

**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

28 June 2012

**Forty-first session**

Geneva, 25 June – 4 July 2012

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 25 to 28 June 2012 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 33 experts in attendance from Australia, Belgium, Canada, China, France, Germany, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, 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.

2. The following papers were discussed.

<b>Document</b>	<b>Title</b>
<u>Agenda Item 2(a)</u>	<u>Test Series 8</u>
<i>ST/SG/AC.10/C.3/2012/1 as corrected by UN/SCETDG/41/INF.10</i>	<i>Recommendations for improvement of the Series 8(b) ANE Gap Test and other Gap Tests</i>
<i>ST/SG/AC.10/C.3/2012/21 (AEISG)</i>	<i>Recommendations for improvement of the Series 8(b) ANE Gap Test and other Gap Tests</i>
<i>UN/SCETDG/41/INF.21 (AEISG)</i>	<i>Review of Test Series 8 - Test 8(a) Thermal Stability Test for ANE</i>
<u>Agenda Item 2(b)</u>	<u>Screening test for substances that may have explosive properties</u>
<i>ST/SG/AC.10/C.3/2012/22 (ICCA and Japan)</i>	<i>Changes to screening test for substances that may have explosive properties</i>
<u>Agenda Item 2(c)</u>	<u>Desensitized explosives</u>
<i>ST/SG/AC.10/C.3/2012/28 (ICCA)</i>	<i>Classification of desensitized explosives for the purposes of supply and use: Test results on industrial nitrocellulose</i>
<i>UN/SCETDG/41/INF.38 (Germany)</i>	<i>Test Results on typical desensitized explosives and other energetic materials</i>
<u>Agenda Item 2(d)</u>	<u>DDT Test and Criteria for flash composition</u>
<i>ST/SG/AC.10/C.3/2012/30 (United States of America)</i>	<i>Proposed alternate flash composition test for fireworks classification using the default table</i>
<i>ST/SG/AC.10/C.3/2012/51 (United Kingdom)</i>	<i>A follow on report on the comparison of the results obtained for a set of pyrotechnic compositions subjected to the HSL Flash Composition Test and the proposed US Modified DDT Test</i>
<i>UN/SCETDG/41/INF.42 (Japan)</i>	<i>Comments on the proposed US modified DDT Test and Criteria to classify the flash compositions</i>

<b>Document</b>	<b>Title</b>
<i>UN/SCETDG/41/INF.49 (USA)</i>	<i>Editorial Corrections to paper ST/SG/AC.10/C.3/2012/30</i>
<u>Agenda Item 2(e)</u>	<u>Additional criteria for Division 1.4 classification</u>
<i>No documents submitted</i>	
<u>Agenda Item 2(f)</u>	<u>Miscellaneous</u>
<i>ST/SG/AC.10/C.3/2012/13 (AEISG)</i>	<i>Transport of explosives, portable tank instructions</i>
<i>ST/SG/AC.10/C.3/2012/14 (AEISG)</i>	<i>Transport of explosives, blasting, type B and E, in tanks</i>
<i>ST/SG/AC.10/C.3/2012/15 (AEISG)</i>	<i>Ammonium nitrate emulsions – Special provision 309</i>
<i>ST/SG/AC.10/C.3/2012/16 (AEISG)</i>	<i>IBCs for transporting UN 3375 Ammonium Nitrate Emulsion, Suspension or Gel</i>
<i>ST/SG/AC.10/C.3/2012/17 (AEISG)</i>	<i>Ammonium nitrate – IBCs</i>
<i>ST/SG/AC.10/C.3/2012/18 (AEISG)</i>	<i>Ammonium nitrate entries – Special Provision 306</i>
<i>ST/SG/AC.10/C.3/2012/20 (AEISG)</i>	<i>Classification of ammonium nitrate</i>
<i>ST/SG/AC.10/C.3/2012/41 (Canada)</i>	<i>Packing Instructions P116, P131 and P137</i>
<i>ST/SG/AC.10/C.3/2012/56 (Germany, the United States of America, and Canada)</i>	<i>Substances and mixtures with explosive properties which are exempted from classification as explosives</i>
<i>ST/SG/AC.10/C.3/2012/57 (United States of America)</i>	<i>Recommendations for clarification related to the Test Series 6(c) Bonfire Test</i>
<i>UN/SCETDG/41/INF.8 (DGAC)</i>	<i>Classification of Novelty Fireworks (snakes and sparklers)</i>
<i>UN/SCETDG/41/INF.9 (DGAC)</i>	<i>Classification of Novelty Fireworks (snappers and party poppers)</i>
<i>UN/SCETDG/41/INF.17 (DGAC)</i>	<i>Hand held signal devices</i>
<i>UN/SCETDG/41/INF.20 (AEISG)</i>	<i>Transport of Explosives, Blasting, Type B and E, and Ammonium Nitrate Emulsion or Suspension or Gel, UN3375 in Bulk Containers</i>
<i>UN/SCETDG/41/INF.25 (Germany)</i>	<i>Revision of the specification for rockets in the default fireworks classification table (sect. 2.1.3.5.5)</i>
<i>UN/SCETDG/41/INF.26 (EWG Chairman)</i>	<i>Difficulties in carrying out classification tests</i>
<i>UN/SCETDG/41/INF.33 (IME)</i>	<i>Reporting of Results of Survey on the Test Series 6</i>
<i>UN/SCETDG/41/INF.34 (SAAMI)</i>	<i>Recommendations related to the Test Series 6(c) Bonfire Test</i>
<i>UN/SCETDG/41/INF.37 (Spain)</i>	<i>Recommendations for the improvement of multilateral recognition based on mutual trust</i>
<i>UN/SCETDG/41/INF.55 (CEFIC)</i>	<i>Availability of Primed Cambric for the Time/Pressure Test</i>
<u>Agenda Item 3(a)</u>	<u>Proposals of amendments to the list of dangerous goods of Chapter 3.2</u>
<i>ST/SG/AC.10/C.3/2012/19 (AEISG)</i>	<i>Ammonium nitrate description</i>
<i>ST/SG/AC.10/C.3/2012/35 (COSTHA)</i>	<i>Proposal to amend the description, the proper shipping name, and the special provisions for UN 0503 (1.4G) and UN 3268 (Class 9) by an entry on "Safety devices for vehicles"</i>
<i>UN/SCETDG/41/INF.44 (COSTHA)</i>	<i>Proposal to amend the description, the proper shipping name, and the special provisions for UN 0503 (Division 1.4G) and UN 3268 (Class 9) by an entry on "Safety Devices for Vehicles"</i>
<u>Agenda Item 10(e)</u>	<u>Proposals of amendments to the list of dangerous goods of Chapter 3.2</u>
<i>ST/SG/AC.10/C.3/2012/56 (Germany, the United States of America, and Canada)</i>	<i>Substances and mixtures with explosive properties which are exempted from classification as explosives</i>

## Agenda Item 2(a) – Test Series 8

3. **Subject.** Improvement of the Series 8 gap tests and other gap tests.

*Documents:* ST/SG/AC.10/C.3/2012/1 (IME)  
ST/SG/AC.10/C.3/2012/21 (AEISG)

*Informal documents:* INF.10 (IME)

IME and AEISG provided detailed introductions of their proposals. The IME proposal had been discussed in some detail at the 39th session and was now put forward as a formal proposal. AEISG supported the proposal and also suggested removal of certain terms and specifications that they considered irrelevant or over-specifications. Although the intent of the IME proposal was to simplify specifications without sacrificing the efficacy of the tests, Germany suggested that more specifications might be desirable, specifically in regards to Test Series 1(a) and 2(a), where fragmentation of the tube is a criterion. It was noted that the current requirements for the tube in Test Series 1(a) and 2(a) calls for cold drawn, seamless carbon steel with no physical properties specified. In regards to Test Series 1(a) and 2(a), it was somewhat unclear if the proposed changes could have unintended results, especially when testing certain chemicals. France noted that in TS 1 and 2, the dimensions resulted from combination of a USA test with a French test when the TS were developed at the UN and cautioned that changing those specifications now could have unintended results. As a compromise, Germany suggested removal of the references to the 1(a) and 2(a) tests and to accept only the proposals related to the 8(b) test. Canada observed that IME's proposals result in a slightly more conservative 8(b) test and was supportive of that approach. AEISG observed that references to "cold drawn" and/or "hot drawn" is unnecessary and could be omitted. Netherlands agreed that this distinction did not seem to matter.

**Conclusion:** Regarding the proposals to amend sections 11 and 12 of the Test Manual, the working group agreed that further study was needed as to whether a future revision changing the wall thickness specification of the steel tube to "nominally  $4.0 \pm 0.1\text{mm}$ " might be appropriate. Experts from Germany, France, Canada, , Netherlands, UK, and the USA offered to collect data for tests 1(a), 2(a), A.5 to examine this possibility.

Regarding the proposal to amend section 18 of the Test Manual, the working group agreed to the changes as outlined in Section 1 of Annex 2 to this report.

4. **Subject.** Test 8(a) Thermal Stability Test for ANE.

*Informal document:* INF.21 (AEISG)

In this paper, AEISG sought to clarify certain issues in relation to Test 8(a), Thermal Stability Test for ANE, by asking a series of questions to the explosives working group.

**Conclusion:** The issues raised by AEISG in INF.21 were discussed by the working group, which responded to AEISG's questions as follows:

4.1. Can water be used to establish heat loss characteristics of the system here?

*Yes, water is acceptable, up to a temperature of 60°C, but for higher temperatures, it is better to use a less volatile liquid.*

- 4.2. Can the formula be made more explicit by the appropriate placement of brackets?

*The working group recommended that the formula in paragraphs 18.4.1.2.5 of Section 18 and paragraph 28.3.5 of Section 28 of the Test Manual be revised as shown in section 2 of Annex 2 to this report.*

- 4.3. Does the heat loss need to be between 80 and 100 mW/kg.K?

*The working group advised that paragraph 18.4.1.2.6 of Section 18 of the Test Manual should be revised as shown in Section 2 of Annex 2 to this report.*

## **Agenda Item 2(b) – Screening test for substances that may have explosive properties**

5. **Subject.** Screening test for substances that may have explosive properties.

*Document: ST/SG/AC.10/C.3/2012/22 (ICCA and Japan)*

The working group had agreed in principle with the proposals of ICCA and Japan to improve the reliability of the screening test by standardizing the exothermic decomposition energy measurement during the 39th session. After additional discussion by the working group during the current session, the proposal, with some modification, was approved.

**Conclusion.** The working group agreed to amend the first sentence of paragraph 20.3.3.3 of the Manual of Tests and Criteria, and to add a new sentence after the first sentence as described in Section 3 of Annex 2 to this report.

## **Agenda Item 2(c) – Desensitized explosives**

6. **Subject.** Classification of desensitized explosives.

*Document: ST/SG/AC.10/C.3/2012/28 (ICCA)*

*Informal document: INF.38 (Germany)*

ICCA and Germany presented some background information regarding industrial nitrocellulose that included typical uses, acceptability in the workplace, transport classification, and the need for specific categories within the GHS. They also explained how industrial nitrocellulose is classified for storage in Germany. ICCA asked the working group to endorse its proposal to accept the German classification system of storage groups for development of a system of classification in the GHS. France recalled the need for a future generic system for classification of desensitized explosives, allowing a better assessment of new products.

Several experts agreed that the principle was acceptable for industrial nitrocellulose, but questioned the acceptability for other desensitized explosives as described in INF.38. Germany responded that the system has also been used for other

desensitized explosives and that there is ample test data available. Germany agreed to provide an overview of substances where no test data is available.

**Conclusion.** The working group unanimously agreed that the German classification system of storage groups was a good basis for development of a system of classification in the GHS and supported the ICCA proposal. However, should a new test be proposed, it should be in a separate appendix of the Test Manual, not applicable to transport classification. A number of experts are considering to prepare a formal proposal to deal with the details of implementation within the GHS system in the next biennium. The sub-committee is requested to include this in the list of work for the next biennium.

## Agenda Item 2(d) – DDT Test and Criteria for flash composition

7. **Subject.** Alternate flash composition test for fireworks classification using the default table.

*Documents:* ST/SG/AC.10/C.3/2012/30 (United States of America)  
ST/SG/AC.10/C.3/2012/51 (United Kingdom)

*Informal documents:* INF.49 (United States of America)  
INF.42 (Japan)

The working group observed that it is important to have tests that will help detect energetic material in compositions that would render them flash compositions. The working group agreed that both the HSL and the USA tests will help in achieving this purpose. Japan had made some additional proposals in INF.42 towards improving the test proposed by the USA and the expert from the USA indicated support for those proposals. The expert from the Netherlands expressed reservations, and would like to see time pressure data for the list of black powders.

The expert from Canada questioned who should perform the test and if 10 tests were necessary. The expert from the USA indicated that precedents exist to allow the manufacturer to perform tests, and to certify compliance, such as thermal stability for fireworks. The working group noted that, when using the default table, the manufacturer should be expected to demonstrate that its products meet the requirements of the default criteria. The working group agreed that some repetition of tests was necessary, but that 10 tests may be overly prescriptive. An informal working group met to resolve that issue and to review the proposed USA test in more detail and prepared an alternate proposal.

**Conclusion.** The working group agreed to revise the Model Regulations and to add a new US Flash Composition Test to the Test Manual, as shown in Section 4 of Annex 2 to this report.

## Agenda Item 2(e) – Additional criteria for Division 1.4 classification

8. No paper was submitted for discussion.

## Agenda Item 2(f) – Miscellaneous

9. **Subject.** Transport of explosives, portable tank instructions.

*Document:* ST/SG/AC.10/C.3/2012/13 (AEISG)

In ...C3/2012/13, AEISG sought to confirm that explosives of Class 1 may be transported in portable tanks under instruction T1. The working group agreed to a corrected version of the proposal by AEISG.

**Conclusion.** The working group agreed to amend the header to the tabulated portable tank instructions for T1 – T22 as shown in Section 5 of Annex 2 to this report.

10. **Subject.** Transport of explosives, blasting types B and E in portable tanks.

*Document:* ST/SG/AC.10/C.3/2012/14 (AEISG)

Transportation of blasting types B and E explosives is already allowed in portable tanks, but only subject to successfully passing certain tests. AEISG observed that it was obvious that explosives will explode in a fire, and that was not a reason to prevent them from being transported. They also noted that testing to determine the obvious (whether they will explode in a fire) was unnecessary and have proposed removal of that requirement.

The working group agreed in principle with the AEISG proposal but also noted that testing should be required for ANEs of UN3375 when transported in tanks.

**Conclusion.** The working group agreed to clarify that the requirement in paragraph (b) of Special Provision TP 32 applies only to ANEs of UN3375 when transported in tanks by revising paragraph (b) of Special Provision TP 32 in paragraph 4.2.5.3 of the Model Regulations as shown in Section 6 of Annex 2 to this report.

11. **Subject.** Special Provision 309 (ANEs).

*Document:* ST/SG/AC.10/C.3/2012/15 (AEISG)

In ...C.3/2012/15, AEISG proposed to clarify the classification requirements for the use of UN3375, and to remove the obligation for competent authority approval to classify UN3375 when the material performs satisfactorily in the relevant Series 8 tests. AEISG explained that, although Test Series 8 contains 4 tests, only the 8(a), 8(b), and the 8(c) tests are used for classification purposes and the 8(d) test is only for determining whether the ANE is suitable for transport in tanks. They also noted that there has been some confusion about which of the series 8 tests are required for classification purposes, and AEISG would like to provide clarification to eliminate this confusion. Additionally, AEISG believes that the entry UN3375 has been in use, safely, for a sufficient length of time that competent authority approval should no longer be required.

For various reasons, such as the desire to control tank transport through conditions in the approval certificate and the desire to continue to control assignment to UN3375, several experts supported the retention of the competent authority approval requirement.

**Conclusion.** The working group supported the proposal from AEISG (with a slight amendment) to clarify that that only the 8(a), 8(b) and 8(c) tests are required for classification of UN3375 as shown in Section 7 of Annex 2 to this report. The working group did not support the proposal to remove the requirement for competent authority approval.

12. **Subject.** IBCs for transporting UN3375.

*Document:* ST/SG/AC.10/C.3/2012/16 (AEISG)

Although not currently allowed by the Model Regulations, AEISG is aware that IBCs have been authorized by some competent authorities for transporting ANEs of UN3375. In ...C.3/2012/16, they have proposed to formalize the authorization of IBCs for transport of UN3375 ANEs. The working group was supportive of the proposal and, having considered the issue surrounding viscosity of these materials, it seemed to the working group that packaging suitable for liquids was appropriate.

**Conclusion.** Rather than accepting the proposal as described in ...C.3/2012/16, a new packing instruction, P505, was approved by the working group. Additionally, the working group agreed to authorize IBCs as valid transport containers for UN3375 ANEs and noted that consequential amendments to the UN3375 entry in the Dangerous Goods List was also necessary. The working group approved the changes described and as shown in Section 8 of Annex 2 to this report.

13. **Subject.** Ammonium Nitrate – IBCs.

*Document:* ST/SG/AC.10/C.3/2012/17 (AEISG)

In ...C.3/2012/17, AEISG proposed to allow transport of UN0222 in IBCs, as is currently allowed for certain other explosives and ANs.

**Conclusion.** The working group accepted the proposal of AEISG as shown in Section 9 of Annex 2 to this report.

14. **Subject.** Special Provision 306.

*Document:* ST/SG/AC.10/C.3/2012/18 (AEISG)

In ...C.3/2012/18, AEISG proposed to clarify and simplify the requirements in SP306 that imposes conditions on the assignment of explosives to UN1942 and UN2067. AEISG claimed that, in the conditions described in ...C.3/2012/18, Test Series 1 was unnecessary because Test Series 2 was also required and would overcome any results obtained in Test Series 1. Therefore, AEISG proposed its removal. The working group agreed with AEISG and noted that the same situation is true for GHS.

**Conclusion.** The working group accepted the proposal from AEISG to amend SP306 as shown in Section 10 of Annex 2 to this report.

15. **Subject.** Classification of Ammonium Nitrate.

*Document:* ST/SG/AC.10/C.3/2012/20 (AEISG)

In ...C.3/2012/20, AEISG proposed to ensure that ammonium nitrate, which does not meet one or more of the existing classification criteria is covered by the Model Regulations and handled appropriately. Additionally, AEISG sought a solution to “a potential, and not unlikely, situation where Ammonium Nitrate, with not more than 0.2% carbon, does not satisfy Test Series 2 and therefore cannot be accommodated within existing entries.” After consideration of and discussion about the AEISG position, the working group agreed with the principle advanced by AEISG.

**Conclusion.** The working group approved the alternate proposal in ...C.3/2012/20 as shown in Section 11 of Annex 2 to this report.

16. **Subject.** Packing Instructions P116, P131, and P137.

*Document:* ST/SG/AC.10/C.3/2012/41 (Canada)

In a recent review of packing instructions in Canada, some minor discrepancies were noted that Canada sought to correct. There was general support in the working group for both proposals from Canada.

**Conclusion.** The working group agreed to amend packing instructions P116, P131, and P137 as shown in Section 12 of Annex 2 to this report.

17. **Subject.** Substances and mixtures with explosive properties which are exempted from classification as explosives.

*Document:* ST/SG/AC.10/C.3/2012/56 (Germany, the United States of America, and Canada)

During the last (December 2011) meeting the proposal to introduce a note in the GHS for substances and mixtures with explosive properties which are exempted from classification as explosives was discussed by both the TDG and the GHS sub-committee. Both sub-committees agreed to the principle of the proposal and welcomed an official document for the next session.

Germany, USA, and Canada have worked together to produce the final text proposed for the note, which is presented in ...C.3/2012/56.

**Conclusion.** The working group considered and supported the principles of the document for GHS purposes, and concluded that the version in the 3rd column of the table in the annex ("Changes by GHS") is the preferred solution. The working group also agreed that clear guidance of how to avoid the potential explosive hazard should be provided (for example, "Do not heat under confinement").

18. **Subject.** 6(c) Test.

*Document:* ST/SG/AC.10/C.3/2012/57 (United States of America)

*Informal document:* INF.34 (SAAMI)

The USA was concerned that laboratories observing the 6(c) test are not able to observe effects in all orientations, including angles that don't intersect with the witness panels. They were seeking to correct this by adding specifications to the 6(c) test procedure regarding the number and placement of video cameras.



Additionally, they were concerned that the present criteria in the 6(c) test concerning fireballs and jets of flame might lead observers to overlook such phenomena when they occur at angles that don't intersect the witness panels, or that the occurrence of such phenomena may indicate that the package orientation was not such as to give the most severe outcome.

SAAMI observed that only one normal speed camera is required and that an additional high speed camera may also be used when appropriate. SAAMI provided a detailed description as to why expanding the requirements of the 6(c) test as described in the US paper would introduce problems in set up and interpretation of the test. Germany was supportive of the comments from SAAMI. The UK explained that it is the responsibility of the the person undertaking the test to design the test to provide the evidence required, and for that reason, would not want the test to be overly prescriptive. France observed that before performing the test good knowledge of the product should be developed. With that knowledge, the lab can better anticipate the reactions that may occur during the test and better design the setup to capture those reactions.

**Conclusion.** The working group did not support the proposals from the USA and observed that the test procedure, as currently written, is adequate. Several comments were provided to assist the USA in solving the problems they have encountered without creating additional test prescriptions and criteria.

19. **Subject.** Transport of Explosives, Blasting, Type B and E, and UN3375 ANEs in Bulk Containers.

*Document:* UN/SCETDG/41/INF.20 (AEISG)

In INF.20, AEISG was asking about the acceptability of including bulk containers as acceptable transport packagings for certain explosives and ANEs. AEISG noted that, although this wasn't allowed under the Model Regulations, that it has been done in many countries around the world, usually under specific CA authorization. AEISG stated that, since this has been the practice for years, experience indicated that the proposal would be to legitimize current practice.

**Conclusion.** There was general support for the idea, with some concern that BK2 may be too broad. AEISG may develop a future proposal taking into account the comments of the working group.

20. **Subject.** Test Series 6.

*Document:* UN/SCETDG/41/INF.33 (IME)

IME reported on preliminary results of a survey that it recently conducted, in consultation with Canada and the USA, regarding evaluation and improvement of Test Series 6. This effort is part of a larger project embarked upon by the working group at the 39th session. Comments received indicated a wide range of knowledge and experience with the test series, but were so extensive that more time is needed to evaluate them. Several members of the working group expressed their appreciation to IME for taking the initiative and coordinating this effort.

**Conclusion.** The working group supported the recommendation by IME that the reply deadline for the survey be extended until 1 October 2012 and that IME contact

IGUS-EOS, IGUS-EPP, the Chief Inspectors of Explosives group, CEFIC, and ICCA to broaden the base of potential commenters. IME agreed to continue the coordination of the review of Test Series 6 and promised a follow-up report at the 43rd session.

21. **Subject.** Novelty fireworks (snakes and sparklers).

*Document:* UN/SCETDG/41/INF.8 (DGAC)

This document was withdrawn from consideration.

22. **Subject.** Novelty fireworks (snappers and party poppers).

*Document:* UN/SCETDG/41/INF.9 (DGAC)

This document was withdrawn from consideration.

23. **Subject.** Hand held signal devices.

*Document:* UN/SCETDG/41/INF.17 (DGAC)

Because these devices contain pyrotechnic substances, they fall within the definition of explosive. In the USA, they are not transported as explosives, which creates a dual-classification conflict when transporting internationally. The devices have been tested at CERL and do not show properties that would be characterized as explosive; therefore, DGAC proposed a new special provision that would allow them to be transported not regulated as dangerous goods. The working group noted that in Europe these articles are covered by a directive that considers them pyrotechnical articles. This would pose a significant problem for acceptance of the proposal in Europe. The working group noted that the problem is related to the definition of explosives, which allows little room for exclusion of articles or substances that are designed to function by an explosive or pyrotechnic effect. If this issue is to be resolved, the definition would have to be amended.

**Conclusion.** The working group did not support the proposal.

24. **Subject.** Rockets / default classification.

*Document:* UN/SCETDG/41/INF.25 (Germany)

Germany proposed to simplify the specification for rockets to be classified as 1.4G and to set the following limits:  $\leq 20$  g pyrotechnic composition and  $\leq 1$  g flash composition. The working group noted that no evidence was available to support the proposal.

**Conclusion.** The working group did not support the proposal. Germany will consider the comments of the working group and may present a new proposal in the future.

25. **Subject.** Difficulties in carrying out classification tests.

*Document:* UN/SCETDG/41/INF.26 (EWG Chairman)

There was general support for the way forward proposed by the chairman of the working group. The working group noted that IME (with the USA and Canada) is already underway in regards of Test Series 6 and that AEISG has committed to work on Test Series 8. The UK commented that they may also have resources that could be devoted to the project. The working group agreed with the priorities but forward by the chairman. The chairman of the working group reconfirmed his willingness to coordinate this effort.

**Conclusion.** The working group endorsed the proposal of INF.26 that the sub-committees on TDG and GHS accept the general principle outlined in regards to Parts I and II of the Test Manual, include this activity in their next programme of work, and take action as deemed appropriate.

26. **Subject.** Multilateral recognition of laboratory testing.

*Document:* UN/SCETDG/41/INF.37 (Spain)

Spain sought to enhance mutual recognition of test reports from accredited laboratories and to improve reliability of test reports from explosives laboratories. Canada observed that the current system was adequate and did not need to be changed. They noted that acceptance of lab reports for classification of explosives is one of national policy and is not specifically binding from the Model Regulations. The emphasis is not who or how accredited the lab is and is more on whether the correct tests were performed and whether the results support the classification requested. USA, Germany, Canada, and France were among those that did not support the proposal. AEISG, IME, and SAAMI supported the principle of the proposal, that valid testing should be accepted among the various competent authorities, but did not believe that the solution in the proposal was the way forward. SAAMI suggested inclusion of a statement in the introductory section of the Model Regulations that, where test results already exist in one country for a product submitted for classification in another country, that it is normal and appropriate for the competent authority to waive retesting at their discretion.

**Conclusion.** The working group observed that appropriately completed testing performed in one country should not be summarily dismissed simply because the tests were not performed in the country from which a classification is being sought. The group was supportive of the suggestion from SAAMI but did not develop any specific recommendations.

27. **Subject.** Availability of primed cambric.

*Document:* UN/SCETDG/41/INF.55 (CEFIC)

Sources for primed cambric have become almost impossible to locate. Some labs and industry members have some stock, but eventually those will be exhausted. The working group considered whether alternatives might be identified, but no specific proposal was put forward. The expert from the UK offered to explore the issue further and to report back to the working group. The working group indicated that the situation is critical and this information from the UK was urgently needed.

### Agenda Item 3(a) – Proposals of amendments to the list of dangerous goods of Chapter 3

28. **Subject.** Ammonium nitrate description.

*ST/SG/AC.10/C.3/2012/19 (AEISG)*

AEISG observed that, as a result of disparate comma placement in the descriptions of AN entries UN1942 and UN0222, the manner in which the 0.2% combustible materials/substances level is calculated would lead to different analyses and different, non-comparable results. AEISG proposed to amend either the entry for UN1942 or for UN0222 to be consistent with the other.

The working group discussed how the calculation described in the UN descriptions is carried out. IME explained that industry measures the total organic carbon content in technical grade ammonium nitrate (TGAN) to ensure conformance to UN 1942. This includes all organic carbon that is typically used in TGAN, e.g. internal and external additives.

**Conclusion.** The working group approved option B in C.3/2012/19 as described in Section 13 of Annex 2 to this report. The working group further noted that these changes do not necessarily apply to all language versions of the Model Regulations.

29. **Subject.** Safety devices.

*Document:* *ST/SG/AC.10/C.3/2012/35 (COSTHA)*

*Informal document:* *UN/SCETDG/41/INF.44 (COSTHA)*

The automotive industry has developed many new safety products that, due to a lack of an entry in the Dangerous Goods List, end up in Division 1.4 which significantly hampers transportation of the devices. Additionally, related products may ship under any of three entries. COSTHA was seeking a single entry under which all of these devices can be transported.

As demonstrated by the 6(c) test, the working group confirmed that the hazards of these components are comparable with or less than those that have already been accepted.

**Conclusion.** The working group approved a revised version of the COSTHA proposal as shown in Section 14 of Annex 2 to this report.

### Agenda Item 10(e) – Proposals of amendments to the list of dangerous goods of Chapter 3.2

30. **Subject.** Substances and mixtures with explosive properties which are exempted from classification as explosives.

*Document:* *ST/SG/AC.10/C.3/2012/56 (Germany, the United States of America, and Canada)*

See paragraph 17 above.

## Annex 1

### Working Group on Explosives (25 – 28 June 2012)

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## Annex 2

### Working Group on Explosives (25 – 28 June 2012)

### Changes for the Model Regulations and the Test Manual

#### Section 1 – Changes related to Test Series 8

- 1.1. Amend 18.5.1.2.1(b) of the 8(b) test procedure to read:  
*(b) 95 mm diameter by 95 mm long pellet with a density of  $1\,600\text{ kg/m}^3 \pm 50\text{ kg/m}^3$  of either 50/50 pentolite or 95/5 RDX/WAX;*
- 1.2. Amend 18.5.1.2.1(c) of the 8(b) test procedure to read:  
*(c) Tubing, steel, seamless, with an outer diameter of  $95.0 \pm 7.0\text{ mm}$ , a wall thickness of  $9.75 \pm 2.75\text{ mm}$  and an inner diameter of  $73.0 \pm 7.0\text{ mm}$ , and with a length of 280 mm;*
- 1.3. Amend 18.5.1.2.1(e) of the 8(b) test procedure to read:  
*(e) Polymethyl methacrylate (PMMA) rod, of 95 mm diameter by 70 mm long. A gap length of 70 mm results in an incident shock pressure at the ANE interface somewhere between 3.5 and 4 GPa, depending on the type of donor used (see Table 18.5.1.1 and Figure 18.5.1.2);*
- 1.4. Amend 18.5.1.2.1(f) of the 8(b) test procedure to read:  
*(f) Mild steel plate, 200 mm × 200 mm × 20 mm;*
- 1.5. Delete 18.5.1.2.1(g) in its entirety and renumber current 18.5.1.2.1(h) to be 18.5.1.2.1(g).
- 1.6. Amend Table 18.5.1.1 of the 8(b) test procedure as follows:  
*(a) In the "PENTOLITE 50/50 DONOR" column, revise the "Barrier Pressure Value" for the 55mm gap length entry to read "4.91" instead of "4.76".*  
*(b) In the "PENTOLITE 50/50 DONOR" column, revise the "Barrier Pressure Value" for the 60mm gap length entry to read "4.51" instead of "4.31".*
- 1.7. Amend 17.5.1.2(b) of the 7(b) test procedure to read:  
*(b) 95 mm diameter by 95 mm long pellet with a density of  $1\,600\text{ kg/m}^3 \pm 50\text{ kg/m}^3$  of either 50/50 pentolite or 95/5 RDX/WAX;*
- 1.8. Amend 17.5.1.2(c) of the 7(b) test procedure to read:  
*(c) Tubing, steel, seamless, with an outer diameter of  $95.0 \pm 7.0\text{ mm}$ , a wall thickness of  $9.75 \pm 2.75\text{ mm}$  and an inner diameter of  $73.0 \pm 7.0\text{ mm}$ , and with a length of 280 mm;*
- 1.9. Amend 17.5.1.2(e) of the 7(b) test procedure to read:  
*(e) Polymethyl methacrylate (PMMA) rod, of 95 mm diameter by 70 mm long;*
- 1.10. Amend 17.5.1.2(f) of the 7(b) test procedure to read:  
*(f) Mild steel plate, 200 mm × 200 mm × 20 mm;*
- 1.11. Delete 17.5.1.2(g) in its entirety and renumber current 17.5.1.2(h) to be 17.5.1.2(g).

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Section 2 – Test 8(a), Thermal Stability Test

- 2.1 Amend the formula in paragraph 18.4.1.2.5 of Section 18 of the Test Manual to read as follows:

$$L = \ln 2 \times (C_p / t_{1/2})$$

- 2.2 Amend the formula in paragraph 28.3.5 of Section 28 of the Test Manual to read as follows:

$$L = \ln 2 \times (C_p / t_{1/2})$$

- 2.3 Amend paragraph 18.4.1.2.6 of Section 18 of the Test Manual to read as follows:

*Dewar vessels filled with 400 ml of inert substance, with a heat loss of 100 mW/kg.K or less are suitable.*

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Section 3 – Screening test for substances that may have explosive properties

- 3.1. Amend section 20.3.3.3 of Section 20 of the Test manual to read:

*20.3.3.3 Thermal stability may be estimated using a suitable calorimetric technique such as differential scanning calorimetry or adiabatic calorimetry. Exothermic decomposition energy may be estimated using a suitable calorimetric technique such as differential scanning calorimetry. In using...*

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Section 4 – Alternate flash composition test for fireworks classification using the default table

- 4.1. Revise Note 2 of paragraph 2.1.3.5.5 of the Recommendations on the Transport of Dangerous Goods Model Regulations (UN Model Regulations Default Fireworks Classification Table) to read as follows:

*“Flash composition” in this table refers to pyrotechnic substances in powder form or as pyrotechnic units as presented in the firework that are used to produce an aural effect or used as a bursting charge, or propellant charge unless:*

- (a) The pyrotechnic substance gives a negative "-" result in the US Flash Composition Test in Appendix 7 of the Manual of Tests and Criteria; or*
- (b) The time taken for the pressure rise is demonstrated to be more than 6 ms for 0.5 g of pyrotechnic substance in the HSL Flash Composition Test in Appendix 7 of the Manual of Tests and Criteria.*

- 4.2. Add the following procedure in Appendix 7 to the Manual of Tests and Criteria and rename Appendix 7 to read "Flash Composition Tests":

## ***US Flash Composition Test***

### ***Introduction***

*The US Flash Composition Test may be used to determine if pyrotechnic substances in powder form or as pyrotechnic units as presented in fireworks that are used to produce an aural effect or used as a bursting charge or propellant charge, may be considered a “flash composition” for the purposes of the UN Model Regulations Default Fireworks Classification Table in Section 2.1.3.5.5 of the Model Regulations.*

### ***Apparatus and materials***

*The experimental set up for the US Flash Composition Test consists of:*

- a cardboard or fibreboard sample tube with a minimum inside diameter of 25 mm and height 150 mm with a maximum wall thickness of 3.8 mm, closed at the base*

- with a thin cardboard or paperboard disk, plug or cap just sufficient to retain the sample;
- a 1.0 mm thick 160 × 160 mm steel witness plate;
  - an electric igniter, e.g. a fuse head, with lead wires of at least 30 cm length;
  - a mild steel confinement sleeve (weighing approximately 3 kg) which is bored from a solid billet approximately 1 mm deeper than the overall sample tube length and having an inside diameter of 38 mm, an outside diameter of 63 mm and a height of 165 mm with a notch or groove cut into one radius of the open end sufficient to allow the igniter lead wires to pass through (the steel sleeve might be provided with a rugged steel handle for easier handling);
  - a steel ring of approximately 50 mm height with an inner diameter of approximately 95 mm; and
  - a solid metal base, e.g. a plate of approximately 25 mm thickness and 150 mm square.

## **Procedure**

Prior to testing, the pyrotechnic substance is stored for at least 24 hours in a desiccator at a temperature of 20 - 30 °C. Twenty-five (25) g net weight of the pyrotechnic substance to be tested as a loose powder or granulated or coated onto any substrate, is pre-weighed and then poured carefully into a fibreboard sample tube with the bottom end closed with a cardboard or paperboard disk, caps or plugs. After filling, the top cardboard or paperboard cap or plug might be inserted lightly to protect the sample from spillage during transport to the test stand. The height of the sample substance in the tube will vary depending on its density. The sample should be first consolidated by lightly tapping the tube on a non-sparking surface. The final density of the pyrotechnic substance in the tube should be as close as possible to the density achieved when contained in a fireworks device.

The witness plate is placed on the supporting ring. If present, the paperboard or cardboard top cap or plug of the fibreboard sample tube is removed and the electric igniter is inserted into the top of the pyrotechnic substance to be tested and visually positioned to an approximate depth of 10 mm. The paperboard or cardboard top cap or plug is then inserted or re-inserted, fixing the igniter's position in the fibreboard sample tube and the depth of its match head. The lead wires are bent over and down along the sidewall and bent away at the bottom. The sample tube is placed vertically and centred on the witness plate. The steel sleeve is placed over the fibreboard sample tube. The igniter lead wires are positioned to pass through the slotted groove in the bottom edge of the steel confining sleeve and will be ready to attach to the firing circuit apparatus. See Figure YY as an example of the test set-up.

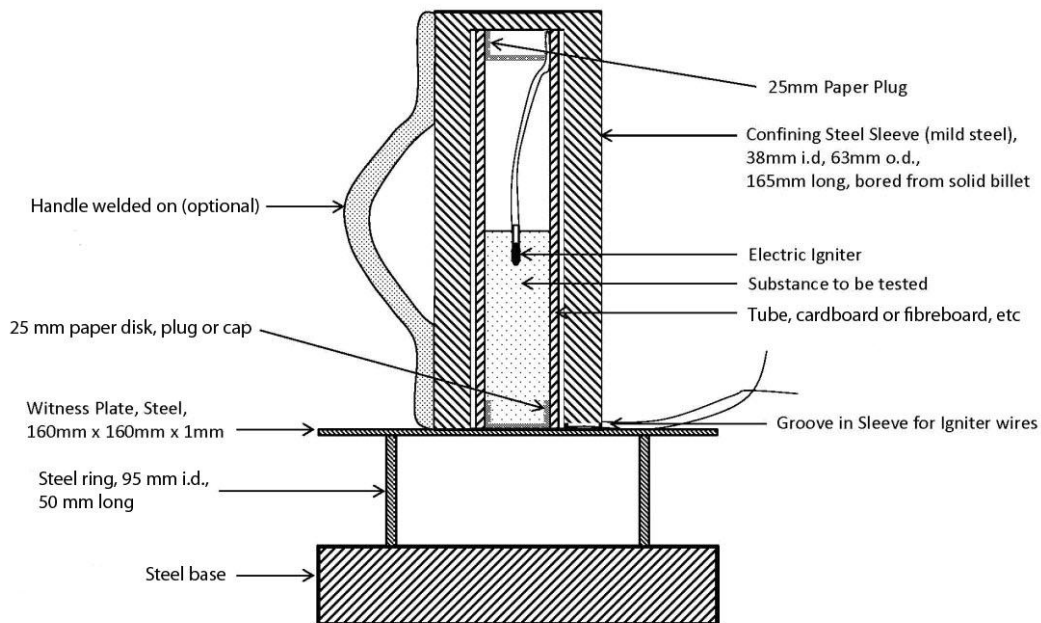
The electric igniter is then initiated from a safe position. After initiation and a suitable interval the witness plate is recovered and examined. The test should be performed 3 times unless a positive result is obtained earlier.

## **Test criteria and method of assessing results**

The result is considered positive "+" and the substance is considered to be a "flash composition" if in any trial the witness plate is torn, perforated, pierced or otherwise penetrated (i.e. light is visible through the plate). Otherwise, the result is considered negative "-". Bulges or folds in the witness plate are not to be considered positive "+" results.



Figure YY




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#### Section 5 – Transport of explosives, portable tank instructions

- 5.1. In paragraph 4.2.5.2.6 of the Model Regulations, amend the header to the tabulated portable tank instructions for T1 – T22 as shown below:

*These portable tank instructions apply to liquid and solid substances of Class 1 and Classes 3 to 9. The general provisions of section 4.2.1 and the requirements of section 6.7.2 shall be met.*

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#### Section 6 – Transport of explosives, blasting types B and E in portable tanks

- 6.1. Revise paragraph (b) of Special Provision TP 32 in paragraph 4.2.5.3 of the Model Regulations to read as follows:

*For UN3375 only, the suitability for transport in tanks shall be demonstrated. One method to evaluate this suitability is test 8 (d) in Test Series 8 (see “Manual of Tests and Criteria”, Part 1, sub-section 18.7)*

## Section 7 – Special Provision 309

7.1. The working group approved the proposal to amend the final sentence of Special Provision 309 of paragraph 3.3.1 of the Model Regulations to read as follows:

*Substances shall satisfactorily pass Tests 8(a), (b) and (c) of Test Series 8 of the Manual of Tests and Criteria, Part I, Section 18 and be approved by the competent authority.*

## Section 8 – IBCs for transporting UN3375

8.1. Add new packing instruction P505 to Section 4.1.4 of the Test Manual as shown below:

<b>P505</b>	<b>PACKING INSTRUCTION</b>		<b>P505</b>
<i>This instruction applies to UN No. 3375</i>			
<i>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</i>			
<b>Combination packagings:</b>	<b>Inner packaging maximum capacity</b>	<b>Outer packaging maximum net mass</b>	
<i>Boxes (4B, 4C1, 4C2, 4D, 4G, 4H2) or drums 1B2, 1G, 1N2, 1H2, 1D) jerricans (3B2, 3H2) with glass, plastics or metal inner packagings</i>	5 l	125 kg	
<b>Single packagings:</b>	<b>Maximum capacity</b>		
<b>Drums</b> <i>aluminium (1B1, 1B2), plastics (1H1, 1H2)</i>	250 l		
<b>Jerricans</b> <i>aluminium (3B1, 3B2), plastics (3H1, 3H2)</i>	60 l		
<b>Composite packagings</b> <i>plastics receptacle with outer aluminium drum (6HB1)</i>	250 l		
<i>plastics receptacle with outer fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)</i>	250 l		
<i>plastics receptacle with outer aluminium crate or box or plastics receptacle with outer wooden, plywood, fibreboard or solid plastics box (6HB2, 6HC, 6HD2, 6HG2 or 6HH2)</i>	60 l		
<i>glass receptacle with outer aluminium, fibre, plywood, solid plastics or expanded plastics drum (6PB1, 6PG1, 6PD1, 6PH1 or 6PH2) or with outer aluminium crate or box or with outer wooden or fibreboard box or with outer wickerwork hamper (6PB2, 6PC, 6PG2 or 6PD2)</i>	60 l		

- 8.2. Add new special provision BXX to IBC02 in Section 4.1.4.2 of the Model Regulations to read:
- BXX**        *For UN3375, IBCs of type 31A and 31N are not allowed without competent authority approval.*
- 8.3. In the Dangerous Goods List in Chapter 3.2 of the Model Regulations, for entry UN3375:
- 8.3.1        In Column 8, replace the notations "P099" and "IBC99" with the notations "P505" and "IBC02"
- 8.3.2        Add the notation "BXX" (see 8.2 above) in Column 9

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#### Section 9 – Ammonium Nitrate – IBCs

- 9.1. In the Dangerous Goods List in Chapter 3.2 of the Model Regulations, for entry UN0222:
- 9.3.1        In Column 8, add the notation "IBC100"
- 9.3.2        In Column 9, add the notation "B3"
- 9.2. In IBC100 in section 4.1.4.2 of the Model regulations:
- 9.3.1        Add the notation "UN0222" to the list of entries to which the packing instruction applies
- 9.3.2        Add Special Provision B3 to the "Special packing instructions" section.

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#### Section 10 – Special Provision 306

- 10.1. Amend Special Provision 306 of paragraph 3.3.1 of the Model Regulations to read as follows:
- This entry may only be used for substances that are too insensitive for acceptance into Class 1 when tested in accordance with Test Series 2 (see Manual of Tests and Criteria, Part I).*

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#### Section 11 – Classification of Ammonium Nitrate

- 11.1. Add new Special Provision XXX to paragraph 3.3.1 of the Model Regulations to read as follows:
- This entry may also be used for Ammonium Nitrate which has shown a positive result in Test Series 2, regardless of combustible content.*
- 11.2. In the Dangerous Goods List in Chapter 3.2 of the Model Regulations, for entry UN0222:
- 11.2.1        In Column 6, add the notation "XXX" (see 11.1)

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#### Section 12 – Packing Instructions P116, P131, and P137

- 12.1. For Packing Instruction P116, add “bags 5H2 and 5H3” as permitted for Outer packagings.
- 12.2. For Packing Instructions P131 and P137, add “Boxes – plastics, solid (4H2)” as permitted for Outer packagings.

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#### Section 13 – Ammonium nitrate description

- 13.1. Amend the entry for Ammonium Nitrate, UN1942, in Column 2 of the Dangerous Goods List so that it is consistent with the Column 2 entry for Ammonium Nitrate, UN0222. It would therefore read:
- AMMONIUM NITRATE with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance.*

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#### Section 14 – Safety devices

- 14.1. In Appendix B, Glossary of terms, in the Model Regulations:

- 14.2.1 Amend the entry for "AIR BAG INFLATORS, PYROTECHNIC or AIR BAG MODULES, PYROTECHNIC or SEAT-BELT PRETENSIONERS, PYROTECHNIC" to read, "SAFETY DEVICES" and amend the definition to read as follows:

*Articles which contain pyrotechnic substances or dangerous goods of other classes and are used in vehicles, vessels or aircraft to enhance safety to persons. Examples are; air bag inflators, air bag modules, seat-belt pretensioners or pyromechanical devices. These pyromechanical devices are assembled components for tasks such as but not limited to separation, locking, or release-and-drive or occupant restraint. The term includes "PYROTECHNICAL SAFETY DEVICES.*

- 14.2 In the Dangerous Goods List in Chapter 3.2 of the Model Regulations, amend the proper shipping name of UN0503 read, "PYROTECHNICAL SAFETY DEVICES".
- 14.3 In the Dangerous Goods List in Chapter 3.2 of the Model Regulations, amend the proper shipping name of UN3268 read, "SAFETY DEVICES".
- 14.4 Amend Special Provision 235 of paragraph 3.3.1 of the Model Regulations to read as follows:

*This entry applies to articles which contain Class 1 explosive substances and which may also contain dangerous goods of other classes. These articles are used to enhance safety in vehicles, vessels or aircraft – e.g. air bag inflators, air bag modules, seat-belt pretensioners, or pyromechanical devices.*

- 14.5 Amend Special Provision 280 of paragraph 3.3.1 of the Model Regulations to read as follows:

*This entry applies to safety devices for vehicles, vessels or aircraft – e.g. air bag inflators, air bag modules, seat-belt pretensioners, or pyromechanical devices and which contain dangerous goods of Class 1 or dangerous goods of other classes and when transported as component parts and if these articles as presented for transport have been tested in accordance with Test Series 6(c) of Part I of the Manual of Tests and Criteria, with no explosion of the device, no fragmentation of device casing or pressure vessel, and no projection hazard nor thermal effect which would significantly hinder fire-fighting or emergency response efforts in the immediate vicinity.*

- 14.6 Amend Special Provision 289 of paragraph 3.3.1 of the Model Regulations to read as follows:

*Safety devices installed in vehicles, vessels or aircraft or in completed components such as steering columns, door panels, seats, etc. are not subject to these Regulations.*

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