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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 Transport of Dangerous Goods

Forty-eighth session
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Item 2 (b) of the provisional agenda
Explosives and related matters: review of test series 6

Additional examination criteria for Division 1.4

Transmitted by the expert from Canada[1]

Introduction

1. At the thirty-seventh session of the Sub-Committee, Canada provided an analysis of the current procedure to assign to Division 1.4 in informal document INF.40 (37th session). The analysis included examples of articles that contain significant quantities of explosives that may, at present be assigned to Division 1.4 (other than S) based on Test Series 6 (a) – 6 (c), present greater than "minor hazards" if they were to initiate. As summarized in informal document INF.73 (37th session), the Working Group on Explosives agreed that additional examination criteria for Division 1.4 may be necessary and encouraged the development of a proposal.

2. The expert from Canada proposes to amend Test Series 6(d) with the addition of examination criteria to ensure that items that have not been assigned to Divisions 1.1, 1.2 and 1.3 do not default to Division 1.4 in addition to its original purpose of ensuring that products are appropriately assigned to Compatibility Group S.

3. The Test Series 6 (d) apparatus and procedure would require amendments to determine a blast overpressure.

4. The additional examination criteria that are being proposed are consistent with some of the criteria from Test Series 6 (c) for assigning a product to Division 1.4 and to a compatibility group other than Compatibility Group S.

[1] In accordance with the programme of work of the Sub-Committee for 2015–2016 approved by the Committee at its seventh session (see ST/SG/AC.10/C.3/92, paragraph 95 and ST/SG/AC.10/42, para. 15).

5. Similarly to the current Tests Series 6 (d), it is being proposed to limit the proposed additional examination criteria to a defined list of entries that are of concern.

Proposal

6. Amend Section 16.7 (as laid down in ST/SG/AC.10/11/Rev.5 as amended by ST/SG/AC.10/42/Add.2) 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 it presents a significant hazard during transport and 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 substance or article or an igniter just sufficient to ensure ignition of the substance or article (see 16.7.1.3.2); ~~and~~

(b) A sheet of 3 mm thick mild steel to act as a witness plate; and

(c) A blast pressure probe or sensor with appropriate signal conditioning and recording equipment. Video equipment may be used.

16.7.1.3 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 donor 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. The blast pressure should be recorded. **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*

16.7.1.4.1 The following criteria are used to answer the questions in Figure 10.3 (box 33) in order to classify the product.

16.7.1.4.2 If a mass explosion does not occur but the following occurs:

(a) A peak incident blast pressure of more than 35 kPa at a distance of 2.5 m (radial distance from the centre of explosion)

Then the product is assigned to Division 1.1.

l6.7.1.4.3 If none of the events occur which would require the product to be assigned to Division 1.1 or 1.2 but anyone of the following events occurs:

(a) A fireball or jet of flame which extends beyond 4 m from the edge of the package or unpackaged article;

(b) A fiery projection emanating from the product is thrown more than 15 m from the edge of the packages or unpackaged articles

Then the product is assigned to Division 1.3.

~~16.7.1.4~~ 16.7.1.4.4 If none of the events occur which would require the product to be assigned to Division 1.1, 1.2 or 1.3, then the product is assigned to Division 1.4. 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 that ignites an adjacent material such as a sheet of 80 ± 3 g/m² paper at a distance of 25 cm from the package;

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

(d) A projection which passes completely through the packaging (a projection or fragment retained or stuck in the wall of the packaging is considered as non-hazardous).

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.

7. To ensure that the revised Test Series 6(d) is applied to UN entries of concern, the expert from Canada recommends that the following entries be subject to SP 347:

- UN 0276 – CARTRIDGES, POWER DEVICE (1.4C)
- UN 0350 – ARTICLES, EXPLOSIVES, N.O.S. (1.4B)
- UN 0351 - ARTICLES, EXPLOSIVES, N.O.S. (1.4C)
- UN 0352 - ARTICLES, EXPLOSIVES, N.O.S. (1.4D)
- UN 0444 – CHARGES, EXPLOSIVE, COMMERCIAL without detonator (1.4D)
- UN 0472 - ARTICLES, EXPLOSIVES, N.O.S. (1.4F)
- UN 0479 – SUBSTANCES, EXPLOSIVE, N.O.S. (1.4C)
- UN 0480 - SUBSTANCES, EXPLOSIVE, N.O.S. (1.4D)