United Nations ECE/TRANS/WP.11/2014/15

Economic and Social Council

Distr.: General
8 July 2014

Original: English

Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Perishable Foodstuffs

Seventieth session
Geneva, 7-10 October 2014
Items 5 (a) and (b) of the provisional agenda
Proposals of amendments to the ATP:
pending proposals/new proposals

Airflow measurement and revision of test standards

Transmitted by the United Kingdom

A. Obligatory provisions for airflow measurement

I. Introduction

1. Currently there is no airflow requirement despite the secondary coolant being vital for safe carriage of perishable cargoes in mechanically refrigerated vehicles.

2. At present the existing text appears to make airflow measurement optional.

3. Annex 1, appendix 2, paragraph 4.3.4 (iii) reads as follows:

"If the air circulation of a refrigeration unit's evaporator fans are to be measured, methods capable of measuring the total delivery volume shall be used."

4. A United Kingdom proposal (ECE/TRANS/WP.11/2012/5) to change the wording regarding airflow tests was presented at the 68th session. This was not accepted, as verifying manufacturers' airflow figures is not mandated. It was proposed that an informal working group prepare an amended proposal for next year.

5. The United Kingdom submitted an informal document (INF.5) for discussion at the 69th session of WP11.

6. During the 69th session, it was agreed that it was important to introduce obligatory provisions for airflow measurement in ATP and invited a small group made up of France, Germany, United Kingdom and the International Institute of Refrigeration to work further on the proposal and submit an official document for the next session.

7. Further discussions took place at the meeting of the IIR sub-commission on refrigerated transport in Padua and the following revised proposal below was agreed.

II. Proposed amendment

8. It is proposed to add a new paragraph to 3.2.6 as follows:

"The airflow specified in the test report of the mechanically refrigerated equipment shall conform to the following:

$$\dot{V}_L \geq 60 \cdot V \quad \text{in } m^3/h$$

where

V is the volume of the empty space, in m^3;
$\dot{V}_L$ is the air flow.

The air delivery system shall be compensated for any loss of airflow due to internal equipment such as air ducts and the frosting of the evaporator(s)."

9. It is proposed to amend 4.3.4 (ii) to read as follows:

"(ii) the rate of air circulation shall be measured using an existing standard:

…".

III. Impact

10. Food safety and quality would be improved. The financial impact to industry would be an additional cost for an airflow test in cases where it is not carried out already.

11. A defined flowrate for the secondary refrigerant would help ensure all products within the cargo space meet the requirements of annexes 2 and 3.

B. Proposed revision of test standards in 4.3.2 and 4.3.4

I. Introduction

12. It has been discussed several times in WP.11 whether test standards are still current. At the 69th session, the International Institute of Refrigeration sub-commission on refrigerated transport was requested to discuss this issue. It is proposed to amend the ATP on the basis of the proposals made at the meeting held in Padua in June 2014.

II. Proposed amendment to 4.3.2

13. It is proposed to amend 4.3.2 as follows:

"4.3.2 The same procedure shall be followed for the enthalpy method described below, but in this case the heat power dissipated by the evaporator fans at each temperature level shall also be measured.

This method may, alternatively, be used to test reference equipment. In this case, the effective refrigerating capacity is measured by multiplying the mass flow (m) of the refrigerant liquid by the difference in enthalpy between the refrigerant vapour leaving the unit (ho) and the liquid at the inlet to the unit (hi).

To obtain the effective refrigerating capacity, the heat generated by the evaporator fans (Wf) is deducted. It is difficult to measure Wf if the evaporator fans are driven by an external motor, in this particular case the enthalpy method is not recommended. When the fans are driven by internal electric motors, the electrical power is measured by appropriate instruments with an accuracy of ± 3%, with refrigerant flow measurement being accurate to ± 3%.

The heat balance is given by the formula:

Wo = (ho - hi) m – Wf."

~~Appropriate methods are described in standards ISO 971, BS 3122, DIN, NEN, etc. An electric heater is placed inside the equipment in order to obtain the thermal equilibrium."~~

III. Proposed amendment to 4.3.4

14. It is proposed to amend 4.3.4 as follows:

"4.3.4 Checks

The following should be verified and the methods used indicated in the test report:

(i) the defrosting system and the thermostat are functioning correctly

(ii) the rate of air circulation **shall be measured** using an existing standard:"

If the air circulation of a refrigeration unit's evaporator fans is to be measured, methods capable of measuring the total delivery volume shall be used. Use of one of the relevant existing standards, i.e. **~~BS 848,~~ ISO 5801, AMCA 210-99, AMCA 210-07~~, DIN 24163,NFE 36101, NF X10.102, DIN 4796~~** is recommended;

…".

IV. Impact

15. It is expected that the amendments would have the positive impact of greater consistency. There would be no financial impact to industry.