## Economic and Social Council

## Economic Commission for Europe

Inland Transport Committee

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

**Seventy-ninth session**
Geneva, 25-28 October 2022
Item 5 (a) of the provisional agenda
**Proposals of amendments to ATP:**
**pending proposals**

## Amendment to Annex 1, Appendix 2, paragraph 3.2.6 and the ATP Handbook

### Transmitted by the Government of the United Kingdom

## Introduction

1.      The United Kingdom airflow proposal was first presented at the seventieth session (ECE/TRANS/WP.11/2014/15, part A) with 10 contracting parties in favour of the proposal (Denmark, Finland, France, Germany, Italy, Poland, Portugal, Spain, United Kingdom and United States) and none against so was adopted at this session. The proposal adopted at the seventieth session is shown below:

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

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

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)."

2.      On 17 September 2015, the Finnish Government made an objection to the proposed amendment to Annex 1, Appendix 2, paragraph 2.3.6 (C.N.481.2015.TREATIES-X1.B.22) (airflow requirement proposal for 60 a/c/h). This was an objection of a single proposal and did not affect the other proposals.

3.      This proposal was revised at the seventy-fourth session with the addition of a footnote for using multi-lateral and bilateral agreements but was not adopted.

4. At the seventy-fifth session the airflow proposal was revised again with different airflow rates for frozen and chilled which is shown below:

"The required airflow for equipment that has an internal volume of ≤2 and ≤100m$^3$ is calculated using the following formula:

$$\dot{V}_L = N \cdot V$$

The air flow rate $N$ is defined as the circulated volumes $V$ of the empty load space each hour.

Where:

$V$ is the volume of the load space, in m$^3$;

$\dot{V}_L$ is the recommended design air flow, in $m^3/h$;

N is the air flow rate, in $h^{-1}$..

with

$40 \leq N \leq 60$ for frozen mode    or
$50 \leq N \leq 90$ for chilled/heating mode.

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) and need not be continuous.

If the internal volume is ≥100m$^3$ or ≤2, the competent authority where the equipment is registered or recorded shall determine adequate airflow based on the overall heat transfer."

5. At the seventy-sixth session we presented a simplified proposal at the request of IIR sub-commission on refrigerated transport (CERTE) which is shown below:

"The required airflow for equipment where 2 m$^3$ ≤ V ≤ 100 m$^3$ is calculated using the following formula:

$$\dot{V}L = N \cdot V$$

Where airflow rate $\dot{V}L$ is air changes per hour, N, multiplied by the empty volume, V.

Where N ≥ 55

For mechanically refrigerated equipment of Class F the airflow may be reduced with N > 40 and where V exceeds 100 m$^3$ VL may be limited to 5500 m$^3$ per hour.

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) and need not be continuous."

6. At the seventy-seventh session we revised the proposal again with a new footnote for a transitional period:

"The required airflow for equipment where 2 m$^3$ ≤ V ≤ 100 m$^3$ is calculated using the following formula:

$$\dot{V}L = N \cdot V$$

Where airflow rate $\dot{V}L$ is air changes per hour, N, multiplied by the empty volume, V.

Where N ≥ 50

The air delivery system shall be compensated for any loss of airflow due to internal equipment such as air ducts and in part load need not be continuous and or may be modulated.

For mechanically refrigerated equipment of Class FRC or BRC the airflow may be reduced to N ≥ 40 and need not be continuous.

Where V exceeds 100 m$^3$ VL may be limited to at least 5500 m$^3$ per hour."

7.      During the seventy-eighth session of the Working Party on the Transport of Perishable Foodstuffs (WP.11) the revised airflow proposal was presented and although there was general agreement in principle this was not adopted.

8.      The Finnish delegation raised some additional concerns regarding the installation of air ducts and how the temperature of the perishable foodstuff transported and the type of equipment used could affect the number of air changes required. It was clarified that in principle, chilled loads would require more air changes than frozen/deep-frozen loads to keep the required temperature.

9.      After consultation with industry representatives and the Finnish Food Authority, the Finnish delegation stated that they could not accept the proposal as drafted as some concerns remained regarding the size of the lorries and the number of air changes required.

10.     The proposal presented at this session is below:

"The minimum required airflow for equipment where $2\text{ m}^3 \leq V \leq 100\text{ m}^3$ is calculated using the following formula:

$$\dot{V}_{Lmin} = N \cdot V$$

Where minimum airflow rate $\dot{V}_{Lmin}$ is air changes per hour N, multiplied by the empty volume V.

With N = 50

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) and may be modulated in part load operation to a minimum of N = 40.

For mechanically refrigerated equipment of Class FRC, BRI, BRJ, BRK or BRL the minimum airflow may be reduced to N = 40 and need not be continuous.

Where V exceeds $100\text{ m}^3$ $\dot{V}_{Lmin}$ shall be at least $5000\text{ m}^3$ per hour."

11.     It was decided to discuss the proposal again at the next CERTE meeting and to try to find a solution that could be acceptable for Finland. The new revised proposal would then be submitted for consideration at the next session.

12.     The same proposal was presented at the CERTE meeting in May 2022 with comments that are more simplified version was recommended and maybe placed into the handbook rather than the ATP agreement, upon further discussions the proposal can't be placed into the ATP handbook as this isn't in the ATP at present.

13.     A simplified proposal is presented for the ATP agreement after comments and feedback from WP.11, CERTE and exchanges with the Finnish and Netherlands delegations.

## I.   Proposed Amendment

14.     We propose to amend the text as follows with a new paragraph which is added to 3.2.6:

"The minimum required airflow for mechanically refrigerated equipment of Class FRC, BRI, BRJ, BRK or BRL shall conform to the following formula[1]:

$$\dot{V}_L = N \cdot V$$

Where minimum airflow rate $\dot{V}_{Lmin}$ is air changes per hour N, multiplied by the empty volume V.

Where N = 50

The air volume flow may be modulated in part load operation after reaching the set point temperature and if the temperature of the class is reached, the air flow needs not be continuous.

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[1]  Applies to equipment manufactured after the date of entry into force (DD MM YEAR)

Where V exceeds 60 m³ V$_L$ may be limited to at least 3000 m³ per hour for wagons and lorries.

Where V exceeds 100 m³ V$_L$ may be limited to at least 5000 m³ per hour."

## II.   Annex 1, Appendix 3

15.   The ATP certificate will need to be amended with a new section below in Annex 1, Appendix 3.

"7.2.6 XX air changes/hour"

16.   New footnote added after footnote 10:

"[11]   Where XX is the number of air changes per hour calculated by dividing the total airflow of the circulation fans by the total internal volume of the equipment. In the case of multi-compartment equipment with movable bulkheads, the total airflow of the circulation fans has to be divided by the maximum internal volume of each compartment."

17.   Original footnotes 11 to 15 to be renamed 12 to 16.

## III.   The following could be added to the ATP handbook for additional explanation:

"Airflow is an essential parameter within temperature-controlled transport.

For frozen cargoes, airflow should be low to avoid desiccation but sufficient to remove heat entering through the insulated walls, supply air can deviate below the set temperature to remove heat without damaging the product. Chilled cargoes require higher airflow for good temperature distribution and also because the supply air temperature cannot be allowed to deviate significantly below the set temperature due to freezing or chilling damage. Some chilled cargoes are metabolically active and therefore require higher airflow to remove that heat.

Intermittent fan operation should not be used for sensitive cargo where close temperature distribution is required. Generally, start/stop operation of the unit when the evaporator fans/unit are allowed to cycle shall be used only for frozen goods transportation.

Table 1
**Examples of air flow requirements for temperature sensitive goods**

| Type of goods | Temperature range [°C] | Sensitivity to humidity | Recommended airflow rate [times/empty volume of equipment] |
|---|---|---|---|
| **Hanging meat** | -1/+1°C | Yes | 50 –90 |
| **Chilled products** | -1/+6°C | Yes | 50 – 90 |
| **Frozen foods** | < -18°C | No | 40 – 60 |
| **Ice cream** | < -20 °C | low | 40 – 60 |

"

## IV.   Impact

18.   This change would modernise ATP and a positive impact would be that food safety and quality would improve. The financial impact to industry is that there would be an additional cost for an airflow test in cases where it is not carried out already.

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

20.     However, the airflow result is required in the machine test report and therefore there appears an inconsistency.

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