

**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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**PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS  
ON THE TRANSPORT OF DANGEROUS GOODS**

Model Regulations on the Transport of Dangerous Goods

Comments on ST/SG/AC.10/C.3/2006/84

Transmitted by the expert from Germany

The expert from Germany has the following considerations and concerns regarding the proposal by the expert of the United Kingdom suggesting to introduce a test based definition of flash composition as referred to in Note 2 to 2.1.3.5.5 (note to the default fireworks classification table).

While the expert from Germany recognises the outlined problem, there are several reasons why it seems premature to decide for a change of the model regulations. Before taking such a step several issues should be addressed and resolved, which may perhaps best be done through discussing in the working group explosives?

The following concerns are raised:

1. The default fireworks classification table has been introduced in order to give authorities a simple tool at hand, which enables them to quickly assign default classifications to fireworks in case of absence of test results. This concept (and the easy usability) is abandoned when a test in addition to the default table is introduced.  
Furthermore several practical questions arise, when a test on composition level is introduced, as to what the consequences are and what the procedure shall be.
2. In ST/SG/AC.10/C.3/2006/84 it is proposed to use the UN 2(c)(i)-test to identify compositions of comparable power like flash/report compositions.  
The UN 2(c)(i)-test was designed to identify, whether a substance ignited under confinement deflagrates "... with explosive violence at pressures attained with substances in normal commercial packages". The test outcome would be used to consider a substance belonging to class 1, if the reaction spans a given pressure range within a given time or shorter.

To the opinion of the expert of Germany, the UN 2(c)(i)-test gives only a rough result indicating explosive behaviour (under confinement) and is not adequate for subtle discriminations.

3. As can be seen in the table of data (UN/SCETDG/30/INF.3, i. e. Annex to document ST/SG/AC.10/C.3/2006/84) and as observed by the expert from the Netherlands in document UN/SCETDG/30/INF.24 the standard deviation of rise-time data seems to be very large especially when 0.5 g of substance are used. General experience shows that it is very difficult to reliably and reproducibly ignite such small amounts as 0.5 g of pyrotechnic composition. While the UN 2(c)(i)-test prescribes a fixed pressure intervall, it may be necessary to view the entire pressure trace, since dependent on gas production and/or other properties of the composition the relevant reaction behaviour may take place in a range of lower or higher pressures.

The UN 2(c)(i)-test may in some cases only record the initial phase of the deflagration and the relevant part of the reaction and pressure development may lie above the monitored pressure (which mostly is the case).

4. It is of major importance that a newly introduced criterion serves its purpose reliably. Looking carefully at the data presented in UN/SCETDG/30/INF.3 it seems extremely difficult to pick a suitable threshold value for the boundary between flash/report compositions and other compositions. In the interval of around 3 ms to 6 ms violently reacting compositions are mixed with different types of black powder. In the case black powder would suddenly (or unintentionally) be regarded as flash composition, this would have consequence for virtually all types of fireworks, which then would have to be classified mostly as 1.1.

This becomes strikingly obvious when a currently 1.4 banger with 3 g of black powder suddenly becomes 1.1.

5. Several of the above mentioned technical drawbacks can be tackled through a modification of the UN 2(c)(i)-test, when the tested amount was larger (at least 2 g), the volume was accordingly adjusted, and the full pressure trace was recorded (i. e. usage of a bursting disc only above e.g. 200 bar).

While the expert from Germany is generally supportive of a thorough investigation of new pyrotechnic compositions under confinement, it seems too early to include a test in the model regulations. In case this questions would be discussed in the working group explosives, Germany would be prepared to produce scientific input and to provide data generated in such a context.

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