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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

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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

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Work on the Globally Harmonized System of Classification and Labelling of Chemicals: Work of the Sub-Committee of Experts on the Transport of Dangerous Goods on matters of interest to the Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals

Packing group assignment for flammable solids other than metal powders

Submitted by the expert from China*

I. Introduction

1. In the current versions of the *Model Regulations* and the *Globally Harmonized System for Classification and Labelling of chemicals (*GHS), a wetted zone test is required for flammable solids other than metal powders to determine whether they belong to packing group II or III (Category 1 or Category 2 in the GHS). According to the *Manual of Tests and Criteria*, the wetted zone is formed by applying a wetting solution to ridge of the pile drop by drop, ensuring the whole cross-section is wetted without loss of liquid from the sides. The wetting solution should be applied over the shortest possible length of the pile consistent with avoiding loss from the sides. Liquid is allowed to be added to a hollow up to 3 mm deep and 5 mm in diameter in the top of the pile.

2. In spite of the detailed description on how to conduct this wetted zone test in the *Manual of Tests and Criteria*, there are many difficulties in practice. For example:

(a) To avoid water from rolling off the sides of the pile, it is permitted to prepare wetting solutions with less than 1% of total active matter by adding wetting agents which are free from combustible diluents into water. However, to find a suitable wetting agent for each solid to be tested is not always achievable.

(b) Due to loose filling of the sample in the mould at the beginning, after the addition of wetting solution, ridge of the pile is very likely to collapse with the infiltration of

* A/78/6 (Sect. 20), table 20.5.

liquid, especially for those samples with good water solubility. Although it is allowed in the *Manual of Tests and Criteria* to add the liquid to a hollow up to 3 mm deep and 5 mm in diameter in the top of the pile, the hollow formed from collapse stand a good chance to exceed the specified dimension, according to our observation.

(c) The pile is placed across the draught in a fume cupboard. Some samples can cause a large flame after ignited, and the presence of wind in the fume cupboard makes the flame tend to "skip" the wetted zone and ignite samples on the other side directly, rather than "spread" through it, which seems not fulfil the original intent of the test.

3. The difficulty of the experimental practice inevitably leads to different results between different conditions and personnel, which is extremely unfavourable for the globally harmonized classification and management of chemicals.

4. The wetted zone test has been used for a long time in both transport of dangerous goods regulations and the GHS, with scientific rationality for its existence. However, considering all the difficulties in practice as mentioned in paragraph 2 above, the expert from China propose the development of a supplementary method to distinguish between packing groups II and III (Category 1 and Category 2) which is easier to be standardized for solids when the wetted zone test is not applicable. We suggest to use burning rate as this supplementary criteria, for the following reasons:

(a) Burning rate is now used as the indicator to determine packing group/ category for flammable metal powders. Applying the indicator also to other flammable solids helps maintain the consistency between classification methods.

(b) Conduction of the burning rate test is not complicated and easy to be standardized. Moreover, no introduction of new test procedure would be needed.

(c) A faster burning rate means that a wider area will be affected in a fire event. Their risk level is indeed relatively high compared with the slowly burning ones.

5. The figure in paragraph 7 below, shows the proposed decision logic. Whether the wetted zone is capable of stopping flame propagation remains the preferred categorisation criteria. The consideration of burning rate is only allowed when the wetted zone is not applicable. Thus, introduction of the new criteria should not cause any packing group reassignment for substances whose packing group has been determined.

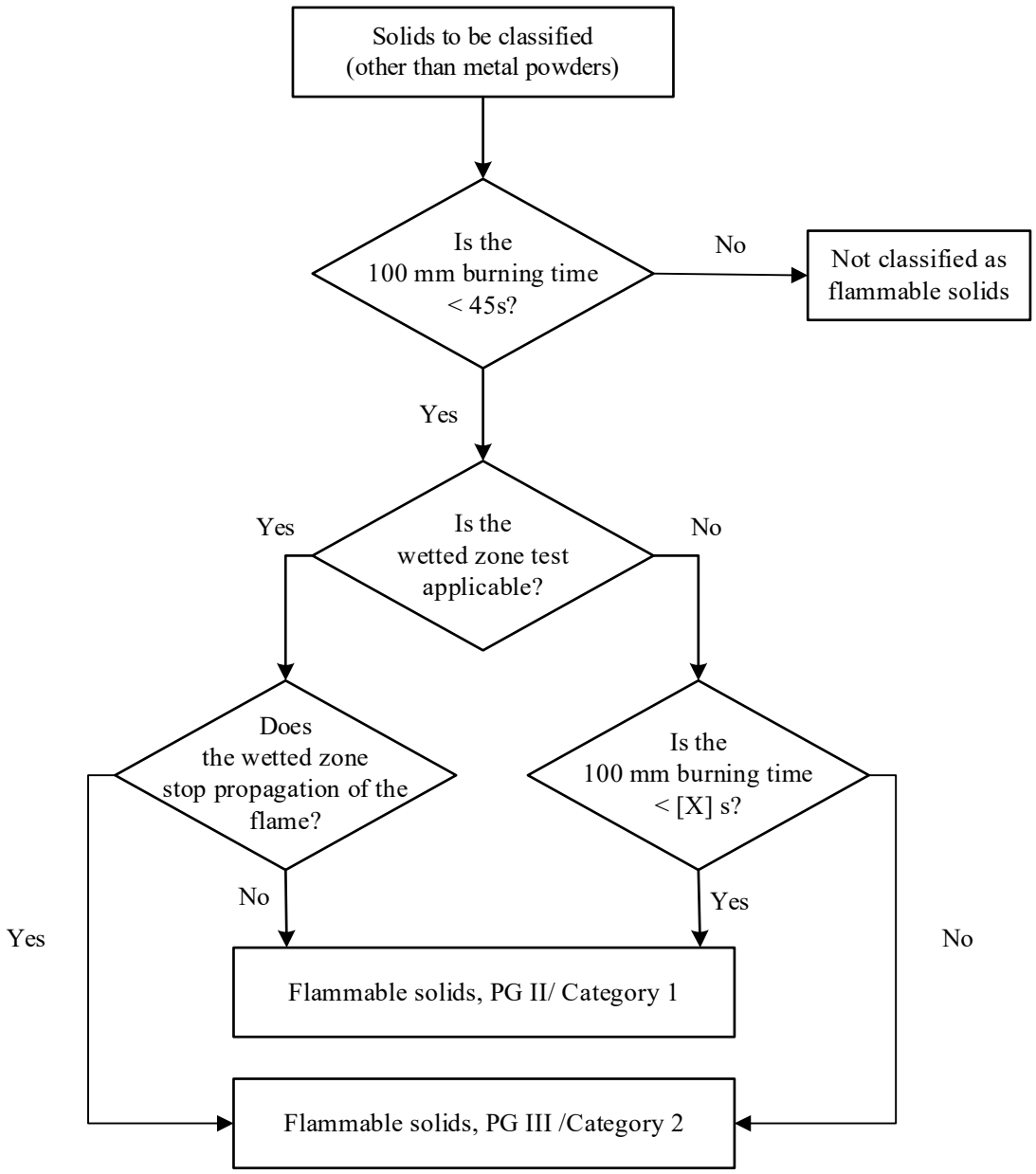
II. Sustainable Development Goals

6. Introducing burning rate as a supplementary classification criteria can make it easier to operate, effectively reduce errors among different personnel and promote globally harmonized classification. This could facilitate the achievement of SDG 16 "peace, justice, and strong institutions", to be specific, Target 16.6 "develop effective, accountable and transparent institutions at all levels".

III. Action to be taken by the Sub-Committee

7. The Sub-Committee is invited to consider whether the decision logic shown below can be supported and how the value of [X] could be decided. The annex in this document provides a preliminary suggestion from Chinese experts on how to select [X].

Proposed decision logic for flammability for solids other than metal powders



Annex

In order to minimize the impact on flammable solids whose packing group has already been determined, the expert from China collected the average 100 mm burning times of eight commonly transported substances listed as Division 4.1, packing group III in the dangerous goods list in chapter 3.2 of the *Model Regulations*, as shown in the table 1 below. The substance to be found with the fastest burning rate among these eight is synthetic camphor. The test results of synthetic camphor samples from over seventy different manufacturers or batches showed that the average 100 mm burning time is 10 s. Thus, we propose to choose 10 s as the shortest burning time to be classified as packing group III/Category 2 for flammable solids when the wetted zone test cannot be applied, i.e. X=10 in the proposed decision logic above.

Average 100 mm burning time for some substances listed as Division 4.1, packing group III in the dangerous goods list in chapter 3.2of the *Model Regulations*

No.	UN number	Name and description（CAS）	Average 100 mm burning time (s)	Number of samples
1	1312	BORNEOL (507-70-0)	17	24
2	1328	HEXAMETHYLENE-TETRAMINE (100-97-0)	35	33
3	1332	METALDEHYDE (108-62-3)	12	9
4	1338	PHOSPHORUS, AMORPHOUS (7723-14-0)	14	5
5	1346	SILICON POWDER, AMORPHOUS (7440-21-3)	43	1
6	2213	PARAFORMALDEHYDE (30525-89-4)	33	8
7	2717	CAMPHOR, synthetic (464-49-3)	10	72
8	2989	LEAD PHOSPHITE, DIBASIC (16038-76-9)	40	2