

**Committee of Experts on the Transport of Dangerous Goods  
and on the Globally Harmonized System of Classification  
and Labelling of Chemicals**

11 June 2010

Sub-Committee of Experts on the  
Transport of Dangerous Goods

**Thirty-seventh session**

Geneva, 21–30 June 2010

Item 3 of the provisional agenda:

**Listing, classification and packing**

Sub-Committee of Experts on the Globally  
Harmonized System of Classification  
and Labelling of Chemicals

**Nineteenth session**

Geneva, 30 June–2 July 2010

Item 2 (a) of the provisional agenda:

**Updating of the third revised edition of the  
Globally Harmonized System of Classification  
and Labelling of Chemicals (GHS): Physical  
hazards**

## **UN Test O.1: Test for oxidizing solids**

### **Note by the secretariat**

The secretariat has received from the secretariat of IGUS the communication below, which the sub-committees may wish to consider, subject to a request by a full member of the sub-committees since IGUS has no official status with any of them.

### **Introduction**

1. IGUS is the International Group of Experts on the Explosion Risks of Unstable Substances. IGUS was set up in 1962 with the aim to harmonize test methods used by different countries to identify and quantify the explosive properties of unstable materials. Over the years, IGUS has continued to offer scientists, who are advisers to their governments, and others, a forum to exchange data and information. The Energetic and Oxidizing Substances (EOS) working group as a sub-group of IGUS is dealing with test methods, classification and safety aspects relating to organic peroxides, self-reactive substances and other energetic substances, fertilizers, ammonium nitrate and oxidizers.
2. A number of experts of IGUS are also delegates to either the SCETDG or the SCEGHS.

### **Background information on test O.1**

3. Test O.1 (test for oxidizing solids) of the UN Manual of Tests and Criteria determines the oxidizing properties of solid substances. The GHS refers to this test method as well for the purposes of classification of oxidizing solids.
4. Test O.1 aims at determining the potential of a solid substance to increase the burning rate or burning intensity of a combustible material when the two are thoroughly mixed. Therefore, the substance to be evaluated is mixed with cellulose in different mass ratios. The burning characteristics of these mixtures are compared with reference mixtures of the same mass ratios of potassium bromate and cellulose. The packing group for transport or the hazard category according to the GHS, respectively, are assigned based on the results of the comparison of the measured burning times.

## Problems associated with test O.1

5. The reference substance potassium bromate ( $\text{KBrO}_3$ ) is classified as oxidizing solid, category 1, for its carcinogenicity, category 1B, and its oral acute toxicity, at least category 3. As the test procedure is rather time consuming (e.g. preparation of the reference mixtures), contact of the tester with potassium bromate cannot always be avoided. This addresses a significant health issue.

6. In a previous interlaboratory comparison a wide range of combustion times was found even for the reference mixtures. The reason is that the tester determines the burning time by visually judging the start and the end of the reaction. This judgement is highly subjective and as a result may lead to different classifications of one and the same substance.

## Proposed way forward

7. IGUS EOS formed an ad-hoc working group to work on this subject. This group recently carried out a further interlaboratory comparison with the aim to overcome the problems associated with the reference substance and the procedure of test O.1.

8. The final report of the interlaboratory comparisons will be published soon. It is the intention of the working group to present the report and the conclusions it draws based on the interlaboratory comparisons either in the next meeting or in the July session 2011.

9. According to the preliminary results of the interlaboratory comparison the suggestion of the working group will be to replace the reference substance by calcium peroxide ( $\text{CaO}_2$ ). Calcium peroxide is classified as oxidizing solid, category 1, for its skin irritation, category 2, and its serious eye damage, category 1, and therefore is beneficial compared to the current reference substance potassium bromate due to its carcinogenicity.

10. In the course of the interlaboratory comparison it was also investigated whether the subjective measurement of the burning time could be replaced by a more objective method based on a gravimetric procedure. The preliminary results of the interlaboratory comparison suggest that the gravimetric method is actually capable of distinguishing better between the packing groups and categories, respectively.

11. The working group welcomes any comments or suggestions of the experts of both Sub-Committees to this document and proposes to include this issue in the program of work for the biennium 2011–2012.

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