

## COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

Sub-Committee of Experts on the  
Transport of Dangerous Goods

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Geneva, 2-6 July 2007  
Item 3(a) of the provisional agenda

### LISTING, CLASSIFICATION AND PACKING

#### Report of the Working Group on Explosives

1. The Working Group on explosives met from 2 to 4 July 2007, in a parallel session with the Sub-Committee of Experts on the Transport of Dangerous Goods to have technical discussions on the documents scheduled under agenda item 3(a) and 10(b) in INF.2 of the 31<sup>st</sup> session of the UN/SCETDG under the Chairmanship of Mr. A. Johansen (Norway).
2. Experts from Canada, China, France, Germany, Ireland, Japan, the Netherlands, Norway, Sweden, Switzerland, United Kingdom and United States of America participated, as well as representatives from COSTHA, DGAC, ICCA, ICPP and SAAMI.
3. The Sub-Committee tasked the Working Group to discuss the following documents:
4. Agenda item 3(a):

ST/SG/AC.10/C.3/2007/4 (Norway)	Assignment of explosive articles packed or fitted with their means of initiation to compatibility groups
ST/SG/AC.10/C.3/2007/12 (SAAMI)	New entry for « Powder, smokeless » 1.4C
UNSCETDG/31/INF.7 (Australia)	Behaviour of propellant and « Powders » in Closed Transport Units
UNSCETDG/31/INF.16 (SAAMI)	1.4C Classification of smokeless propellants
ST/SG/AC.10/C.3/2007/16 (Australia)	Proper shipping names for electric and electronic detonators
ST/SG/AC.10/C.3/2007/17 (Australia)	Classification as a consequence of Net Explosive Quantity (NEQ)
UNSCETDG/31/INF.19 (Australia)	Classification as a consequence of Net Explosive Quantity (NEQ)
UNSCETDG/31/INF.27 (Netherlands)	Classification as a consequence of Net Explosive Quantity (NEQ)
ST/SG/AC.10/C.3/2007/22 (United States of America)	Amendment to UN 3474 for inclusion of 1-HOBt Monohydrate

UNSCETDG/31/INF.33 (United Kingdom)	
UNSCETDG/31/INF.37 (United States of America)	
ST/SG/AC.10/C.3/2007/29 (Canada)	Additional test for 1.4S classification
UNSCETDG/31/INF.34 (United States of America)	
ST/SG/AC.10/C.3/2007/30 (United Kingdom)	Proposal for a review of the UN Test Series 7
ST/SG/AC.10/C.3/2007/31 (United Kingdom)	Amendments to the UN firework classification table
UNSCETDG/31/INF.35 (United States of America)	Problems encountered for testing “Explosive properties” of pharmaceutical chemicals
UNSCETDG/31/INF.36 (United States of America)	Criteria for classifying an article as non-explosive

Agenda item 10(b):

ST/SG/AC.10/C.3/2007/10 (Germany)	Substances having explosive properties and desensitized explosives
ST/SG/AC.10/C.3/2007/13 (SAAMI)	Amendments to Chapter 2.1 of the GHS
UNSCETDG/31/INF.30 (Germany)	Open issues regarding desensitized explosives not yet properly addressed in the GHS

5. **Assignment of explosive articles packed or fitted with their means of initiation to compatibility groups**

Norway introduced the paper ST/SG/AC.10/C.3/2007/4 and explained that an inconsistency was found between ADR/RID and the UNRTDG with regards to transport of explosive articles packed or fitted with their own means of initiation. The expert from Sweden proposed to change the last sentence of the proposed Note 1 to include unpackaged articles as well. It was decided to support the Norwegian proposal with the amendment made by Sweden (see Annex 1 for the complete text).

6. **New entry for “Powder, smokeless” 1.4C**

The SAAMI document ST/SG/AC.10/C.3/2007/12 and INF.16 were discussed together with the Australian document INF.7. Australia could not be present in the WG but comments in writing were given to the chairman in advance of the meeting. Australia typically uses cans containing 500 g of propellant, which are classified as 1.3G. They are not in favour of the proposal and suggested to use UN0501 instead. This is not possible given the composition of the propellants.

Other experts queried the proposed packing provision limiting the amount to 3.7 kg. When it is demonstrated that the 1.4C criteria are met, then there is no need to put a mass limit in PP-XX.

Concerns were raised on the possible use of metal packagings, since this could lead to more violent reactions. The assignment of PP48 to P114(b) would solve this issue. The expert from the USA was in favour of assigning P101, but this was felt not appropriate by the other experts, since this would lead to additional paperwork. It was decided that a new

1.4C entry was appropriate, to use P114(b) and to assign PP48 to this new entry (see Annex 1 for the complete text).

7. **Proper shipping names for electric and electronic detonators**

The chairman briefly introduced document ST/SG/AC.10/C.3/2007/16 on behalf of Australia.

Most experts were of the opinion that a change to the proper shipping name was not necessary. A change in the definition for detonator given in Appendix B to include electronic detonators was felt more appropriate. The expert from Australia is invited to submit a new proposal.

8. **Classification as a consequence of Net Explosive Quantity (NEQ)**

The Australian papers ST/SG/AC.10/C.3/2007/17 and INF.19 were briefly introduced by the chairman. Most experts had sympathy for applying restrictions in relation to the classification of fireworks. It was noted that no justification for the limit of 1000 kg was given.

The expert from the UK provided evidence from his experience that unexpected, violent explosions can occur with a lower NEQ of fireworks.

For fireworks France uses a system based on apparent pyrotechnic density (mass per unit volume of the package). Documentation on the system will become available in the next months.

There was a lot of support for the French concept which could be introduced in the fireworks classification default table in the future.

The results of the research project mentioned in the Netherlands document INF.27 and the proposed new project can give supporting data.

The group concluded that something needs to be done, but that there is no immediate solution available. Further proposals from UK and France are anticipated.

9. **Amendment to UN 3474 for inclusion of 1-HOBt Monohydrate**

Documents ST/SG/AC.10/C.3/2007/22 and INF.37 from the USA and INF.33 from the UK were presented and discussed. It was clear that the mechanism of losing water is different for the monohydrate crystal as compared to the wetted anhydrous form. There was concern that the crystal water might be released during a long trip, e.g. six to eight weeks at elevated temperatures, rendering the substance explosive.

Representatives from industry pointed out that there is at present no guidance on how to demonstrate compliance with SP28 and more in general that desensitised explosives remain desensitised over a longer period of time. The group encourages that proposals to that extent are being developed.

The expert from the UK further pointed out that the results of the Koenen test were not given.

It was felt that additional information was needed before a decision can be made.

10. **Additional test for 1.4S classification**

The expert from Canada briefly introduced document ST/SG/AC.10/C.3/2007/29. The expert from the USA introduced INF. 34 and questioned the necessity of adding a new test and to change the Test Series 6 procedure. The problem appears to be limited to shaped charges and may have serious consequences for industry.

The proposal was not only intended for shaped charges, items like detonators, commercial charges, bursting charges, etc. should also be subjected to the new test.

Other experts pointed out the possible consequences in airplanes if effects occur outside the packagings.

DGAC believed that an accidental initiation is not possible with shaped charges, they are shipped without detonator. DGAC also highlighted the fact that many millions of 1.4S shaped charges have been transported annually for more than 20 years, without a single known incident of accidental functioning in transport packaging.

In response to that, it was said that the likelihood of accidental functioning is not a factor in the definition of Compatibility Group S. Hazard Divisions 1.1 to 1.4 are based on hazards, whilst 1.5 and 1.6 are based on risks. In Test 6(a) and 6(b) the concept of accidental functioning is used too.

Several experts supported the proposal from Canada since it fills a gap in the current regulations. Only half the definition for Compatibility Group S is currently addressed. The test would have to be considered for all articles containing detonating explosives.

Some experts felt that the definition in Compatibility group S is not completely correct.

Canada provided the Working Group with INF.43 which contained additional test results on shaped charges.

The expert from France was of the opinion that it should help to improve packaging methods, e.g. for detonators to better match the 1.4S definition instead of adding a new test.

Some experts felt that the proposal was not complete, for instance: no guidance is given on what to do if a product does not pass the 6(d) test.

It became clear that the opinions are divided. The majority of the Working Group was in favour of placing the text proposed by Canada in square brackets awaiting further results and/ or proposals in favour or against the test. If no new results or new proposals are submitted the brackets are to be removed. The Sub Committee is requested to take a decision.

#### 11. **Proposal for the review of UN Test Series 7**

The proposal contained in ST/SG/AC.10/C.3/2007/30 was discussed. After the concept of TS7 was developed, the military users had moved in a different direction in developing "Insensitive Munitions" or "MURAT". While TS7 is largely relying on the insensitiveness of the explosives used in the munitions, the IM concept allows other ways of meeting the safety criteria of military explosives.

It was pointed out that there would be a lot of consequential amendments, such as changing the definition of Compatibility Group N, etc.

There was wide support in the Working Group for revisiting Test Series 7. Countries interested in participating in an intersessional Working Group are invited to contact the UK delegate participating in the UN Working Group, Dr. Marriott.

#### 12. **Amendments to the UN firework classification table**

Several issues are addressed in the UK document ST/SG/AC.10/C.3/2007/31.

A proposal on adding a new entry in the default table for "Comets" was discussed. There was some support for giving guidance on how to deal with these products. However the proposed solution was opposed by a number of experts.

Concerning the Time/pressure test (TPT): the expert from the UK briefed the WG on the activities to improve the TPT and to decrease the standard deviation. The data will be available before the end of the year.

Germany, Japan and the Netherlands are also working on the TPT; the results will be shared with the WG, preferably before the end of the year.

The expert from the UK invited all experts to give comments on the above mentioned issues and the proposed changes to the default list, so that a new proposal could be developed for the next July meeting.

13. **Problems encountered for testing “Explosive properties” of pharmaceutical chemicals**

The expert from the USA introduced INF.35 and explained that the problem is not limited to pharmaceutical chemicals. The problems were also discussed at IGUS Working Groups. The option to use UN 0190 “SAMPLES, EXPLOSIVE” was mentioned. However, the issue is not always limited to samples for evaluation or classification but also includes commercial shipments of small quantities.

Other experts offer the possibility to use Test Series F, for instance Trauzl or modified Trauzl test, to assess explosive power. Only 10 or 6 grams are needed for each test.

The expert from the USA invited the other experts to give comments and suggestions on the subject.

14. **Criteria for classifying an article as non-explosive**

The USA introduced their paper INF.36. Earlier attempts from Canada were recalled. The scope includes, but is not limited to, cable cutters, money bags, etc.

There was wide support for developing methods and criteria for the exclusion from Class 1 but further work needs to be done taking guidance for the GHS concerning the hazards into account.

15. **Substances having explosive properties**

Germany introduced the proposal ST/SG/AC.10/C.3/2007/10 (*GHS: ST/SG/AC.10/C.4/2007/1*) on explosive properties. Substances sensitive to friction or impact are currently not covered in the GHS. In the EU system, these substances were assigned risk phrase R2 or R3 depending on the level of sensitiveness.

Several experts remarked that this is important information to communicate to users but that it was not a classification issue. The best place to communicate this information is on the Safety Data Sheet (SDS). A reference in Annex 4, for example in paragraph A4.3.2.3 might be appropriate. There was no agreement on whether such a reference should also include test methods and criteria.

With regards to explosive properties: some experts raised concerns that the GHS system points the users to Test Series 2 to assess explosive properties. This Test Series only determines if the substance is too insensitive for inclusion in transport Class 1 but does not give information on whether a substance has explosive properties.

The group recommends the GHS Sub-Committee to include a reference to Test Series 1 for determining explosive properties (see Annex 1 for the complete text).

The expert from Germany will consider if a new proposal is appropriate and, if so, draft a new proposal.

16. **Amendments to Chapter 2.1 of the GHS**

SAAMI introduced the document ST/SG/AC.10/C.3/2007/13 (*GHS: ST/SG/AC.10/C.4/2007/3*). The proposal is typically meant for 1.4S articles sold in retail shops. In case of incidents, local fire brigades might misinterpret the exploding bomb sign, since they usually have no experience with Class 1 items.

In the 1<sup>st</sup> edition of the GHS, there was no need to assign an exploding bomb to 1.4 articles and substances, but this was changed in Revision 1.

A number of experts expressed sympathy for the proposal, on the condition that test 6(d) discussed in paragraph 10 above is adopted.

Other experts pointed out that a 1.4S classification depends largely on the packaging and that for GHS purposes the unpackaged situation needs to be addressed as well.

The chairman reminded the members of the fact that classification for GHS purposes would have to be done on the level of the smallest inner packaging used. This might have consequences for revised test methods.

Not all countries have had the opportunity to coordinate the points of view on a national level and asked that the proposal is carried forward to the next July meeting. Since this is the first meeting of the biennium this was agreed.

17. **Open issues regarding desensitized explosives not yet properly addressed in the GHS**

In the paper from Germany INF.30 (*GHS: INF.7*) the issue of desensitised explosives was addressed. The representative from ICCA (on behalf of the industrial nitrocellulose processing industry) raises concerns on the negative impact of including these products in a possible Hazard Division 1.7 on its members. Under many national legislations these products would suddenly fall under the scope of the explosives regulations with consequences for separation distances, licensing etc. He asked if the nitrocellulose entries in Division 4.1 (UN 2555, 2556 and 2557) could have special status.

ICCA expressed concern that several substances classified as desensitised explosives in transport will be classified as an explosive in GHS due to the results of Test Series 2 with regulatory consequences.

A number of experts pointed out that desensitised explosives do not exist in the GHS system. There is only Note 2 to Table 2.1.1: *Some explosive substances and mixtures are wetted with water or alcohols or diluted with other substances to suppress their explosives properties. They may be treated differently from explosive substances and mixtures (as desensitized explosives) for some regulatory purposes (e.g. transport).*

One possibility is to make special reference to these category of substances in the SDS, for instance in paragraph A4.3.2.3 of Annex 4. Guidance can be given that when the mixture is physically stable and there is no danger of losing the diluent or phlegmatizer then the potential explosive properties can be ignored.

The best solution may be to introduce a new chapter in Part 2 dealing with desensitised explosives. There was considerable interest in an informal intersessional working group organised by Germany to develop proposals for a new chapter in part 2 of the GHS document.

The Sub-Committee of Experts on the Globally Harmonised System is invited to take a decision on having such a working group meeting.

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## ANNEX TO THE REPORT OF THE WORKING GROUP

### CONSEQUENTIAL AMENDMENTS

1. add the following notes after the table in 2.1.2 of the UNRTDG:

**“NOTE 1:** *Articles of compatibility groups D and E may be fitted or packed together with their own means of initiation provided that such means have at least two effective protective features designed to prevent an explosion in the event of accidental functioning of the means of initiation. Such articles and packages shall be assigned to compatibility groups D or E.*

**NOTE 2:** *Articles of compatibility groups D and E may be packed together with their own means of initiation, which do not have two effective protective features when, in the opinion of the competent authority of the country of origin, the accidental functioning of the means of initiation does not cause the explosion of an article under normal conditions of carriage. Such packages shall be assigned to compatibility groups D or E;”*

2. Create a new entry for POWDER, SMOKELESS in Hazard Division 1.4C

XX	POWDER,	1.4C				NONE	P114 (b)	PP48		
XX	SMOKELESS†									

In Packaging Method 114(b), change the text of PP48 to read:

PP48 For UN 0508 and UN XXXX, metal packagings shall not be used.

3. In part 2 of the GHS document:

- Renumber existing paragraph 2.1.2.2 to 2.1.2.3
- Introduce a new paragraph 2.1.2.2. reading: *“For some regulatory purposes (e.g. transport) substances having explosive properties according to Test Series 1 can be excluded from Division 1.1 to 1.6 when Test Series 2 demonstrates that the substance is too insensitive. The fact that a substance has explosive properties is important for other regulatory purposes and for the hazard communication. It is therefore important that Test Series 1 is performed in the classification procedure.”*
- In Table 2.1.1, change “Test Series 2” to “Test Series 1 and 2” (twice)
- In Figure 2.1.2, delete the asterisks in the blocks called “Test Series 1” and “Test Series 8” (in the latter it is placed accidentally)
- Delete the footnote to Figure 2.1.2

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