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 **27 June 2013**

Forty-third session
Geneva, 24 – 28 June 2013
Item 2 of the provisional agenda
Explosives and related matters

Report of the Working Group on Explosives

Transmitted by the chairman of the Working Group

Introduction

1. The working group met from 24 to 27 June 2013 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 32 experts in attendance from Australia, Belgium, Canada, France, Germany, Japan, Netherlands, Norway, Spain, Sweden, United Kingdom, United States of America, AEISG, CLEPA, COSTHA, DGAC, ICCA, IME, and SAAMI. A list of participants is provided in Annex 1 to the report. 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 following papers were discussed.

Document	Title
Agenda Item 2(a)	Tests and criteria for flash compositions
ST/SG/AC.10/C.3/2013/23 (USA)	*A proposed modification to the HSL flash composition test apparatus*
ST/SG/AC.10/C.3/2013/24 (USA)	*Proposed modification of the US Flash composition test to measure both detonation and deflagration properties*
UN/SCETDG/43/INF.20 (Japan)	*Comments on the modification of the US Flash Composition Test proposed by the United States of America (ST/SG/AC.10/C.3/2013/24)*
UN/SCETDG/43/INF.31 (USA)	*Editorial corrections to ST/SG/AC.10/C.3/2013/24 - proposed modification of the US Flash Composition Test to measure both detonation and deflagration properties*
Agenda Item 2(b)	Review of test series 6
ST/SG/AC.10/C.3/2013/17 (SAAMI)	*Amendments to introductory portions of the Manual of Tests and Criteria*
ST/SG/AC.10/C.3/2013/27 (SAAMI)	*Amendments to Test Series 6(c)*
UN/SCETDG/43/INF.9 (IME)	*Reporting of Results of Survey on the Test Series 6*
UN/SCETDG/43/INF.27 (Germany)	*Amendment of firing ammunition in UN 6(a), 6(b) and (d) tests*
Agenda Item 2(c)	Review of tests in parts I and II of the Manual of Tests and Criteria
ST/SG/AC.10/C.3/84, para. 86 (a)	*Report of the Sub-Committee on its 42nd session*
UN/SCETDG/43/INF.10 (IME)	*Recommendations for improvement of Series 1 (a) and 2 (a) Gap Tests and Series 1 (c) and 2 (c) Time/Pressure Tests*
UN/SCETDG/43/INF.19 (AEISG)	*Review of Test Series 8*
UN/SCETDG/43/INF.40 (USA)	*Proposals for Division 1.6 and Potential Series 7 response descriptors utility in assessing Series 6 tests*

Document	Title
Agenda Item 2(d)	Review of packing instructions for explosives
ST/SG/AC.10/C.3/84, para. 10	*Report of the Sub-Committee on its 42nd session*
ST/SG/AC.10/C.3/2013/18 (SAAMI)	*Amendment to PP48 as applied to Packing Instruction P114(b) for UN0509*
Agenda Item 2(e)	Desensitized explosives
ST/SG/AC.10/C.3/84, para. 86 (a)	*Report of the Sub-Committee on its 42nd session*
ST/SG/AC.10/C.4/48, para. 14	*Report of the GHS Sub-Committee on its 24th session*
UN/SCETDG/43/INF.13 (Germany)	*Implementation of a new Chapter 2.17 "Desensitized Explosives" in the GHS and implementation of "Classification procedures, test methods and criteria relating to the class of desensitized explosives" in a new Part V of the UN Manual of Tests and Criteria*
Agenda Item 2(f)	Miscellaneous
ST/SG/AC.10/C.3/2013/8 (Sweden)	*Editorial clarification of a screening procedure for potential explosives in the Manual of tests and Criteria and in the GHS*
ST/SG/AC.10/C.3/2013/10 (DGAC)	*Discussion on relief for low hazard explosive articles*
ST/SG/AC.10/C.3/2013/12 (Sweden)	*Mixed transport of goods of Class 1 with other classes in freight containers, vehicles or wagons*
ST/SG/AC.10/C.3/2013/15 (AEISG)	*Classification of ammonium nitrate – new SP370*
ST/SG/AC.10/C.3/2013/19 (SAAMI)	*Default list for classification of Class 1 Products other than fireworks*
UN/SCETDG/43/INF.11 (UK)	*Proposal for additional guidance on the contents of Competent Authority Documents (CAD)*
UN/SCETDG/43/INF.18 (IME)	*Harmonized International Standard for Explosives Traceability Markings*
UN/SCETDG/43/INF.21 (Austria)	*Classification of Ammunition, Smoke, containing titanium tetrachloride*
UN/SCETDG/43/INF.32 (AEISG)	*Proposal to have the UN Packing Group for UN No 3375 reviewed and possibly changed from PG II to PG III*
UN/SCETDG/43/INF.54/Rev.1 (Switzerland)	*Comments on INF.32 from AEISG on the Proposal to have the UN Packing Group for UN No 3375 reviewed and possibly changed from PG II to PG III*
Agenda Item 3(a)	Listing, classification and packing: miscellaneous
ST/SG/AC.10/C.3/2013/31 (COSTHA)	*Proposal to eliminate the description text, for the proper shipping name of; "Safety devices", for UN 3268 (Class 9)*

Agenda Item 2(a) – Tests and criteria for flash compositions

3. **Subject.** Proposed modification of HSL flash composition test apparatus.

Documents: *ST/SG/AC.10/C.3/2013/23 (USA)*

Informal documents: *None*

Discussion: USA has noticed a problem with reproducibility and gumming (fouling) when using the HSL apparatus, especially in instance of "no-go" results that cause delays in test completion. USA described the modifications it made to eliminate the problem and is proposing that those modifications be accepted for use in the HSL flash composition test.

UK acknowledged that it also has the same problem and welcomed the work done by USA and the proposed modification. UK suggested that additional testing by several experts would be welcome to demonstrate the reliability of the proposed modified test apparatus and offered to coordinate a work program to accomplish this. Germany, Japan, USA, and COSTHA (study

group) agreed to participate in the work program. The study group met on Tuesday morning and formulated its initial plan of work.

Conclusion: The explosives working group concluded that the proposed changes appeared sensible and should advance, provided supportive data resulted from the work program. The study group should have testing completed and report back to the explosives working group at the 45th session in 2014.

4. **Subject.** Proposed modification of the US Flash composition test to measure both detonation and deflagration properties.

Documents: *ST/SG/AC.10/C.3/2013/24 (USA)*

Informal documents: *UN/SCETDG/43/INF.20 (Japan)*
UN/SCETDG/43/INF.31 (USA)

Discussion: The USA is looking to further refine the US Flash Composition Test that was accepted by the Sub-Committee at the 41st session, with a goal to improve correlation with the HSL Flash Composition Test. The USA has begun to look at dent depth as an indicator in the test in addition to witness plate perforation. France mentioned difficulties in correlation of dent depth and explosive properties (e.g., fertilizers).

It was noted by several in the group that flash composition tests are not often used for classification purposes, opting more for classification by examination of the flash composition's components. The tests are more often used for checking unusual formulations and for confirming classifications that have been alleged.

The group felt that the work, including criteria to better match both test methods, could be finalized in this biennium,.

Conclusion: Further data will be collected by the study group mentioned above. The USA will continue its work and collect more data with an aim to finalize refinement of the US Flash Composition Test by the 45th session.

Agenda Item 2(b) – Review of test series 6

5. **Subject.** Amendments to introductory portions of the Manual of Tests and Criteria.

Documents: *ST/SG/AC.10/C.3/2013/17 (SAAMI)*

Informal documents: *None*

Discussion: The working group discussed the three proposals from SAAMI as described in …C.3/2013/17:

- **Examples** – There are examples within the test procedures that are provided for informational purposes and to provide assistance to the reader in understanding the procedural setup. Although these are merely intended for the purposes noted, some competent authorities are treating them as though they are requirements, which is not the intent of those examples. For example:

- Section 16.6.1.3.2 of the test manual describes one method of building a wood fire for the 6(c) test. The section states that this is "one method" that is "suitable", implying by the use of the phrase "one method" that there are also other methods. In some instances competent authorities are insisting that this "one method" is the only method acceptable in building a wood fire.

- Also, in section 16.4.1.3.4, a method of providing the confinement required in the 6(a) test is described. Despite the fact that the section concludes with a note about alternative methods, some are requiring only the method described.

These are a couple of cases to illustrate the problem of examples being taken as requirements or specification. The working group agreed that such examples are merely examples and determined that some guidance on the matter would be helpful, especially to competent authorities that have little or no previous experience in explosives classifications. Some of the working group felt that the issue of examples was one of common sense and that further explanation was unnecessary, but did not oppose inclusion of some guidance on the matter in the Test Manual. The working group considered the proposal by SAAMI and several revisions thereof, but ultimately agreed that an alternate proposal by the USA was the best solution.

The working group also considered whether such guidance should be provided in Section 1 of the Test Manual, where it would apply to all such examples or whether the guidance should be included in Section 10 of the Test Manual, where it would only apply to examples within procedures of tests related to Class 1. The working group agreed that the most appropriate placement of this guidance would be in Section 1 since it applies to the whole Manual.

- **Flexibility –** SAAMI cited some instances in performing the 6(c) test where some flexibility in the procedure should be allowed. AEISG observed that there was a similar need in performing test series 8. Some of the group felt that the proposal by SAAMI really didn't offer much help, while others agreed that it might be helpful and that it couldn't hurt to include some guidance in the test manual regarding flexibility in the test procedures.

- **Reciprocity** – SAAMI referred to para. 26 of explosives working group report from the 41st session (UN/SCETDG/41/INF.67) and is seeking to develop the working group's conclusion further. Germany opined that this issue was common sense and further guidance, as proposed by SAAMI, was unnecessary. AEISG and Spain expressed that it would be good to provide such guidance. Some of the working group agreed with Germany and others with AEISG and Spain; however, those who felt additional guidance was unnecessary did not oppose provision of such guidance. The working group agreed that the guidance should be as proposed by SAAMI with some amendment.

Conclusion:

a) **Examples** – The working group recommends adding the following to the end of Section 1.1.2 in the Test Manual (as shown in Annex 3 of this report):

Examples may also be listed within various test procedures. These are meant to be used for purposes of illustration and are not meant to be prescriptive in nature.

b) **Flexibility** – SAAMI will consider the comments from the working group and may submit a proposal for the 45th session.

c) **Reciprocity** – The working group recommends addition of a new section 1.1.3 to the test manual as shown below and in Annex 3.

In situations where the proper classification of substances and articles of certain Hazard Classes or Divisions for transport is the responsibility of the Competent Authority, it is normal and accepted practice that due consideration will be given to testing or classification results of other Competent Authorities when provided.

6. **Subject.** Review of test series 6

Documents: *ST/SG/AC.10/C.3/2013/27 (SAAMI)*

Informal documents: *UN/SCETDG/43/INF.9 (IME)*
UN/SCETDG/43/INF.27 (Germany)

Discussion:

- **2013/27** –SAAMI discussed research they've been doing regarding witness screen material selection and effects of heat on the performance of the screens and makes several proposals regarding the performance and assessment of the 6(c) test. Regarding their work on the effects of heat on the witness panels, SAAMI concluded that the heating of the witness screens softens the screens such that dent depth resulting from a particular energy level is actually deeper than stated in the manual. SAAMI is of the opinion that this is resulting in classification of items that are traditionally 1.4S into 1.4C and higher classifications.

  In considering 2013/27, the working group reviewed projection hazards and how the 1990s 6(c) working group evaluated and determined what energy levels were appropriate between 1.4S and 1.4 and between 1.4 and 1.2. The working group also discussed how witness screen response was calibrated in an attempt to evaluate these energy levels.

  - *Proposal 1, witness panel construction* – SAAMI advised that its study was incomplete and that they would continue the work with a probable formal proposal for the 45th session.
  - *Proposal 2, video equipment* – the USA supported the first sentence of the proposal, but objected to the second, and proposed alternate wording. The working group supported a modified proposal consisting of the first sentence of the SAAMI proposal and replacing the remainder of the text proposed by SAAMI with the alternate proposal from the USA.
  - *Proposal 3, the number and placement of packages* – The working group agreed with a suggestion by Germany to remove the clause "… typically … energetic effects" from the text proposed by SAAMI. Some of the working group favored removal of the temperature specification, while others did not. After discussion the working group agreed on an amended proposal.
  - *Proposal 4, how to build a wood fire* – After considering whether to have exact specifications on how to build wood fires, whether to delete the requirement that the wood extend 1m beyond the edges of the packages, and whether to delete or modify the fire duration requirement, the working group concurred with a modified version of the SAAMI proposal.
  - *Proposal 5, witness panel placement and positioning* – The working group agreed to remove the downwind quadrant reference as proposed by SAAMI but preferred to retain the positioning information found in the current procedure. The working group concurred with a modified version of the SAAMI proposal.

- *Proposal 6, safe waiting period* – France cited examples why a safe waiting period was necessary and pointed out that the safe waiting period warning is contained in several other test methods. Some of the working group felt that the manual should stick to procedures and test performance safety should be left to the testing agency. Others preferred that some warning remain. The working group agreed to a modified version of the SAAMI proposal. The working group noted that similar waiting periods are contained in other procedures in the manual, and the Sub-Committee may want to review other such occurrences to determine if amendments there may also be appropriate.
- *Proposal 7, observations to be made* – See conclusion.
- *Proposal 8, definition of mass explosion* – The working group supported the SAAMI proposal; however, the issue will be deferred pending the outcome of a more extensive review.
- *Proposal 9, projection hazard analysis* – SAAMI withdrew the proposal pending development of further data.
- *Proposal 10, Division 1.3 criteria* – SAAMI discussed the need to define terms such as fireball and jet of flame and referred to a paper by Safety Management Services, Inc. on the subject. SAAMI agreed to send the paper to Mr. Boston for distribution to the working group. SAAMI agreed to defer a decision on this proposal pending the IME review discussed below under INF.9.
- *Proposal 11, Division 1.4 criteria* – SAAMI agreed to defer a decision on this proposal pending the IME review discussed below under INF.9.
- *Proposal 12, 1.4S criteria* – USA was of the opinion that the language referencing fire fighting was useful as guidance and preferred an alternate version keeping it as parenthetical text. It was decided to include a reference to Box 32 in Figure 10.3 to address this issue. Canada expressed concern about large products that pass the 1.4S criteria in 6(c). It is their opinion that such products don't belong in 1.4S because of their size and they are developing a proposal to address this problem using testing like the 6(d) test. Spain expressed concerns about transporting 1.4S detonators on the same vehicle as Division 1.1 explosives and Norway advised that they are working on a proposal on that issue.

  The working group also discussed an apparent problem with the flow chart in Figure 10.3 of the Test Manual. The flow from Box 32 to 33 infers that the 6(d) test is required for all 1.4S candidates. This is not the case, as the 6(d) test is only required for the eight 1.4S entries to which special provision 347 applies. SAAMI and IME agreed to review the issue further and to submit a joint proposal to remedy the issue at the 45th session in 2014.

  The working group agreed to an amended version of the SAAMI proposal.

- **INF.9** – IME briefly discussed INF.9 and offered to conduct a more extensive review utilizing its UN Sub-Committee and any of the working group that wanted to participate. SAAMI (Barrett and Eder), Canada (Arpin), USA (Vos and Knoblett), COSTHA (Madsen), and the Netherlands (de Jong) offered to participate.

- **INF.27** – Germany described an apparatus that it has developed to facilitate firing ammunition in the 6(a), (b), and (d) tests. The apparatus is small and does not contribute side-effects that might interfere with assessment of ammunition in these tests. Although covered by a German patent, the apparatus, which can be easily adjusted to center fire or rim fire ammunition, can be purchased from BAM or built by others (outside of Germany). SAAMI noted that the apparatus is useful to achieve reproducible results.

Conclusions:

a) **2013/27**

i. Proposal 1 – further study to be completed by SAAMI. A new formal proposal is expected for the 45th session in 2014.

ii. Proposal 2 – the working group recommends replacing the text in section 16.6.1.2.(h) of the Test Manual with the text shown below and as shown in Annex 3 to this report:

Video equipment capable of recording the events necessary for classification. The type, number and placement of the camera(s) shall be sufficient to record all events to be assessed.

iii. Proposal 3 – the working group recommends replacing the text in section 16.6.1.3.1 of the Test Manual with the text shown below and as shown in Annex 3 to this report:

The required number of packages or unpackaged articles, in the condition and form in which they are offered for transport, are arranged as close as possible to one another on the metal grid. If directional effects are anticipated, packages or unpackaged articles should be oriented in such a way to maximize probability for projections to hit witness screens and for discrete flame jets to be pointed horizontally. If necessary, the packages or unpackaged articles may be encircled with a steel strip to support them during the test. Fuel is placed beneath the grid so that the fire will engulf the packages or unpackaged articles. Suitable methods of heating include a wood, liquid or gas fuel fire or a combination thereof, which achieves a temperature of 800 °C. Fluctuations of temperature below 800°C are normal and should not render the test invalid.

iv. Proposal 4 – the working group recommends replacing the text in section 16.6.1.3.2 of the Test Manual with the text shown below and as shown in Annex 3 to this report:

16.6.1.3.2 A wood fire should burn the packages or unpackaged articles with sufficient intensity and duration to completely react the explosives (see 16.6.1.2(e)). Dried pallets, boards, laths, or other wood alone or in combination may be stacked to form a lattice beneath the grid 1 m off the ground, and up to the base of the grid supporting the packages or unpackaged articles. The wood should extend beyond the packages or unpackaged articles sufficiently for the fire to engulf the product.

v. Proposal 5 – the working group recommends amending section 16.6.1.3.5 of the Test Manual by deleting the word "vertical" from the first sentence, deleting the second sentence, and adding the word "approximately" in the third sentence (as counted before deletion of the second sentence) between the words "are" and "level" as shown in Annex 3 to this report.

vi. Proposal 6 – the working group recommends amending the last sentence in section 16.6.1.3.6 of the Test Manual by replacing the phrase "after the fire has extinguished" with "before approaching the test area" as shown in Annex 3 to this report.

vii. Proposal 7 – SAAMI withdrew in deference to IME proposals in INF.9 and the proposed conclusion to that INF paper discussed below.

viii. Proposal 8 – Deferred pending outcome of IME review (see INF.9 conclusion below).

ix. Proposal 9 – Withdrawn pending development of further data.

x. Proposal 10 – Deferred pending outcome of IME review (see INF.9 conclusion below).

xi. Proposal 11 – Deferred pending outcome of IME review (see INF.9 conclusion below).

xii. Proposal 12 – SAAMI and IME to propose a solution to the box 32/33 issue at the 45th session. The working group recommends amending section 16.6.1.4.6 of the Test Manual by inserting a reference in the first sentence to the appropriate box number after the phrase "other than Compatibility Group S", by deleting the phrase "the thermal, blast … within the package," in the first sentence, and by adding the words ", unless Special Provision 347 applies" at the end of the last sentence as shown in Annex 3.

b) **INF.9** – IME will coordinate a more extensive review of test series 6 utilizing the review group described above. IME anticipates completion of this review and preparation of a working paper for the 45th session to be available in March 2014.

c) **INF.27** – No specific proposal. The document merely notes a method for ignition when performing the 6(a), (b), and (d) tests on small arms ammunition.

Agenda Item 2(c) – Review of tests in parts I and II of the Manual of Tests and Criteria

7. **Subject.** Background

Document: *ST/SG/AC.10/C.3/84, para. 86 (a)*

Informal document: *None*

Discussion: Terms of reference document

Conclusion: None

8. **Subject.** Test Series 1 and 2

Document: *None*

Informal document: *UN/SCETDG/43/INF.10 (IME)*

Discussion: In INF.10, IME proposed amendments to the specifications of the pipe used in the 1(a) and 2(a) tests and to the type of washer used in the 1(b) and 2(b) tests.

- **Pipe specifications** – The UK observed that in test 1(a) and 2(a) the amendment to the pipe specifications proposed by IME would probably have no effect on results; however, they were of the opinion that, if such changes were also included in the 8(b) test, some variability in results would occur.

  Canada proposed adding C-4 as another material that could be used as the booster in the 1(a) and 2(a) gap tests.

- **Washer** – the USA suggested adding some examples of deformable washers to supplement the proposal by IME. Others in the working group were not convinced that removing the specification for lead washers was necessary since the hazard from lead is one resulting from ingestion and with proper hygiene precautions the risk of this arising is low.

Conclusion: IME will consider the input provided by the working group as it prepares a formal proposal for the 45th session in 2014.

9. **Subject.** Test Series 8

Document: *None*

Informal document: *UN/SCETDG/43/INF.19 (AEISG)*

Discussion: AEISG had submitted INF.19 for discussion only and was not seeking formal adoption of any proposal. In this INF paper, AEISG discusses its review of Test Series 8 and reports on its recommendations for amendments to the test series in order to remove unnecessary or over specifications. Regarding the recommendations proposed by AEISG:

- **8(a) test** (para. 6(a) of INF.19) – the working group had no additional comments and supported the proposed amendments.

- **8(b) test** (para. 6(b) of INF.19) – Canada suggested inclusion of C-4 as a material suitable for use in the booster in this test. The working group agreed that this might be possible.

- **8(c) test** (para. 6(c) of INF.19) – Issues raised by errors that were in the tracked revision document were clarified to ensure no changes to the Koenen tubes were being proposed.

- **8(d) test** (para. 6(d) of INF.19) – the USA and IME were of the opinion that the description of the method for building a wood fire was still overly prescriptive. Their feeling was that the procedure should provide a description of the intensity required for such a fire, but how to achieve that should be left to the testing authority.

Conclusion: AEISG took note of the comments above and requested that working group members forward any additional comments to AEISG by the end of October, 2013, so that they could be considered for a formal proposal that AEISG plans to submit for the 45th session in 2014.

10. **Subject.** Test Series 7

Document: *None*

Informal document: *UN/SCETDG/43/INF.40 (USA)*

Discussion: The working group supported the proposal from USA in para. 4 and 5 of INF.4.

Regarding the possibility of the use of the Series 7 response descriptors for assessing the results from Series 6 tests, the working group was unsure that these particular descriptors were appropriate for Series 6. However, the working group was of the opinion that development of response descriptors for Series 6, possibly using the Series 7 descriptors as a starting point, had merit. IME agreed to add this possibility to the work plan for detailed review of Series 6 described in para. 6 above.

The USA also inquired as to whether there might be a projection level value missing for the breakpoint between Divisions 1.3 and 1.2. They were of the opinion that an energy level should be available to characterize the "minor projection" hazard of Division 1.3. IME agreed to include investigation of an energy level for the 1.3/1.2 breakpoint to the work plan for detailed review of Series 6 described above.

Conclusion: The working group recommends amending Section 2.1.1.4(f) of the Model Regulations by inserting the word "predominantly" before the word "contain" and deleting the word "only" following the word "contain" as shown in Annex 2 to this report.

The working group further recommends amending Section 2.1.2.1.1 of the Model Regulations by inserting the word "predominantly" before the word "containing" and deleting the word "only" following the word "containing" as shown in Annex 2 to this report.

The possibility of developing response descriptors for Series 6 and of developing an energy level to be associated with the Division 1.3/1.2 breakpoint will be considered during the Series 6 review led by IME.

Agenda Item 2(d) – Review of packing instructions for explosives

11. **Subject.** Background

Document: *ST/SG/AC.10/C.3/84, para. 10*

Informal document: *None*

Discussion: Terms of reference document

Conclusion: None

12. **Subject.** Amendment to PP48 as applied to Packing Instruction P114(b) for UN0509

Document: *ST/SG/AC.10/C.3/2013/18 (SAAMI)*

Informal document: *None*

Discussion: The working group agreed in principle with the SAAMI proposal, but preferred that the 20% specification in the proposal should be deleted. The USA questioned whether the proposed allowance of metal lids on non-metal inner packagings might apply to other packagings as well. An alternative solution to the SAAMI proposal might be to clarify in the Model Regulations that packaging does not include lids. The working group noted that plastic receptacles are not authorized in P114(b); however, Belgium noted that plastic receptacles are

allowed in the French version of P114(b). SAAMI proposed to table the proposal until this discrepancy could be resolved.

Conclusion: The working group recommends research of the discrepancy between the English and French versions of P114(b) in regards to plastic receptacles as inner packagings. SAAMI will return with a proposal at the 45th session in 2014, at which time resolution of the noted discrepancy is anticipated.

Agenda Item 2(e) – Desensitized explosives

13. **Subject.** Background

Document: *ST/SG/AC.10/C.3/84, para. 86 (a)*
ST/SG/AC.10/C.4/48, para. 14

Informal document: *None*

Discussion: Terms of reference document

Conclusion: None

14. **Subject.** Implementation of a new Chapter 2.17 "Desensitized Explosives" in the GHS and implementation of "Classification procedures, test methods and criteria relating to the class of desensitized explosives" in a new Part V of the UN Manual of Tests and Criteria

Document: *None*

Informal document: *UN/SCETDG/43/INF.13 (Germany)*
(UN/SCEGHS/25/INF.5 (Germany))

Discussion: The working group welcomed and unanimously supported the report from Germany on the development of a new chapter 2.17 in the GHS addressing desensitized explosives. The working group briefly reviewed the proposed new chapter and made some suggestions as outlined below. Additionally, Germany has requested that the working group continue a more thorough review and provide any comments to them within the next two months to aid in development of a formal proposal.

In its review of the proposed new chapter 2.17, the working group offered the following suggestions.

- In section 2.17.1.2(a), add a comma between the words "substances" and "to" and between the words "mixture" and "to" and replace the period at the end of the sentence with a colon. It was suggested that Sections 2.3.1.4 and 2.4.2.4.1 of the Model Regulations should be checked to verify if the comma placement noted above was also needed there. These sections were checked (in the 18th Revision) and the comma placement was found to be as indicated above.

- In section 2.17.2.1, add "or" after list item (a) and after list item (b).

- In Note 3 to Table 2.17.1, delete "SD" that appears before the words "safety data sheet" at the end of the note.

- In section 2.17.4.1, add a comma between the words "explosives" and "data" in the first line.

Belgium commented that it would be good to have guidance on how to store desensitized explosives and what separation distances would be appropriate regarding the categories introduced by the new classification procedure. Germany and the Netherlands indicated that they had experience with this and would be willing to share that information.

USA commented that it had extensive questions regarding the test procedures and would forward those to Germany for clarification.

Conclusion: Germany will prepare a formal proposal for the 44th Session and 26th Session.

Agenda Item 2(f) – Miscellaneous

15. **Subject.** Screening procedures

Document: *ST/SG/AC.10/C.3/2013/8 (Sweden)*

Informal document: *None*

Discussion: The working group supported the proposal from Sweden in principle, but could not agree on the way to most clearly describe when testing would not be required. Sweden considered the comments of the Sub-Committee and offered two alternative proposals for consideration. The working group agreed that the second of the two alternatives offered by Sweden was preferable and noted that some consequential amendments were necessary.

Conclusion: The working group recommends:

(a) that the text in section 3.3(c) of Appendix 6 in the Test Manual be replaced by the text indicated in Annex 3 of this report,

(b) that the reference to Table A6.2 in section 5.1(a) of Appendix 6 in the Test Manual be amended to read "Table A6.3",

(c) that the Table A6.2 in section 5.1 of Appendix 6 in the Test Manual be renumbered as Table A6.3, and

(d) that the text in section Section 2.1.4.2.2(c) of the GHS be replaced by the text indicated in Annex 4 of this report.

16. **Subject.** Low hazard explosive articles

Document: *ST/SG/AC.10/C.3/2013/10 (DGAC)*

Informal document: *None*

Discussion: The working group responded to the questions posed by DGAC as follows:

- Q1: Since section 2.1.3.6.4 applies to all explosives, it would apply to snaps if the criteria in that section can be met.

- Q2: This was not discussed.

- Q3: Not applicable since the answer to Q1 was not "no".

- Q4: It would be difficult for highway flares to escape class 1. Section 2.1.1.1(b) is an obstacle to this possibility to escape via test series 6 since highway flares are designed to produce a pyrotechnic effect. The working group advised that the only solution might be to change the definition of pyrotechnic effect; however there was no support for that possibility. It could be possible to develop criteria for such devices to be shipped as limited quantities, but this will require substantial data to support any proposal that might be submitted. A good starting point would be the criteria like SAAMI proposed in UN/SCETDG/37/INF.73.

Conclusion: Discussion only, no proposals

17. **Subject.** Mixed transport of Class 1 with other classes

Document: *ST/SG/AC.10/C.3/2013/12 (Sweden)*

Informal document: *None*

Discussion: The working group agreed with the proposal by Sweden. It noted that various segregation regimes may need to be checked.

Conclusion: The working group recommends that the following text be added to Section 7.1.3.2.3 after the parenthetical reference to UN2067, as indicated in Annex 2 to this report:

ammonium nitrate emulsion or suspension or gel (UN3375)

18. **Subject.** Ammonium nitrate (SP 370)

Document: *ST/SG/AC.10/C.3/2013/15 (AEISG)*

Informal document: *None*

Discussion: The working group agreed that the wording in Special Provision 370 is wrong; however, it could not agree on which of the options proposed was the best way to resolve the problem. The working group agreed to refer the matter to the secretariat for resolution.

In response to a question from China about how to determine combustible content of < 0.2%, the working group advises that it is common practice to determine the total carbon content. An example of such method is described in EU Regulation 2003/2003, which can be downloaded from the Internet.

Conclusion: Refer the issue to the secretariat for resolution.

19. **Subject.** Default list for Class 1 (other than fireworks)

Document: *ST/SG/AC.10/C.3/2013/19 (SAAMI)*

Informal document: *None*

Discussion: Much of the working group supported the SAAMI proposal in principle; however, others, such as Germany and the Netherlands did not. The working group would want to see a definite proposal with clearly defined controlling parameters such as what items may be considered, what packaging, what configurations, what explosive content, what explosive weights, and so forth. The working group was sympathetic to avoiding duplicative and unnecessary testing; however, there was no consensus on how to accomplish this. Options might be family grouping, classification by analogy, a default list such as proposed by SAAMI, and so forth.

Conclusion: SAAMI was encouraged to consider the input provided by the working group and to come back with a formal proposal.

20. **Subject.** Competent Authority Documents

Document: *None*

Informal document: *UN/SCETDG/43/INF.11 (UK)*

Discussion: Many in the working group supported the concept put forward by the UK in INF.11. COSTHA noted that this would be helpful from a global perspective, especially when tendering CADs to carriers who are not as experienced at reading and understanding them. IME also supported the concept and observed that some form of format harmonization would be useful. USA supported the concept generally but was not supportive of actually defining a format. Canada, the Netherlands, and Germany were also supportive of the concept and the Netherlands would not experience too much trouble if a format change were to come about. SAAMI supported the list approach in paragraph 6.

If such guidance were developed, the UK would like help in determining where that guidance should be placed, i.e., in the Test Manual or in the Model Regulations. The working group noted this could be applicable to other classes of dangerous goods.

Conclusion: There was general support for the idea, yet some reluctance on a defined layout. It may be helpful to standardize some of the terminology used in CADs. The UK plans a formal paper for the 45th session.

21. **Subject.** Harmonized International Standard for Explosives Traceability Markings

Document: *None*

Informal document: *UN/SCETDG/43/INF.18 (IME)*

Discussion: IME presented a slide presentation on the need for and the usefulness of an internationally harmonized marking format for traceability markings on explosives. It further explained that its proposal was about marking with labels or direct printing and was not about the use of chemical taggants to be added to the explosives. Also, IME confirmed that it was in no way seeking to supplant an existing system like that which has been established in the EU. IME pointed to requirements within Section 1.4 of the Model Regulations that would infer that defining such a marking format would be within the mandate of the Sub-Committee.

There was general agreement in the working group that this was something that needs to be done to aid in deterring misappropriation of commercial explosives for illicit uses. It was observed that today's local and global logistics require transportation of explosives products, and during

transport these products are less secure compared to manufacturing and storage. As such, promoting the security of these transported explosives products falls under the remit of the Sub-Committee. It was also observed that this should be an issue taken up somewhere within the UN and the this Sub-Committee and its explosives working group were the most likely groups to actually achieve action.

Conclusion: It was concluded that it might be worthwhile to have something in Section 1.4.3.2.2 (Security Plans) of the Model Regulations that provides for a harmonized format for such markings, most likely based on the EU marking format. IME was encouraged to return with a formal proposal to accomplish this.

22. **Subject.** Classification of Ammunition, Smoke, containing titanium tetrachloride

Document: *None*

Informal document: *UN/SCETDG/43/INF.21 (Austria)*

Discussion: No one in the working group has experience with smoke ammunition containing titanium tetrachloride. Although the working group felt that it might be difficult to apply the proposed 6.1 subsidiary risk to the specific ammunition containing titanium tetrachloride, it saw some logic in doing so, given the toxic nature of the reaction products resulting from activation of such ammunition.

Conclusion: Support of the working group for a proposal as discussed in INF.21 would be dependent upon the appropriateness of the data provided in support of such a proposal.

23. **Subject.** UN3375: Review and packing group assignment

Document: *None*

Informal document: *UN/SCETDG/43/INF.32 (AEISG)*
UN/SCETDG/43/INF.54/Rev.1 (Switzerland)

Discussion: This paper requested information on the origin of the assignment of Packing Group II to UN3375 because the early reports of the ANE Working group recommended PG III. In discussion it appeared that there was no scientific rationale for the decision to assign PG II. However, the packing group is not assigned on the basis of their oxidizing properties. Should AEISG decide to prepare a proposal to the Sub-Committee, it was recommended to base the proposal on test data, preferably Test O.3.

Conclusion: There was general agreement that AESIG could prepare a proposal, based on test data for the 45th Session.

Agenda Item 3(a) – Listing, classification and packing: miscellaneous

24. **Subject.** Proposal to eliminate the description text, for the proper shipping name of; “Safety devices”, for UN 3268 (Class 9)

Document: *ST/SG/AC.10/C.3/2013/31 (COSTHA)*

Informal document: *None*

Discussion: After discussion, COSTHA withdrew the proposal.

Conclusion: The proposal was withdrawn.

Annex 1
Working Group on Explosives (24 – 27 June 2013)
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Annex 2
Working Group on Explosives (24 – 27 June 2013)
Changes for the Model Regulations (18th Revised Edition)

Note: Source of proposed change is indicated by *italicized text with yellow highlight*

Section 2.1.1.4(f) – amend as indicated below:

(f) Division 1.6 Extremely insensitive articles which do not have a mass explosion hazard

This division comprises articles which predominantly contain ~~only~~ extremely insensitive substances and which demonstrate a negligible probability of accidental initiation or propagation.

NOTE: *The risk from articles of Division 1.6 is limited to the explosion of a single article.*

Source: UN/SCETDG/43/INF.40, para. 4

Section 2.1.2.1.1 – amend the description in the Compatibility Group N row as indicated below:

Articles predominantly containing ~~only~~ extremely insensitive substances

Source: UN/SCETDG/43/INF.40, para. 4

Section 7.1.3.2.3 – amend as indicated below:

7.1.3.2.3 Blasting explosives (except UN 0083 Explosive, blasting, type C) may be transported together with ammonium nitrate (UN Nos. 1942 and 2067) , ammonium nitrate emulsion or suspension or gel (UN 3375) and alkali metal nitrates (e.g. UN 1486) and alkaline earth metal nitrates (e.g. UN 1454) provided the aggregate is treated as blasting explosives under Class 1 for the purposes of placarding, segregation, stowage and maximum permissible load.

Source: ST/SG/AC.10/C.3/2013/12, para. 6

Annex 3
Working Group on Explosives (24 – 27 June 2013)
Changes for the Test Manual (5th Revised Edition)

Note: Source of proposed change is indicated by *italicized text with yellow highlight*

Section 1.1.2 – add the following sentence at end of the paragraph:

1.1.2

Examples may also be listed within various test procedures. These are meant to be used for purposes of illustration and are not meant to be prescriptive in nature.

Source: ST/SG/AC.10/C.3/2013/17, *para. 8 as amended by the explosives working group*

Section 1.1.3 – add a new section 1.1.3 to read:

1.1.3 In situations where the proper classification of substances and articles of certain Hazard Classes or Divisions for transport is the responsibility of the Competent Authority, it is normal and accepted practice that due consideration will be given to testing or classification results of other Competent Authorities when provided.

Source: ST/SG/AC.10/C.3/2013/17, *para. 10 as amended by the explosives working group*

Section 16.6.1.2.(h) – replace the existing text with the text as indicated below:

(h) Video equipment capable of recording the events necessary for classification. The type, number and placement of the camera(s) shall be sufficient to record all events to be assessed.

Source: ST/SG/AC.10/C.3/2013/27, *para. 2 as amended by the explosives working group*

Section 16.6.1.3.1 – replace the existing text with the text as indicated below:

The required number of packages or unpackaged articles, in the condition and form in which they are offered for transport, are arranged as close as possible to one another on the metal grid. If directional effects are anticipated, packages or unpackaged articles should be oriented in such a way to maximize probability for projections to hit witness screens and for discrete flame jets to be pointed horizontally. If necessary, the packages or unpackaged articles may be encircled with a steel strip to support them during the test. Fuel is placed beneath the grid so that the fire will engulf the packages or unpackaged articles. Suitable methods of heating include a wood, liquid or gas fuel fire or a combination thereof, which achieves a temperature of 800 °C. Fluctuations of temperature below 800°C are normal and should not render the test invalid.

Source: ST/SG/AC.10/C.3/2013/27, *para. 3 as amended by the explosives working group*

Section 16.6.1.3.2 – replace the existing text with the text as indicated below:

16.6.1.3.2 A wood fire should burn the packages or unpackaged articles with sufficient intensity and duration to completely react the explosives (see 16.6.1.2(e)). Dried pallets, boards, laths, or other wood alone or in combination may be stacked to form a lattice beneath the grid 1 m off the ground, and up to the base of the grid supporting the packages or unpackaged articles. The wood should extend beyond the packages or unpackaged articles sufficiently for the fire to engulf the product.

Source: ST/SG/AC.10/C.3/2013/27, *para. 4 as amended by the explosives working group*

Section 16.6.1.3.5 – amend as indicated below:

16.6.1.3.5 The ~~vertical~~ witness screens are erected vertically in each of three quadrants at a distance of 4 m from the edge of the packages or unpackaged articles. ~~The downwind quadrant is not used for screens because prolonged exposure to flames may change the resistance of the aluminium sheets to projections.~~ The sheets should be placed so that the centres are approximately level with the centre of the packages or unpackaged articles or, if this is less than 1.0

m above the ground, in contact with the ground. If there are any perforations or indentations in the witness screens before the test, they should be marked so that they can be clearly distinguished from those created during the test.

Source: ST/SG/AC.10/C.3/2013/27, *para. 5 as amended by the explosives working group*

Section 16.6.1.3.6 – amend the last sentence as indicated below:

A safe waiting period, prescribed by the test agency, should be observed before approaching the test area~~after the fire has extinguished~~.

Source: ST/SG/AC.10/C.3/2013/27, *para. 6 as amended by the explosives working group*

Section 16.6.1.4.6 – amend as indicated below:

16.6.1.4.6 If none of the events occur which would require the product to be assigned to Division 1.1, 1.2, 1.3 or 1.4 other than Compatibility Group S [see Box 32 of Figure 10.3], ~~, the thermal, blast, or projection effects would not significantly hinder fire fighting or other emergency response efforts in the immediate vicinity, and if hazardous effects are confined within the package,~~ then the product is assigned to Division 1.4 Compatibility Group S, unless special provision 347 applies.~~.~~

Source: ST/SG/AC.10/C.3/2013/27, *para. 12 as amended by the explosives working group*

Appendix 6 Screening Procedures, Section 3.3(c) – replace the current text with the text indicated below:

(c) For the organic substance or a homogenous mixture of organic substances containing chemical group (or groups) associated with explosive properties:

- when the exothermic decomposition energy is less than 500 J/g, or

- when the onset of exothermic decomposition is 500 ºC or above

as indicated by Table A6.2.

Table A6.2 DECISION TO APPLY THE ACCEPTANCE PROCEDURE FOR CLASS 1 FOR ORGANIC SUBSTANCE OR HOMOGENOUS MIXTURE OF ORGANIC SUBSTANCES

Decomposition energy (J/g)	**Decomposition onset temperature (**°C)	**Apply acceptance procedure for Class 1? (Yes/No)**
< 500	< 500	No
< 500	≥ 500	No
≥ 500	< 500	Yes
≥ 500	≥ 500	No

The exothermic decomposition energy may be determined using a suitable calorimetric technique (see 20.3.3.3); or

Source: ST/SG/AC.10/C.3/2013/8, para. 12 & 15 as amended by the working group

Appendix 6 Screening Procedures, Section 5.1

1. Change the reference to Table A6.2 in Section 5.1(a) to read "Table A6.3".

2. Renumber Table A6.2 to A6.3

Source: ST/SG/AC.10/C.3/2013/8, para. 12 & 15 as amended by the working group

Annex 4
Working Group on Explosives (24 – 27 June 2013)
Changes for the GHS Document (5th Revised Edition)

Note: Source of proposed change is indicated by *italicized text with yellow highlight*

Section 2.1.4.2.2(c) – replace the current text with the text indicated below:

(c) For the organic substance or a homogenous mixture of organic substances containing chemical group (or groups) associated with explosive properties:

- when the exothermic decomposition energy is less than 500 J/g, or

- when the onset of exothermic decomposition is 500 ºC or above

as indicated by Table 2.1.3.

Table 2.1.3 DECISION TO APPLY THE ACCEPTANCE PROCEDURE FOR CLASS 1 FOR ORGANIC SUBSTANCE OR HOMOGENOUS MIXTURE OF ORGANIC SUBSTANCES

Decomposition energy (J/g)	**Decomposition onset temperature (**°C)	**Apply acceptance procedure for Class 1? (Yes/No)**
< 500	< 500	No
< 500	≥ 500	No
≥ 500	< 500	Yes
≥ 500	≥ 500	No

The exothermic decomposition energy may be determined using a suitable calorimetric technique; or

Source: ST/SG/AC.10/C.3/2013/8, para. 16 & 18, as amended by the working group