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Inland Transport Committee

Working Party on the Transport of Perishable Foodstuffs

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Item 6 (b) of the provisional agenda
Proposals of amendments to ATP:
new proposals

Proposal to amend Annex 1, Appendix 2, paragraph 4.2.1: Specification of Calorimeter Box

Transmitted by the Government of Germany

Summary

Executive summary:	By dispensing with the requirement for a heavily insulated calorimeter box, the costs for carrying out tests can be reduced without negatively impacting the accuracy of the measurement.
Action to be taken:	Amend Annex 1, Appendix 2, paragraph 4.2.1
Related documents:	None

Introduction

1.   In paragraph 4.2.1, two main requirements are stipulated for the calorimeter box regarding the test method for measuring the effective refrigerating capacity W_0 of a transport refrigeration unit when the evaporator is free from frost:

- The heat transmission of the calorimeter box $U \cdot \Delta T$ should be not higher than 35% of the effective refrigerating capacity W_0 of the refrigeration unit.

- The calorimeter box or unit of transport equipment shall be heavily insulated which means its k-coefficient has to be equal to or less than 0.40 W/m^2K.

2.   From a technical point of view, the second requirement can be dispensed with. The fact that the calorimeter box is not heavily insulated does not have any negative impact on the accuracy of the measurement as long as the first requirement is met.

3.   The measurement accuracy can even be improved by dispensing with the second requirement since heavy insulated panels have high inertia and therefore a significant thermal capacity which leads to a longer time period for the equalization of the internal temperatures of the panels and the internal air temperature of the calorimeter box.

4.   Furthermore, costs can be reduced by dispensing with the second requirement because:

- • energy consumption is decreased. Heavy insulated panels have high inertia and therefore a significant thermal capacity which leads to a longer time period for the equalization of the internal temperatures of the panels and the internal air temperature of the calorimeter box.

- • acquisition costs are reduced. The costs of calorimeter boxes with heavy insulated panels are high. The potential savings are particularly relevant to tests of multi-temperature refrigeration units for which up to three calorimeter boxes are needed.

- • the inner volume of the calorimeter boxes can be increased, which is important since the outer dimensions are limited due the transport of the complete equipment to the test station. By increasing the inner volume, the installation of the host unit onto and the additional evaporators including piping etc. into the boxes can be simplified in the case of multi-temperature refrigeration units. Tests with more than 3 evaporators that need to be installed inside one box are not unusual.

- • weight is reduced, which facilitates the transport of the calorimeter boxes from the manufacturer to the test station.

5.   In addition, in the last but one sentence of paragraph 4.2.1 the wording should be corrected. The heat flow $U \cdot \Delta T$ should be not more than 35% of the effective refrigerating capacity W_0 (and not of the total heat flow).

Proposed amendment

6.   Insert the following changes in Annex 1, Appendix 2, paragraph 4.2.1:

The calorimeter box or unit of transport equipment is placed in a test chamber. If a calorimeter box is used, $U \cdot \Delta T$ should be not more than 35% of the ~~total heat flow~~ effective refrigerating capacity W_0.

~~The calorimeter box or unit of transport equipment shall be heavily insulated.~~

Impact

Cost: The costs for carrying out the tests will be reduced without having any negative impact on the accuracy of the measurement.

Feasibility: The proposed amendment can easily be implemented in ATP. A transitional period is not needed.

Enforceability: No problems are expected.