

Economic and Social Council

Distr.: General 10 August 2021

Original: English

Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Perishable Foodstuffs

Seventy-seventh session

Geneva, 26-29 October 2021 Item 5 (b) of the provisional agenda **Proposals of amendments to ATP: new proposals**

Proposal to amend Annex 1, Appendix 2, paragraphs 7.3.2, 7.3.3 and 7.3.4

Reference of multitemp calculations

Submitted by the Government of Germany

Summary

Executive summary: Clarification that all multitemp calculations in chapters 7.3.3 ff. should

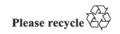
refer to the inside surface area of the respective chambers

Action to be taken: Annex 1, Appendix 4

Related documents: None

Introduction

- 1. Since the implementation of the Finnish proposal of 2014, in order to confirm the FRC classification of the refrigerated vehicle set out in chapter 7.3.2., the calculation of the heat intake through the external body walls has been referring to the average surface area of the external walls of the refrigerated body as is the case with monotemp vehicles.
- 2. However, when this proposal was implemented, the information that all multitemp calculations in chapters 7.3.3 ff. should continue to refer to the inside surface area of the respective chambers, was lost. This is to be corrected with this proposal for amendment.
- 3. The reference to the inside surface area simplifies the calculation in case a configuration has to be calculated by hand.
- 4. Furthermore, the possibility should be used to standardise the definition of the term "surface area".





I. Proposed amendment

5. Amend Annex 1, Appendix 2, paragraph 7.3.2 as follows:

7.3.2 Conformity of the entire body

The outer body shall have a K value $K \le 0.40 \text{ W/m}2.K$.

The internal surface area of the body shall not vary by more than 20 %.

The equipment shall conform to:

$$P_{nominal} > 1.75 \, * \, K_{body} \, * \, S_{body} \, * \, \Delta T$$

Where:

P_{nominal} is the nominal refrigerating capacity of the multi-temperature refrigeration unit,

K_{body} is the K value of the outer body,

S_{body} is the geometric mean surface area of the full outer body,

 ΔT is the difference in temperature between outside and inside the body.

6. Amend Annex 1, Appendix 2, paragraph 7.3.3 as follows:

7.3.3 Determination of the refrigerating demand of chilled evaporators

With the bulkheads in given positions, the refrigerating capacity demand of each chilled evaporator is calculated as follows:

$$P_{\text{chilled demand}} = \left(S_{\text{chilled-comp}} - \Sigma S_{\text{bulk}}\right) * K_{\text{body}} * \Delta T_{\text{ext}} + \Sigma \left(S_{\text{bulk}} * K_{\text{bulk}} * \Delta T_{\text{int}}\right)$$

Where:

K_{body} is the K value given by an ATP test report for the outer body,

 $S_{\text{chilled-comp}}$ is the **inside** surface **area** of the chilled compartment for the given positions of the bulkheads,

S_{bulk} are the surfaces areas of the bulkheads,

K_{bulk} are the K values of the bulkheads given by the table in paragraph 7.3.7,

 ΔT_{ext} is the difference in temperatures between the chilled compartment and $+30^{\circ}$ C outside the body,

 ΔT_{int} is the difference in temperatures between the chilled compartment and other compartments. For unconditioned compartments a temperature of +20°C shall be used for calculations.

7. Amend Annex 1, Appendix 2, paragraph 7.3.4 as follows:

7.3.4 <u>Determination of the refrigerating demand of frozen compartments</u>

With the bulkheads in given positions, the refrigerating capacity demand of each frozen compartment is calculated as follows:

$$P_{\text{frozen demand}} = \left(S_{\text{frozen-comp}} - \Sigma S_{\text{bulk}}\right) * K_{\text{body}} * \Delta T_{\text{ext}} + \Sigma \left(S_{\text{bulk}} * K_{\text{bulk}} * \Delta T_{\text{int}}\right)$$

Where:

 K_{body} is the K value given by an ATP test report for the outer body,

 $S_{\text{frozen-comp}}$ is the **inside** surface **area** of the frozen compartment for the given positions of the bulkheads.

 S_{bulk} are the surfaces areas of the bulkheads,

K_{bulk} are the K values of the bulkheads given by the table in paragraph 7.3.7,

 $\Delta Text$ is the difference in temperatures between the frozen compartment and +30 °C outside the body,

 ΔT_{int} is the difference in temperatures between the frozen compartment and other compartments. For insulated compartments a temperature of +20°C shall be used for calculations.

II. Impact

Cost: No impact.
Environment: No impact.

Feasibility: The proposed amendment can easily be implemented in ATP. A transitional

period is not needed.

Enforceability: No problems are expected.

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