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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

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

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ISSUES RELATING TO THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS)

Physical hazards

Self-heating substances and mixtures

Transmitted by the expert from Germany[1]

Introduction

1. The UN Model Regulations on the Transport of Dangerous Goods, sub-section 2.4.3.1.2 contain the following information on self-heating substances and mixtures:

> "2.4.3.1.2 Self-heating of substances, leading to spontaneous combustion, is caused by reaction of the substance with oxygen (in the air) and the heat developed not being conducted away rapidly enough to the surroundings. Spontaneous combustion occurs when the rate of heat production exceeds the rate of heat loss and the auto-ignition temperature is reached."

[1] 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.10/34, para. 14).

2. The GHS contains in section 2.11.1 a note with the same wording.

3. The last sentence of these clauses could be misunderstood in a way that spontaneous combustion occurs only if two (independent) conditions are precedent:

- The rate of heat production exceeds the rate of heat loss **and**
- The auto-ignition temperature (self-ignition temperature) is reached.

Explanation

4. If a given volume of combustible material is stored above the self-ignition temperature the rate of heat production inside the material will exceed the rate of heat loss. Hence, the stored material will ignite after a certain time (the induction time). And vice versa: If a given volume of combustible material is stored below the self-ignition temperature the rate of heat production inside the material cannot exceed the rate of heat loss. Hence, the stored material does not ignite.

5. This makes clear that these conditions are linked and cannot be met independently. The wording should be such that this connection becomes clear.

6. In addition, the term auto-ignition temperature should be replaced by self-ignition temperature. Auto-ignition temperature is mainly used in connection with liquids and gases. The use of the term self-ignition temperature would align the Model Regulations with the Manual of Tests and Criteria, see 33.3.1.3.3 of the Manual, furthermore it would correspond to the wording used later in the GHS, see 2.11.2.2, Note 2 of the GHS. (Additionally it would be in line with EN 15188 "Determination of the spontaneous ignition behavior of dust accumulations" in which the self-ignition temperature is defined as follows: The self-ignition temperature T_{SI} is the highest (storage) temperature at which a given volume of dust just does not ignite.)

Proposal

7. Amend the last sentence in sub-section 2.4.3.1.2 of the UN Model Regulations to read as follows (amended text is underlined):

> "2.4.3.1.2 Self-heating of substances, leading to spontaneous combustion, is caused by reaction of the substance with oxygen (in the air) and the heat developed not being conducted away rapidly enough to the surroundings. <u>The self-ignition temperature is the minimum ambient temperature of a substance volume which leads to self-heating followed by spontaneous combustion after a certain time (induction time).</u> ~~Spontaneous combustion occurs when the rate of heat production exceeds the rate of heat loss and the auto-ignition temperature is reached~~.

8. Amend the last sentence of the note in section 2.11.1 of the GHS to read as follows (amended text is underlined):

"NOTE: *Self-heating of substances or mixtures, leading to spontaneous combustion, is caused by reaction of the substance or mixture with oxygen (in the air) and the heat developed not being conducted away rapidly enough to the surroundings.* *<u>The self-ignition temperature is the minimum ambient temperature of a substance volume which leads to self-heating followed by spontaneous combustion after a certain time (induction time).</u>* *~~Spontaneous combustion occurs when the rate of heat production exceeds the rate of heat loss and the auto-ignition temperature is reached.~~"*