

# UN/SCEGHS/13/INF.15

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## 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 Globally  
Harmonized System of Classification  
and Labelling of Chemicals

Thirteenth session  
Geneva, 9-11 July 2007  
Item 2 (a) of the provisional agenda

### Outcome of the TDG Sub-Committee session

#### Note by the Secretariat

The secretariat reproduces hereafter the following documents, which should be of interest to the GHS Sub-Committee:

- a summary of the conclusions of the discussions held during the thirty-first session of the Sub-Committee on experts on the TDG on matters of concern to the GHS Sub-Committee (paragraphs 9-11, 21, 61-65 and 95-98 of the SCETDG draft report);
- the full report of the working group on explosives (UN/SCETDG/31/INF.45), in annex 1;
- document ST/SG/AC.10/C.3/2007/30 (Proposal for a review of UN Tests series 7) in annex 2.

## **PART 1: WORK OF THE WORKING GROUP ON EXPLOSIVES**

1. The Sub-Committee of experts on the TDG requested the Working Group on Explosives to discuss several official and informal documents among which the following were of interest to the GHS Sub-Committee:

ST/SG/AC.10/C.3/2007/10 - ST/SG/AC.10/C.4/2007/1	(Germany) Substances having explosive properties and desensitized explosives
UN/SCETDG/31/INF.30 - UN/SCEGHS/13/INF.7	Open issues regarding desensitized explosives not yet properly addressed in the GHS
ST/SG/AC.10/C.3/2007/13 - ST/SG/AC.10/C.4/2007/3	(SAAMI) Proposal of amendment to Chapter 2.1 of the GHS (Explosives)
ST/SG/AC.10/C.3/2007/29	(Canada) Additional test for 1.4S classification
ST/SG/AC.10/C.3/2007/30	(United Kingdom) Proposal for a review of the UN Test series 7

2. Following a presentation and brief discussion of the documents (see annex 1 to this document) in plenary, their consideration was entrusted to a working group on explosives, which met from 2 to 4 July, chaired by Mr. A. Johansen (Norway).
3. The expert from the Netherlands emphasized that some of the submitted proposals concerned classification, and should therefore be considered also in the context of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). He suggested that they should be submitted to the GHS Sub-Committee as well.
4. It was agreed that the GHS Sub-Committee should be kept up to date, in accordance with the established procedures. It was, however, recalled that the Sub-Committee was responsible for work relating to physical hazards in the GHS framework, and that it must therefore bear in mind the multisectoral dimension of classification when considering such proposals.
5. The Sub-Committee endorsed the decisions of the Working Group reflected in paras. 5 to 9, and 11 to 17 and in the annex of the report of the working group

### **(a) Substances having explosive properties and desensitized explosives**

- (i) Document: ST/SG/AC.10/C.3/2007/10 - ST/SG/AC.10/C.4/2007/1 (Germany)

*(Report of the working group on explosives, para. 15)*

The group recommended the GHS Sub-Committee to include a reference to Test Series 1 for determining explosive properties (see paragraph 3 in the annex to the report of the working group). The expert from Germany will consider if a new proposal is appropriate and, if so, draft a new proposal.

The Sub-Committee of experts on the TDG endorsed the recommendation of the working group (see paragraph 61 of the draft report).

- (ii) Document: ST/SG/AC.10/C.3/2007/13 - ST/SG/AC.10/C.4/2007/3 (SAAMI)

*(Report of the working group on explosives, para. 16)*

The working group noticed that not all countries have had the opportunity to coordinate their points of view at a national level and asked the proposal be carried forward to the next July meeting. Since this is the first meeting of the biennium this was agreed.

The Sub-Committee of experts on the TDG endorsed the decision of the working group (see paragraph 61 of the draft report).

(iii) Informal document: UN/SCETDG/31/INF.30 - UN/SCEGHS/13/INF.7 (Germany)

*(Report of the working group on explosives, para. 17)*

The working group suggested that one option could be 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 phlegmatiser then the potential explosive properties can be ignored.

However, the working group considered that the best solution might 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.

The Sub-Committee of experts on the TDG endorsed the recommendation of the working group (see paragraph 61 of the draft report).

**(b) Additional test for 1.4S classification**

Document: ST/SG/AC.10/C.3/2007/29

*(Extracts from the draft report of the Sub-Committee of experts on the TDG, paras. 62 to 65 )*

For the additional test for 1.4S classification proposed in ST/SG/AC.10/C.3/2007/29 (para. 10 of the report), the Sub-Committee noted that the Working Group had not reached consensus. Some experts felt that it was urgent to introduce such a test because the current tests relate mainly to fire situations only and do not cover other possible events that could affect 1.4S article packages, such as accidental functioning. Others felt that the need for this additional test had not yet been demonstrated, and since it would affect the current classification of many articles, additional test results should be provided in particular for articles other than shaped charges.

Several experts did not agree with the proposal of the Working Group that the text proposed be placed between square brackets which would be deleted if no new results or new proposals were submitted. They felt that this would be an incentive for those experts supporting the proposal not to provide additional data that would justify this additional test, when in principle it should be up to them to provide the necessary arguments and justifications and to explain the likely effects on the classification of articles currently classified as 1.4S.

After lengthy discussions, the Chairman of the Working Group said that the sentence “if no new results or new proposals are submitted, the brackets are to be removed” should be deleted from the report, since this sentence was mainly intended to ensure that a decision on this issue be taken as soon as possible. The Sub-Committee agreed to place the text proposed by the expert from Canada in square brackets pending further results or proposals in favour or against the test. Members of the Sub-Committee which were not represented in the Working Group session were invited to consult their experts on explosives so that they could express a position when this issue is discussed again.

The issues which concern the GHS should be brought to the attention of the GHS Sub-Committee, including the question of the review of the UN Test Series 7 which was not on its agenda.

**(c) Proposal for the review of UN Test Series 7**

Document: ST/SG/AC.10/C.3/2007/30

*(Report of the working group on explosives, para. 11)*

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.

The Sub-Committee of experts on the TDG endorsed the decision of the working group (see paragraph 61 of the draft report).

**PART 2: PROPOSALS RELATED TO FLAMMABLE LIQUIDS**

Document: ST/SG/AC.10/C.3/2007/11 - ST/SG/AC.10/C.4/2007/2 (Germany)

*(Extracts from the draft report of the Sub-Committee of experts on the TDG, paras. 95 and 96 )*

There was no consensus on the proposed amendment to NOTE 2 of the GHS, Section 2.6.2. Several experts recognized that the sustained combustibility test of Section 32 of the Manual of Tests and Criteria was not suitable for flammable liquids of the GHS Category 4, but it was felt that further work could be done to consider how to deal with such liquids before adopting new texts at the beginning of a biennium.

The proposals No. 2 (calculation of the flash point of mixtures, in 2.6.4.2.2), No. 3 (standards cited for determining the flash point in 2.4.6.2.5) and No. 4 (determination of the boiling point) were adopted.

**PART 3: REPORT OF THE FIRST MEETING OF THE INFORMAL WORKING GROUP ON CHEMICALLY UNSTABLE SUBSTANCES**

Informal document: UN/SCETDG/31/INF.22 – UN/SCEGHS/13/INF.5 (Germany)

*(Extracts from the draft report of the Sub-Committee of experts on the TDG, paras. 97 and 98 )*

The expert from Germany said that he was intending to organize a second meeting of this informal working group before the next session of the Sub-Committee, and he invited all experts who would be interested in participating to inform him accordingly by e-mail so that he could send invitations.

The Chairman noted that, according to paragraph 17 of the report, the experts from Germany, after having received information regarding test methods for determining the energy output of reactions in gaseous phase, said that they would consider an approach similar to that in the United States standard NFPA704. Therefore he felt that if the expert from Germany agreed to follow the same approach, it might not be necessary to convene a new working group meeting, especially as very few experts had participated in the first meeting. The expert from Germany concurred with this view.

Annex 1Report of the Working Group on Explosives

*(this document has been reproduced as UN/SCETDG/31/INF.45)*

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) UNSCETDG/31/INF.7 (Australia)	New entry for « Powder, smokeless » 1.4C Behaviour of propellant and « Powders » in Closed Transport Units
UNSCETDG/31/INF.16 (SAAMI) ST/SG/AC.10/C.3/2007/16 (Australia)	1.4C Classification of smokeless propellants 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) UNSCETDG/31/INF.27 (Netherlands)	Classification as a consequence of Net Explosive Quantity (NEQ)
ST/SG/AC.10/C.3/2007/22 (USA) UNSCETDG/31/INF.33 (UK) UNSCETDG/31/INF.37 (USA)	Amendment to UN 3474 for inclusion of 1-HOBt Monohydrate
ST/SG/AC.10/C.3/2007/29 (Canada) UNSCETDG/31/INF.34 (USA)	Additional test for 1.4S classification
ST/SG/AC.10/C.3/2007/30 (UK) ST/SG/AC.10/C.3/2007/31 (UK)	Proposal for a review of the UN Test Series 7 Amendments to the UN firework classification table
UNSCETDG/31/INF.35 (USA)	Problems encountered for testing “Explosive properties” of pharmaceutical chemicals
UNSCETDG/31/INF.36 (USA)	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 being explosive 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 desensitized 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 phlegmatiser 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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Annex 2

Text of document ST/SG/AC.10/C.3/2007/30

Proposal for a review of the UN Test Series 7

Transmitted by the expert from the United Kingdom

**Introduction**

1. UN Test Series 7 is used to test extremely insensitive detonating substances (EIDS) and articles containing EIDS and is aimed primarily at military explosives. The military community has spent a lot of resources over the past 30 years or so developing less vulnerable High Explosives and munitions containing them as part of the Insensitive Munitions (IM) initiative but there are very few articles that have been classified as Division 1.6.
2. The description of Division 1.6 in 2.1.1.4 is:

"Extremely insensitive articles which do not have a mass explosion hazard.

This division comprises articles which contain only extremely insensitive detonating 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".*  
With such an assignment the military can, for example, transport the Division 1.6, Compatibility Group N (articles containing only extremely insensitive detonating substances) explosives under the same exemptions as Division 1.4 explosives in European land transport under the provisions of ADR. This would also considerably assist military storage of the insensitive munitions because of the reduced safety distances needed in storage at depots and magazines.

**Insensitive munitions**

3. Insensitive munitions (IM) are being excluded from Division 1.6 because they contain explosives that do not meet the criteria for EIDS in that they will not meet all of the requirements of Test Series 7a to 7f. These tests were designed to deal with a certain type of weapon system such as cased bombs and are not applicable to the majority of insensitive munitions now used by the military. The North-Atlantic Treaty Organization (NATO) determines whether an explosive article is an insensitive munition using NATO publication AOP39 which contains Test Series 7 tests or equivalent tests. The United Kingdom, and some other NATO members, has a large missile with many tens of kilos of high explosive which meets all of the IM criteria but the explosives in it will not meet the EIDS criteria. There are other munitions which would also not pass all the Test Series 7 tests but do meet the NATO AOP39 tests.

4. The AOP 39 tests are carried out on the munitions and are listed below:

STANAG 4240 – Fast Heating  
STANAG 4241 – Bullet Impact  
STANAG 4382 – Slow Heating  
STANAG 4396 – Sympathetic Reaction  
STANAG 4496 – Fragment Impact

In order to meet the IM criteria, the required response to all the tests (except for Sympathetic Reaction) should be burning only. For Sympathetic Reaction there should be no detonation of the acceptor munition and no reaction worse than explosion.

### Test Series 7

5. The main problem with classifying as 1.6 seems to be with Test 7a, the EIDS Cap Test and Test 7b, the EIDS Gap Test. The difficulty with Test 7a is that military munitions contain an explosive train inside them and part of that includes a shock sensitive booster which would not pass the Cap Test but would pass the NATO AOP39 criteria. The issue with Test 7b is the threshold level which is such that nearly all explosives are excluded except for Triaminotrinitrobenzene (TATB). Modern Polymer Bonded Explosive (PBX) materials have been shown to be incapable of detonating without a very strong shock stimulus and modern munition design is capable of ensuring that there is no credible stimulus that can detonate the PBX compositions in a munition. These PBX materials were not available when Test Series 7 was finalised at the UN many years ago.

### Proposal

6. The expert from the United Kingdom proposes that there should be a short overview of Test Series 7, in particular tests 7a to 7f, by the Working Group on Explosives on the basis of this paper to determine whether a more comprehensive review is justified. If that is the conclusion, the United Kingdom Ministry of Defence would be willing to host an inter-sessional informal working group to assist in a review of Test Series 7, to ensure that military munitions are assigned to the most appropriate Hazard Division based on the negligible probability of accidental initiation or propagation.
7. It is suggested that there should be:
- (a) Substance tests to demonstrate low explosiveness and consistency of response; and
  - (b) Article tests to demonstrate the invulnerability of the munition to credible accident stimuli.

One possible scheme could involve:

- 7a: A test to demonstrate low explosiveness of the explosive substances (inability to transition from deflagration to detonation)
- 7b: A test to determine the reaction of the explosive substances to an external fire when the material is confined
- 7c: A test to determine the reaction of the (confined) explosive substances to an environment in which the temperature is gradually increases
- 7d: Article external fire test

- 7e: Article slow heating test
- 7f: Article fragment impact test
- 7g: Article Stack Test.

8. The expert from the United Kingdom welcomes the views of other experts on this issue.
-