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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

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

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**UPDATING OF THE SECOND REVISED EDITION OF THE GLOBALLY HARMONIZED
SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS)**

Physical hazards

Clarification and updating of some issues regarding flammable liquids addressed in the GHS

Transmitted by the expert from Germany*

Introduction

1. The issues of this document address the unsolved open item of ST/SG/AC.10/C.3/2007/11 and ST/SG/AC.10/C.4/2007/2 on sustained combustion.

* In accordance with the programme of work of the Sub-Committee for 2007-2008 approved by the Committee at its third session (refer to ST/SG/AC.10/C.3/60 para. 100 and ST/SG/AC.10/C.3/34, para. 14)

Sustained combustion

2. Currently NOTE 2 to table 2.6.1 in chapter 2.6 of the GHS refers to the *sustained combustibility test L.2, Part III, section 32 of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*.
3. According to this Note the sustained combustibility test is applicable to liquids with a flash point of more than 35 °C.
4. However, the test temperatures (60.5 °C and 75 °C) given in the sustained combustibility test L.2, Part III, Section 32 of the *UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria* are not suitable for testing liquids of category 4. The test temperatures of 60.5 °C and 75 °C give reliable results only for category 3 liquids. Therefore, NOTE 2 should be restricted accordingly to category 3.

Proposal

5. Amend NOTE 2 of the GHS, section 2.6.2 to read as follows:

“NOTE 2: Liquids with a flash point of more than *or equal to* 35 °C *and less than or equal to* 60 °C may be regarded as flammable liquids of category 4 for some regulatory purposes if negative results have been obtained in the sustained combustibility test L.2, Part III, Section 32 of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria. *In case flammable liquids of category 4 are not part of the regulation (e.g. transport) they may be regarded as non-flammable liquids if negative results have been obtained in the sustained combustibility test L.2, Part III, Section 32 of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria.*”

Additional information on sustained combustibility

6. Most flammable liquids with a flash point between 35 °C and 60 °C show sustained combustion when tested according to *L.2, Part III, Section 32 of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*.” Only a minority of the liquids with flash point between 35 °C and 60 °C do not support combustion.
7. Mostly these liquids not supporting combustion contain high amounts of components which do not burn e.g. water. As a result, the fire load corresponds only to the amount of the flammable components.

Additional information for a future proposal for liquids of category 4

8. Exploratory tests for sustained combustibility of pure liquids and mixtures at 95 °C and 110 °C showed that only in some cases (flash points above 85 °C) combustion is not supported (see table). This means that the fire load of liquids having lower flash points (close to 60 °C) is

comparable to the fire load of liquids having a flash point just below 60 °C and must be considered higher than that of liquids of category 3 not sustaining combustion.

9. Therefore it is not justified to exempt category 4 liquids without testing for the same regulatory purposes for which note 2 is applied to category 3 liquids.

10. In order to introduce an exemption similar to that for liquids of category 3, it should be checked whether sustained combustion may also be a suitable criterion for category 4 liquids for some regulatory purposes (e.g. storage). If so, appropriate test temperatures for category 4 liquids will have to be fixed.

11. For flammable liquids of category 3 the test temperatures for the sustained combustibility test amount to 60 °C (the upper limiting value of cat. 3) and 75 °C. If the same approach is adopted for flammable liquids of category 4, the test temperatures for the sustained combustibility test would have to be 93°C and 108°C.

Table: Sustained Combustion Tests for category 4 liquids

Test conditions		Liquid (pure Substances)					
Temperature °C	time s	Cyclohexanol Fp: 62°C	1-Octanol Fp: 84°C	1-Nonanol Fp: 96°C	Methylpyrrolidone Fp: 86°C	n-Dodecane Fp: 80°C	1-Heptanol Fp: 70°C
95	60	+	+	-	-	+	+
	30	+	+	-	-	+	+
110	60	+	+	+	+	+	+
	30	+	+	+	+	+	+

Test conditions		Liquid (mixtures)					
Temperature °C	time s	Methylpyrrolidon + Water (98 + 2) Fp: 75°C	n-Octanol + n-Hexanol (92 + 8) Fp: 81°C	Methanol + Water (95 + 5) Fp: 73°C	Commercial mixture of hydrocarbons Fp:63°C	Commercial mixture of hydrocarbons Fp: 72°C	Commercial mixture of hydrocarbons Fp: 97°C
95	60	+	+	-	+	+	-
	30	+	+	-	+	+	-
110	60	-	+	-	+	+	-
	30	-	+	-	+	+	-