UN/SCETDG/33/INF.79

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

Thirty-third session
Geneva, 30 June-9 July (a.m) 2008
Item 2 of the provisional agenda

LISTING, CLASSIFICATION AND PACKING

Report of the Working Group on Explosives

1. The Working Group on explosives met from 30 June to 3 July 2008, 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 2 in INF.2 of the 33rd session of the UN/SCETDG under the Chairmanship of Mr. E. de Jong (the Netherlands).

2. Experts from Australia, Austria, Canada, France, Germany, Ireland, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom and United States of America participated, as well as representatives from CLEPA, COSTHA, ENA, ICCA, IME, ICPP and SAAMI.

3. The Sub-Committee tasked the Working Group to discuss the following issues:

4. Additional test for 1.4S classification

ST/SG/AC.10/C.3/2008/10 (IME)
ST/SG/AC.10/C.3/2008/11 (Canada)
ST/SG/AC.10/C.3/2008/44 (Germany)
ST/SG/AC.10/C.3/2008/55 (United States of America)
UN/SCETDG/33/INF.13 (Canada)
UN/SCETDG/33/INF.27 (Canada)
UN/SCETDG/33/INF.57 (IME)
UN/SCETDG/33/INF.38 (United Kingdom)
UN/SCETDG/33/INF.66 (Germany)

(a) The Working Group discussed the following issues:

(1) Is a test needed to examine hazardous effects arising from accidental initiation or ignition? The majority of the Working Group concluded that such a test was required.

(2) Should such a test be applied to all 1.4S candidates or just to those judged by the Working Group likely to have hazardous effects outside of the package? The Working Group agreed that such a test should be applied only to specific 1.4S candidates.

(3) Do the criteria proposed in …C.3/2008/11 need to be modified? The Working Group agreed that modification was necessary.

(b) The Working Group determined that the proposed test should apply to the following articles:

UN0323: Cartridges, power device
UN0366: Detonators for ammunition
UN0441: Charges, shaped
UN0445: Charges, explosive, commercial
UN0455: Detonators, non-electric
UN0456: Detonators, electric
UN0460: Charges, bursting, plastics bonded
UN0500: Detonator assemblies, non electric

(c) The Working Group discussed the test method proposed by Canada and considered other alternatives. The Working Group also considered the criteria that should be used for acceptance into 1.4S for the items mentioned above. Consequential amendments that would be necessary if the new test method is adopted by the Sub-committee were also discussed. A new test method, acceptance criteria, and consequential amendments were prepared by the Working Group and are reproduced in Annex 1 to this report. A majority of the Working Group supported the acceptance of the test proposed in Annex 1.

(d) The Working Group prepared a Special Provision to be applied in the Dangerous Goods List to the entries listed in paragraph (b) above. This Special Provision is reproduced in Annex 2 to this report.

5. Criteria for excluding articles from Class 1

ST/SG/AC.10/C.3/2008/54 (United States of America)
UN/SCETDG/33/INF.43 (United Kingdom)

(a) The USA has submitted …C.3/2008/54 as a first step to developing a test and criteria to be used to evaluate explosive articles that may be candidates for exclusion from Class 1 as provided in Section 2.1.1.1(b) of the Model Regulations. After considering comments of the Working Group, the USA plans to submit a subsequent paper taking those comments into account. France recalled criteria provided by Canada in the 1990s. Suggestions were made to include some form of

burn test and to consider the amount of explosive in the candidate article. The Working Group did not agree that a burn test was necessary, as the article would most likely have been subjected to the 6(c) test.

(b) Other delegations were invited to provide comments to USA as they work to refine a proposal for consideration in the next biennium.

6. Desensitized explosives

ST/SG/AC.10/C.3/2008/39 (Netherlands)

The Working Group took note of the report of the informal Working Group on Desensitized Explosives.

7. Miscellaneous proposals

(a) Definition of “Phlegmatized”

ST/SG/AC.10/C.3/2008/2/Rev.1 (Australia)

(1) The Working Group considered whether to retain the term “phlegmatized” or seek an alternative, such as the term “desensitized”. The Working Group recalled that the two words have distinct different meanings and uses within the Model Regulations and determined that both terms should be retained.

(2) The Working Group supported acceptance of the Australian proposal with some revisions and that it placed in Chapter 2.1.1.3 instead of chapter 1.2, as had been proposed. The text of the new definition is provided in Annex 3.

(b) Special packing provisions for goods of Class 1

ST/SG/AC.10/C.3/2008/26 (Australia)
UN/SCETDG/33/INF.44 (United Kingdom)

The Working Group preferred to defer consideration of the Australian proposal until next session. Additionally, the Working Group favoured the proposal provided by the UK in INF.44, but asked the UK to submit a formal proposal to the Sub-committee to give delegates time to consider the details with their national experts.

(c) Classification as a consequence of Net Explosive Quantity (NEQ)

ST/SG/AC.10/C.3/2008/32 (Australia)

Australia offered a slide presentation depicting a fireworks storage accident in Australia in which many storage containers were destroyed. The Working Group was concerned that there was evidence that many of the fireworks involved were not 1.3G (as labelled), but were actually 1.1G. The USA observed that there are

problems related to classification as a consequence of NEQ, such as the need to change classification as a transport unit moves from place-to-place picking up and/or delivering explosives. France mentioned national recommendations for limiting the NEQ in packages, but not applicable to all storage situations. Additionally, the feeling of the Working Group was that there is still much to be learned about the classification of fireworks, which is the goal of the CHAF follow-up project. The Working Group preferred that the work of CHAF continue to be used to try to resolve some of the classification problems with fireworks and did not support the concept of classification as a consequence of NEQ for all fireworks articles.

(d) Amendment to the proper shipping name of UN 3474 for inclusion of 1-HOBt Monohydrate

ST/SG/AC.10/C.3/2008/41 (ICCA)
UN/SCETDG/33/INF.45 (ICCA)

(1) ICCA reviewed results of additional testing on 1-HOBt monohydrate that had been requested during the last Working Group meeting. UK advised that since HOBt monohydrate has the water in the crystal, it does not meet the requirements of Special Provision 28 that applies to UN3474. It was felt that a new 4.1 entry without Special Provision 28 was preferable. Others in the Working Group felt that the problem could be addressed by revising Special Provision 28.

(2) The Working Group observed that the additional data presented by ICCA shows that the wetted anhydrous HOBt is really the same as the monohydrate; therefore, the Working Group recommended that UN3474 be revised to replace the wetted anhydrous form and its Special Provision 28 with the monohydrate with no Special Provision.

(3) The entry in the Dangerous Goods List is provided in Annex 3.

(e) Classification of Airbags

UN/SCETDG/33/INF.22 (Austria)

The Working Group considered the questions posed by Austria and responded as follows:

(1) To question 1, the reply was: As provided in para. 16.3.1, “The geometrical arrangement of the products should be realistic in regard to the packing method and the conditions of transport and should be such as to produce the most disadvantageous test results .”.

(2) To question 2, the reply was: No. Figure 16.6.1.1 addresses metallic fragments.

(3) To question 3, the reply was: Orientation arrows do not have to be adhered to. As provided in para. 16.3.1, "The geometrical arrangement of the products should be realistic in regard to the packing method and the conditions of transport and should be such as to produce the most disadvantageous test results."

(4) To question 4, the reply was: No.

(5) To the question, are generators for seatbelt pretensioners UN3268 or UN0432, the reply was: UN0432. The working group was not in favour of including them in Class 9.

(f) Classification table, default list for fireworks

UN/SCETDG/33/INF.32 (Germany)

No decision was taken on the proposal to limit flash composition of rockets to not more than 10%. The proposal was not supported by the Working Group because it observed that there was some information missing.

(g) Definition of flash composition as part of the default fireworks classification table

UN/SCETDG/33/INF.33 (Germany)

Germany discussed its concern that it may be impracticable to subject all fireworks substances to the time/ pressure test when the items enter the country. The Working Group discussed the responsibility for and extent of testing the substances in accordance with the suggested procedure (see INF.37). It was suggested that the sender/importer should be made responsible for submitting the data.

Other concerns regarding technical issues that Germany had raised were addressed by INF.37.

(h) Modifications to the time/ pressure test for defining flash powders

UN/SCETDG/33/INF.37 (United Kingdom)

There was unanimous support for the approach described by the UK. Technical comments should be sent to the UK to help develop a formal paper for December. The UK plans to circulate a draft for comment among the Working Group members prior to submitting to the Secretariat for the December session. Technical drawings of the modified ignition system are currently available from the UK expert.

(i) Amendment to paragraph 16.6.1.3.2 of the Manual of Tests and Criteria

UN/SCETDG/33/INF.49 (Germany)

Germany discussed its problem with the 6(c) test prescription that "The wood should extend . . . in every direction . ." The Working supported the proposal. The revised text is provided in Annex 3.

(j) Review of the UN Test Series 7

UN/SCETDG/33/INF.54 (United Kingdom)

The Working Group took note of the report of the working group on Test Series 7 and the e-mail address of the organizer of the next informal working group will be distributed.

(k) Compressed gas cylinders containing an actuating device

UN/SCETDG/33/INF.70 (United States)

The USA is seeking information as to the advisability of a proposal to allow compressed gas cylinders with an explosive actuator attached, similar to that already described in the Model Regulations for fire extinguishers under Special Provision 225. Several experts expressed the opinion that the dominant hazard would be that of the compressed gas and not of the actuator. The Working Group was invited to provide comments to the USA during the next few months. The USA will prepare a formal proposal for July 2009.

8. GHS related issues

(a) Screening test for substances which may have explosive properties and consequential changes. Introduction of additional criteria

ST/SG/AC.10/C.3/2008/40 (ICCA)

ICCA discussed difficulties in performing classification tests on pharmaceuticals (cost of material, carcinogenicity, hazards to those performing tests, etc.) and proposed a screening test to assess detonation behaviour for new substances suspected of having explosive properties. Members of the Working Group offered several comments and encouraged ICCA to submit a paper for a future session.

(b) Physical hazards; substances having explosive properties

ST/SG/AC.10/C.3/2008/43 (Germany)
UN/SCETDG/33/INF.71 (Germany)

Germany discussed their rationale to alter the sequence of test performance under GHS to perform Test Series 3 first as it utilizes smaller samples than the other tests. The Working Group did not support the proposal.

(c) Classification of Ammonium Nitrate Emulsions

UN/SCETDG/33/INF.42 (United Kingdom)

The Working Group supported the proposals from the UK as shown in Annex 4.

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ANNEX 1 TO THE REPORT OF THE WORKING GROUP

Test 6(d): Test to Evaluate Hazardous Effects Arising from Accidental Ignition or Initiation

Proposal

1. Replace Section 10.4.2.3 of the Manual of Tests and Criteria with the following:

"10.4.2.3 The results from the four types of series 6 tests are used to determine which division, amongst Divisions 1.1, 1.2, 1.3 and 1.4, corresponds most closely to the behaviour of a product if a load is involved in a fire resulting from internal or external sources, or an explosion from internal sources (boxes 26, 28, 30, 32 and 33 of Figure 10.3). The results are also necessary to assess whether a product can be assigned to Compatibility Group S of Division 1.4 and whether or not it should be excluded from Class 1 (boxes 35 and 36 of Figure 10.3). The four types of test are:

Type 6 (a): A test on a single package to determine if there is mass explosion of the contents;

Type 6 (b): A test on packages of an explosive substance or explosive articles, or non-packaged explosive articles, to determine whether an explosion is propagated from one package to another or from a non-packaged article to another;

Type 6 (c): A test on packages of an explosive substance or explosive articles, or non-packaged explosive articles, to determine whether there is a mass explosion or a hazard from dangerous projections, radiant heat and/or violent burning or any other dangerous effect when involved in a fire; and

Type 6 (d): A test on an unconfined package of explosive articles to which SPXXX applies, to determine if there are hazardous effects outside the package arising from accidental ignition or initiation of the contents."

2. Replace Section 10.4.3.4 with the following:

"10.4.3.4 Test types 6 (a), 6 (b), 6 (c) and 6 (d) are performed in alphabetical order. However, it is not always necessary to conduct all four types of tests. Test type 6 (a) may be waived if explosive articles are carried without packaging or when only one article is in the package. Test 6 (b) may be waived if, in each type of 6 (a) test:

(a) The exterior of the package is undamaged by internal detonation and/or ignition; or

(b) The contents of the package fail to explode, or explode so feebly as would exclude propagation of the explosive effect from one package to another in test type 6 (b).

Test type 6 (c) may be waived if, in a type 6 (b) test, there is practically instantaneous explosion of virtually the total contents of the stack. In such cases the product is assigned to Division 1.1.

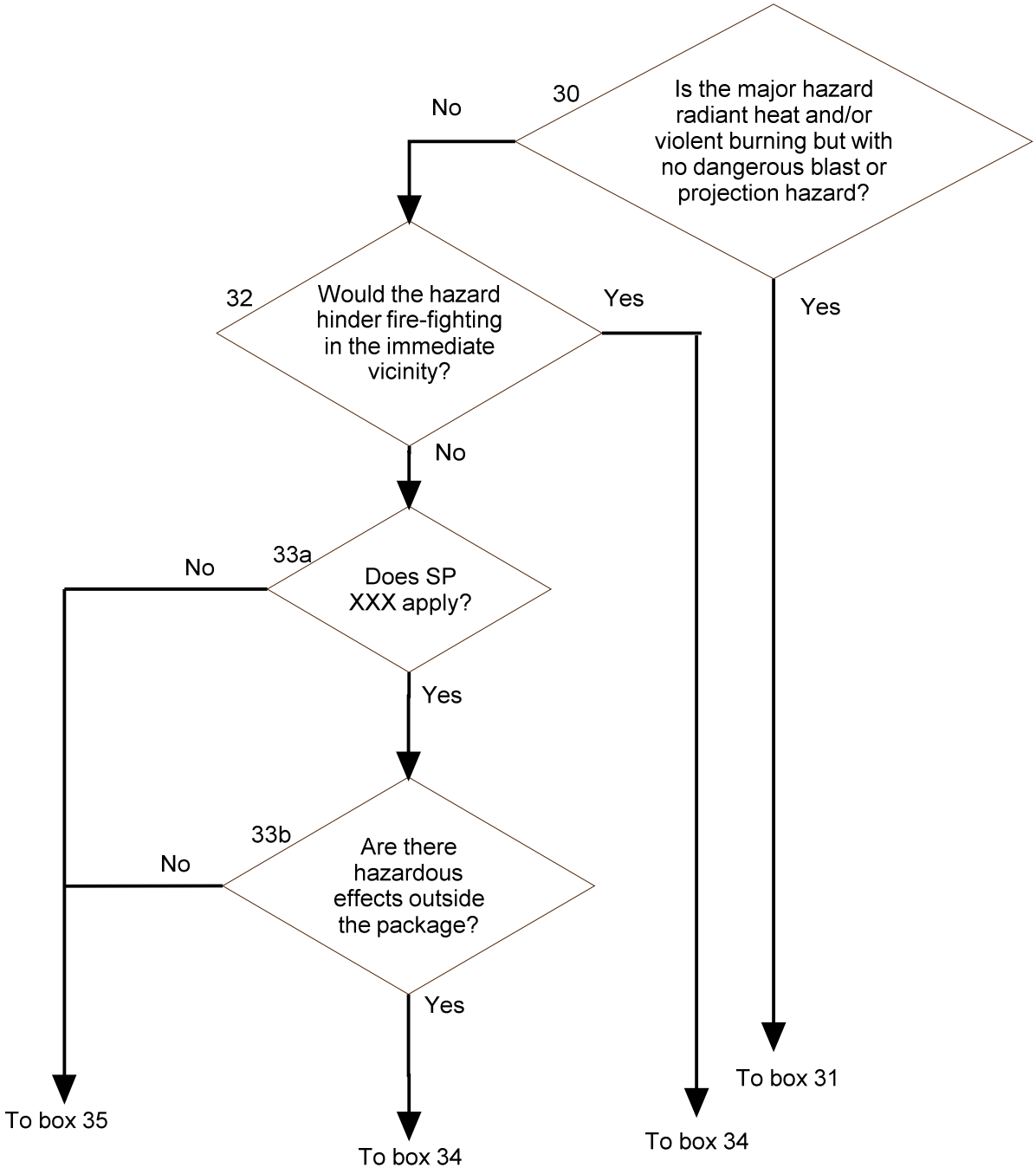
Test type 6 (d) is a test used to determine whether a 1.4S classification is appropriate and is only used if:

(a) The results of test series 6 (a), 6 (b) or 6 (c) indicate that a 1.4S classification may be applicable; and

(b) The functioning of the product as intended would be expected to produce effects more severe than those obtained in the 6 (c) test.”

The results of test 6 (c) and 6 (d) indicate if 1.4S is appropriate, otherwise the classification is 1.4 other than S.

3. To amend Figure 10.3 and Figure 10.8 as shown on below.


30
Is the major hazard radiant heat and/or violent burning but with no dangerous blast or projection hazard?
No
Yes
32
Would the hazard hinder fire-fighting in the immediate vicinity?
Yes
No
33a
Does SP XXX apply?
No
Yes
33b
Are there hazardous effects outside the package?
No
Yes
To box 31
To box 34
To box 35
To box 34

4. Replace Section 16.1 with the following:

"16.1 Introduction

16.1.1 The results from the four types of series 6 tests are used to determine which division, amongst Divisions 1.1, 1.2, 1.3 and 1.4, corresponds most closely to the behaviour of a product if a load is involved in a fire resulting from internal or external sources, or an explosion from internal sources (boxes 26, 28, 30, 32 and 33 of Figure 10.3). The results are also necessary to assess whether a product can be assigned to Compatibility Group S of Division 1.4 and whether or not it should be excluded from Class 1 (boxes 35 and 36 of Figure 10.3). The four types of test are:

Type 6 (a): A test on a single package to determine if there is mass explosion of the contents;

Type 6 (b): A test on packages of an explosive substance or explosive articles, or non-packaged explosive articles, to determine whether an explosion is propagated from one package to another or from a non-packaged article to another;

Type 6 (c): A test on packages of an explosive substance or explosives articles, or non-packaged explosive articles, to determine whether there is a mass explosion or a hazard from dangerous projections, radiant heat and/or violent burning or any other dangerous effect when involved in a fire; and

Type 6 (d): A test on an unconfined package of explosive articles to which SPXXX applies, to determine if there are hazardous effects outside the package arising from accidental ignition or initiation of the contents."

5. Replace Section 16.2 with the following:

"16.2 Test methods

16.2.1 The test methods currently in use are listed in Table 16.1.

Table 16.1: TEST METHODS FOR TEST SERIES 6

Test code	Name of Test	Section
6 (a)	Single package test[a]	16.4.1
6 (b)	Stack test[a]	16.5.1
6 (c)	External fire (bonfire) test[a]	16.6.1
6 (d)	Unconfined package test[a]	16.7.1

[a] *Recommended test.*

16.2.2 Test types 6 (a), 6 (b), 6 (c) and 6 (d) are performed in alphabetical order. However, it is not always necessary to conduct tests of all types. Test 6 (a) may be waived if explosive articles are carried without packaging or when the package contains only one article. Test type 6 (b) may be waived if in each type 6 (a) test:

(a) The exterior of the package is undamaged by internal detonation and/or ignition; or

(b) The contents of the package fail to explode, or explode so feebly as would exclude propagation of the explosive effect from one package to another in test type 6 (b).

Test type 6 (c) may be waived if, in a type 6 (b) test, there is practically instantaneous explosion of virtually the total contents of the stack. In such cases the product is assigned to Division 1.1.

Test type 6 (d) is a test used to determine whether a 1.4S classification is appropriate and is only used if:

(a) The results of test series 6 (a), 6 (b) or 6 (c) indicate that a 1.4S classification may be applicable; and

(b) The functioning of the product as intended would be expected to produce effects more severe than those obtained in the 6 (c).

The results of test 6 (c) and 6 (d) indicate if 1.4S is appropriate, otherwise the classification is 1.4 other than S.

16.2.3 If a substance gives a "—" result (no propagation of detonation) in the Series 1 type (a) test, the 6 (a) test with a detonator may be waived. If a substance gives a "—" result (no or slow deflagration) in a Series 2 type (c) test, the 6 (a) test with an igniter may be waived.

16.2.4 Explanations of certain terms used in the assignment of divisions and compatibility groups are given in the Glossary in Appendix B of the Model Regulations (e.g. mass explosion, pyrotechnic substance, entire load, total contents, explode, explosion of the total contents)."

6. Replace 16.6.1.4.6 with the following:

If none of the events occur which would require the product to be assigned to Division 1.1, 1.2, 1.3 or 1.4 other than Compatibility Group S, the thermal, blast, or projection effects would not significantly hinder fire-fighting or other emergency response efforts in the immediate vicinity and if hazardous effects are confined within the package, the product is assigned to Division 1.4 Compatibility Group S.

7. Insert a new Section 16.7 after Section 16.6 as follows:

"16.7 Series 6 type (d) test prescription

16.7.1 Test 6 (d): Unconfined package test

16.7.1.1 Introduction

This is a test on a single package to determine if there are hazardous effects outside the package arising from accidental ignition or initiation of the contents.

16.7.1.2 *Apparatus and materials*

The following items are required:

(a) A detonator to initiate the article; or

(b) An igniter just sufficient to ensure ignition of the article; and

(c) A sheet of 3.0 mm thick mild steel to act as a witness plate.

Video equipment may be used.

16.7.1.2 *Procedure*

16.7.1.3.1 The test is applied to packages of explosive articles in the condition and form in which they are offered for transport. Where explosive articles are to be carried without packaging, the tests should be applied to the non-packaged articles. The decision to use either an initiating stimulus or an igniting stimulus is based on the following considerations.

16.7.1.3.2 For packaged articles:

(a) Articles provided with their own means of initiation or ignition:

The functioning of an article near the centre of the package is stimulated by the article's own means of initiation of ignition. Where this is impracticable, the article's own means of initiation or ignition is replaced by another form of stimulus having the required effect;

(b) Articles not provided with their own means of initiation or ignition:

(i) An article near the centre of the package is caused to function in the designed mode; or

(ii) An article near the centre of the package is replaced by another article which can be caused to function with the same effect.

16.7.1.3.3 The package is placed on a steel witness plate on the ground without confinement.

16.7.1.3.4 The article should be initiated and observations made on the following: denting or perforation of the witness plate beneath the package, a flash or flame capable of igniting an adjacent material, disruption of the package causing projection of the explosives contents; or full perforation of the packaging by a projection. ***A safe waiting period, prescribed by the test agency, should be observed after initiation.*** The test should be performed three times, in different orientations, unless a decisive result is observed earlier. If the results of the recommended number of tests do not enable unambiguous interpretation of the results, the number of tests should be increased.

16.7.1.4 *Test criteria and method of assessing the results*

Inclusion in Compatibility Group S requires that any hazardous effects arising from functioning of the articles in this test are confined within the package. Evidence of a hazardous effect outside the package includes:

(a) Denting or perforation of the witness plate beneath the package;

(b) A flash or flame capable of igniting an adjacent material;

(c) Disruption of the package causing projection of the explosives contents; and

(d) Full perforation of the packaging by a projection;

The competent authority may wish to take into account the expected effect of the initiator when assessing the results of the test, if these are expected to be significant when compared to the articles being tested. If there are hazardous effects outside the package, then the product is excluded from Compatibility Group S.

16.7.1.5 *Examples of results*

[to be provided for the December meeting]

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ANNEX 2 TO THE REPORT OF THE WORKING GROUP

Special Provision XXX

Proposal

1. Add a new Special Provision to Section 3.3.1 of the Model Regulations as follows:

SPXXX This designation shall only be used if the explosive article has demonstrated in test type 6(d) that any hazardous effects arising from functioning are confined within the package.

2. This Special Provision should be noted in the Dangerous Goods list against the following entries UN0323, UN0366, UN0441, UN0445, UN0455, UN0456, UN0460 and UN0500.

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ANNEX 3 TO THE REPORT OF THE WORKING GROUP

Miscellaneous Amendments to the Model Regulations and the Manual of Test and Criteria

1. In Chapter 2.1.1.3 of the Model Regulations add the new definition for the term "phlegmatized", to read as follows:

"(d) *Phlegmatized* means the addition of a substance (or "phlegmatizer") to an explosive to enhance its safety in handling and transport. The phlegmatizer renders the explosive insensitive, or less sensitive, to the following actions: heat, shock, impact, percussion or friction. Typical phlegmatizing agents include, but are not limited to: wax, paper, water, polymers (such as chlorofluoropolymers), alcohol and oils (such as petroleum jelly and paraffin)."

2. Revise the entry for UN3474 in the Dangerous Goods List as shown below:

UN No.	Name and description	Class or div.	Subsi-diary risk	UN packing group	Special provi-sions	Limited and excepted quantities		Packagings and IBCs		Portable tanks and bulk containers	
								Packing instruc-tion	Special packing provisions	Instruc-tions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
	3.1.2	2.0	2.0	2.0.1.3	3.3	3.4	3.5	4.1.4	4.1.4	4.2.5 4.3.2	4.2.5
3474	1-HYDROXYBENZOTRIAZOLE, MONOHYDRATE	4.1		I		0	E0	P406	PP48		

3. Amend the last sentence of paragraph 16.6.1.3.2 of the Manual of Tests and Criteria, 4th revised edition, to read (amendment in bold print):

"16.6.1.3.2 . . . The wooden **laths** should extend beyond the packages or unpacked articles to a distance of at least 1.0 m in every **horizontal** direction and the lateral distance between the laths should be about 100 mm."

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ANNEX 4 TO THE REPORT OF THE WORKING GROUP

Amendments to the GHS Document

1. Amend the title of Figure 2.1.4 to read:

"Procedure for the classification of ammonium nitrate emulsion, suspension or gel (ANE)"

2. Amend the final box in Figure 2.1.4 to read:

"ANE substance/mixture shall be classified as a Category 2 oxidizing liquid or a Category 2 oxidizing solid; (Chapters 2.13 or 2.14)"