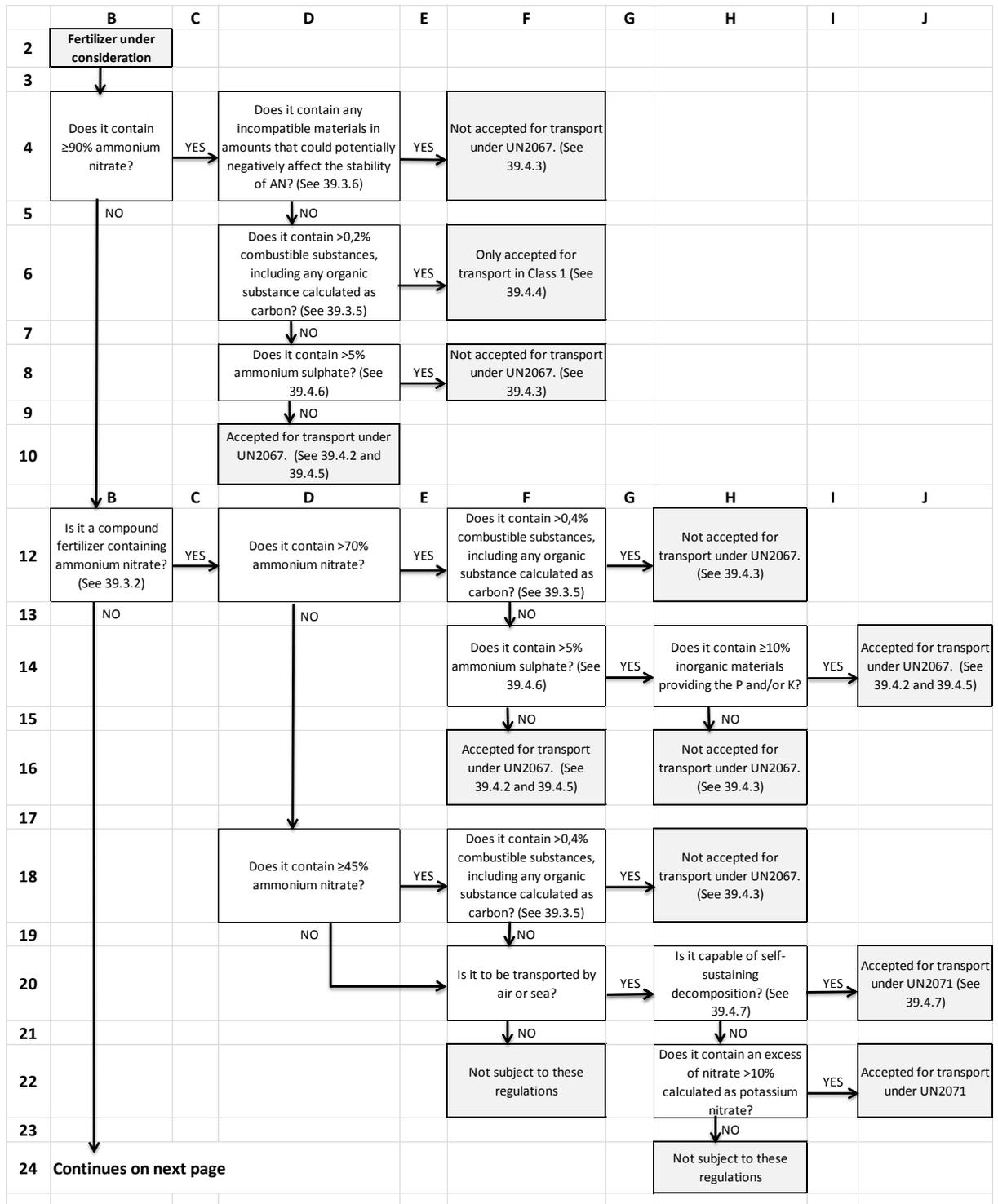
39.4.6 Fertilizers that contain 70 % or more ammonium nitrate shall not contain ammonium sulphate as nutrient, unless they are compound fertilizers with less than 90% ammonium nitrate and with at least 10% inorganic materials providing the P and/or K.

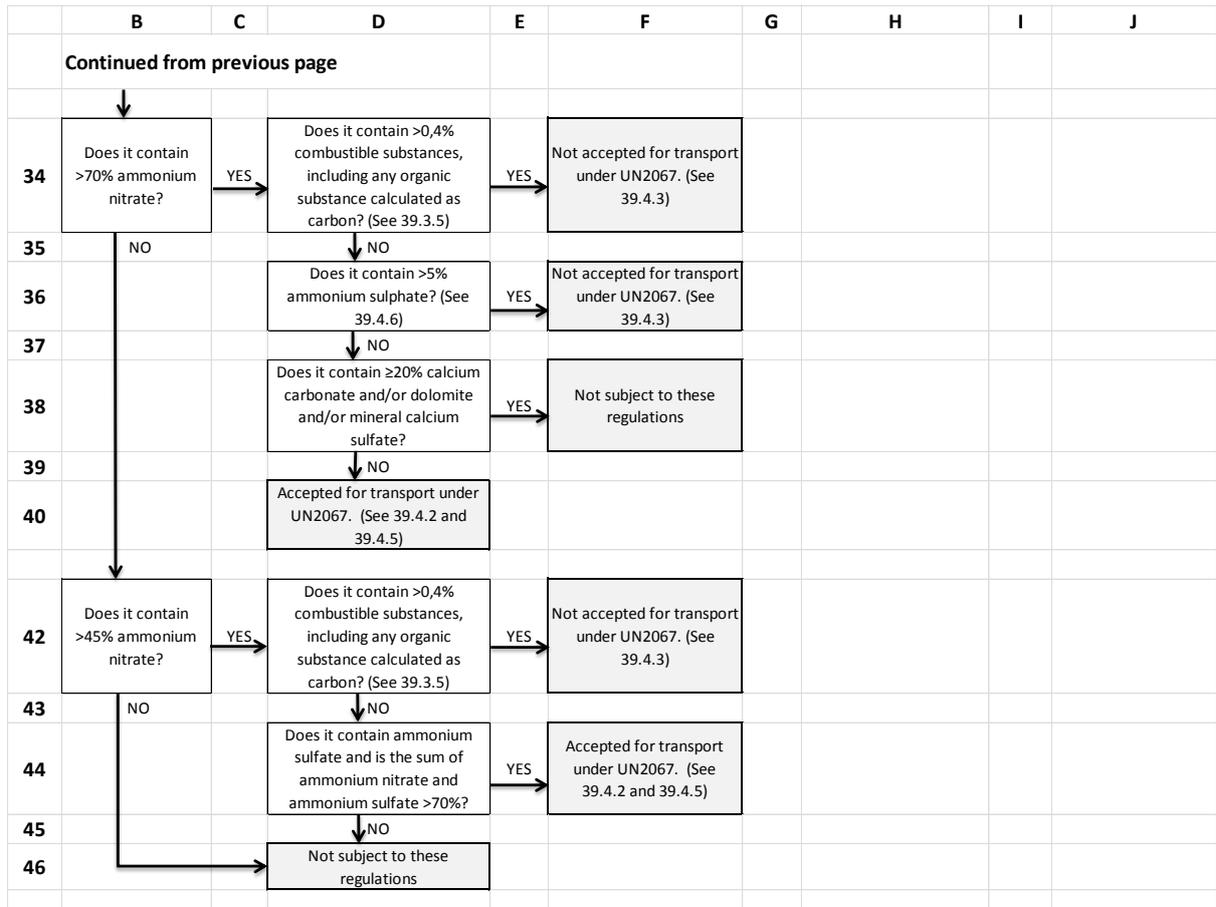
39.4.7 Compound fertilizers that meet the composition limits relevant for potential inclusion for transport in Class 9, shall be tested for their capability to undergo self-sustaining decomposition according to the method given in paragraph 38.2.4 of this Manual (test S.1, trough test) and classified according to criteria given there and in 39.5.

39.5 Classification criteria

39.5.1 Ammonium nitrate based fertilizers shall be classified in accordance with the flowchart below.

Figure 39.5.1 Flowchart for the classification of ammonium nitrate based fertilizers





Annex 3

Correspondence between the proposed flow chart and the existing criteria for UN 2067 and UN 2071

**(For editorial reasons, this annex is reproduced as informal document INF.5) (English
only)**
