

**Economic and Social Council**

Distr.: General  
10 August 2021  
English  
Original: French

**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****Simplification of the procedure for measuring the capacity of liquefied gas refrigeration units****Transmitted by the Government of France***Summary*

**Executive summary:** The purpose of this proposal is to propose a conditional simplification of the procedure for measuring the capacity of liquefied gas refrigeration units.

**Action to be taken:** Amend the relevant part of section 9 of Annex 1, Appendix 2 of the ATP Agreement.

**Related documents:** None.

**Introduction**

1. The test method described in section 9 of Annex 1, Appendix 2 of ATP for liquefied gas refrigeration units was developed from the one used for mechanical vapour compression refrigeration units. Indeed, the number and temperature levels at which liquefied gas and mechanical vapour compression units are currently tested are similar, with refrigeration capacity checked at -20 °C, -10 °C and 0 °C for mono-temperature units.

2. The theoretical approach to the main physical phenomena involved in the calculation of the cooling capacity of liquefied gas units shows little variation for such phenomena between the different temperature levels, the main one being the use of heat.

3. On the basis of four tests of liquefied gas refrigeration units using nitrogen or CO<sub>2</sub> as a liquefied gas, a factual analysis showed the existence of two groups, with specific properties:

- The first group includes all the tests, including all evaporators. Its properties show that there is a strong proportional relationship between the developed cooling capacities and the temperature level at which the evaporators are tested, and also that the developed cooling capacities are greater at the 0 °C temperature level than those measured at the -20 °C temperature level.



- The second group includes a majority of evaporators, whose cooling capacities are similar when measured at the -20 °C, -10 °C and 0 °C temperature levels. That is, the relative deviation of the given cooling capacities from the cooling capacity measured at the temperature level of -20 °C is less than 5 per cent.

4. It has been established that the similarity of the cooling capacities developed by liquefied gas refrigeration units at the various temperature levels is dependent on the technology used to build the units. On the other hand, it is possible to calculate by linear interpolation any refrigerating capacity developed by any liquefied gas refrigeration unit.

## **I. Proposal**

5. In its current version, the fourth paragraph of section 9.2.1 of Annex 1, Appendix 2 reads as follows:

“For mono-temperature liquefied gas units, only the refrigeration capacity of the regulating unit with the maximum nominal capacity evaporator will be measured. A third temperature level is added in accordance with Annex 1, Appendix 2, paragraph 4 of ATP.”

6. It is proposed to replace this paragraph with the following:

“For mono-temperature liquefied gas units, only the refrigeration capacity of the regulating unit with the maximum nominal capacity evaporator will be measured. A third temperature level is added in accordance with Annex 1, Appendix 2, paragraph 4 of ATP. The cooling capacity obtained for the third temperature level may be calculated by the testing station on the basis of an interpolation based on the results obtained during tests carried out at the -20 °C and 0 °C temperature levels.”

## **II. Justification**

7. It is useful to propose a test methodology for liquefied gas refrigeration units optimized for this kind of unit. The third temperature level does not provide any additional information on whether or not the units are working properly.

## **III. Costs**

8. There are no additional costs for the official ATP test stations or even for manufacturers.

## **IV. Feasibility**

9. There are no additional requirements for official ATP test stations.

## **V. Enforceability**

10. No problems are foreseen in implementing the proposals.

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