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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 Globally Harmonized  
System of Classification and Labelling of Chemicals****Thirty-seventh session**

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Item 2 (b) of the provisional agenda

**Classification criteria and related hazard communication:  
review of Chapter 2.1****Clarifications to the scope of the class of explosives****Transmitted by the Sporting Arms & Ammunition Manufacturers'  
Institute (SAAMI)\*****Background**

1. During the work on revising Chapter 2.1 for Explosives in the GHS, SAAMI has noticed that there could be benefits to clarifying paragraph 2.1.1.2 of the GHS on the scope of the class of explosives. As this text closely approximates the text defining the scope of Class 1 in the Model Regulations in 2.1.1.1, any change would also necessitate review of the Model Regulations for consequential amendments. It is for this reason that SAAMI submits a separate proposal from the work on revising Chapter 2.1.
2. SAAMI believes that the text in 2.1.1 of the GHS (the scope of the class, augmented by the definitions) does not accurately summarize the detailed classification logic in 2.1.2 of the GHS. It also does not correlate with Box 2 of Figure 10.2 of the Manual of Tests and Criteria. If applied literally, this high-level text could result in an unintended expansion of the class to include fuels which properly belong in other classes.
3. Relevant observations have also been made by Sweden, most recently in ST/SG/AC.10/C.3/2018/81 - ST/SG/AC.10/C.4/2018/19. This is an issue of ongoing concern in both the GHS and the Model Regulations.

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\* In accordance with the programme of work of the Sub-Committee for 2019-2020 approved by the Committee at its ninth session (see ST/SG/AC.10/C.3/108, paragraph 141 and ST/SG/AC.10/46, paragraph 14).

## Description of the issue

4. In the GHS the current text of 2.1.1.2 and the definition of an explosive substance in 2.1.1.1, is:

“2.1.1.2 The class of explosives comprises:

- (a) Explosive substances and mixtures;
- (b) Explosive articles, except devices containing explosive substances or mixtures in such quantity or of such a character that their inadvertent or accidental ignition or initiation shall not cause any effect external to the device either by projection, fire, smoke, heat or loud noise; and
- (c) Substances, mixtures and articles not mentioned under (a) and (b) above which are manufactured with the view to producing a practical explosive or pyrotechnic effect.”

“2.1.1.1 An explosive substance (or mixture) is a solid or liquid substance (or mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.”

5. SAAMI asks what the purpose is of 2.1.1.2(c), i.e. what are substances, mixtures and explosive articles not mentioned in 2.1.1.2 (a) and (b)? The first two paragraphs (a) and (b) are comprised of explosives that are “capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings.” This includes both intentional and unintentional explosives. A literal reading of (c) could include fuels of any type, especially since explosives are excluded. When fuels burn, they produce heat, light, smoke and gases, and these effects could be interpreted as “a practical explosive or pyrotechnical effect”. With this logic, all fuels potentially fall within the class of explosives, which is not the intent of the GHS.

6. We can compare the scope of the class to the corresponding flow chart in the Manual of Tests and Criteria (the Manual), Figure 10.2. Box 2 asks the question “Is the substance manufactured with the view to producing a practical explosive or pyrotechnic effect?” Candidates are directed into one of two paths - if the answer is no, to Test Series 1, 2 or 8 if applicable to verify exclusion from the class, or if the answer is yes, to applicable test series for the determination of a division. The text in 2.1.1.2 of the GHS does not correlate with this classification step of the Manual.

## Possible solution in the GHS

7. Representatives of the United States of America Task Force showed the following amendments at the recent meeting of the IGUS EPP, (the International Group of Experts on the Explosion Risks of Unstable Substances, Explosives, Propellants and Pyrotechnics working group):

- (a) Explosive substances and mixtures manufactured with the view to producing an explosive or pyrotechnic effect;
- (b) Explosive articles manufactured with the view to producing an explosive or pyrotechnic effect, except devices containing explosive substances or mixtures in such quantity or of such a character that their inadvertent or accidental ignition or initiation shall not cause any effect external to the device either by projection, fire, smoke, heat or loud noise; and

(c) ~~Substances and mixtures and articles~~ not mentioned under (a) and (b) above which ~~are manufactured with the view to producing a practical explosive or pyrotechnic effect~~ have regulated explosive properties (i.e., fail Test Series 2 of the Manual of Tests and Criteria).

8. Since the IGUS meeting we have thought further about this text and offer the following new text to replace existing paragraphs 2.1.1.2 (a) to (c):

“2.1.1.2.1 Explosive substances and mixtures which:

(a) are manufactured with the view to producing an explosive or pyrotechnic effect; or

(b) have regulated explosive properties (e.g., fail Test Series 1 of the Manual of Tests and Criteria).

2.1.1.2.2 Explosive articles, except devices containing explosive substances or mixtures in such quantity or of such a character that their inadvertent or accidental ignition or initiation shall not cause any effect external to the device either by projection, fire, smoke, heat or loud noise.

9. In this text we re-number to the standard GHS hierarchy when writing text at the fifth and sixth levels, e.g. 2.1.1.2 (a) at the fifth level becomes 2.1.1.2.1 and the sixth level becomes 2.1.1.2.1 (a). The existing (a) and (c) are combined under 2.1.1.2.1 into (a) and (b), as they both deal with substances and mixtures, rather than articles. The existing (b) becomes 2.1.1.2.2.

10. In the new 2.1.1.2.1 we deal with the question of whether there are intentional explosive effects or not, and split these into (a) and (b). Taking into account the preliminary nature of this paper, in 2.1.1.2.1 (b) we propose an example of Test Series 1, which might be a new appropriate threshold for Category 1 in the work on the review of Chapter 2.1 of the GHS. Category 2 would retain a threshold of Test series 2.

11. In 2.1.1.2.2 we revert to the existing text of 2.1.1.2 (b) verbatim. This has the advantage of avoiding whether there is an intentional effect. Experts generally agree that there are no unintentional explosives articles. However relative to the exclusion for devices we are aware that in a complex device there can be confusion that an explosive article is overarched by an inert device which obscures the effects of the explosive article, and this text avoids the possibilities of incorrect interpretations.

12. This text correlates directly to the Figure 10.2 of the Manual (see Annex). Section 2.1.1.2.1 (a) enables an answer of “Yes” to box 2. Following 2.1.1.2.1 (b) correlates to an answer of “No” to box 2. Following 2.1.1.2.2 leads to Box 18 for the classification of explosive articles.

## **Proposal**

13. SAAMI’s proposal is for the Working Group on Explosives of the Sub-Committee of Experts on the Transport of Dangerous Goods, as the focal point, to consider the text tentatively proposed above, and have a discussion of the principles on their own merit extending beyond the limitations of the scope of work for the review of Chapter 2.1 of the GHS.

Annex

"Figure 10.2: Procedure for provisional acceptance of a substance or article in the class of explosives

