



**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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Explosives and related matters: miscellaneous

**Sub-Committee of Experts on the Globally Harmonized
System of Classification and Labelling of Chemicals**
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Item 2 (a) of the provisional agenda
**Classification criteria and hazard communication: work of
the Sub-Committee of Experts on the Transport of
Dangerous Goods on physical hazards**

**Editorial clarification of a screening procedure for potential
explosives in the Manual of Tests and Criteria and in the
GHS**

Transmitted by the expert from Sweden¹

Introduction

1. Appendix 6 of the Manual of Tests and Criteria lists a number of screening procedures for various Classes for transport of dangerous goods (TDG). With the same test methods being applied also in the GHS for physical hazards, these screening methods also are used in the classification for supply and use according to GHS criteria.
2. The screening procedures for substances (and mixtures) which may have explosive properties are described in section 3 of Appendix 6 of the Manual of Tests and Criteria. If, based on these procedures, it can be inferred that a substance (or mixture) does not have explosive properties; it may be exempted from having to be tested for possible inclusion in Class 1. Exemption from testing for possible inclusion in the hazard class “Explosives” of the GHS may be granted on the same grounds (see paragraph 2.1.4.2.2 in Chapter 2.1 of the GHS).

¹ In accordance with the programme of work of the Sub-Committee for 2013-2014 approved by the Committee at its sixth session (refer to ST/SG/AC.10/C.3/84, para. 86 and ST/SG/AC.10/40, para. 14).

3. As the testing according to the procedures for Class 1 (TDG) or Explosives (GHS) is rather time-consuming and expensive, it is valuable for industry if a product can be excluded from it through screening. Since both the Model Regulations and the GHS are transposed into legally binding documents such as the ADR/RID and the European Union classification, packaging and labelling (CLP) Regulation², the screening procedures also become part of the legal instruments for classification. It is therefore important that they are correct and unambiguous in order to minimise costs for industry and differing interpretations on their applicability.

4. It should be noted that Sweden submitted an informal paper to the forty-second session of the Sub-Committee of Experts on the TDG (INF. 97) and, in parallel to the twenty-fourth session of the Sub-Committee of Experts on the GHS (INF. 14) on this matter. However, due to lack of time that paper was never considered by the Sub-Committee of Experts on the TDG. The Sub-Committee of Experts on the GHS, however, supported the paper in principle, with the exemption of one delegation that expressed concerns. As a result of this, it was decided to carry the issue over to the next biennium, see the report from that session (ST/SG/AC.10/C.4/48).

Problem

5. The current wording in sub-paragraph 3.3 (c) in the screening procedures for explosive properties in Appendix 6 of the Manual of Tests and Criteria is:

“ 3.3 “The acceptance procedure for Class 1 explosives need not be applied:

...

(c) *When the organic substance or a homogenous mixture of organic substances contain chemical groups associated with explosive properties but the exothermic decomposition energy is less than 500 J/g and the onset of exothermic decomposition is below 500 °C. (The temperature limit is to prevent the procedure being applied to a large number of organic materials which are not explosive but which will decompose slowly above 500 °C to release more than 500 J/g.) The exothermic decomposition energy may be determined using a suitable calorimetric technique (see 20.3.3.3); or...*”

6. Breaking the text down, the first sentence could easily be read to state that two separate conditions must be fulfilled in order to exempt a substance from testing, namely:

- (i) The decomposition energy (E_{dec}) should be less than 500 J/g, and
- (ii) The onset temperature of exothermic decomposition (T_{onset}) should be below 500 °C.

7. After this initial sentence containing the criteria, it is explained within brackets that the condition of the temperature limit is meant to prevent the procedure from being applied to materials that are not explosive but will decompose slowly at temperatures above 500 °C releasing more than 500 J/g.

8. An organic substance with $E_{\text{dec}} < 500$ J/g contains too little energy to be regarded as being a potential explosive, and it fulfils condition (i) above. However, if its T_{onset} is 500 °C

² Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

or higher, it appears that it will not be allowed to escape testing, since it does not fulfil condition (ii) above. Such a substance should, however, be allowed to escape testing.

9. An organic substance with $E_{dec} \geq 500$ J/g could in principle be explosive, but as explained within brackets just after the criteria, such a substance should be allowed to escape testing if T_{onset} is 500 °C or higher.

10. The criteria as currently worded in sub-paragraph 3.3 (c) are thus ambiguous and need to be clarified. As it is clear from the sentence in brackets in the current wording what the intention is, the proposed clarification (below) should be regarded as an editorial correction. No changes to the screening criteria are thus being proposed – only a clarification of the already existing ones.

11. In addition, the current wording in sub-paragraph 3.3 (c) contains a minor grammatical error which might as well be corrected. The word “contain” should be replaced by the word “contains”.

Proposal

Proposal

12. Amend the first sentence in 3.3 (c) of the screening for explosive properties in Appendix 6 of the Manual of Tests and Criteria as follows (text to be deleted is shown in bold strike-through; text to be added is shown in bold underline):

“When the organic substance or a homogenous mixture of organic substances contains chemical groups associated with explosive properties but the exothermic decomposition energy is less than 500 J/g ~~and or~~ the onset of exothermic decomposition is ~~below at least~~ 500 °C.”

13. The new wording of sub-paragraph (c) would then become:

“When the organic substance or a homogenous mixture of organic substances contains chemical groups associated with explosive properties but the exothermic decomposition energy is less than 500 J/g or the onset of exothermic decomposition is at least 500 °C. (The temperature limit is to prevent the procedure being applied to a large number of organic materials which are not explosive but which will decompose slowly above 500 °C to release more than 500 J/g.) The exothermic decomposition energy may be determined using a suitable calorimetric technique (see 20.3.3.3); or”

14. The proposed new wording is unambiguous and achieves the proper selection.

Additional proposal

15. To reflect the criteria as worded in the proposed amended text (paragraph 12 of this proposal) very clearly, insert additionally the following table in sub-paragraph 3.3 (c), directly after the text:

Decomposition energy (J/g)	Decomposition onset temperature (°C)	Testing or further screening required?
< 500	< 500	No
< 500	≥ 500	No
≥ 500	< 500	Yes
≥ 500	≥ 500	No

Consequential amendments to the GHS

16. Since the screening criteria of the Manual of Tests and Criteria are repeated in the GHS, Chapter 2.1 (Explosives), the corresponding changes need to be made there as well. Therefore, amend the first sentence in paragraph 2.1.4.2.2 (c) in Chapter 2.1 of the GHS as follows (text to be deleted is shown in bold strike-through text words to be added is shown in bold underline):

"When the organic substance or a homogenous mixture of organic substances contains chemical groups associated with explosive properties but the exothermic decomposition energy is less than 500 J/g ~~and or~~ the onset of exothermic decomposition is ~~below~~ at least 500 °C."

17. The text in 2.1.4.2.2 (c) would then become:

"When the organic substance or a homogenous mixture of organic substances contains chemical groups associated with explosive properties but the exothermic decomposition energy is less than 500 J/g or the onset of exothermic decomposition is at least 500 °C. (The temperature limit is to prevent the procedure being applied to a large number of organic materials which are not explosive but which will decompose slowly above 500 °C to release more than 500 J/g.) The exothermic decomposition energy may be determined using a suitable calorimetric technique; or"

18. If it is chosen to insert the table in sub-paragraph 3.3 (c) of Annex 6 of the Manual of Tests and Criteria as proposed in the additional proposal (paragraph 15 of this paper), consequently also insert the following table in paragraph 2.1.4.2.2 (c) in Chapter 2.1 of the GHS, directly after the text:

Decomposition energy (J/g)	Decomposition onset temperature (°C)	Testing or further screening required?
< 500	< 500	No
< 500	≥ 500	No
≥ 500	< 500	Yes
≥ 500	≥ 500	No