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Item 2 (i) of the provisional agenda

Explosives and related matters: Review of Chapter 2.1 of the GHS

Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals

Thirty-fourth session

Geneva, 6-8 December 2017

Item 2 (b) of the provisional agenda

Classification criteria and related hazard communication: Review of Chapter 2.1

Status report on the work of the informal correspondence group on the revision of GHS Chapter 2.1

Transmitted by the expert from Sweden

Background

1. Since the start of the previous (2015/16) biennium, work has been on-going regarding revision of Chapter 2.1 of the GHS, which contains the classification and labelling provisions for Explosives. While the work is done within the Sub-Committee of Experts on the GHS (SCEGHS), it involves also the Sub-Committee of Experts on the Transport of Dangerous Goods (SCETDG) as the focal point for the physical hazards of the GHS. An Informal Correspondence Group (ICG) has been formed for the task, which currently consists of around forty members from both Sub-Committees – many of them experts from the Working Group on Explosives (EWG). Progress reports for the work have been submitted to the last four sessions of both Sub-Committees[1], and at the last (July 2017) session of the SCEGHS a Programme of Work was agreed[2] which sets out to conclude the work within the current biennium.

2. The core of the problem with the current GHS-classification of Explosives is that it to some degree depends on the packaging or configuration, which has been explained in detail in previous progress reports and is evident from the flow charts in Figures 2.1.2 and 2.1.3 of Chapter 2.1 in the GHS. Due to the inheritance of the GHS physical hazards from the UN Model Regulations on the Transport of Dangerous Goods, and to avoid having to perform multiple tests, this is usually the packaging/configuration for transport. The document from the expert from Australia[3] that initiated the work on revising Chapter 2.1 of GHS in December 2014 essentially poses the question whether this classification system

[1] See UN/SCEGHS/33/INF.7 - UN/SCETDG/51/INF.15, UN/SCEGHS/32/INF.8 - UN/SCETDG/50/INF.11, UN/SCEGHS/31/INF.10 - UN/SCETDG/49/INF.37 and UN/SCEGHS/30/INF.9 - UN/SCETDG/48/INF.32

[2] See UN/SCEGHS/33/INF.13 – UN/SCETDG/51/INF.44 and section III, sub-section B of the report from the 33:rd session of the SCEGHS, ST/SG/AC.10/C.4/66

[3] See ST/SG/AC.10/C.4/2014/15 - ST/SG/AC.10/C.3/2014/79

developed for the transport sector is suitable also for other sectors where the GHS may be applied (e.g. supply, use, manufacturing, processing and storage).

3. The current GHS classification system for Explosives, as for any other hazard class, governs the labelling of explosive substances, mixtures and articles, see Table 2.1.2 of Chapter 2.1. Without the packaging/configuration in which the classification was done (which again is usually that for transportation purposes) the behaviour of an explosive may no longer be appropriately described by the labelling assigned in that particular packaging/configuration. For example, mass-exploding substances, mixtures and articles can, by special packaging, be classified as Division 1.4 for transport and will hence carry the signal word "Warning" and hazard statement "Fire or projection hazard". Whilst this is appropriate in that particular packaging, it gives an insufficient warning when removed from it. The ICG is currently seeking to overcome these problems by introducing a new classification system for Explosives in the GHS, and associated labelling.

4. The ICG has previously agreed upon some fundamental principles for a new classification and labelling system for Explosives in the GHS[4]. They were that (i) no new substances, mixtures or articles should be classified as Explosives; (ii) no new classification procedures or mandatory tests should be introduced; (iii) GHS labelling elements should be assigned to all Explosives; and (iv) the new system should be kept as simple as possible. At the July 2017 session of the SCEGHS some further principles were also agreed upon[5], namely that (v) transport classifications should not be affected; (vi) information on the (transport) Divisions should be retained; (vii) new requirements for testing should be avoided; and (viii) any proposed changes should be weighed against the added value of them.

5. In accordance with the above principles, any new GHS classification system should comprise exactly the same substances, mixtures and articles as the current one, which is Class 1 for transport plus the GHS-category "Unstable explosives" (which may not be transported and hence are rejected from Class 1). The following table illustrates the connection:

<table>
<tr><td rowspan="2">Current GHS classification</td><td>Hazard class</td><td colspan="2">Explosives</td></tr>
<tr><td>Category</td><td>Unstable explosives</td><td>Divisions 1.1 – 1.6</td></tr>
<tr><td rowspan="2">Transport-classification</td><td>Class</td><td rowspan="2">Not applicable – rejected from Class 1 since too dangerous for transport</td><td>Class 1</td></tr>
<tr><td>Division</td><td>Divisions 1.1 – 1.6</td></tr>
</table>

6. Although the scope of the hazard class of Explosives as a whole should remain the same, it can be divided into categories (and subcategories) in a multitude of ways. At the June/July 2017 sessions of the Sub-Committees, the item was discussed extensively at dedicated meetings during the SCETDG and in the margins of the SCEGHS. A skeleton for a new possible classification system was shown on screen to the SCEGHS, which is reproduced in Annex 1 to this paper. The main feature of this system is a division of the hazard class of Explosives into categories ranking from very high hazard (Category 1) to low hazard (Category 3B), which is the normal fashion for GHS hazard classes (but not how the hazard class of Explosives is currently organized). In this system, categories 2 and 3 are further divided into sub-categories, providing further distinction between different degrees of hazard. The core of the system is shown below:

[4] See paragraph 8 of UN/SCEGHS/31/INF.10 - UN/SCETDG/49/INF.37
[5] See section III, sub-section B, of the report from that session, ST/SG/AC.10/C.4/66

Suggested new GHS-categories	**1** (Very high hazard)	**2**		**3**	
		A (High hazard)	**B** (High hazard)	**A** (Medium hazard)	**B** (Low hazard)
Transport classification	*Not applicable*		**Class 1** (all Divisions)		

Recent developments

7. While the principle of the new classification system shown at the July 2017 session of the SCEGHS gained support from most experts present, the criteria for the various categories were not well defined at that stage. Furthermore, there was still much disagreement on the labelling within the ICG, and this issue was left aside at that point. After the July 2017 sessions, the expert from Sweden directed the ICG to first focus on finding the appropriate criteria to distinguish various categories. Thereafter the group would turn its attention to the labelling, and finally any other problems with the chapter would be dealt with.

8. For the work on the criteria, the expert from Sweden sent out a spread sheet with the categories of the system shown in July 2017 to the ICG soon after the sessions of the Sub-Committees, asking for input for criteria to distinguish the various categories of the table in Annex 1. He also shared some further thoughts on the limitations of any classification system, e.g. that it needs to be consistent with transport and not expand the scope of the GHS hazard class. One group of ICG-members responded to this requests in mid-October with elaborate suggestions for criteria, as wells as ideas on the labelling. Another group of ICG-members responded in the first half of November, with their suggestions for criteria.

9. The first group of responders prefers to amend the July 2017 system by splitting the hazard class into categories 1 and 2 only, where Category 2 would cover exactly (and only) Class 1 of transport, thus keeping a direct consistency with the overall transport classification. Category 2 would be further divided into sub-categories A, B and C, distinguishing Explosives according to the degree of hazard they present in a non-transport situation. The table below illustrates the principle, the details of this group's suggestion are shown in Annex 2 to this document. It needs to be mentioned that the group submitted an elaborate document to the ICG explaining their views, and Annex 2 only shows the core table from their document where the criteria are summarized.

Suggested new GHS-categories	**1**	**2**		
		A (High hazard)	**B** (Medium hazard)	**C** (Low hazard)
Transport classification	*Not applicable*	**Class 1** (all Divisions)		

10. The second group of responders stuck to the classification system as it was presented in July 2017 (see above), and made distinctions between the criteria for explosive substances/mixtures versus explosive articles, as well as between intentional explosives versus unintentional explosives. The details of this group's suggestion are shown in Annex 3 to this document. Also this group submitted comments and further explanations to their criteria to the ICG, and Annex 3 only shows the criteria without these additional texts.

Upcoming discussions

11. The expert from Sweden aims to bring the suggestions of the two groups into a single (draft) classification system, and to reformat the criteria so that they are formulated and presented in a consistent way. This to facilitate comparison of the suggested criteria so

that similarities and differences are more easily spotted. Especially the differences will then be discussed to see whether they can be overcome so that one single classification system with criteria emerges. After that, labelling elements will need to be assigned to the various categories. Views on the labelling have thus far been somewhat divided within the ICG[6], and a way forward will be sought within the possibilities that the GHS labelling provisions provide[7].

12. Two dedicated meetings for Chapter 2.1 GHS are foreseen to be convened in connection with the sessions of the two Sub-Committees in November/December 2017. It is suggested that the first meeting commences after the EWG has finished their ordinary business[8], subject to the decision of the SCETDG. The principal topic at this meeting is suggested to be the classification system and the criteria for the various categories of it (since it may be assumed that many of the EWG-experts will attend and this is a highly technical issue). The second meeting will take place in the margins of the SCEGHS session[9], and is suggested to focus more on the introduction of a new classification system as such and on the labelling elements (since GHS-experts will be able to attend, whereof most do not specialise in explosives).

13. The expert from Sweden would like to thank the ICG-members and other experts involved that have worked creatively and hard to provide input, and looks forward to the upcoming discussions which, in his view, will be decisive for whether it will be possible to propose a revised classification and labelling system within the current biennium, as indicated in the Programme of Work[10].

[6] See previous status report, UN/SCEGHS/32/INF.8 - UN/SCETDG/50/INF.11
[7] See Chapter 1.4 of the GHS
[8] Probably sometime on Wednesday 29 November
[9] Wednesday 6 December at 12:15 – 14:15 in meeting room S4, see UN/SCEGHS/34/INF.6
[10] See UN/SCEGHS/33/INF.13 – UN/SCETDG/51/INF.44

Annex 1 - Possible new GHS classification system for Explosives as discussed at UN-meetings in July 2017

Red texts are the main areas of discussion.

Category	**[1]**	**[2A]**	**[2B]**					**[3A]**	**[3B]**
Division	*n/a*	*n/a*	1.1	1.2	1.3	1.5	1.6	*n/a*	*n/a*
Description	Very high hazard	High hazard						Medium hazard	Low hazard
Criteria	Positive results in Test Series 3 or 4 or Test 8(a).	Positive results in Testseries 2 or test 8(b) or 8(c) or intentional explosive, and not exempted article nor Category [1].							
Additional criteria		Division not assigned	Div. 1.1 as configured for transport.	Div. 1.2 as configured for transport.	Div. 1.3 as configured for transport.	Div. 1.5 as configured for transport.	Div. 1.6 as configured for transport.	Division 1.4X as configured for transport and individually not posing a high hazard	Division 1.4S as configured for transport and individually not posing a high or medium hazard
Symbol	GHS01	GHS01						GHS01	*No symbol*
Signal word	DANGER	DANGER						WARNING	WARNING
Hazard statement	H200	H20X	H201	H202	H203	H205	H20Y	H204	H204

Annex 2 – Suggested criteria from the first group of ICG-members in October 2017

Category	**[1]**	**[2A]**	**[2B]**	**[2C]**
Description	TBD Hazard	**High hazard**	**Medium hazard**	**Low hazard**
Criteria:	Division not assigned by TDG Competent Authority **OR** Positive results in Test Series 3 or 4 **OR** Processing	Positive results in Test Series TS 2 **OR** intentional explosive, **AND** not exempted article **NOR** Category [1] **AND** Negative result in TS 3 or 4 **AND**		
		Assign High Hazard based on other data or considerations **OR** 1.1, 1.2, 1.3, 1.5, or 1.6 Transport Classifications **OR** 1.4 Transport Classification **AND** • Transport Compatibility Groups B, D, E, or F **OR** • Special Packaging Instructions/Criteria Required **OR** • Special Orientation or Dividers Required to pass TS 6 criteria for 1.4 **OR** • Violent Test 6a/6b reaction without mass explosion	1.4 Transport Classification **AND** Transport Compatibility Groups C or G **AND** No Special Packaging Instructions/ Criteria Required **AND** No Special Orientation or Dividers Required to pass TS 6 criteria for 1.4 **AND** No Violent Test 6a/6b reaction without mass explosion	1.4 Transport Classification **AND** Transport Compatibility Group S **AND** No Special Packaging Instructions/ Criteria Required **AND** No Special Orientation or Dividers Required to pass TS6 criteria for 1.4S **AND** No Violent Test 6a/6b reaction without mass explosion
Symbol	GHS01	GHS01	GHS01	*No symbol*
Signal word	DANGER	DANGER	WARNING	WARNING
Hazard statement:	”TBD Hazard”	Explosive	Fire or projection hazard	Fire or projection hazard

Annex 3 – Suggested criteria from the second group of ICG-members in November 2017

Criteria	[1]	[2A]	[2B]	[3A]	[3B]
Intentional explosive substances/ mixtures	Fails Ts 3 **OR** fails Ts 8 (a) (as applicable);	Not Cat [1] **AND** Div not known;	Not Cat [1] **AND** Div known;	Div. 1.4 and Cg other than S **AND** There is no indication (criterion?) that the packaging is designed such that the hazard is reduced.	Div. 1.4 and Cg S **AND** there is no indication that the packaging is designed such that the hazard is reduced
Explosive articles	Fails Ts 4 **OR** fails "drop test" (for individual articles)	Not Cat [1] **AND** Div not known; **OR** Div 1.4 **AND** articles are posing individually a high hazard such as shaped charges, … (alternatively such articles might be assigned to the most appropriate division within Cat [2B])	Not Cat [1] **AND** Div known;	Div 1.4 and Cg other than S **AND** there is no indication that the packaging is designed such that the hazard is reduced **AND** not Cat [3b]	Div 1.4 and Cg S **AND** there is no indication that the packaging is designed such that the hazard is reduced **AND** testing of the individual article or the smallest inner packaging unit with similar (or identical?) approach as TS 6(d)
Unintentional explosive substances/ mixtures	Fails Ts 3 (a) or 3 (b) (mechanical sensitivity) **AND** Fails Ts 2? **AND** not a self-reactive (**AND** Div not known)	Not Cat [1] **AND** fails Ts 2 **AND** has not been exempted based on Ts 6 (in case Ts 6 results are available see for example Orange Book 2.4.2.4.2; UN 1261, UN 2956, UN 3241, UN 3242 and UN 3251) **AND** Div not known.	Not Cat [1] **AND** fails Ts 2 **AND** has not been exempted based on Ts 6 or fails Ts 8 (b) or 8 (c) (if applicable, see Fig. 2.1.4) **AND** Div known	Div. 1.4 and Cg other than S **AND** there is no indication that the packaging is designed such that the hazard is reduced **AND** possibly further criteria based on information from other test series such as detonation properties (Ts 2), deflagrates only slowly (Ts 2 (c)(i)),heating under confinement (Ts 2)	Div. 1.4 and Cg S **AND** there is no indication that the packaging is designed such that the hazard is reduced **AND** possibly further criteria based on information from other test series such as detonation properties (Ts 2), deflagrates only slowly (Ts 2 (c)(i)), heating under confinement (Ts 2).