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 **7 July 2017**

Fifty-first session
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Item 2 and 10(d) of the provisional agenda
Explosives and related matters, Use of the MTC of Tests and Criteria in the context of the GHS

Report of the Working Group on Explosives

Transmitted by the chairman of the Working Group on Explosives

Introduction

1. The working group met from 3 – 6 July 2017 in a parallel session to the plenary meeting of the Sub-Committee on the Transport of Dangerous Goods. This meeting of the working group was well attended with 34 experts in attendance from Belgium, Canada, Finland, France, Germany, Japan, Netherlands, New Zealand, Poland, Spain, Sweden, Switzerland, United Kingdom, United States of America, Australian Explosives Industry and Safety Group (AEISG), Association of European Manufacturers of Sporting Ammunition (AFEMS), European Chemical Industry Council (CEFIC), European Association of Automotive Suppliers (CLEPA), Institute of Makers of Explosives (IME), Sporting Arms & Ammunition Manufacturers' Institute (SAAMI), and the GHS Secretariat. The Annex to this report provides a list of participants. The group was tasked to discuss technical matters related to official papers and to discuss informal papers as time allowed. Mr. Ed de Jong (Netherlands) served as chair of the working group and Mr. David Boston (IME) as secretary.

2. The working group met for two and one-half days to consider the papers assigned to it by the TDG Sub-Committee and informally on the final day and one-half while this report was being prepared and reviewed and to discuss other matters of interest. Those informal discussions are not reported herein.

3. UN/SCETDG/51/INF.2 listed the following papers for consideration of the working group:

Document	Title
Agenda Item 2(b)	Review of tests in parts I, II and III of the MTC of Tests and Criteria
UN/SCETDG/51/INF.6 (Sweden)	*MTC of Tests and Criteria - Proposal to amend section 10.3.3.4*
UN/SCETDG/51/INF.19 (IME)	*Recommendations for Improvement of Series 8 (c)*
UN/SCETDG/51/INF.28 (Netherlands)	*Comparison of standard detonators*
Agenda Item 2(c)	Electronic detonators
ST/SG/AC.10/C.3/2017/14 (AEISG)	*New UN entries for electronic detonators*
UN/SCETDG/51/INF.33 (Sweden)	*Comments on ST/SG/AC.10/C.3/2017/14 about new UN entries for electronic detonators*
Agenda Item 2(e)	Stability tests for industrial nitrocellulose
ST/SG/AC.10/C.3/2017/3 (Germany)	*Stability tests for industrial nitrocellulose*
UN/SCETDG/51/INF.9 (CEFIC, WONIPA)	*Stability tests for industrial nitrocellulose*
UN/SCETDG/51/INF.24 (SAAMI)	*Stability tests for industrial nitrocellulose*

Document	Title
UN/SCETDG/51/INF.10 - UN/SCEGHS/33/INF.4 (CEFIC, WONIPA)	*Classification of desensitized explosives for the purposes of supply and use according to UN GHS chapter 2.17: Test results on industrial nitrocellulose*
Agenda Item 2(f)	Application of security provisions to explosives N.O.S.
ST/SG/AC.10/C.3/2017/19 (UK)	*Application of security provisions to explosives*
ST/SG/AC.10/C.3/2017/20 (UK)	*Application of security provisions to explosives*
Agenda Item 2(i)	Review of Chapter 2.1 of the GHS
UN/SCETDG/51/INF.15 - UN/SCEGHS/33/INF.07 (Sweden)	*Status of the work of the informal correspondence group on the revision of GHS Chapter 2.1*
Agenda Item 2(j)	Miscellaneous
ST/SG/AC.10/C.3/2017/23 (Switzerland)	*Transporting fireworks in small quantities*
UN/SCETDG/51/INF.34 (Switzerland)	*Comments on ST/SG/AC.10/C.3/2017/14 about new UN entries for electronic detonators*
Agenda Item 10(b)	Testing of oxidizing substances
ST/SG/AC.10/C.3/2017/28 (France)	*Tests for oxidizing liquids (UN Test O.2) and oxidizing solids (UN Tests O.1 and O.3); Consequential amendments of cellulose replacement to test descriptions*
UN/SCETDG/51/INF.12 (France)	*Tests for oxidizing liquids (UN Test O.2) and oxidizing solids (UN Tests O.1 and O.3) Consequential amendments of cellulose replacement to test descriptions Additional information to document ST/SG/AC.10/C.3/2017/28*
Agenda Item 10(d)	Use of the MTC of Tests and Criteria in the context of the GHS
UN/SCETDG/51/INF.7 - UN/SCEGHS/33/INF.3 (EWG Chair)	*Revision of the MTC of Tests and Criteria Section 1*
UN/SCETDG/51/INF.7/Add.1- UN/SCEGHS/33/INF.3/Add.1 (EWG Chair)	*Revision of the MTC of Tests and Criteria: Part I: Section 10*
UN/SCETDG/51/INF.7/Add.2 - UN/SCEGHS/33/INF.3/Add.2 (EWG Chair)	*Revision of the MTC of Tests and Criteria: Part II: (sections 20 to 28)*

Agenda Item 2(b) – Review of tests in parts I, II and III of the MTC of Tests and Criteria

4. **Subject:** Amendment of section 10.3.3.4 of the MTC of Tests and Criteria (MTC)

Documents: *None*

Informal documents: *UN/SCETDG/51/INF.6 (Sweden)*

Discussion: The working group considered the revisions suggested by Sweden intended to prevent misinterpretation of section 10.3.3.4 in line with revisions suggested by the working group (and subsequently adopted) to 10.3.3.2 and 10.3.3.3 of the MTC. Several suggestions to improve the correctness of the proposed wording were offered including:

- Replace references to “new material” with “new substance”
- Replace references to “explosive effect” with “practical explosive or pyrotechnic effect”

The working group also considered the reference to Test Series 1 in the proposed revised text, the purpose of that test, and its placement in the MTC and considered that:

- Test Series 1 is not used for classification but is useful for hazard assessment and hazard communication and

- The test may be more appropriately located elsewhere in the MTC, perhaps in Part V.

Finally, the working group agreed that terminology used in 10.3.3.4 and Figure 10.2 of the MTC (the flowchart) should be consistent. For example, in box 4, the reference should be to "explosive properties" instead of "explosive substance".

Conclusion: Taking account of the comments from the working group, Sweden prepared an updated proposal which the working group agreed upon. The group agreed to include the updated proposal into the updated INF.7/Add.1 (see para. 14).

5. **Subject:** Improvement of the 8(c) Koenen Test

Documents: *None*

Informal documents: *UN/SCETDG/51/INF.19 (IME)*

Discussion: After considerable discussion, the working group agreed that ammonium nitrate (AN) suspensions and gels can be successfully classified using data from the 8(c) Koenen Test, but AN emulsions, due to their high water content, present a unique challenge and the 8(c) Koenen Test is not suitable for classifying certain types of emulsions. IME claimed that, unlike for AN suspensions and gels, this unsuitable test leaves emulsion manufacturers with no acceptable way to qualify their products as Division 5.1 instead of Division 1.5.

IME stated further that emulsions can be made to pass the 8(c) Koenen Test, but require formulations with more volatile oil phases. This however creates a safety issue when the emulsion has to be loaded into upholes, which require high pump discharge pressures. The higher volatility oils increase the risk during this loading process since their minimum burning pressure may be exceeded by the pump.

France indicated that a test similar to MBP is used satisfactorily in combination with the 8(c) Koenen Test in its regulation for the safety of pumping explosives including emulsions. Since the Manual now encompasses GHS, the lifecycle of AN emulsions needs to be taken into consideration.

Despite the previous determination by the working group that the 8(c) Koenen Test is unsuitable for evaluating AN emulsions, Germany was still not convinced that the 8(c) Koenen Test needed any work to make it suitable for such evaluation and, to further assess the issue, would like more information on composition and what in that composition contributes to this unique challenge.

AEISG stated their preference that the MBP test be added to test series 8, not as a replacement for the 8(c) Koenen Test, but as a test that provides additional useful information that could be used in classifying emulsions. There was some support for this within the working group, especially after IME agreed that it would work on some guidance regarding the purpose and intent of the MBP test in TS8; however, a consensus could not be reached.

Conclusion: The working group could find no immediate way forward and asked if IME would lead continued work to investigate the possibility of modifications to the 8(c) Koenen Test, to determine suitability of the MBP test as an additional test, and to research other possible tests that could be added to TS8 to aid in classification of ANEs including emulsions. IME agreed that it would work with Spain, AEISG, and others to come up with a future proposal.

6. **Subject:** Standard Detonators

Documents: *None*

Informal documents: *UN/SCETDG/51/INF.28 (Netherlands)*

Discussion: The working group welcomed the additional test data provided in INF.28 and was encouraged that the goal of a single standard detonator specification may be possible. The working group considered the potential impact of adopting a new specification for the standard detonator. It was generally agreed that the impact of changing the standard detonator to something like the "alternative" detonators described in INF.28 would be greater on the chemical industry rather than the "intentional explosives" industry. It was also observed that the net explosive mass of a detonator is more likely to impact the chemical industry, whereas physical aspects like the actual explosives used, shell material, shell design (dimpled bottom) may have more impact on the "intentional explosives" industry. The working group was reminded to keep in mind that, whether factual or not, USA and EU standard detonators are considered equal in the MTC.

Conclusion: The work will continue with a completion goal by the end of the current biennium.

Agenda Item 2(c) – Electronic detonators

7. **Subject:** New entries for electronic detonators

Documents: *ST/SG/AC.10/C.3/2017/14 (AEISG)*

Informal documents: *UN/SCETDG/51/INF.33 (Sweden)*

Discussion: The working group considered the proposals by AEISG and the comments from Sweden and agreed that some attention in the Model Regulations was warranted to address electronic detonators. Many in the working group preferred the proposal in INF.33 that would expand the current electric detonator entries to include electronic detonators; however, some agreed that creation of new entries for electronic detonators, as proposed by AEISG, was the preferred way forward.

Regardless of the method to be used the working group agreed that electronic detonators must be distinguished from electric detonators, not so much for transport safety, but for downstream uses (i.e., storage, handling, use). Further the working group noted that confusion can be expected when electronic detonators (described as such in product identification on packagings) are marked as electric detonators for transport purposes. Another source of confusion exists when UN numbers are used for purposes other than transport safety, for which they were designed. Finally, due to confusion between the terms "electric" and "electronic" it was suggested to use an alternative word such as "digital" to describe the latter.

Although agreeing that a distinction between "electronic" and "electric" detonators was needed, the working group could not come to consensus on how to do so.

Conclusion: AEISG continues to prefer separate entries and, taking account of the concerns and comments of the working group, will return with an updated proposal.

Agenda Item 2(e) – Stability tests for industrial nitrocellulose

8. **Subject:** Proposal to require stability tests for industrial nitrocellulose

Documents: *ST/SG/AC.10/C.3/2017/3 (Germany)*

Informal documents: *UN/SCETDG/51/INF.9 (CEFIC, WONIPA)*
UN/SCETDG/51/INF.24 (SAAMI)

Discussion: The EWG considered the issues raised by Germany related to stabilization of nitrocellulose (NC) mixtures even if the mixture becomes completely dry and agreed that additional tests to confirm stability of NC mixtures were needed. Much of the discussion concerned the issue of stabilization of NC and the need for such, especially once the NC is dried. The working group agreed that stabilization was required to ensure safe handling of NC but also determined that the 3(c) thermal stability test was not suited for evaluating NC stabilization. The working group unanimously concluded that the Bergmann Junk test and the Methyl Violet Paper tests were suitable tests for such assessment and recommended their performance in place of the 3(c) test when classifying NC. However, the working group decided that the autoignition temperature test was not beneficial.

Conclusion: CEFIC will lead an intersessional group to work out details of implementation, test procedures, placement of the Bergmann Junk test and the Methyl Violet Paper test in the Model Regulations and the MTC, and will consider some allowance for grandfathering currently existing NC approvals and prepare a new proposal for the next session.

9. **Subject:** Classification of desensitized explosives

Documents: *None*

Informal documents: *UN/SCETDG/51/INF.10 (CEFIC, WONIPA)*

Discussion: The working group considered the proposal to use the test results (SprengLR011) already achieved by the German competent authority BAM over the past 30 years for the classification of industrial nitrocellulose products according to the new UN GHS chapter 2.17 desensitized explosives and concluded that the data was useful and how to include it in the GHS should be addressed by the intersessional group discussed above.

Conclusion: Referred to the intersessional group (see para. 8) for further consideration.

Agenda Item 2(f) – Application of security provisions to explosives N.O.S.

10. **Subject:** Security provisions for explosives

Documents: *ST/SG/AC.10/C.3/2017/19 (United Kingdom)*
ST/SG/AC.10/C.3/2017/20 (United Kingdom)

Informal documents : *None*

Discussion: It was noted that the Table 1.4.1 is a list "indicative" (although some incorrectly use it as an absolute list) of those explosives that may be subject to the security provisions of Chapter 1.4 and that, as such, some preferred that the list should be positive (i.e., list those entries to which the provisions apply), rather than negative (exclusion list) as proposed in …2017/19. It was generally felt that entries referring to goods that are freely available to the general public are not security risks and shouldn't be subject to Chapter 1.4 requirements. Consideration was given to the suggestion that the list should simply read that it is applicable to all explosives except those that are freely available. That would then leave the decision to the authorities as to what "freely available" means and what items in their jurisdiction should be subject to Chapter 1.4.

USA noted the 1.6 definition does not exclusively include high hazard items, but agreed the incentive driven by military Insensitive Munition requirements justifies adding 1.6 to the list. There was unanimous agreement with …2017/20 that, although presently there is only one 1.6 entry, all 1.6 explosives should be included in Table 1.4.1.

Conclusion: The UK will consider the comments from the working group and may return with an updated proposal.

Agenda Item 2(i) – Review of Chapter 2.1 of the GHS

11. **Subject:** Review of Chapter 2.1 of the GHS

Documents: *None*

Informal documents : *UN/SCETDG/51/INF.15 - UN/SCEGHS/33/INF.07 (Sweden)*

Discussion: This topic was discussed during an informal session after this report was prepared and is not reported herein.

Agenda Item 2(j) – Miscellaneous

12. **Subject:** Transporting fireworks in small quantities

Documents: *ST/SG/AC.10/C.3/2017/23 (Switzerland)*

Informal documents : *UN/SCETDG/51/INF.34 (Switzerland)*

Discussion: Acknowledging the comments made in plenary before this paper was referred to the working group, several recommendations were provided to the expert from Switzerland regarding how the proposal might be improved to make it more acceptable to the TDG Sub-committee. The working group recalled 4 principles that had been previously used by the working group and SAAMI to develop the final proposal that was accepted by the TDG Sub-committee leading to a limited quantity option for certain small arms ammunition[1]:

1. The items must not propagate independent of packaging.
2. No entries on high consequence list were selected.
3. No generic entries or n.o.s. entries were selected.
4. The item must present no hazardous effects outside the package in the event of accidental initiation (as determined by use of the 6(d) test).

However, the working group was not optimistic that fireworks could be made to meet all of these principles.

Conclusion: The expert from Switzerland may consider the comments from the working group and determine if an amended proposal should be submitted.

[1] UN/SCETDG/37/INF.73, para. 4

Agenda Item 10(b) – Testing of oxidizing substances

13. **Subject:** Tests for oxidizing liquids and solids

Documents: *ST/SG/AC.10/C.3/2017/28*

Informal documents: *UN/SCETDG/51/INF.12*

Discussion: The working group did not discuss this topic as France preferred to have a discussion in plenary.

Conclusion: None

Agenda Item 10(d) – Use of the MTC of Tests and Criteria in the context of the GHS

14. **Subject:** Addition of GHS context into the MTC

Documents: *None*

Informal documents: *UN/SCETDG/51/INF.7 - UN/SCEGHS/33/INF.3*
UN/SCETDG/51/INF.7/Add.1- UN/SCEGHS/33/INF.3/Add.1
UN/SCETDG/51/INF.7/Add.2- UN/SCEGHS/33/INF.3/Add.2

Discussion: The working group reviewed the proposed revisions to the Table of Contents and Section 1 (INF.7) and Section 10 (INF.7/Add.1) of the MTC. In general, most of the recommended amendments were accepted by the working group; however, some additional changes were made. The working group chairman recorded the additional changes and an updated set of working documents will be distributed to the working group for verification. Changes to those working documents will likely come as written proposals (most likely INF documents) prior to the next review session. The working group noted:

- That clarification is needed to explain that, in appropriate places, TS 4 and 6 are intended only to be performed on goods in transport configuration. Also, clarification is needed to explain that, in certain instances, the results of Test Series 1, though not required for classification, may be needed for hazard assessment and hazard communication.
- That there is certain text in the MTC that is recommended for revision and the same text also appears in the Model Regulations and/or the GHS document. It is unclear to the working group whether, if the MTC changes are approved, the same changes would be necessary where the text also appears in the Model Regulations and/or the GHS document. The working group is seeking guidance from the sub-committee as to how this should be addressed.
- That the working group recognizes there are numerous references to "product" in the Model Regulations and the MTC. However, due to the sheer volume of revisions that would be required and the potential for unintended consequences, it is not recommended to replace these occurrences with "substance or article". The review of Sections 20 – 28 (INF.7/Add.2) will take place at a later session.

Conclusion: The working group chairman will consolidate the comments and suggestions from the working group into new working documents and will distribute them to the working group for verification and further review.

Annex
Working Group on Explosives (3 – 6 July 2017)
List of Participants

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