

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

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Sub-Committee of Experts on the Transport of Dangerous Goods

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Item 6 (b) of the provisional agenda

Miscellaneous proposals for amendments to the Model Regulations on the Transport of dangerous Goods: packagings

Packaging performance testing for articles with the potential to produce excessive heat – Proposal for Chapter 6.1

Transmitted by the expert from the United Kingdom

Introduction

1. As indicated in document ST/SG/AC.10/C.3/2019/30 this paper offers detailed proposals to add a new design type test for packagings intended to contain articles which have the capability of producing excessive heat into Chapter 6.1 with accompanying modifications to the UN packagings mark. The proposal is based upon the text of various packing instructions but is restricted to those elements that fit with the existing ethos of the UN packaging tests in that they are relatively easy to perform and assess and are not modal specific requirements. As with packaging that has passed other performance tests, it is proposed that an indication is included in the UN packaging compliance mark.

Proposal 1 - testing

2. Proposal for a new design type test in chapter 6.1.

Add the following new test text as 6.1.5.7 and renumber the existing 6.1.5.7 as 6.1.5.8:

“6.1.5.7 Internal heat resistance test

The internal heat resistance test shall be performed on all single packagings and outer packagings intended to contain articles which if accidentally initiated have the capability of producing excessive heat or could catch fire, other than articles of class 1.

6.1.5.7.1 *Number of test samples:* three test samples per design type and manufacturer, for packaging up to 250 litres internal volume or 200kg net mass, one sample per design type and manufacturer for packaging from 250 litres to 450 litres or net mass from 200kg to 400kg.

6.1.5.7.2 *Special preparation of test samples for the test:* Initiation of the articles shall be conducted in such a way so that subsequently it does not influence the results. e.g. if heaters are used they shall be switched off once initiation of an event occurs. Where test content is an electrical storage system (e.g. lithium ion battery) test content shall be fully charged and the total watt hour rating recorded. Where test content is a heat generating article the maximum “burn” temperature of an unpackaged article should be recorded (e.g. for a chemical oxygen generator).

6.1.5.7.3 *Test method:* The packaging as prepared for transport shall be filled with an article or articles equal to the gross mass of articles or replicates in the samples tested in accordance with 6.1.5.3.

NOTE: For this test it is not necessary to use the same number and size of articles as used in the test samples for 6.1.5.3

The test articles shall be initiated in a suitable manner in the closed packaging such that the whole content is initiated during the test.

Throughout the test the surface temperature of the packaging shall be recorded in at least 5 different places expected to be those most likely to display a temperature rise.

At least one temperature sensor shall be placed inside the packaging, ideally in a void to record the internal temperature.

The packaging shall be observed throughout the reaction period and any flames seen on the outside of the packaging shall be noted.

Once the content has ceased reacting and the packaging cooled, the structural integrity of the tested packaging shall be ascertained by a repeat of the stacking test performed in accordance with 6.1.5.6.

6.1.5.7.4 *Criterion for passing the test:*

- (a) The external surface temperature of the packaging did not exceed 100°C;
- (b) No flames were seen outside the packaging; and
- (c) The packaging passes the repeat of the stack test.”

Proposal 2 – Marking

3. In order to verify that the packaging has passed the additional internal heat resistance test, the expert from the United Kingdom offers two alternative solutions for consideration by the Sub-Committee.

Option 1

Making an amendment to the packaging code which introduces an additional letter to indicate that the packaging has passed the internal heat resistance test.

Amend 6.1.2.4 as follows, (new text underlined)

“The letters “F” or “T” or “V” or “W” may follow the packaging code. The letter “F” signifies an internally heat resistant packaging conforming to the requirements of 6.1.5.7. The letter “T” signifies a salvage packaging conforming to the requirements of 6.1.5.1.11. The letter “V” signifies a special packaging conforming to the requirements of 6.1.5.1.7. The letter “W” signifies that the packaging, although of the same type indicated by the code, is manufactured to a specification different from that in 6.1.4 and is considered equivalent under the requirements of 6.1.1.2.”

Add a new sub-paragraph 6.1.3.14 as follows:

“6.1.3.14 Example for marking INTERNALLY HEAT RESISTANT packagings

4GF/Y20/S/19/GB/9515 as in 6.1.3.1. (a), (b), (c), (d), (e), (f) and (g)”

Option 2

Making an amendment to the fourth element of the mark.

Amend 6.1.3.1 (d) as follows, (new text underlined):

“(d) Either the letter “S” denoting that the packaging is intended for the transport of solids, articles, or inner packagings or with the suffix letter “F” for articles presenting a heat hazard, or for packagings (other than combination packagings)

intended to contain liquids, the hydraulic test pressure which the packaging was shown to withstand in kPa rounded down to the nearest 10 kPa;”

Add a new sub-paragraph 6.1.3.14 as follows:

“6.1.3.14 Example for marking INTERNALLY HEAT RESISTANT packagings

4G/Y20/SF/19/GB/9515 as in 6.1.3.1. (a), (b), (c), (d), (e), (f) and (g)”

Proposal 3 – Performance rating

4. To indicate the performance rating of the packaging so tested, the following new text is proposed:

Insert a new 6.1.3.10 (renumbering existing subsequent paragraphs 6.1.3.10 - 6.1.3.12):

“6.1.3.10 Packagings tested for internal heat resistance in accordance with 6.1.5.7 shall bear the following additional mark or marks near the marks prescribed in 6.1.3.1:

- Where the test content was electrical storage systems the total watt hour rating tested in the packaging; or
 - For all other heat generating articles, the maximum internal temperature in °C recorded during the packaging test, achieved for at least 10 consecutive seconds.”
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