



**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****Forty-seventh session**

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Item 6 (d) of the provisional agenda

**Miscellaneous proposals for amendments to the Model Regulations
on the Transport of Dangerous Goods: packagings****Temperature during internal pressure (hydraulic) test with
plastics packagings and plastics IBCs****Submitted by the expert from Germany¹****Introduction**

1. Regarding the internal pressure (hydraulic) test according to the requirements in 6.1.5.5 and 6.5.6.8 of the United Nations Recommendations on the Transport of Dangerous Goods – Model Regulations, there are no rules which prescribe that the water temperature must be kept within a certain range during the test. Nevertheless, experts have known for a long time that temperature has a big influence on the mechanical behaviour of plastics material, i.e. the higher the temperature the worse the mechanical properties.

2. BAM (Federal Institute for Materials Research and Testing, Germany) has performed hydraulic pressure tests to failure with plastics jerricans at different temperatures (10 °C, 15 °C, 21 °C) to show how the mechanical properties depend on temperature. The applied pressure was 3 bar. As can be seen in Figure 1, there are big differences in the times to failure at the different temperatures. Starting with the highest water temperature (21 °C, red symbols), the times to failure range from 20 minutes to 1 hour. At 15 °C, (blue symbols) they range from 1 hour 20 minutes to 3 hours and at 10 °C (green symbols) from 2 hours 40 minutes to 8 hours 20 minutes. The jerricans did not pass the test in accordance with 6.1.5.5 at 21 °C, but they passed it at 10 °C and 15 °C.

¹ In accordance with the programme of work of the Sub-Committee for 2015-2016 approved by the Committee at its seventh session (refer to ST/SG/AC.10/C.3/92, paragraph 95 and ST/SG/AC.10/42, para. 15).

3. To make the hydraulic pressure test results more comparable between test labs, the German expert proposes introducing a lower water temperature limit of 12 °C when testing plastics packagings and plastics IBCs. Water with a temperature above 12 °C would be permitted but not water with a temperature below 12°C. It can be assumed that plastics packagings and IBCs are usually tested with temperatures exceeding 12 °C as this is the usual practice in many test laboratories.

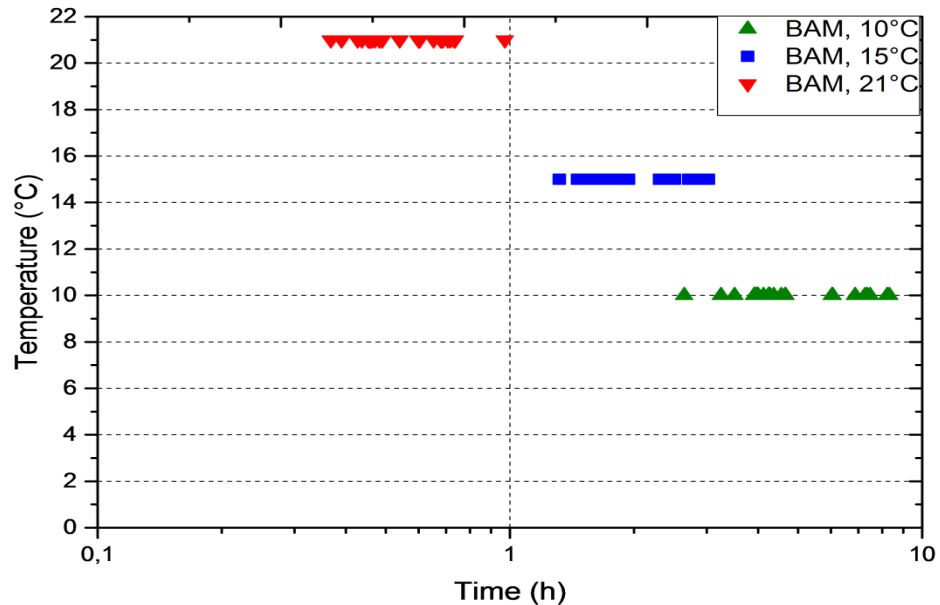


Figure 1: Time to failure depending on temperature

Proposal

4. Amend the text of 6.1.5.5.4 to read as follows:

*“Special preparation of packagings for testing: either vented closures shall be replaced by similar non-vented closures or the vent shall be sealed. **The temperature of plastics packagings and their contents shall not be below 12 °C during the test. The water temperature shall be documented.**”*

5. Amend the text of 6.5.6.8.2 to read as follows:

“Preparation of the IBC for test

The test shall be carried out before the fitting of any thermal insulation equipment. Pressure-relief devices shall be removed and their apertures plugged, or shall be rendered inoperative. **The temperature of plastics IBCs and their contents shall not be below 12 °C during the test. The water temperature shall be documented.**”