

## 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

Twenty-fifth session  
Geneva, 5-14 July 2004  
Item 3 (a) of the provisional agenda

### EXPLOSIVES, SELF-REACTIVE SUBSTANCES AND ORGANIC PEROXIDES

#### Classification criteria for fireworks

Transmitted by the expert from the Netherlands

#### **1. Introduction**

At the 24th session of the Sub-Committee of Experts on the Transport of Dangerous Goods a Working Group on explosives continued the development of the default table for the classification of fireworks.

During that Working Group meeting a discussion on the percentage of flash powder (as loose powder and/ or report effects) in colour shells, rockets and mines took place. At that time it was anticipated that results of a European research project would be available to support or contradict the 25% limit for flash powder at the 1.1/1.3 boundary.

It was decided to:

- harmonize the percentage, for the time being, on 25% flash composition in shells, rockets and mines;
- put square brackets around this figure; and
- decide at the next Sub-Committee, on the basis of test results, on the acceptable percentage.

(see ST/SG/AC.10/C.3/48/Add.1; paragraph 6 to 8)

Because it became evident, that test results from the European project CHAF may not be available in time for the July meeting, the experts from the Netherlands and Germany decided to jointly perform experiments in order to provide data to enable the Working Group to make a decision on the percentage of flash powder.

#### **2. Test set up**

For reasons of convenience, the tests are performed with 80 mm bag mines with 15 report effects, each containing 2.44 g of flash powder (70/30; KClO<sub>4</sub>/ Al). The total mass of pyrotechnic substance was 142.33 g, resulting in 25.7% flash powder in the article.

In case the test with 25% flash powder would give a mass explosion, the bag mines can easily be opened to remove a number of report effects to obtain a product with a lower percentage of flash powder.

The articles were packed in fibreboard boxes, each box containing 32 articles without inner packaging or other separators.

Two 6(b) tests are performed at the BAM test site in Horstwalde, near Berlin, Germany. The first test is performed with three boxes and the second with four boxes.

A steel witness plate is placed on wooden beams at the bottom of a hole in the ground, around 1 meter deep. The boxes under test are placed on the witness plate and one of the boxes is equipped with an electric igniter to initiate one article. The hole is filled with sand, during the first test there is a layer of sand of about 0.7 m on top of the boxes, during the second test this was around 1 m.

Video recordings and photographs are taken during the tests and can be presented at the Working Group meeting in July 2004.

### **3. Results**

The first test did not result in a mass explosion (witness plate undamaged, hardly any scattering of confining materials, no significant blast and several individual reactions during about 8 seconds).

The second test is performed with more confinement to represent the worst case situation. Clearly, the reaction was more rapid but not a mass explosion (witness plate undamaged, hardly any scattering of confining material, no significant blast and individual reactions within 3 seconds).

The results will be presented at the Working Group meeting in July.

### **4. Conclusion**

From the evidence obtained during the tests, the experts from the Netherlands and Germany draw the conclusion that it is very unlikely to observe a mass explosion with bag mines with 25% flash powder distributed in report subunits within the article. Further on, we believe that the reaction obtained with bag mines is representative for other articles such as shells and rockets, and that the results can be used for those articles as well.

### **5. Proposal**

The experts from the Netherlands and Germany agree in the interpretation of the tests and from this, the expert from the Netherlands proposes to remove the square brackets around all the 25% numbers in the column with the heading "Calibre/Mass" for the following articles:

shell, spherical or cylindrical;

?? rockets; and

?? mines

?? (10 times in total)

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