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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 11 of the provisional agenda

**ISSUES RELATING TO THE GLOBALLY HARMONIZED SYSTEM OF
CLASSIFICATION AND LABELLING OF CHEMICALS (GHS)**

**Implementation corrosivity criteria of GHS into Class 8 of the UN Recommendations
on the Transport of Dangerous goods**

Transmitted by the expert from the Netherlands*

Introduction

1. At the 32nd session of the Sub-Committee in December 2007 document ST/SG/AC.10/C.3/2007/50 of ICCA concerning skin corrosion tests was discussed. During the discussion, the point was made that while the classification criteria for Class 8 were compatible with the GHS criteria relating to skin corrosion, they do not include the GHS criteria in their entirety. The text of the criteria for Class 8 was adopted to enable the use of in vitro test methods. In this context the expert from the Netherlands said that the criteria and the

* In accordance with the programme of work of the Sub-Committee for 2007-2008 approved by the Committee at its third session (refer to ST/SG/AC.10/C.3/60 para. 100 and ST/SG/AC.10/C.3/34, para. 14).

classification procedures of the Model Regulations should be checked more thoroughly, in view of the GHS criteria, and that he would prepare a document for the next session with respect to corrosiveness. (see ST/SG/AC.10/C.3/64, paras. 26-28).

Differences between the transport and GHS criteria

2. As a first step, a comparison was made between the UN Recommendations and the GHS. This comparison shows that significant differences are present. Especially in the absence of in vitro and/or in vivo tests the GHS gives guidance and even criteria (e.g. the use of pH) in order to classify substances as corrosive.

Annex 1 gives the results of the analyses made. These results show that there are some queries that need to be answered.

3. The Sub-Committee is invited to consider these issues.

Principle

4. The expert from the Netherlands is of the opinion that the classification criteria and the classification procedures should be taken over from GHS as much as possible since there is no reason to use other procedures in transport as compared with those used for supply and use. The latter could lead to differences in classification resulting in disharmony between transport, supply and use regulations.

5. The Sub-Committee is invited to confirm this principle.

How to achieve the result of full harmonisation?

6. In order to harmonize as much as possible with the GHS criteria and classification procedures it appears that a considerable amount of new text is needed in the UN Recommendations. A less desirable alternative could be a reference to the GHS in which case, a comprehensive text on classification would be left out from the transport regulation and the GHS would be needed to classify substances or mixtures.

7. Another argument for adding new text to the UN Recommendations is that not all building blocks prescribed in the GHS are currently included in the transport regulation. The GHS chapter on skin corrosion also includes skin irritation. However, only skin corrosion and not skin irritation is currently included in the transport regulation. An analysis of the GHS text shows that a reference to the relevant parts on corrosion is neither easy nor straightforward because the criteria for skin corrosion are intertwined with the criteria for irritation. Moreover the criteria and the procedures for classification are intertwined as well.

8. However, it must be very clear for the transport regulation which GHS building blocks and criteria are to be considered.

Conclusion

9. In order to achieve a comprehensive approach for the classification of corrosive substances and mixtures for transport the best solution in the view of the Netherlands is to prepare a comprehensive text based on the GHS text for inclusion in the transport regulations. If this is acceptable to the Sub-Committee, the expert from the Netherlands is prepared to make a text proposal.
10. This approach should be followed for the other classes as well.
11. The Sub-Committee is invited to approve this approach.

Annex

Corrosivity: Differences between the purple book (GHS) and the Orange Book (UN Recommendations on transport of dangerous goods, Model Regulations)

1. Number of categories

- (a) The GHS has two separate categories for corrosive substances:
 - (i) corrosive to skin;
 - (ii) corrosive to metals.

- (b) The Orange Book has one category: corrosive substances. The primary focus is on substances that are corrosive to skin. Substances that are corrosive to metals are allocated to packing group III only and only if “they are judged not to cause full thickness destruction of intact skin tissue but which exhibit a corrosion rate on either steel or aluminium surfaces...” (see point 2) Sub-categories).

The criteria for ‘corrosive to metals’ in the GHS are the same as those in the Orange Book. However, the GHS does not make the corrosive to metals category a part of the corrosive to skin criteria as is now done in the Orange Book.

2. Sub-categories

- (a) The purple book specifies 3 sub-categories for authorities that need sub-categories:
 - 1A) Response following up to 3 min exposure, and up to 1 h observation;
 - 1B) Response following exposure between 3 min and 1 h, and observation up to 14 days;
 - 1C) Response following exposure between 1 h and 4 h, and observation up to 14 days.

- (b) The Orange Book classifies into packing groups according to these criteria:
 - (i) Full thickness destruction of skin after exposure of up to 3 min, and up to 1-h observation period;
 - (ii) Full thickness destruction of skin after 3- to 60-min exposure, up to 14 days observation period;
 - (iii) Full thickness destruction of intact skin after 1 to 4-h exposure, up to 14 days observation period; or
 - (iv) Do not cause full thickness destruction but exhibit a corrosion rate to metals exceeding 6.25 mm a year at 55 °C.

- (c) The definition of a 'response' in section 3.2.2.4.2 issues to be considered in the GHS is not very clear. Is a 'response' a full corrosive response as defined by "produces destruction of skin tissue, namely visible necrosis through the epidermis and into the dermis" or is any response (including a partial response) acceptable?
- (d) The definition of 'skin' in the Orange Book is not very clear as it can mean epidermis, dermis or both. The definition should be clarified.

3. Information used for classification

- (a) The GHS classifies on the basis of all available data, including human data, in vivo data, in vitro data (e.g. OECD 430, 431 or 435), extreme pH (<2 and >11.5) and QSARS. New in vivo studies are discouraged. Flow-charts are provided to help in the decision making.
- (b) The Orange Book classifies on the basis of human experience and OECD 404. Additionally, at the 2008 December session of the Sub-Committee it was agreed that in vitro testing using OECD 435 was also considered acceptable for classification. Furthermore, a substance which is determined not to be corrosive in accordance with OECD 430 or 431 may be considered not to be corrosive to skin without further testing. The Orange Book states also that other factors such as inhalation risk and reactivity with water should be taken into account when deciding on a packing group. However, no instructions are given on how to classify on the basis of information on reactivity with water. Specific instructions are given on how to classify substances that are also toxic by inhalation.

4. Mixtures

- (a) The GHS has detailed instructions on how to classify mixtures, including concentration and dilution of mixtures, interpolations, substantially similar mixtures and cut-off concentration limits.
 - (b) The Orange Book only states that mixtures can be assigned to packing groups based on the length of time of contact necessary to produce full thickness destruction. Further instructions are not provided.
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