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

Comments on ST/SG/AC.10/C.3/2009/15 and informal document INF.3 submitted at the thirty-fifth session. Suggested text for implementation of GHS criteria in Class 8 of the Model Regulations on the Transport of Dangerous Goods (Netherlands)

Transmitted by the expert from the United Kingdom[1]

Introduction

1. The expert from the United Kingdom has strong concerns about the Netherlands proposals to implement the current GHS third revised edition corrosivity criteria in Class 8 of the Model Regulations.

2. The proposals to fully align transport with the current GHS third revised edition will complicate the regulations for the transport of corrosive substances for all those in the transport chain and inappropriately bring into scope more products, and is likely to lead to much more testing.

[1] In accordance with the programme of work of the Sub-Committee for 2009-2010 approved by the Committee at its fourth session (refer to ST/SG/AC.10/C.3/68, para. 118 (i) and ST/SG/AC.10/36, para. 14).

The following paragraphs explain the reasons for the United Kingdom's reservations on implementing the current GHS corrosivity criteria.

Reasons

Differences in classification for sample chemicals

To illustrate some of the problems that full alignment with the current GHS criteria would bring, a comparison has been made between GHS and transport (TDG) for some common corrosive chemicals. This has been carried out by looking at the classification between the Model Regulations and GHS as being implemented through the European Regulation on the Classification, Labelling and Packaging of Substances and Mixtures (known as the CPL Regulation or EU CLP).

This comparison is presented in tabular form in the Annex hereto. The first column lists the substances concerned and the next three columns the concentrations at which the substance would be regarded as corrosive to skin based on (a) GHS (EU CLP specific concentration limits) and (b) TDG, subdivided into category and packing group. The last column gives the concentrations at which the substance would be regarded as a skin irritant under GHS (EU CLP) and non-dangerous/not regulated under TDG.

3. Under the Netherlands proposals to align TDG with GHS, the correlation would be:

Category 1A = packing group I

Category 1B = packing group II

Category 1C = packing group III

Skin irritant = Non-dangerous

As can be seen from the table in the Annex, there is little that matches up but in particular the following consequences would result.

Sulphuric acid, nitric acid, sodium hydroxide, potassium hydroxide, and high strength acetic acid and formic acid solutions would all be packing group I rather than packing group II and in some cases packing group III for lower strength solutions.

Acetic acid, propionic acid, and ammonia solutions would be packing group II rather than packing group III for lower strength solutions.

Formaldehyde and phosphoric acid solutions would be packing group II rather than packing group III.

4. It makes no difference in classification and labelling in supply systems based on GHS, such as the EU CLP, whether a substance is Category 1A, 1B or 1C, as the symbol, signal word, and hazard statement are all exactly the same (see table 3.2.5 in GHS).

For transport however the packing group is particularly significant as it determines the requirements for the containment system. A change from packing group II to packing group I or from packing group III to packing group II will mean considerably more stringent packaging and tank requirements.

It will also mean significantly more stringent downstream consequences relating to requirements for the transport operation. A good example of this is the transport unit load size exemptions in 1.1.3.6 of ADR. These determine requirements such as placarding and marking, driver training, security provisions, vehicle supervision, dangerous goods safety adviser (DGSA) requirements, instructions in writing (emergency information), equipment to be carried, and other operational requirements, as well as requirements concerning the construction and approval of vehicles.

This would affect not only these substances specifically listed by name but also mixtures (including new formulations or products) of which one or more of these substances are constituents, which would be allocated generic or n.o.s. entries.

5. The packing group system in the Model Regulations with the current spread of allocation of corrosive substances as follows:

Packing group I	very dangerous substances and preparations
Packing group II	substances and preparations presenting medium danger
Packing group III	substances and preparations presenting minor danger

has been in existence for many years and has proved perfectly adequate for transport purposes.

6. Full alignment with the GHS would lead to an unbalanced classification system not only for corrosives, but would also affect other classes. For substances with a corrosive hazard and (an) other hazard(s), an inappropriate classification could result from the precedence of hazard characteristics. Allocation to a lower packing group (indicating a higher danger) is a likely outcome and for products with more than one hazard possibly inappropriate primary classification. This would result in unjustified harsher and more costly conditions of carriage throughout the transport chain.

7. For classification of mixtures as corrosive under GHS, generic trigger levels are given for the individual and the sum of all the ingredients of a mixture. These levels are typically concentrations of 1% or more and 5% or more of the mixture. However for transport, in the Model Regulations, varying trigger levels are given for various substances as follows:

Sulphuric acid > 3%

Formic acid ≥ 5%

Ammonia solution > 10%

Acetic acid > 10%

Propionic acid ≥ 10%

Formaldehyde solution ≥ 25%.

8. These values are given in the lower case text of the name and description of various UN entries in the Dangerous Goods List in Chapter 3.2. In RID/ADR/ADN, special provisions in the series SP500 – 654 usually confirm that lower concentrations of these substances are not subject to the regulations.

9. For mixtures containing several potential corrosive ingredients, the situation is more complex, but mixtures containing, say, one of the above substances in excess of the trigger levels under GHS but below the concentrations given in the Model Regulations would be regarded as corrosive if the current GHS is followed.

Differences in criteria

10. In the GHS, pH can be used to indicate corrosivity. It should be noted that pH is not the only or major criterion for corrosivity. However as measurement of pH is a quick, simple and inexpensive way to get an answer, it is often used to assess a product. A substance/mixture is considered corrosive if it has a pH value of less than or equal to 2 (acidic end of the scale) or greater than or equal to 11.5 (basic/alkaline end of the scale).

11. However, pH is not necessarily a good indicator of corrosivity and the threshold values set will mean a potential increase in the range of products caught such as propriety cleaners. As pH gives no indication of packing group, it has been used in some regions to default to the worst case. For example, a 0.1N (Normal) solution of sodium carbonate with a pH of 11.6 would be caught (sodium carbonate is a very common substance and is used as a food additive, in cleaning products, soaps and detergents).

12. Some other examples where extreme pH values would lead to an inappropriate transport classification are:

(a) Product A contains 0.96% sulphuric acid and would be regarded as non-dangerous for transport. However, by extreme pH (1.75) this equates to Category 1A which is aligned with packing group I;

(b) Product B contains 2.5% benzalkonium chloride and 8% lactic acid and would be regarded as non-dangerous for transport. However again by extreme pH (1.3-2.3) it would equate to Category 1A which is aligned with packing group I;

(c) Product C contains 8% phosphoric acid. Extreme pH (0.8-1.5) would put this in Category 1A which equates to packing group I. However, tests carried out previously showed that phosphoric acid was not packing group III until 10%;

(d) Product D contains 9% sulphamic acid and some surfactant. Extreme pH (0.6) would put this in Category 1A which equates to packing group I. Tests carried out have shown that sulphamic acid is not corrosive for transport until above 10%;

(e) Product E contains 2% ethanolamine and at this concentration would not be regarded as corrosive for transport. However, extreme pH (11.9 – 12.4) pushes it into Category 1A which would equate to packing group I;

13. Assessment of acid or alkali reserve, if possible, is preferable to consideration of pH on its own. However even if this parameter suggests a substance or mixture may not be corrosive despite the low or high pH value, further testing needs to be carried out to confirm this – leading to considerably more assessment and testing of a wide range of products hitherto not being regarded as corrosive for transport.

14. In the annex to ST/SG/AC.10/C.3/2009/15, the proposed new second sentence in 2.8.2.2 refers off to 2.8.3.4 which corresponds to the GHS criteria for the classification for skin corrosion (see section 3.2.2.4 including table 3.2.1 in GHS). This would mean inappropriate wholesale testing for new substances particularly mixtures as more products come onto the market. It could also lead to allocation of a packing group not in line with:

(a) Those of existing entries, in the case of new products assigned to new entries that are added to the Dangerous Goods List of Chapter 3.2;

(b) Those of existing products, in the case of new products assigned to the same existing generic or n.o.s. entries.

15. The sub-categorization of corrosivity in relation to exposure times and observation periods for animal testing in GHS are the same as those referred to in the UN Model Regulations for assignment of packing group. However, in the Annex to ST/SG/AC.10/C.3/2009/15, the proposed new text in 2.8.3.4.2 (reflecting GHS section 3.2.2.4.2) makes reference to “responses” being noted following the particular exposure time within the relevant observation period. The types of corrosive reaction are listed at the end of the proposed new text in 2.8.3.4.1 (reflecting GHS section 3.2.2.4.1) and it would seem that this would lead to more substances, including mixtures, being caught by the criteria. To avoid this and problems of interpretation and opinion, reference to “full thickness destruction of intact skin tissue” as in the current Model Regulations text would be preferable.

16. In the discussions on corrosivity criteria at the Sub-Committee meeting in June 2009, it appeared to be felt from some of the views expressed that the emphasis in the Model Regulations was on animal testing in the absence of human experience. It should be noted that the amendments to 2.8.2.4 in the sixteenth revised edition now make reference to three OECD guidelines for the testing of chemicals using “in vitro” rather than “in vivo” methods (OECD Test Guidelines 430, 431 and 435).

17. As reflected in paragraph 110 of the report of the thirty-fourth session of the Sub-Committee (ST/SG/AC.10/C.3/68), the Netherlands explained that there was no intent to bring any change to the current scope of the Model Regulations in relation to the classification criteria for corrosivity. However, as illustrated above we believe that by direct implementation of the GHS criteria as they currently stand, considerable changes will result which would be inappropriate to the transport sector.

18. Finally, it should be noted that implementation of the current (third revised edition) GHS criteria in classification and labelling for the supply of dangerous chemicals is only really just commencing, and that as many more substances and mixtures are classified to the current GHS criteria that this may lead to calls for revision of the criteria from those involved in supply.

Conclusion

19. The GHS Sub-Committee is carrying out an editorial review of GHS Chapters 3.2 (skin corrosion/irritation) and 3.3 (serious eye damage/eye irritation) in this biennium. Because of the serious problems we believe would be created by fully embracing the current criteria, it is recommended that alignment of the Model Regulations with the GHS corrosivity criteria is deferred at least until this editorial review has been carried out. For example the tiered approach to the evaluation of initial information (GHS section 3.2.2.3 together with figure 3.2.1) is likely to be deleted through this editorial review process so it would be premature to adopt the Netherlands proposal (which contains this text in proposed paragraph 2.8.3.3 and figure 2.8.1 of 2009/15). This would enable further work to be done to establish systematically why differences can currently arise between transport and supply classifications of some substances and the consequences in practice if transport adopted GHS.

20. Then a further review of the way in which the two systems classify for corrosivity should enable them to be adapted to meet the needs of both supply and transport while still maintaining the building block approach of the GHS.

Annex

Corrosivity criteria – skin corrosion

A comparison between GHS (Rev.3) (EU CLP) and TDG (Rev.16)

Substance	**Category 1A PG I**	**Category 1B PG II**	**Category 1C PG III**	**Skin irritant Non-dangerous**
Sodium hydroxide solution a) GHS b) TDG	$C \geq 5\%$ -	$2\% \leq C < 5\%$ $C > 4\%$ meeting criteria	- $C > 4\%$ meeting criteria	$0.5\% \leq C < 2\%$ $C \leq 4\%$
Sulphuric acid a) GHS b) TDG	$C \geq 15\%$ -	- $C > 3\%$	- -	$5\% \leq C < 15\%$ $C \leq 3\%$
Formic acid a) GHS b) TDG	$C \geq 90\%$ -	$10\% \leq C < 90\%$ $C \geq 10\%$	- $5\% \leq C < 10\%$	$2\% \leq C < 10\%$ $C < 5\%$
Acetic acid a) GHS b) TDG	$C \geq 90\%$ -	$25\% \leq C < 90\%$ $C \geq 50\%$	- $10\% < C < 50\%$	$10\% \leq C < 25\%$ $C \leq 10\%$
Propionic acid a) GHS b) TDG	- -	$C \geq 25\%$ $C \geq 90\%$	- $10\% \leq C < 90\%$	$10\% \leq C < 25\%$ $C < 10\%$
Ammonia solution a) GHS b) TDG	- -	$C \geq 5\%$ -	- $10\% < C \leq 35\%$	- $C \leq 10\%$
Formaldehyde solution a) GHS b) TDG	- -	$C \geq 25\%$ -	- $C \geq 25\%$	$5\% \leq C < 25\%$ $C < 25\%$
Phosphoric acid, solution a) GHS b) TDG	- -	$C \geq 25\%$ -	- C – all meeting criteria	$10\% \leq C < 25\%$ SP223

Hydrochloric acid a) GHS b) TDG	- -	C ≥ 25% C – all meeting criteria	- C – all meeting criteria	10% ≤ C < 25% SP223
Potassium hydroxide solution a) GHS b) TDG	C ≥ 5% -	2% ≤ C < 5% C – all meeting criteria	- C – all meeting criteria	0·5% ≤ C < 2% SP223
Nitric acid (other than red fuming) a) GHS b) TDG	C ≥ 20% C > 70%	5% ≤ C < 20% C ≤ 70%	- C – all meeting criteria	- -

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