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## Economic Commission for Europe

### Inland Transport Committee

#### Working Party on the Transport of Perishable Foodstuffs

##### Seventy-third session

Geneva, 10-13 October 2017

Item 5 (b) of the provisional agenda

##### Proposed amendments to ATP:

##### New proposals

### **Amendments to annex 1, appendix 2, of ATP on accounting for errors (uncertainty) in measuring the overall heat transfer coefficient of the body in determining the category of special transport equipment and correction of a typo in the Russian version of 2.3.1 of ATP annex 1, appendix 2**

#### **Transmitted by the Russian Federation**

##### *Summary*

##### **Executive summary:**

The determination of the category (with heavy or normal insulation) of special transport equipment is based on the value of the overall heat transfer coefficient of the body (the K coefficient), taking account of the upper limit of the interval of uncertainty of its measurement.

ATP limits the margin of error of the K coefficient measurement, but the use of margins of error is outdated, as the scientific community today speaks about uncertainty of measurement of physical quantities.

There is an error in paragraph 2.3.1 of annex 1, appendix 2, of the Russian version of ATP, as follows: “Where the purpose of the tests is not to determine the K coefficient but simply to verify that it is not below a certain limit, the tests ...”, whereas the English and French versions correctly indicate “is below”, i.e., respectively, that the K coefficient “is below a certain limit” and “*est inférieur à une certaine limite*”.

##### **Action to be taken:**

Amend ATP annex 1, appendix 2, on accounting for uncertainty of measurement of the K coefficient in determining the category of special equipment.



Make an editorial change in the Russian version of paragraph 2.3.1 of ATP annex 1, appendix 2, replacing the words “is not below” with “is below”, as is indicated in the English and French versions of ATP.

**Related documents:**

None.

## Introduction

1. This proposal is aimed at ensuring the best possible preservation of perishable foodstuffs during their carriage in special equipment, particularly given the deterioration of thermal insulation properties of the equipment in the course of their operation.

2. With a view to decreasing the negative consequences of using special equipment, whose thermal insulation properties deteriorate in the course of operations, it is proposed to introduce a category of special equipment that takes into account the upper limit of the interval of uncertainty of measurement of the K coefficient. The possible reserve of thermal insulation properties of special equipment in the course of its operation is to be ensured at a level that does not exceed the uncertainty of measurement of the K coefficient.

3. It is important that the proposed solution does not in any way change the reasoning behind the ATP as it pertains to determining the category of special equipment.

4. The following arguments may be made in favour of using for the determination of the category of the special equipment K coefficient values that take account of the upper limit of the interval of uncertainty of its measurement.

5. There is fairly vast array of special equipment without thermal appliances that maintains temperature conditions (for a certain length of time) exclusively by means of insulation. Guided by the principal purpose of the ATP, as expressed in the preamble to the Agreement, the determination of the K coefficient value should fully ensure the conditions of preservation of the quality of perishable foodstuffs during their carriage. This corresponds to the worst K coefficient value, which can be determined by the upper limit of the interval of uncertainty in its measurement.

6. The period between inspections is six years when it comes to testing. During this time, the thermal insulation properties of insulation even of the highest quality produced from material most resistant to deterioration will be worse than six years previously. The use of K coefficient values taken at the upper limit of the interval of uncertainty of its measurement (i.e., approximately 5% to 10% higher than its mean average depending on the testing method used) may be seen as the minimum level necessary for indicating the deterioration in the thermal insulation properties of the special equipment between inspections.

7. In an effort to save costs, producers try to use the thinnest insulation possible when producing new special equipment. Insulation with a K coefficient of 0.38 to 0.39 W/m<sup>2</sup>.K is often used for new special equipment. Producers rightly believe that, during its lifetime, the quality of the insulation of special equipment will be checked only once for new equipment, and the producer therefore often has no incentive to try to provide for any kind of reserve for the K coefficient value. Furthermore, such a situation entails a growing danger as the special equipment is in operation of deterioration of the quality of perishable foodstuffs during carriage, an increased negative impact on the environment and the need to factor in the costs of carriage of significant unpredictable risks. The use of K coefficient values determined by the upper limit of the interval of uncertainty of its measurement could partly prevent such practices on the part of producers of special equipment from occurring.

8. In this formal document, specialists from the Russian Federation propose the introduction in APT annex 1, appendix 2, of an amendment by which, in order to determine a category of special equipment, the K coefficient value must be used taking into account the upper limit of the interval of uncertainty of its measurement.

9. The Russian text of APT, as amended, valid from 19 December 2016, was used for the proposed amendments.

## I. Proposal

10. Amend ATP annex 1, appendix 2, with a new paragraph, as follows:<sup>1</sup>

“2.3.3 Final K coefficient value

The final K coefficient value used to determine the category of special transport equipment must take into account the upper limit of the interval of uncertainty of its measurement.<sup>1</sup>

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<sup>1</sup> *These requirements are to apply to inspections of special equipment as from 2018.*

## II. Justification

11. ATP contains two categories of special equipment: equipment with heavy insulation and equipment with normal insulation. The category of special equipment is determined on the basis of the K coefficient.

12. The K coefficient value is determined as a result of thermal testing, during which the value is measured by indirect means with a margin of error that does not exceed the values indicated in APT annex 1, appendix 2, paragraph 2.3.2.

13. It is currently usual in the scientific community to refer to measurement uncertainty rather than margin of error. In practice, however, similar mathematical and statistical methods of analysis are used, because quantifying the margin of error or uncertainty of measurement of the K coefficient may be taken (to some extent) to be equivalent.

14. Based on the method for measuring the K coefficient, it can be argued that the K coefficient is the result of averaging repeated measurements of a number of physical quantities such as heating or cooling capacity of exchangers determined inside a hermetically sealed body of the special equipment, the temperature inside and outside such equipment and the heat transfer surface area of the body of the special equipment. The so-called best estimate (or, in theoretical terms, measurement uncertainty) of the K coefficient is thus currently made to determine the category of special equipment.

15. However, it could very well be argued that the value of the physical quantity being measured is within the established limits of uncertainty of its measurement; the mean (“best estimate”) is only one of the most likely of its values. The following statement is therefore correct: the K coefficient value may in all probability also be within the limit of the specified uncertainty.

## III. Costs

16. No additional costs will be incurred. The new requirements for the establishment of a category of special equipment concern only inspections of such equipment, as from 2018.

## IV. Feasibility

17. No problems are foreseen.

## V. Enforceability

18. No problems are foreseen.

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<sup>1</sup> The text added to ATP is underlined.